

RESEARCH ARTICLE

Patient Access to Care: In-Network and Out-of-Network Utilization of Services

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ABSTRACT

Background: Access to health care is impacted by several key factors such as urbanization, insurance coverage, availability of health care facilities, specialists, and equipment. For an in-depth understanding of Portage County area residents' health care utilization location choices, a study was conducted to identify the main factors and assess health care outmigration.

Methods: A total of 125 292 patients were identified using 2019 administrative health data from University Hospitals Portage Medical Center in Portage County, Ohio. A descriptive analysis, t test, and chi-square tests were used to examine 3 primary outcomes: (1) patients' demographics (age, gender, insurance, etc.), (2) time and distance patients are willing to travel for care, and (3) health services demand that is causing outmigration.

Results: An analysis of 119 034 patients showed 66% of patients stayed in network and 34% went out of network. In-network participants had an average travel time of 30 minutes [95% CI, 29.5 to 29.8] and an average distance of 19.4 miles [95% CI, 15.9 to 16.1]. Conversely, out-of-network participants averaged 43 minutes [95% CI, 43.1 to 43.5] and 30.8 miles [95% CI, 30.4 to 30.8]. Outmigration was mainly influenced by the need for radiology services (66.3%), specifically mammograms (12.7%), computerized tomography (CT) (39.2%), and lab (18.2%).

Conclusion: Outmigration can negatively impact a county's health care infrastructure and growth and contribute to a loss of revenue to the local hospitals. In this case, out-of-network services are more commonly used for radiology and lab work than for chronic conditions. It is recommended that both physicians and patients become knowledgeable about the impact of seeking out-of-network care.

Keywords: Outmigration; Out-of-network; In-network; Access to care; Hospital service area

INTRODUCTION

Outmigration of health care services is a widespread issue that causes many challenges, especially in rural areas. Outmigration means that patients travel out of their primary service areas to receive health care services in other geographical locations.¹ Outmigration occurs in different patterns observed in patients with varying health needs.² Multiple factors have contributed to outmigration such as seeking better health services, health system reputation, convenience, insurance coverage, social networking, and many other reasons.^{3,4} Patients may also have negative perceptions about care delivered by certain institutions. Negative perceptions may result from past negative experiences by patients or family members due to limited resources, lack of privacy, mistrust,

and communication challenges.³ Patients may choose to travel to regional health institutions if the required health care services are unavailable in local institutions.

Existing data indicate outmigration is a growing problem in the United States. According to Miller, outmigration is a challenge to health institutions within a 75-mile radius of large US cities.² A survey by Swanston in 2019 found that 86% of community hospitals experienced outmigration, with 25% to 30% of these hospitals ranking outmigration among their top challenges.⁵ The Institute for Public Policy and Economics found that in 1 rural Pennsylvania county 25% of the residents traveled to other counties for patient care. Rural Ohio counties, which in many ways are similar to rural Pennsylvania counties, are likely to experience the same issues. In





approximately 50% of those who traveled, the decision for outmigration was driven by a perceived quality disparity.⁶ Furthermore, the rate of outmigration is higher in rural areas than in urban settings.⁶ According to Mosley and colleagues, approximately 76% of patients in rural counties out-migrated for health care compared to 23% in urban areas.¹ Rural outmigration was common across several services, including general care (22%), surgery (13%), orthopedics (17%), heart disease (11%), pulmonary medicine (8%), and neuroscience.¹ On average, 67.1% of gastrectomy patients traveled 17 miles from the nearest health care institution.⁷ Likewise, 61% of individuals with ovarian cancer traveled approximately 50 miles for care.⁸ These statistics underscore the need for further research and health care policies to tackle outmigration.

Patients traveling for care can cause severe consequences such as financial loss and poor health outcomes. Patient outmigration led to approximately \$1 billion in losses for hospitals in just 2 counties.² There is a link between longer-distance traveling patients and how medical initiatives improve medical conditions, disease prevention, and disease management; although hospital distance influences medical programs, rural inhabitants are unlikely to access these programs to improve chronic illness management.⁹ As a result, many people wait to seek medical care until it is an emergency. Another study investigated the geographic and social aspects of engagement in the chronic illness self-management initiatives and diabetes.¹⁰ The study concluded that involvement in self-management programs depends on initiative, class size, and on traveling shorter distances.

The physical distance between a patient and a hospital influences patients' choice when selecting surgical service location.¹¹ On the same note, other aspects besides the inherent risk and care distance influence traveling for elective surgery.¹² Even though improved results at high-end surgery hospitals facilitate the centralization of intricate operation facilities, admission into the deluxe facilities often requires extended travel distances. A study sought to assess the travel patterns among esophagectomy clients to determine the willingness to travel for surgical care.¹³ The study concluded that more patients prefer traveling to high-volume surgical centers regardless of their distant location. Conclusively, the travel problem is an essential aspect in conceptualizing physical reach to medical facilities. Probst et al aimed to assess the topographic and ethnic-based disparities in destination covered and how long it takes to access health care.¹⁴ The researchers concluded that both people from rural regions and African Americans face greater travel burdens than urban inhabitants or Whites accessing medical services.

Even though outmigration trends are a growing problem overall, limited research exists that covers the matter in detail. To our knowledge, there is no published research on this topic specific to any Ohio counties. Portage County is a good place to start because it has 1 major hospital with several networked facilities and service providers. Portage County is located in northeast Ohio, approxi-

mately 30 miles south of Cleveland. Of the 88 counties, it is the 15th most populated county in Ohio and is a mostly rural county with proximity to the larger cities of Akron and Cleveland. The demographics of the county are displayed in Table 1. The Portage County Community Health Needs Assessment (CHNA) revealed 9 "Areas of health need." "Access to care" and "Chronic disease" were listed as numbers 2 and 3 on that assessment. As previously mentioned, these are both issues that are exacerbated by patient outmigration, and reducing patient outmigration can improve both access to care and health outcomes related to chronic disease.

There is a need for empirical research on which service lines are most likely to lose patients to outmigration and the distances those patients are willing to travel for care. The research gaps establish the need for additional research on the problem so that health centers can better address the issues. Research shows limited information regarding what programs individuals travel for and lack of evaluating electronic health records (EHR) that include county-level data with demographics and insurance coverage.⁶ This paper aims to examine University Hospitals Portage Medical Center in Portage County, Ohio, in-network versus out-of-network health care utilization, identify out-of-network travel time and mileage, and detect the most common health services utilized out of network.

METHODS

Setting

University Hospitals Portage Medical Center is a 302 licensed-bed community hospital in Northeast Ohio. It primarily serves the residents of Portage County and is the only hospital in the county. University Hospitals Portage Medical Center has a level III trauma emergency department, 2 urgent care facilities, imaging centers, outpatient centers, and a network of physician practices.

Study Design

We conducted a retrospective cohort study of 125 292 Portage County, Ohio, patients using patient-level administrative data that included 140 metrics from University Hospitals Portage Medical Center in Portage County, Ohio. Data included demographics (age, gender, ethnicity), health insurance network status, procedure codes, ICD-9 diagnosis codes, provider city and specialty, patient risk level, medical diagnosis, spend and cost, drive time, and drive mileage. Drive time and mileage (distance) were calculated using geographical information system (GIS) techniques by mapping patient home addresses to the health care facility.

Participants

The initial cohort for this study included 125 292 patients for 2019. The study excluded patients outside the hospital service area (HSA); hospitals typically predetermine an HSA for their patients who come from specific area codes, zip codes, or other determining factors. Patients outside of the HSA were excluded because the focus of this project is to analyze patient travel for those inside



the University Hospitals Portage Medical Center HSA who were seeking services outside the HSA. The final analysis after exclusion yielded 119 034 patients.

Measures/Outcomes

The primary measured outcomes were the rates of out-of-network services and which groups would most likely out-migrate for service. The secondary outcome was estimating how much time and distance patients are willing to drive for care. Finally, the last outcome measure was identifying the primary service line(s) for which out-of-network patients are traveling. Based on prior research, we determined a priori the following were potential predictors of out-of-network migration: age, insurance type, patient risk level, and medical diagnosis. Patient risk score is an internal measure calculated by the University Hospitals Portage Medical Center using the patient's age, diagnoses, and gender.

Statistical Analysis

Descriptive statistics included means and standard deviations (SDs) for continuous variables and frequencies for categorical variables. Network status was the primary outcome; thus, each predictor's bivariate association was analyzed using the chi-square test (χ^2). The t test was used to compare the drive time and miles in network to out of network. Statistical significance was assessed at $\alpha = 0.05$. All analyses were conducted using SAS

(version 9.4; SAS Institute). The study has been reviewed by the University Hospitals review board (IRB) and received a determination that it was not human subjects research (IRB Number: STUDY20211210).

RESULTS

Table 1 shows descriptive analysis of 119 034 patients. Eighty percent of the patients were aged 50 years and over, 60% were female, 40% were male, and 92% were White. The largest number of patients (50.5%) were insured under the Medicare program, followed by patients with private health care coverage at 46%. Sixty-six percent of patients stayed in network, and 34% went out of network, migrating to bigger cities. Statistically significant differences ($P < 0.01$) were found between in-network and out-of-network groups regarding travel time, mileage, and health services.

In-network patients had an average travel time of 30 minutes [95% CI, 29.5 to 29.8] and an average distance of 19.4 miles [95% CI, 15.9 to 16.1] (Table 2). Conversely, out-of-network patients averaged 30.8 miles [95% CI, 30.4 to 30.8] and 43 minutes of travel time [95% CI, 43.1 to 43.5].

Outmigration was mainly driven by the need for radiology (66.3%), computerized tomography (CT) (39.2%), and lab (18.2%); for the sub-services, organ/disease panel (15.2%) and

Table 1. Population Demographic Characteristic, n=119 034

| | In-network (66%) | Out-of-network (34%) | Chi-square P value |
|--------------------|------------------|----------------------|--------------------|
| Gender | | | <.0001 |
| Male | 32 390 (27.2%) | 14 760 (12.4%) | |
| Female | 46 231 (38.8%) | 25 653 (21.6%) | |
| Age | | | <.0001 |
| 0-19 years | 2359 (2.0%) | 1146 (1.0%) | |
| 20-39 years | 6254 (5.2%) | 2531 (2.1%) | |
| 40-54 years | 14 270 (12.0%) | 5991 (5.0%) | |
| 55-74 years | 38 816 (32.6%) | 18 162 (15.2%) | |
| 75 years and over | 16 922 (14.2%) | 12 583 (10.7%) | |
| Ethnicity | | | 0.1855 |
| Asian | 412 (0.2%) | 169 (0.1%) | |
| African American | 2472 (2.1%) | 1241 (1.1%) | |
| White | 72 988 (63.2%) | 36 217 (31.7%) | |
| Others | 706 (0.5%) | 364 (0.5%) | |
| Insurance | | | <.0001 |
| Commercial | 40 056 (33.6%) | 14 500 (12.2%) | |
| Medicaid | 851 (0.7%) | 684 (0.6%) | |
| Medicare | 35 710 (30.0%) | 24 433 (20.5%) | |
| Medicare advantage | 2004 (1.7%) | 796 (0.7%) | |
| Risk Level | | | <.0001 |
| High risk | 26 367 (22.1%) | 12 064 (10.2%) | |
| Highly complex | 24 950 (21.0%) | 17 303 (14.5%) | |
| Low risk | 11 038 (9.3%) | 4729 (4.0%) | |
| Rising risk | 16 266 (13.6%) | 6317 (5.3%) | |

**Table 2. Mean Difference in Drive Distance and Drive Time**

| | In-Network | | | Out-of-Network | | | Pr > t |
|-------------------------|------------|------|-----------|----------------|------|-----------|---------|
| | n | Mean | 95% CI | n | Mean | 95% CI | |
| Drive distance in miles | 78 615 | 19.4 | 15.9-16.1 | 39 358 | 30.7 | 30.4-30.8 | <.0001 |
| Drive time in minutes | 78 615 | 29.7 | 29.5-29.8 | 39 358 | 43.3 | 43.1-43.5 | <.0001 |

mammograms (12.7%) were the most utilized services out of network (Table 3). Also, when looking at provider taxonomy, we found that the most visited out-of-network physicians were radiology-diagnostic (46.5%) and general acute care (23.4%). Finally, respiratory related diseases were considered high for both in-network and out-of-network patients, in which 75% of out-of-network and 68% of in-network patients were diagnosed with pulmonary disease.

DISCUSSION

This study was conducted to better assess health care service out-migration in Portage County, Ohio. We believe this work will be of particular interest to health care administration leadership, as well as health care providers and policy makers. Outmigration is influenced by cost and insurance coverage, quality of care, convenience, access to information and services, perceived reputation, and social networking. Additionally, patients are more likely to travel if they have higher education and income.³ These factors influence patients' willingness to travel for care and imply that those without resources are likely less able to travel for care.

Health care outmigration is a common challenge particularly in smaller and more rural counties, and this study confirmed that outmigration to bigger cities within a 75-mile radius is a valid concern. The study found that travel time and distance were notably

higher among out-of-network patients than those within the network group. Previous work indicated that up to 75% of patients in rural areas out-migrated for care.¹ This does not seem to be the situation in Portage County where that number was only around 34%. Also, it seems that some of the more complex and high-risk cases are staying in the service area for care, which is not typically the case.¹ What is happening, however, is that there are specific services for which patients are very likely to travel.

As data indicated, respiratory-related diseases and radiology services, particularly in specific sub-services such as CT and mammograms, were the most utilized services out of network. The findings also show 46.5% of patients going out of network for diagnostic radiology. This can be explained by facility location and a shortage of pulmonologists in the county. Fewer facilities that provide CT and mammograms can cause a lack of appointment availability and longer wait times, which may contribute to patients seeking care elsewhere. Other factors contribute to outmigration as well; mammogram services are influenced by social networking.^{15, 16} If patients have a good experience at a particular location, this anecdotal evidence can be highly influential in driving patients to that location.¹⁵ It is important for health care leadership to know which service lines in their HSA are prone to outmigration because it allows them to use this information when making decisions regarding the placement of facilities and recruitment of spe-

Table 3. Selected Services Features

| | In-network (n=78 621) | Out-of-network (n=40 413) | Chi-square P value |
|--|-----------------------|---------------------------|--------------------|
| Most utilized service lines | | | |
| Radiology | 21 916 (27.9%) | 26 803 (66.3%) | <.0001 |
| Lab | 35 124 (44.7%) | 7354 (18.2%) | <.0001 |
| Cardiology | 7664 (9.7%) | 1317 (3.2%) | <.0001 |
| Most utilized sub-services | | | |
| Organ/Disease panel | 29 349 (37.3%) | 6156 (15.23%) | <.0001 |
| CT | 10 726 (13.6%) | 15 849 (39.2%) | <.0001 |
| Mammography | 6428 (8.2%) | 5131 (12.7%) | <.0001 |
| MRI | 3316 (4.2%) | 4248 (10.5%) | <.0001 |
| Most visited provider by taxonomy | | | |
| General acute care hospital | 37 137 (47.2%) | 9468 (23.4%) | <.0001 |
| Radiology - diagnostic radiology | 804 (1.02%) | 18 785 (46.5%) | <.0001 |
| Clinical medical laboratory | 13 051 (16.6%) | 2009 (4.9%) | <.0001 |
| Most common medical diagnosis | | | |
| Pulmonary disease | 53 473 (68%) | 30 075 (75%) | <.0001 |
| COPD | 17 410 (22.1%) | 11 278 (27.9%) | <.0001 |
| Asthma | 13 383 (17%) | 7843 (19.4%) | <.0001 |
| Respiratory failure | 8578 (10.9%) | 7370 (18.2%) | <.0001 |
| Chronic bronchitis | 9136 (11.6%) | 6303 (15.6%) | <.0001 |



cialists. Other rural counties in Ohio and elsewhere can conduct similar analyses.

The current study has notable strengths and limitations in its identification of and potential causes of outmigration. The main strength is the use of EHR data. The EHRs have significant value to research as they provide detailed information collected during patient care.¹⁷ The EHR data facilitated the inclusion of a large sample of the patients utilizing University Hospitals Portage Medical Center. With the large sample size, the current study's findings can be generalized to other counties by ensuring adequate representation.¹⁶ The EHR data also allows the identification of the services being utilized as well as the location of these services. Another strength is the inclusion of Medicare and non-Medicare patients, which provides a comprehensive approach to capturing patients with different insurance coverage. However, a limitation of this study relates to the lack of consideration of patients' perspectives. The analysis of outmigration only accounts for factors captured in the EHR data, and it is difficult to identify the true nature of patients' travel decisions. Some patients may prefer to seek health care services closer to their employer rather than their home. Further studies using patients' perspectives are needed to determine why patients might travel for care.

PUBLIC HEALTH IMPLICATIONS

Health care services outmigration can have critical consequences if it remains unresolved. First, outmigration can negatively impact the county's health care infrastructure and growth. As previously stated, the Portage County CHNA listed "access to care" and "chronic diseases" as 2 of the 9 main health issues. In the CHNA, University Hospitals Portage Medical Center (formerly known as Robinson Memorial Hospital) is identified as 1 of the public health assets in Portage County.

The care institutions and associated facilities can be negatively affected if outmigration increases. The high rates of patient travel out of network may affect the health care infrastructure by triggering widespread provider shortage and limited investment in the local health care industry.¹ Outmigration can reduce demand for health care services, leading health care organizations to reduce workforce, which then could lead to even higher levels of outmigration due to long wait times and quality of care concerns. Also, some health care workers may move to work for competing institutions in neighboring counties, leading to greater provider shortages. The more that outmigration occurs within a specific HSA contributes to facility closures, which then further decreases access to care for patients. Outmigration may cause limited investment in the county's health care sector due to reduced demand for health care utilization as many patients move to other counties.⁹

Another impact of outmigration is the potential economic losses for health care institutions in the county. As patients travel to other geographical areas, hospitals will incur financial losses which will impact operational costs and reduce cash flow.⁶ The economic

losses may trigger additional outmigration of health care providers from the county. The popularity of health care service outmigration shows real or perceived disparities in the quality of care offered by different facilities. Other factors such as the cost of care also come into play because financial constraints will limit patients' desire and ability to visit a given institution. Patients seeking care elsewhere impacts upon the facility's revenue, which inhibits the ability to afford specialized or upgraded infrastructure and equipment.

Multiple solutions to reduce outmigration have been recommended. One solution is the integration of all health systems in a particular area. Integration would allow providers to make referrals to in-network service providers.¹⁸ Also, providers can improve the patient experience to influence them to remain within local hospitals by making in-network referrals easier. Likewise, educating patients on the advantages of staying in network and establishing positive relationships with consumers is crucial to tackling outmigration.¹ Staying in network also potentially allows medical providers to view a patient's history and medical treatments in a unified health record system. Given the influence of anecdotal evidence for certain services, health systems may want to use patient vignettes or cases to help promote their services.¹⁵ Outmigration does not necessarily mean that patients will receive the quality of care they want. Instead, it potentially exposes them to more risks and expenses such as traveling and the challenge of getting timely assistance when one must cover long distances to acquire it. These consequences underline the need for policy interventions to tackle health care outmigration in the county.

Policymakers are encouraged to investigate and address health care outmigration by proposing a policy that increases funds for small counties. Currently, the Health Resources and Services Administration (HRSA) allocates more funds for large counties.⁶ At the same time, small counties can use the fund to facilitate their health care infrastructure growth. The policy would ensure that the health care providers in these smaller counties can deliver quality and competitive health care services.⁶ At the same time, hospitals and health system responsibilities involve educating patients on the impact of out-of-network care. There is a high need to keep patients informed about health care services in their local health care institutions.⁸ Addressing health care outmigration would support the growth of health care infrastructure in small and rural counties. Determining which services are of greatest need in the county, and for which services patients are most likely to travel is a vital first step in addressing outmigration.

Conclusion

The findings in this study demonstrate that patient outmigration is a significant issue for rural areas with far-reaching repercussions. Resolving such an issue requires a reconsideration of decisions around health care administration and patient care. Ensuring that the best possible care is offered at minimal costs may discourage



patients from seeking assistance elsewhere. Such efforts require significant investment in infrastructure, equipment, and personnel training. This initiative should also be supported by policy changes that promote the development of high-quality care facilities. Similarly, subsidizing care can ensure that patients do not have to look for cheaper care elsewhere. Lastly, efforts should be made to educate the citizens about the care offered in local hospitals and the benefits from visiting the local hospitals instead of traveling elsewhere. Nonetheless, further studies are needed to help develop more sustainable solutions that promote access to care while ensuring that more institutions are adequately equipped to provide quality health care.

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