

## Use and Performance Variations in U.S. Rural Emergency Departments: Implications for Improving Care Quality and Reducing Costs

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### Key Findings

- Based on 2008-2010 data from a nationally representative sample of ambulatory visits made to nonfederal, general, and short-stay U.S. hospitals, 38% of Emergency Department (ED) visits were for non-emergent conditions.
- When only cases that were classified as emergent or non-emergent are considered, higher percentages of patients visiting EDs in Small Rural/Isolated Small Rural ZIP Code areas (67%) and Large Rural ZIP Code areas (69%) were seen for non-emergent conditions than in Urban ZIP Code areas (62%).
- Factors associated with higher levels of non-emergent use included: age less than 40 years, female gender, and low-income. Residence in Small Rural/Isolated Small Rural areas, areas with fewer than five primary care physicians per 10,000 people, and the South U.S. Census Region were associated with increased proportions of non-emergent ED use.
- Compared to urban EDs, patients visiting rural EDs spent less time waiting to be seen for emergent (by 7-10 fewer minutes) as well as non-emergent conditions (by 10-15 fewer minutes).
- The lengths of visits in rural EDs were shorter for emergent (23-86 fewer minutes) and non-emergent conditions (42-60 fewer minutes) than in urban EDs.

### Introduction

Rural areas have a higher prevalence of subpopulations who are at high risk for using the Emergency Department (ED) for non-emergent purposes, namely low income populations who either lack health insurance and/or who qualify for state Medicaid programs. Rural areas are also more likely to be facing shortages of primary care providers than urban areas. Hence, the potential for using the ED for non-emergent purposes is greater in rural than urban areas. However, no studies have documented differences in the geographic variation in the use of ED services for non-emergent conditions.

The purpose of this brief is to describe the geographic variation in the use of EDs for non-emergent health conditions across rural and urban areas as well as by U.S. Census Regions. Potential risk factors including patients' socioeconomic characteristics, geographic location and

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level of primary care resources are identified. Quality of care indicators, limited to wait times and the length of the visit for rural and urban EDs, are also addressed.

## Background

ED visits account for only 4% of U.S. healthcare expenditures and 10% of all ambulatory care visits. However, in certain subsets of the population--for example, the Medicaid population--where the use of the ED for non-emergent purposes is relatively high, reducing the use of the ED for primary care purposes could save the Medicaid program significant amounts of money.<sup>1</sup> The appropriate use of the ED for health problems is, however, complicated by the fact that patients use the ED for reasons other than the urgency of their conditions. Reasons may include low levels of health literacy, a lack of financial resources to pay for primary care visits, limited geographic access to primary care because of shortages of primary care providers, and the lack of viable options for urgent cases and/or off-hours of care. Workforce shortages may make it difficult to find primary care providers close to home or work and schedule same-day appointments. Because of these complicating factors, studies estimating the prevalence of non-emergent ED visits vary widely and range from 10-50%.<sup>1,2,3</sup>

## Methods

The 2008-2010 National Hospital Ambulatory Medical Care Survey (NHAMCS) data were used to address the utilization of ED services for the general U.S. population. NHAMCS data comprise a nationally representative sample of ambulatory visits made to nonfederal, general, and short-stay U.S. hospitals. The Area Health Resource Files (AHRF) were used to identify levels of primary care resources by county. ED visits were classified as occurring in Urban, Large Rural, and Small Rural/Isolated Small Rural provider categories using the Rural-Urban Commuting Area (RUCA) Version 2.0 codes.<sup>4</sup> The percentage of people living in poverty was determined using the Census Bureau's poverty thresholds.<sup>5</sup> Performance on National Quality Forum-approved measures included wait times and length of visit.<sup>6,7</sup>

ED visits were classified as emergent and non-emergent using the New York University Emergency Department (NYU ED) visit severity algorithm.<sup>8</sup> The algorithm assigns the probability that each patient diagnosis code associated

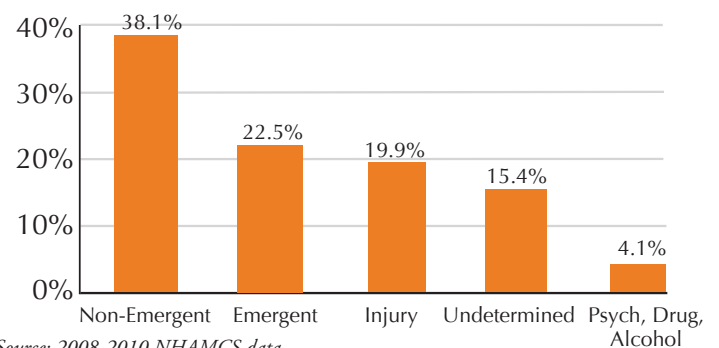
with an ED visit falls into one of four categories: (1) a non-emergency; (2) an emergency (a condition requiring medical care within 12 hours) that is treatable in a primary care office visit; (3) an emergency that is not treatable in an office visit but is preventable or avoidable; and (4) an emergency that is not preventable or avoidable. The algorithm excludes injuries and unusual diagnoses, and treats mental health and substance-related diagnoses separately. If the probabilities of being in either of the two non-emergent categories (i.e., categories 1 and 2 from this paragraph) are added together and total over 50%, the case was considered to be non-emergent.

Bivariate statistical tests were used to determine the association of various factors and non-emergent ED use. Logistic regression was used to identify socioeconomic risk factors and to estimate the association of geographic location and the supply of primary care providers on the likelihood of non-emergent ED use.

## Findings

Based on 2008-2010 NHAMCS data, 38% of ED visits in U.S. hospitals were for non-emergent conditions, while injuries and emergent conditions accounted for 20% and 23% of visits, respectively (Figure 1).

**Figure 1. Frequency of emergency department visits in U.S. hospitals**



Considering only cases that were classified as emergent or non-emergent (i.e., a 60.6% subset of all ED visits), subpopulations with significantly higher rates of non-emergent ED use included children and adults under the age of 40, women, Medicaid recipients, patients living in areas with fewer than five primary care physicians per 10,000 population, and patients living in RUCA-defined rural areas (significant at the p=0.05 level) (Table 1). Higher percentages of patients visiting EDs in Small Rural/

Isolated Small Rural and Large Rural ZIP Code areas were seen for non-emergent conditions (67% and 69%, respectively) than in Urban areas (62%). Of the four U.S. Census Regions, the highest rates of non-emergent use were found in the South (66%), where higher concentrations of rural populations with incomes below the Census Bureau's poverty thresholds exist.<sup>9</sup>

**Table 1. Rates of non-emergent ED use for subpopulations defined by socioeconomic characteristics, levels of primary care resources and geographic location**

		% Non-Emergent
<b>Total sample</b>		<b>62.86%</b>
<b>Age Group</b>	infant-20	80.1%*
	21-40	75.4%*
	41-60	57.5%
	>60	42.1%
<b>Gender</b>	Male	59.5%
	Female	65.4%*
<b>Race/Ethnicity</b>	White	34.6%
	Black	33.1%
	Hispanic	36.8%
	Other	30.9%
<b>Percent in Poverty</b>	0%-10%	59.85%
	11%-15%	64.0%
	>15%	62.8%
<b>Payer Type</b>	Private	65.0%
	Medicare	45.6%
	Medicaid	72.4%*
	Other	71.5%*
<b>Physicians per 10,000</b>	≤5 (0-5)	68.3%*
	>5 and ≤7 (5.1-7)	60.6%
	<7 and ≤9 (7.1-9)	64.3%
	>9	61.0%
<b>Geographic location</b>	Small/Isolated Rural	67.2%*
	Large Rural	68.8%*
	Urban	62.2%
<b>Census Region</b>	Region 1 (Northeast)	61.2%
	Region 2 (Midwest)	61.2%
	Region 3 (South)	65.8%*
	Region 4 (West)	60.7%

Source: 2008-2010 NHAMCS data

\* Significantly different from other categories at the 0.05 level.

Logistic regression analysis was used to adjust for confounding factors and confirmed that non-emergent use of the ED included younger age, female gender, living

in areas with fewer than five primary care physicians per 10,000 population, and treatment in a Small Rural/Isolated Small Rural ED (Table 2). More specifically, the risk of children (up to age 20 years) using the ED for non-emergent purposes was more than twice the risk of the reference group of adults age 61 and older; patients age 21-40 years had twice the risk and 41-60 year olds had a 34% higher risk of using the ED for non-emergent conditions. Females had a 15% higher risk of presenting with non-emergent conditions as males. Patients without private or public insurance coverage (i.e. the uninsured) or whose services were covered by worker's compensation and identified as "other" in Table 2 had a 14% higher risk of using the ED for non-emergent conditions. The risk of patients using the ED for non-emergent conditions was 10% higher in areas with fewer than five primary care physicians per 10,000 population than in areas not facing workforce shortages, as well as 11% higher risk in Small Rural/Isolated Small Rural ZIP Code areas compared to Urban areas.

**Table 2. Logistic regressions predicting non-emergent ED use**

	Odds Ratio	LL; UL	Centered Risk Ratio = $\sqrt{\text{OR}}$
<b>Age Group</b>			
infant-20	5.26*	4.54; 6.09	2.29*
21-40	3.83*	3.40; 4.32	1.96*
41-60	1.79*	1.60; 2.00	1.34*
<b>Gender: Female</b>	1.32*	1.22; 1.42	1.15*
<b>Percent in Poverty</b>			
11-15%	1.17	0.98; 1.40	1.08
>15%	1.01	0.86; 1.20	1.00
<b>Payer Type</b>			
Private	1.03	0.91; 1.15	1.01
Medicaid	1.09	0.95; 1.26	1.04
Other <sup>†</sup>	1.30*	1.13; 1.51	1.14*
<b>Physicians per 10,000</b>			
≤5	1.22*	1.04; 1.44	1.10*
>5 and ≤7	0.93	0.79; 1.10	0.96
<7 and ≤9	1.12	0.97; 1.28	1.06
<b>Geographic location</b>			
Small Rural/Isolated	1.23*	1.03; 1.56	
Small Rural			1.11*
Large Rural	1.32	0.96; 1.80	1.15

Source: 2008-2010 NHAMCS data

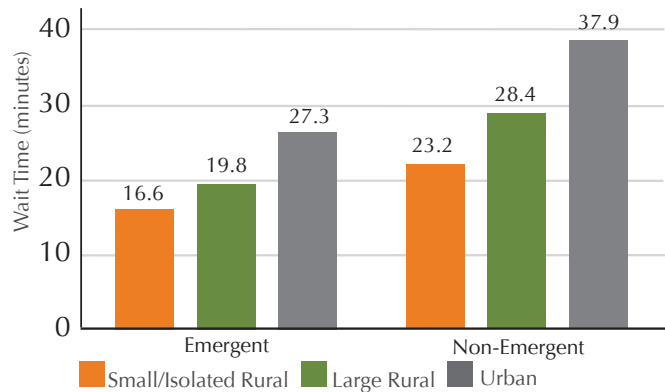
<sup>†</sup>"Other" payer type includes workman's compensation, self-pay, and no charge

Note: LL = Lower Limit, UL = Upper Limit. The reference group for age group is 61 and older, gender is male, percent in poverty is ≤10%, payer type is Medicare, physicians per 10,000 is >9, geographic location is Urban. Census regions were not significant.

\* Significant at the 0.05 level.

Across all geographic locations, ED wait times for care were significantly longer for non-emergent compared to emergent cases (Figure 2). For both non-emergent and emergent conditions, wait times were shorter in rural compared to urban EDs. Urban patients spent approximately 38 minutes waiting to be seen for a non-emergent condition and 27 minutes for emergent conditions. This compares to rural patients spending 7-10 minutes less time waiting to be seen for emergent conditions and 10-15 minutes less time waiting for non-emergent conditions.

**Figure 2. ED recorded wait times for emergent and non-emergent cases by geographic location**

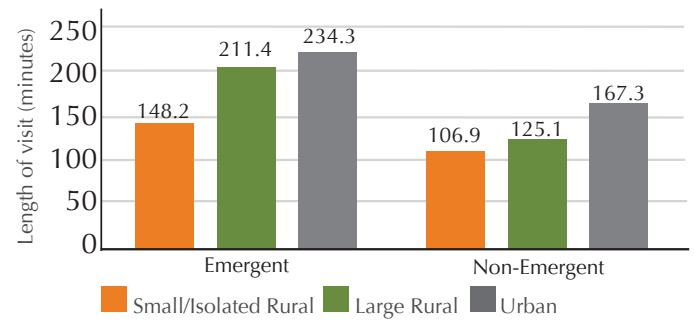


Source: 2008-2010 NHAMCS data

Alternatively, across all geographic location types, the length of the ED visits was significantly shorter for non-emergent

compared to emergent cases (Figure 3). Regardless of whether presenting conditions were emergent or not, the lengths of the visits were shorter in more remote rural EDs. While urban patients spent 234 and 167 minutes with ED providers for emergent and non-emergent conditions, respectively, the length of the visits in more remote rural EDs were 23-86 minutes shorter for emergent conditions and 42-60 minutes shorter for non-emergent conditions.

**Figure 3. ED recorded length of visits for emergent and non-emergent cases by geographic location**



Source: 2008-2010 NHAMCS data

Across all geographic locations the top 10 non-emergent diagnoses included symptoms involving the abdomen and pelvis (10-13%), acute bronchitis and bronchiolitis (7-10%), symptoms involving head and neck (5-7%), respiratory, digestive, and urinary tract issues (3-6%), acute pharyngitis (4-5%), and back issues (3-4%) (Table 3).

**Table 3. Incidence and rank of the most common non-emergent diagnoses by geographic location**

	Small/Isolated Rural		Large Rural		Urban	
	Percent	Rank	Percent	Rank	Percent	Rank
Symptoms involving abdomen and pelvis	9.89%	2	13.10%	1	10.86%	1
Acute bronchitis and bronchiolitis	9.97%	1	8.30%	2	7.21%	2
Symptoms involving head and neck	7.39%	3	6.64%	3	5.07%	6
Cellulitis and abscess	4.21%	8	5.35%	5	5.92%	3
General symptoms	5.59%	6	6.27%	4	5.92%	4
Respiratory system and chest symptoms	5.85%	4	5.35%	6	5.75%	5
Symptoms involving digestive system	3.18%	11	4.61%	7	4.22%	7
Urethra and urinary tract disorders	5.59%	5	3.32%	13	4.18%	8
Acute pharyngitis	4.64%	7	3.51%	12	3.62%	10
Back disorders	3.78%	9	2.58%	14	4.12%	9
Noninfectious gastroenteritis and colitis	2.75%	12	3.69%	10	2.43%	12
Infectious mononucleosis	3.27%	10	3.69%	9	2.22%	15
Suppurative and unspecified otitis media	2.67%	13	3.51%	11	3.16%	11
Joint disorders	2.32%	15	3.87%	8	2.37%	13
Soft tissue disorders	1.55%	18	2.32%	15	2.33%	14

Source: 2008-2010 NHAMCS data



## Conclusions

This study finds that younger, low-income and uninsured populations, as well as Small Rural/Isolated Small Rural populations are at higher risk for using EDs for non-emergent care. Other studies have documented the prevalence of low levels of health literacy among younger, low-income and uninsured populations.<sup>10</sup> However, personal and family decisions regarding the use of ED services are not solely a function of a lack of information or low levels of health literacy, but are rather often a reflection of structural and situational circumstances that serve as barriers to receiving services in a cost effective and timely manner. For example, populations utilizing EDs in ZIP Code areas where there are relatively fewer primary care physicians per 10,000 population and/or in Small Rural/Isolated Small Rural areas are more likely to use those EDs for non-emergent care. Given a lack of viable alternatives at a given time in a given place, the ED may serve as the rational choice for obtaining care. Patients may not be able to see a primary care provider in a timely fashion because of the shortage of local providers and the associated long appointment waiting times. The times rural non-ED providers are available may be much more limited than in urban environments. In some cases, access to weekend or evening pharmacy services may leave the ED as the only alternative to obtaining care and needed prescription medications.

Likely reflecting fewer problems with overcrowding in rural versus urban EDs, Small Rural/Isolated Small Rural EDs fare better in terms of the two quality of care measures (wait times and length of visit) that could be addressed in this study. For both emergent and non-emergent conditions, wait times and the length of visits were shorter in more remote rural locations. Although the top 10 presenting conditions did not appear to systematically differ by geographic location, further research controlling for the potential influence that case mix has on these quality indicators is warranted.

Although rural EDs appear to perform well within their feasible scope-of-practice (as indicated by shorter wait times and length of visit) relative to urban EDs, this study suggests the need for a multifaceted approach towards promoting appropriate use of ED services in rural areas. A variety of promising health reform strategies include developing integrated care systems and infrastructure that

focus on coordinating the provision of health services, expanding the rural primary care workforce, and increasing the capacity of the local safety-net system by expanding the hours when local care and prescription medications are available outside the hospital ED.

With the implementation of the Affordable Care Act (ACA), transitioning the uninsured population onto insurance coverage through the health insurance marketplaces or through Medicaid expansions may reduce the rates of non-emergent ED services in participating states. Developing educational outreach efforts designed to improve community levels of health literacy in tandem with the expansion of insurance coverage may be critically important.

Finally, this study provides baseline measures for analyzing future changes associated with health reform initiatives. Further research delving deeper into each of the facets of non-emergent ED use is needed. The focus of these studies should extend beyond user characteristics to include the structural and situational barriers that set the stage for behavioral decisions regarding medical care. Successful ameliorative policy changes will likely improve health information literacy levels as well as facilitate better rural access to medical care.

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