POPULATION CHARACTERISTICS OF MARKETS OF SAFETY-NET AND NON-SAFETY-NET HOSPITALS

DARRELL J. GASKIN, PHD, AND JACK HADLEY, PHD

ABSTRACT

Research Objectives. To compare and contrast the markets of urban safety-net (USN) hospitals with the markets of other urban hospitals.

Study Design. To develop profiles of the actual inpatient markets of hospitals, we linked 1994 patient-level information from hospital discharge abstracts from nine states with 1990 data at the ZIP code level from the US Census Bureau. Each hospital's market was characterized by its racial and ethnic composition, median household income, poverty rate, and educational attainment. Measures of hospital competition were also calculated for each hospital. The analysis compared the market profiles of USN hospitals to those of other urban hospitals. We also compared the level of hospital competition and financial status of USN and other urban hospitals.

Principal Findings. The markets of USN hospitals had higher proportions of racial and ethnic minorities and non-English-speaking residents. Adults residing in markets of USN hospitals were less educated. Families living in markets of USN hospitals had lower incomes and were more likely to be living at or below the federal poverty level. USN hospitals and other urban hospitals faced similar levels of competition and had similar margins. However, USN hospitals were more dependent on Medicare disproportionate share payments and on state and local government subsidies to remain solvent.

Conclusion. USN hospitals disproportionately serve vulnerable minority and low-income communities that otherwise face financial and cultural barriers to health care. USN hospitals are dependent on the public subsidies they receive from federal, state, and local governments. Public policies and market pressures that affect the viability of USN hospitals place

---

Drs. Gaskin and Hadley are from Georgetown University, Institute for Health Care Research and Policy, 2233 Wisconsin Avenue Northwest, Suite 525, Washington, DC 20007. (E-mail: gaskind@gunet.georgetown.edu or hadleyj@gunet.georgetown.edu)

An earlier draft of this paper was presented as a poster at the 14th annual meeting of the Association for Health Services Research, Chicago, IL, June 15–17, 1997.

Financial support for this research was provided by the Commonwealth Fund. The opinions expressed are solely those of the authors and do not necessarily reflect the positions of Georgetown University and the Commonwealth Fund.

the access to care by vulnerable populations at risk. Public policy that jeopardizes public subsidies places in peril the financial health of these institutions. As Medicare and Medicaid managed care grow, USN hospitals may lose these patient revenues and public subsidies based on their Medicaid and Medicare patient volumes. The loss of these funds would hinder the ability of USN hospitals to finance uncompensated care for uninsured and underinsured patients.

KEY WORDS Hospital markets, Minority health, Safety-net hospitals, Urban hospitals.

INTRODUCTION

Urban safety-net (USN) hospitals are those that have demonstrated a commitment to provide care to low-income persons, to those with special needs, and to other vulnerable populations regardless of their ability to pay. The safety net mission of these hospitals stems from either a legal obligation to care for charity patients or an organizational commitment to meet the health care needs of vulnerable populations. While most hospitals do provide some charity care and treat some patients with special needs, safety-net hospitals are distinguished by the volume of care they provide to vulnerable populations. A relatively high percentage of the patients of safety-net hospitals have low incomes or have conditions such as human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS), drug addictions, or mental disorders that require special medical services. In addition, safety-net hospitals may be the primary source of care, or at least the providers of last resort, for vulnerable populations in their communities.

USN hospitals are the dominant providers of medical services to low-income and uninsured populations. While almost all hospitals participate in the health care safety net, a recent study identifies urban public and major teaching hospitals as important players.[1] The National Association of Public Hospitals and Health Systems (NAPH) reports that in 1995 Medicaid and uninsured patients comprised 73.9% of discharges and 76.9% of outpatient visits in member hospitals.[2] The National Public Health and Hospital Institute (NPHHI) reports that in 1993 urban public hospitals provided 31% of Medicaid discharges in their communities, compared to only 16% of all discharges in their communities.[3] In 1994, Medicaid and uninsured patients accounted for 29% of discharges from academic medical centers. Also in 1994, academic medical centers provided 45% of the hospital care for residents of low-income areas and 36% of hospital care received by minorities.[4]

USN hospitals are also major providers of special medical services such as AIDS treatment, trauma treatment, emergency psychiatric services, and burn care for the entire community. The NAPH reports that in 1991 all of their member hospitals provided AIDS services, 50% provided trauma services, and 69% pro-

vided emergency psychiatric services.[5] The National Public Health and Hospital Institute reports that in 1993 urban public hospitals provided 37% of the pediatric intensive care, 27% of the neonatal intensive care, and 36% of inpatient burn care in their communities.[6] This ranges from 1.5 to over 2 times their share of their communities' total inpatient care.

To assess the potential impact of Medicare and Medicaid policy changes and the growth of managed care on USN hospitals and the low-income and uninsured populations these hospitals serve, this study quantifies the role of USN hospitals in their respective markets. Although it is presumed commonly that USN hospitals disproportionately treat low-income and minority populations, this study is unique in that it identifies the actual sociodemographic characteristics of the neighborhoods served by USN hospitals using ZIP code information from the US Census Bureau.[7] In particular, this study addresses the following questions:

- How do USN hospitals compare with other hospitals in urban areas?
- What are the sociodemographic characteristics of the patients served by USN hospitals? How do these patients compare to the patient populations of other hospitals in urban areas?
- Are low-income and minority communities dependent on USN hospitals? Do USN hospitals provide most of the hospital care in these communities?
- To what extent are USN hospitals exposed to intense hospital competition? What are the characteristics of hospitals that compete with USN hospitals?
- How do USN hospitals compare financially with other hospitals in urban areas?

The analysis presented below provides baseline information on patients and institutions at risk. Policymakers and industry analysts should consider this information as they make decisions that affect the patient base and revenue sources of USN hospitals.

DATA AND METHODS

The analysis compares the market profiles of USN hospitals with those of non-safety-net hospitals. This analysis improves on previous studies by using patient origin data to define the markets of USN hospitals instead of using geopolitical boundaries. This analysis combines patient-level information from hospital discharge abstracts of nine states* for 1994 with ZIP code data published by the

*In general, discharges from outside the hospital's state were excluded. However, for New York hospitals, New Jersey discharges were included; for New Jersey hospitals, New York and Pennsylvania discharges were included; and for Pennsylvania hospitals, New Jersey discharges were included.

US Census Bureau for 1990. The nine states are California, Florida, Illinois, Massachusetts, New Jersey, New York, Pennsylvania, Washington, and Wisconsin. Using the ZIP code of the patient's residence (taken from the hospital discharge abstract), sociodemographic information for the ZIP code was linked with the patient's record. This information was aggregated to the hospital level by taking the weighted average of the sociodemographic variables using the number of the hospital's patients residing in the ZIP code as the weight. Hence, each hospital's market was characterized by its racial and ethnic composition, household income, poverty status, and educational attainment. This market profile is a detailed description of a hospital's actual inpatient market.

Urban hospitals were defined as any hospital located in a metropolitan service area (MSA). The hospitals were divided into two groups based on location. The first group included hospitals located in center cities with more than 1 million residents: Chicago, Illinois; Los Angeles, California; New York City, New York; Philadelphia, Pennsylvania; and San Diego, California. These are five of the six largest center cities in the country; all are at least 60% larger than any of the other center cities in the nine states in the study. The second group comprised hospitals located in the remaining urban areas in these nine states and included hospitals located in MSAs that have populations that exceed 1 million persons, such as Boston, Massachusetts; Nassau-Suffolk counties, New York; Newark, New Jersey; and Oakland and San Francisco, California. They were not included in the first group of center city hospitals because the populations of their center cities relative to their suburban populations were smaller. Hospitals in these smaller center cities were more likely to maintain their patient census by extending their geographic markets into the suburbs. Dividing the hospitals into these two groups prevents the market profiles of hospitals in these very large center cities from dominating the results.

For the purposes of this study, USN hospitals are those institutions that are members of NAPH or those that have a proportion of discharges of low-income patients that is more than one standard deviation above the average proportion for all urban short-term general hospitals in the state. Low-income patients are those whose source of payment is Medicaid, charity care, or self-pay. NAPH membership includes most major metropolitan public or nonprofit hospitals with an explicit safety net mission. These hospitals typically have a legal obligation to serve all regardless of ability to pay or have a contract with local government to serve indigent patients. The proportion of low-income patients identifies those private hospitals that have an unusually high number of low-income patients. State-specific cutoffs were used to identify USN hospitals because Medicaid

coverage and the percentage of the population that is uninsured differs across states. Of the nine states in the study, Wisconsin and New Jersey have the lowest combined percentage of population under 65 covered by Medicaid or uninsured (15% and 17%, respectively), while California and Florida have the highest rates (33% and 29%, respectively).[8]

The remaining urban hospitals in these nine states were used as a comparison group. For ease of exposition, they are referred to as non-safety-net hospitals. Notwithstanding, we do recognize that these hospitals in most cases did participate in the hospital safety net by providing services to self-pay/charity and Medicaid patients. However, their involvement in the safety net did not dominate the composition of their patient populations. Hence, the profile of their markets differs from markets of USN hospitals.

This study uses hospital-specific market measures because hospital markets can be characterized as spatial competitions. The location and service mix of hospitals determine demand for their services. Empirical literature on hospital choice indicates that the farther away a patient lives from a particular hospital, the less likely that patient will use that hospital.[9] A hospital's ability to compete for a patient depends partially on the distance between the hospital and the patient's residence. This implies that two hospitals located near one another compete for more of the same patients than two hospitals that are far apart, all things being equal. Because hospitals are dispersed geographically, each hospital has its own geographic market, which is defined by the patients residing near the hospital. While a hospital's market overlaps with the markets of other hospitals, it is not identical to them. Similarly, hospitals with a different service mix attract different patients. This product differentiation creates hospital-specific markets.

Because a hospital can feel competitive pressure from two sources (those hospitals that currently compete with it for patients and those hospitals that could enter its market easily and compete with it for patients), two sets of variables were used to measure hospital competition. The first set measures actual competition and is based on the distribution of discharges in the hospital's market. The second set measures potential competition and is based on the distribution of hospital beds within a 15-mile radius of the hospital.

To construct the measures of actual hospital competition, patient origin markets were defined using information recorded on state hospital discharge abstracts. For each hospital, the discharge data were aggregated to the patient ZIP code level. Then, each patient ZIP code was ranked, in descending order, by number of discharges. A hospital's market was defined as the set of ZIP codes that comprised the top 90% of its discharges. This method of defining a hospital

market is similar to Phibbs and Robinson's variable-radius measure of local hospital market structure, except that they ranked ZIP codes by distance from the hospital.[10] Other hospitals serving patients from these ZIP codes were identified as competitors. Using this information, the hospital's market share, Herfindahl-Hirshman Index (HHI),* and number of competitors were calculated. The calculations of the hospital's actual market share and actual HHI use the distribution of the discharges within the hospital's market. The number of actual competitors was calculated two ways: (1) the total number of competitors regardless of how small a market share and (2) the number of competitors with more than 5% of the market.

Measures of potential hospital competition were also constructed for each hospital by identifying hospitals within a 15-mile radius as potential competitors.† Each hospital's potential market share and potential HHI were calculated using the distribution of beds within the radius. A 15-mile radius is used because it is a reasonable distance for physicians to travel to visit patients in competing hospitals.[11]

CHARACTERISTICS OF THE NINE STUDY STATES

The nine states chosen for this analysis are somewhat representative of the nation (see Table I). In 1990, 43.1% of the nation's population resided in these nine states. Asian- and Hispanic-Americans were over-represented; African-Americans were under-represented. In these nine states lived 65.3% of the nation's Asian-American population and 61.9% of the nation's Hispanic population, due to the presence of California in the study. Only 38.4% of African-Americans lived in these states, reflecting the absence of southern states in the study.

The nine states varied with respect to composition of their population by race and Hispanic origin. Wisconsin, Washington, and Massachusetts had the highest proportion of white Americans; New York and California had the lowest. California had the highest proportion of Asian- and Hispanic-Americans, while barely 3% of the population in Wisconsin was either Asian or Hispanic. The percentage of African-Americans in population was highest in New York, Illinois, and New Jersey, but was less than half the national percentage in Washington, Wisconsin, and Massachusetts.

*The HHI summarizes the distribution of market shares among firms in a market. The HHI is equal to the sum of the squares of the market shares. A monopoly or single firm market has an HHI of 1, whereas for a very competitive market with a lot of firms, HHI approaches 0. For further explanation, see J. Tirole, *The Theory of Industrial Organization*, Cambridge, MA: MIT Press; 1990.

†The distance between two hospitals was approximated using the distance between the population centroids of the ZIP codes of the two hospitals.

TABLE I Racial and Ethnic Composition, Median Household Income, and Poverty Rates for States in the Study*

	Percentage of Population in 1990†				Economic Status	
State	Asian and Pacific Islander	African-American	White	Hispanic (Any Race)	Median Household Income‡	Poverty Rate‡
California	9.9	7.7	81.4	25.8	39,458	16.7
Florida	1.2	13.7	84.8	12.2	31,708	14.9
Illinois	2.6	14.9	82.3	7.9	40,613	11.9
Massachusetts	2.4	5.4	91.9	4.8	41,016	11.1
New Jersey	3.7	14.4	85.3	10.0	47,612	8.8
New York	3.9	17.0	78.7	12.3	35,601	16.6
Pennsylvania	1.2	9.3	89.4	2.0	36,525	11.7
Washington	4.4	3.1	90.6	4.4	39,846	11.2
Wisconsin	1.1	5.1	93.0	1.9	41,215	8.5
US	3.0	12.3	84.1	9.1	36,399	13.6

*Data from US Bureau of the Census Population Estimates Program, Population Division.

†These estimates are based on 1990 census data, making them comparable with the ZIP code level information used to compile the market profiles. Racial groups do not sum to 100 because Native American and others have been excluded. Hispanics can include members of all races.

‡Based on 3-year average for 1995–1997 from the US Bureau of the Census, 1998, 1997, and 1996 Current Population Surveys.

For the most part, residents in these nine states were more affluent than average residents in the nation. Compared to the nation, seven of the nine states had higher median household incomes, and six states had lower poverty rates. The nine states varied substantially in respect to economic status. There was almost a $16,000 difference in median household incomes across the states, ranging from $31,708 in Florida to $47,612 in New Jersey. The poverty rate had an equally wide distribution, ranging from 8.5% in Wisconsin to 16.7% in California.

CHARACTERISTICS OF URBAN SAFETY-NET HOSPITALS

In 1994, there were 1,191 urban or metropolitan hospitals in the nine states, of which 177 were USN hospitals. Of the USN hospitals, 31.1% were owned publicly, 53.1% were private nonprofit hospitals, and 15.8% were investor-owned hospitals (Table II). The investor-owned USN hospitals tended to be mostly small hospitals (less than 150 beds) located primarily in Los Angeles. USN hospitals were larger than non-safety-net hospitals: 33.9% of USN hospitals had more than 300 beds, compared to 30.1% of non-safety-net hospitals. USN hospitals were more likely to be involved with graduate medical education (GME). Of the 52 academic health center hospitals in these nine states, 19 were USN hospitals. Almost 19.8%

TABLE II Safety-Net Hospitals and Non-Safety-Net Hospitals: Ownership, Size, and Teaching Status in Medical School Affiliates in Nine States, 1994*

	Safety Net Hospitals (N = 177)		Non-Safety-Net Hospitals (N = 1,014)	
	n	%	n	%
Ownership				
Public	55	31.1	69	6.8
Nonprofit	94	53.1	785	77.4
For profit	28	15.8	160	15.8
Capacity				
Less than 100 beds	27	15.2	176	17.4
100–300 beds	90	50.9	533	52.6
More than 300 beds	60	33.9	305	30.1
Teaching status				
Medical school affiliate	77	43.5	300	29.6
COTH	35	19.8	94	9.3
Academic health centers	19	10.7	33	3.2

COTH = Council of Teaching Hospitals.
*Data from state discharge abstracts and the AHA Annual Survey of Hospitals.

of USN hospitals were members of the Council of Teaching Hospitals (COTH), compared to 9.3% of non-safety-net hospitals. About 43.5% of USN hospitals were affiliated with a medical school, compared to 29.6% of non-safety-net hospitals. There were 57 USN hospitals in the five largest center cities in 1994 and 111 non-safety-net hospitals. Of the remaining urban hospitals in these nine states, 120 were USN hospitals, and 903 were non-safety-net hospitals.

USN and non-safety-net hospitals were distributed similarly across the nine states in the study (Table III). California and New York had slightly higher shares of USN hospitals compared to their shares of non-safety-net hospitals. The other states, notably Massachusetts and Pennsylvania, had slightly lower shares of USN hospitals in relation to their shares of non-safety-net hospitals. California had the most USN hospitals (63), followed by New York and Florida (31 and 23, respectively).

PROFILES OF GEOGRAPHIC MARKETS OF URBAN SAFETY-NET HOSPITALS

By definition, USN hospitals treated more Medicaid and self-pay/charity care patients than non-safety-net hospitals (Table IV). In the five largest center cities and other urban areas in the nine states, the majority of discharges from USN

TABLE III Safety-Net Hospitals and Non-Safety-Net Hospitals by Location for Selected States, 1994*

	Safety-Net Hospitals (N = 177)†		Non-Safety-Net Hospitals (N = 1,014)†	
State	n	%	n	0%
California	63	35.6	271	26.7
Florida	23	13.0	144	14.2
Illinois	16	9.0	88	8.7
Massachusetts	5	2.8	64	6.3
New Jersey	9	5.1	75	7.4
New York	31	17.5	143	14.1
Pennsylvania	17	9.6	137	13.5
Washington	7	4.0	40	3.9
Wisconsin	6	3.4	52	5.1

*Data from state discharge abstracts.
†Columns do not sum to 100% due to rounding.

hospitals were Medicaid or self-pay/charity patients. USN hospitals had three times as many Medicaid and self-pay/charity discharges as non-safety-net hospitals in the five largest center cities and the other urban areas. Conversely, USN hospitals had half as many Medicare, private, and health maintenance organization discharges as non-safety-net hospitals.

The residents in the geographic markets of USN hospitals were more likely

TABLE IV Source of Payment for Patients of Urban Safety-Net Hospitals and Other Urban Hospitals in Selected States, 1994*

	Five Largest Center Cities†		Remaining Urban Area†	
	Safety-Net Hospitals (N = 57), %	Non-Safety-Net Hospitals (N = 111), %	Safety-Net Hospitals (N = 120), %	Non-Safety-Net Hospitals (N = 903), %
Payer Source				
Medicaid	56.3	17.7	43.9	13.0
Self-pay/charity care	7.7	3.1	11.6	4.2
Medicare	16.9	37.6	20.4	39.4
Private	11.9	23.1	13.2	24.2
HMO	4.0	13.1	8.6	15.1
Other	3.2	5.3	2.4	4.1

†Columns do not sum to 100% due to rounding.
HMO = health maintenance organization.
*Data from state discharge abstracts.

to be ethnic and racial minorities and less likely to speak English in their homes (Table V). USN hospitals in the five largest center cities had the most ethnic and racially diverse geographic markets. Of residents in the markets of USN hospitals in the five largest center cities, 60% were nonwhite. Americans of other races (excluding African-Americans, Asians, and whites) comprised, on average, 18% of the residents in geographic markets of USN hospitals in the five largest center cities. The racial and ethnic compositions of the residents of geographic markets of non-safety-net hospitals in these large center cities appeared to be similar to the markets of USN hospitals in the remaining urban areas. In comparison, the markets of non-safety-net hospitals in these large center cities had higher percentages of Asian and African-American residents, while markets of USN hospitals in the remaining urban areas had higher percentages of Hispanics. However, the markets of USN hospitals in the remaining urban areas were more diverse racially and ethnically than the markets of non-safety-net hospitals in these urban areas. The residents in the markets of USN hospitals in the remaining urban areas were more likely to be nonwhite and/or Hispanic and less likely to speak English than residents of the non-safety-net hospitals in these urban areas.

Not surprisingly, the population in the markets of USN hospitals had lower

TABLE V Race, Ethnic Status, and Language of Patients of Urban Safety-Net Hospitals and Non-Safety-Net Hospitals in Selected States, 1994*

	Five Largest Center Cities		Remaining Urban Areas	
	Safety-Net Hospitals (N = 57)	Non-Safety-Net Hospitals (N = 111)	Safety-Net Hospitals (N = 120)	Non-Safety-Net Hospitals (N = 903)
Race, %†				
Asian or Pacific Island	4.8	6.4	4.8	3.4
African-American	37.1	22.1	16.6	7.7
Americans of other races and national origins	18.0	10.2	12.9	5.0
White	40.0	61.3	65.7	83.9
Ethnicity, %				
Hispanic (any race)	30.2	18.9	23.1	10.4
Household language, %				
Asian or Pacific Island	3.5	4.2	3.3	2.2
English	60.2	67.8	71.1	81.3
Spanish	27.3	16.0	19.0	8.9
Other	9.0	12.0	6.5	7.6

†Data do not sum to 100% due to rounding.

*Data from state discharge abstracts and US Census Bureau.

socioeconomic status than those in markets of non-safety-net hospitals (Table VI). The residents in the markets of USN hospitals were less educated, had lower incomes, and lived in areas with higher poverty rates. The residents in markets of USN hospitals in the large center cities were the least educated and lived in areas with the highest poverty rates, followed by residents of USN hospitals in the remaining urban areas. The non-safety-net hospitals in the large center cities and the remaining urban areas served markets with similar economic status. Educational attainment of the residents in the markets of non-safety-net hospitals in the large center cities was more diverse in comparison to residents in the markets of non-safety-net hospitals in the remaining urban areas. The large center cities had more college-educated residents and more residents with less than a high school education, while residents in the markets of non-safety-net hospitals in the remaining urban areas were more likely to have only a high school diploma or some college.

USN hospitals were important providers of care for low-income and vulnerable minority communities. USN hospitals provided a disproportionate share of the discharges originating from ZIP codes with high concentrations of minorities and persons living in poverty (Table VII). In the nine states, USN hospitals provided 41.4% of the discharges from ZIP code areas with high poverty. In each of the states, the share of discharges for USN hospitals from ZIP code areas with

TABLE VI Educational Attainment and Economic Status of Patients of Urban Safety-Net Hospitals and Non-Safety-Net Hospitals in Selected States, 1994*

	Five Largest Medical School Affiliates		Remaining Urban Areas	
	Safety-Net Hospitals (N = 57)	Non-Safety-Net Hospitals (N = 111)	Safety-Net Hospitals (N = 120)	Non-Safety-Net Hospitals (N = 903)
Education, %†				
No high school	19.2	12.6	15.9	9.6
Some high school	22.4	16.5	17.2	14.1
High school	25.8	25.8	28.1	30.9
Some college	19.1	23.0	23.8	25.6
Bachelor's degree or higher	13.6	22.1	14.9	19.9
Economic status				
Median household income, $	24,597	32,742	28,932	34,347
Per capita income, $	11,228	16,356	12,585	15,491
Poverty rate, %	25.4	15.7	17.2	10.5

†Data may not sum to 100% due to rounding.
*Data from state discharge abstracts and US Census Bureau.

TABLE VII Urban Safety-Net Hospital Shares (%) of All Urban Discharges and Discharges Originating from ZIP Codes with High Percentages of Racial/Ethnic Minorities and High Poverty Rates, 1994*

State	All Discharges	Asian	African-American	Hispanic	Other Races and National Origins	Non-English Speaking	High Poverty
California	21.1	27.8	34.7	56.0	59.2	53.8	52.5
Florida	16.9	14.6	43.1	22.7	30.6	23.9	42.8
Illinois	14.0	6.9	34.5	21.7	22.1	19.6	41.9
Massachusetts	9.8	10.4	26.5	28.3	30.2	20.7	29.5
New Jersey	9.3	12.7	32.5	25.7	25.9	23.6	36.8
New York	22.5	29.3	48.1	43.3	44.3	42.8	51.1
Pennsylvania	8.0	10.2	11.4	18.3	17.4	20.9	17.6
Washington	8.5	13.0	18.5	46.5	44.4	42.4	23.4
Wisconsin	9.8	6.2	23.3	18.2	22.2	16.4	24.2
All nine states	15.7	17.8	34.1	34.2	35.3	34.0	41.4

*Data from state discharge abstracts and US Census Bureau.

high poverty was two to four times greater than their share of all urban discharges. In California and New York, USN hospitals provided over half of the discharges from ZIP code areas with high poverty. In five states where USN hospitals provided less than 10% of the urban discharges, their share of discharges from ZIP code areas with high poverty ranged from 17.6% to 36.8%.

African-American, Hispanic, Native American, and other minority communities were dependent disproportionately on USN hospitals for care. USN hospitals provided over a third of the discharges originating from ZIP codes with high concentrations of African-Americans, Hispanics, Native Americans, and other minorities. However, there are differences across states that correspond to the national distribution of racial and ethnic minorities. African-Americans were most dependent on USN hospitals in New York (48.1%) and Florida (43.1%); Hispanic-Americans were most dependent on USN hospitals in California (56%), Washington (46.5%), and New York (43.3%); Native Americans and other minorities were most dependent on USN hospitals in California (59.2%), Washington (44.4%), and New York (44.3%). Similarly, non-English-speaking communities were dependent on USN hospitals, particularly in California (53.8%), New York (42.8%), and Washington (42.4%).

Although the shares of USN hospitals of discharges from ZIP codes with high concentrations of Asian-Americans were 28% to 53% greater than their shares of urban hospital discharges in six of the nine states, Asian-American communi-

ties did not appear to depend on USN hospitals for care. In the nine states, there was only a small difference between the share of discharges of USN hospitals from ZIP codes with high concentrations of Asian-Americans (17.8%) and their share of all urban discharges (15.7%). Another interpretation of this small difference is that Asian-Americans are not as segregated residentially as other racial and ethnic groups. In 99% of all ZIP codes, Asians comprised less than 24% of the population. Consequently, ZIP codes are not a very effective way of identifying Asian-American neighborhoods.

URBAN SAFETY NET HOSPITALS AND HOSPITAL COMPETITION

The measures of actual competition indicate that USN hospitals and non-safety-net hospitals faced similar levels of competition (Table VIII). There is a dramatic difference in the level of competition in the five largest center cities and the remaining urban areas. The actual HHI for urban hospitals in the five largest center cities was equivalent to a market with about 20 hospitals, each with 5% of the discharges, while markets in the remaining urban areas were equivalent to about 7 hospitals, each with 14.3% of the discharges. However, there was no

TABLE VIII Hospital Competition Faced by Urban Safety-Net Hospitals and Non-Safety-Net Hospitals, 1994*

	Five Largest Center Cities			Remaining Urban Areas		
	Urban Safety-Net Hospitals	Non-Safety-Net Hospitals	*P*	Urban Safety-Net Hospitals	Non-Safety-Net Hospitals	*P*
Actual hospital competition						
Actual market share	6.0	4.4	.04	15.3	17.7	.11
Actual HHI	0.0494	0.0427	.11	0.1387	0.1475	.40
Number of competitors with more than 5% of market	4.9	4.6	.43	5.3	5.3	.88
Distance traveled by median discharge	3.7	4.9	.00	7.2	7.1	.89
Distance traveled by 90th percentile discharge	11.1	18.7	.00	25.0	22.2	.22
Potential hospital competition						
Potential market share	2.1	3.1	.00	22.6	28.3	.05
Potential HHI	0.0308	0.0396	.00	0.2590	0.3238	.02
Number of potential competitors	51.0	42.4	.00	15.5	11.4	.01

HHI = Herfindahl-Hirshman Index.
*Data from state discharge abstracts.

statistical difference in the level of competition between USN hospitals and non-safety-net hospitals in either the five largest center cities or the remaining urban areas.

The data indicate that the geographic markets of USN hospitals in the five largest center cities were more compact. Based on the distance traveled by the 90th percentile discharge, in comparison to USN hospitals in the five largest center cities, the radius of the geographic markets was 68% greater for non-safety-net hospitals in these center cities and more than twice the size for hospitals in the remaining urban areas.

The measures of potential competition also indicate that urban hospitals in the five largest center cities faced more competition than hospitals in the remaining urban areas. Hospitals in the large center cities had smaller shares of the beds in their geographic market and much smaller HHIs. Comparing USN and non-safety-net hospitals within both areas suggested that USN hospitals faced slightly greater potential competition than non-safety-net hospitals.

USN hospitals sometimes competed with one another; 78 of the 177 USN hospitals drew patients from the same ZIP codes. Also, 65 other USN hospitals were located within 15 miles of another USN hospital, but these hospitals actually did not compete with each other. The remaining 34 USN hospitals did not have a USN hospital as an actual or potential competitor.

There were 287 non-safety-net hospitals that competed with a USN hospital (Table IX). These hospitals tended to be large, private, nonprofit institutions. Another 290 hospitals were located within 15 miles of a USN hospital, but did not draw many patients from the same ZIP codes as a USN hospital. These hospitals tended to be smaller, between 100 and 300 beds. Also, 28.6% of these potential competitors were for-profit hospitals.

THE FINANCIAL STATUS OF URBAN SAFETY-NET AND NON-SAFETY-NET HOSPITALS

In 1993, USN hospitals were dependent financially on government subsidies (Table X). In the five largest center cities and the remaining urban areas, USN and non-safety-net hospitals had similar total margins. While total margins were lower on average in the five largest center cities, this was true for both types of hospitals. The financial parity between USN hospitals and non-safety-net hospitals was due in part to two sources of funds: Medicare disproportionate share (DSH) payments and state and local government appropriations.

In both areas, USN hospitals had significantly higher Medicare margins than non-safety-net hospitals. This difference can be attributed to Medicare DSH

TABLE IX Characteristics of Hospitals that Compete with USN Hospitals, Selected States, 1994*

	Actual Competitor Hospitals (N = 287)		Potential Competitor Hospitals (N = 290)	
	n	%	n	%
Ownership				
Public	21	7.3	12	4.1
Nonprofit	230	80.1	195	67.3
For profit	36	12.5	83	28.6
Capacity				
Less than 100 beds	14	4.9	52	17.9
100–300 beds	129	44.9	172	59.3
More than 300 beds	144	50.2	66	22.8
Teaching status				
Medical school affiliate	109	38.0	90	31.0
COTH	50	17.4	23	7.9
Academic health center	17	5.9	9	3.1

COTH = Council of Teaching Hospitals.

*Data from state discharge abstracts and the AHA Annual Survey of Hospitals.

payments. The Medicare DSH payments were designed to reimburse hospitals for increased costs related to treating low-income patients. The average USN hospital received about 90% more in DSH payments per bed in the five largest center cities and over 225% more in the remaining urban areas. While both types of urban hospitals received indirect medical education (IME) and direct graduate medical education (GME) payments, payments to USN hospitals were not different statistically from payments to non-safety-net hospitals.*

Support from state and local governments was important to USN hospitals in the remaining urban areas. In these areas, there was an almost 17-fold difference in government appropriations per bed between USN hospitals and non-safety-net hospitals—$17,280 versus $1,068. While on average USN hospitals in the five largest center cities received more state and local government support, this difference was not significant statistically.

*IME payments were designed to reimburse hospitals with GME programs for the increased costs related to practicing medicine while training residents, increased patient complexity and severity, a broader scope of services, and the development and implementation of new medical technologies. The GME payments were designed to reimburse hospitals for the direct costs of residency programs.

TABLE X Financial Status of Urban Safety-Net Hospitals and Non-Safety-Net Hospitals, 1993*†

	Five Largest Center Cities			Remaining Urban Areas		
	Urban Safety-Net Hospitals	Non-Safety-Net Hospitals	*P*	Urban Safety-Net Hospitals	Non-Safety-Net Hospitals	*P*
Total margin	−1.1	0.6	.64	3.4	3.2	.70
PPS margin	13.0	−0.4	.00	−0.9	−12.3	.00
Beds	337	388	.31	241	240	.97
DSH payments per bed‡	$14,953	$7,871	.00	$9,624	$2,956	.00
IME payments per bed§	$8,441	$10,144	.45	$3,347	$2,603	.28
GME payments per bed‖	$4,370	$5,540	.30	$1,524	$1,094	.11
State and local government appropriations per bed	$6,391	$2,005	.19	$17,280	$1,068	.02

PPS = Medicare Prospective Payment System.

DSH = disproportionate share.

*Data from state discharge abstracts and Medicare Cost Reports (1996).

†Missing financial data resulted in a loss of 11% of the USN hospitals and 4% of the non-safety-net hospitals.

‡This reflects Medicare DSH payments only. Individual hospital data on Medicaid DSH payments are unavailable for all the study states. Medicaid DSH payments are reflected in the total margins.

§Medicare indirect medical education (IME) payments were designed to reimburse hospitals with graduate medical education (GME) programs for the increased costs related to practicing medicine while training residents, increased patient complexity and severity, broader scope of services, and development and implementation of new medical technologies.

‖Medicare direct graduate medical education GME payments were designed to reimburse hospitals for the direct costs of residency programs.

The primary government safety-net subsidy program for hospital services is the Medicaid DSH program. This program is a joint federal-state subsidy for hospitals that serve a disproportionate number of low-income patients. In 1997, the Medicaid DSH payments for inpatient care totaled $12.5 billion, compared to $4.6 billion for IME payments, $2.2 billion for GME payments, and $4.6 billion for Medicare DSH payments.[12] The federal government provided $7.1 billion, 56.8% of the total funding for the program. Medicaid DSH payments are an important source of revenue for safety-net hospitals. NAPH reports that, in 1995, these payments were 40% of funds used by their member hospitals to offset uncompensated care costs.[2] In Table X, Medicaid DSH payments are reflected in the total margins. While Medicaid DSH payments have a major impact on the margins of USN hospitals, the Medicare and state and local subsidies are also key factors in maintaining the financial solvency of these institutions.

DISCUSSION

This study documents that, in these nine states, USN hospitals were important providers of hospital care to vulnerable minority and low-income communities. Patients of USN hospitals were more likely to be from ZIP codes with

- more racial and ethnic minorities,
- more non-English-speaking residents,
- less-educated adult residents,
- more residents living at or below the poverty level, and
- lower median household incomes.

This study also found that substantial percentages of persons who some policymakers would not consider at risk resided near USN hospitals. For example, over a third of adult residents in the markets of USN hospitals have at least some college education. USN hospitals should not concede the hospital care of these people to other urban hospitals. Instead, they should market their services aggressively to these persons to complement their safety net mission.

While researchers and makers of public policy have asserted that USN hospitals treat vulnerable populations, this study improves on previous research because it combines hospital discharge data with ZIP code sociodemographic data from the US Census Bureau to develop profiles of the actual markets of the hospitals. Prior studies have used the demographic information of the city, county, or neighborhood of the hospitals to infer the composition of the patient population of hospitals. These methodologies do not control for border crossing between geopolitical areas; hospitals located near county or city borders may draw patients from neighboring geopolitical areas. Also, hospitals in the center city may be located near poor neighborhoods, but because of commuting patterns within the metropolitan area, they may serve primarily middle-class suburban populations.

This study has some limitations. First, the results are based on data from only nine states. While the analysis includes four of the five most populous states (California, New York, Florida, and Illinois) and the three largest urban centers (New York City, Chicago, and Los Angeles), southern and mountain states are not well represented. Therefore, the results may not be indicative of the markets of urban safety-net hospitals located in the southern and mountain regions. Second, the results are based on inpatient data. The markets of hospitals for outpatient services may differ geographically from their inpatient markets. Outpatient markets may be more compact geographically because patients may be less willing to travel long distances for outpatient services. Market profiles for

hospitals located in low-income and minority areas would tend to underestimate the extent to which these hospitals serve low-income and minority populations. Third, the study may understate market differences between USN and other hospitals. Hospital markets may be more segregated than ZIP code characteristics indicate. Despite living in the same ZIP code area, low-income and minority residents may use USN hospitals, while other residents may use non-safety-net hospitals.

This study documents that USN hospitals in these nine states served patients with special needs. Ethnic and racial minorities and low-income persons regardless of race/ethnicity face cultural and financial barriers to health care.[13] The ethnic and racial compositions of the patient population of USN hospitals raise the issue of the cultural competence of providers.* A recent study reports that Hispanics who have Hispanic physicians are more likely to trust their medical providers' judgment and ability to offer sound treatment for illness than Hispanics who have non-Hispanic providers.[14] This study suggests that understanding Hispanic culture and the ability to speak Spanish may enhance the ability of physicians to communicate with their patients effectively.

USN hospitals, by serving a disproportionate share of racial/ethnic minorities, may have developed the cultural and social amenities required to provide quality care to these communities. For example, hospitals serving a disproportionate share of Spanish-speaking patients may employ a bilingual staff or translators and produce hospital literature in Spanish to serve this segment of their markets better. Public safety-net hospitals in New York City report that they use bilingual staff to translate in over 50 languages.[5] Other hospitals, although within proximity of these patients, may not have the capability to provide services in a bilingual manner easily, thus limiting access to hospital care for Spanish-speaking patients. Asian-American and immigrant populations may face similar difficulties. In 1995, 21% of all minority adults indicated that language differences hindered their ability to obtain health care.[15]

POLICY IMPLICATIONS

Public policies that affect the viability of USN hospitals may place the access of vulnerable populations to hospital care at risk. The Balanced Budget Act of 1997

*_Cultural competence_ is defined as an active understanding of a person's culture, social norms, mores, and sanctions as these influence behavior and reactions to illness. For further explanation, see M. A. Orlandi, The challenge of evaluating community-based prevention programs: a cross-cultural perspective. In: M. A. Orlandi, R. Weston, L. G. Epstein, eds., _Cultural Competence for Evaluators_, Rockville, MD: US Department of Health and Human Services, Public Health Service; 1992:1–22.

(BBA) will affect USN hospitals. Some provisions may affect USN hospitals adversely, while other provisions may benefit USN hospitals. In the law, Congress limited future spending in the Medicare and Medicaid DSH programs. Congress is reducing Medicare DSH payments over 5 years: 1% in fiscal year (FY) 1998, 2% in FY 1999, 3% in FY 2000, 4% in FY 2001, and finally 5% in FY 2002. In addition, the federal government capped the federal portion of Medicaid DSH payments to 12% of total expenditures of the state medical assistance plan. States that currently are above the 12% ceiling are scheduled for a reduction in their Medicaid DSH allotments. For example, New York's allotment will fall from $1,512 million to $1,285 million—a 15% decline; California's allotment will fall from $1,085 million to $877 million—a 19% decline.

Although Congress reduced the DSH subsidies, it attempted to target them better to hospitals serving low-income and Medicaid patients. The BBA requires the Department of Health and Human Services to develop a new Medicare DSH formula based on the service of the hospitals to Medicaid patients, Medicare supplemental security income (SSI) beneficiaries, and uncompensated/charity care. Also, under the BBA, states can no longer include Medicaid DSH payments in the Medicaid capitation rates paid to managed-care organizations. Congress also restricted the ability of states to use DSH payments to support state mental health facilities. The BBA limits the flexibility of states in defining Medicaid DSH hospitals and setting Medicaid DSH payment amounts. States now are required to set priorities for Medicaid DSH payments to hospitals according to the proportions of low-income and Medicaid patients at the hospitals. Perhaps better targeting will secure the financial viability of USN hospitals despite the reduction in spending for DSH programs.

USN hospitals do not enjoy disproportionate levels of Medicare GME subsidies. While GME payments support the direct costs associated with teaching, IME payments are intended to compensate hospitals for the increased costs associated with education and teaching. Teaching hospitals, because of their technology, mode of service delivery, range of services, and patient populations, tend to have higher costs.[16] Patients admitted to teaching hospitals are believed to have more complex illnesses, which require more expensive treatments. Safety-net advocates argue that, in addition to education and research, IME payments help compensate hospitals for the costs of serving the poor and uninsured; however, this claim is disputed by some policymakers and industry officials.[17] As Congress reviews and revises the GME and IME payments under Medicare, careful consideration should be given to the relationship between the teaching and indigent care missions. Future payment methodology should reward those teaching hospitals

that take advantage of the joint costs associated with the two missions and use these subsidies to provide care to the poor and uninsured.

USN hospitals depend on the subsidies they receive from federal, state, and local governments. Public policy, such as reductions in Medicare and Medicaid DSH payments, may jeopardize the financial health of USN hospitals and limit their ability to finance their safety net mission. Policymakers should ensure that their actions do not reduce inadvertently the financial support that USN hospitals use to provide services to vulnerable communities, especially the uninsured.

REFERENCES

1. Fishman LE. What type of hospitals form the safety net? *Health Aff.* 1997;16(4):215–222.
2. National Association of Public Hospitals and Health Systems. *Characteristics of NAPH Member Hospitals.* Washington, DC: NAPH; 1996.
3. National Public Health and Hospital Institute. *Urban Social Health.* Washington, DC: NAPH; 1995.
4. Moy E, Valente E, Levin RJ, Griner PF. Academic medical centers and the care of the underserved populations. *Acad Med.* 1996;71(2):1369–1377.
5. National Association of Public Hospitals. *Preserving Access in the Era of Reform: America's Urban Health Safety Net.* Washington, DC: NAPH; 1994.
6. National Public Health and Hospital Institute. *Urban Social Health.* Washington, DC: NAPH; 1995.
7. Census of Population and Housing, 1990: Congressional Districts of the United States, 103rd Congress on CD-ROM (Summary Tape file 1D) (Summary Tape file 3D) [machine-readable data files]/prepared by the Bureau of the Census. Washington, DC: Bureau of the Census [producer and distributor]; 1993.
8. Loprest P, Gates M. *State-Level Data Book on Health Care Access and Financing.* Washington, DC: Urban Institute Press; 1993.
9. Porell FW, Adams EK. Hospital choice models: a review and assessment of their utility for policy impact analysis. *Med Care Res Rev.* 1995;52(2):158–195.
10. Phibbs CS, Robinson JC. A variable-radius measure of local hospital market structure. *Health Serv Res.* 1993;281(3):313–324.
11. Garnick DW, Luft HS, Robinson JC, Tetreault J. Appropriate measures of hospital market areas. *Health Serv Res.* 1987;22(1):69–89.
12. Medicare Payment Advisory Commission. *Report to the Congress: Medicare Payment Policy, March 1999.* Washington, DC: Medicare Payment Advisory Commission; 1998.
13. Lillie-Blanton M, Alfaro-Correa A. *Summary Report. In the Nation's Interest: Equity in Access to Health Care.* Washington, DC: Joint Center for Political and Economic Studies; 1995.
14. Castro FG, Coe K, Harmon M. The effects of ethnic and racial matches between provider and patient on the use of health services by Hispanics and African Americans. In: Lillie-Blanton M, Leigh WA, Alfaro-Correa AI, eds. *Achieving Equitable Access: Studies of Health Care Issues Affecting Hispanics and African Americans.* Washington, DC: Joint Center for Political and Economic Studies; 1996.
15. The Commonwealth Fund. *National Comparative Survey of Minority Health Care.* New York: The Commonwealth Fund; 1995.
16. Prospective Payment Assessment Commission. *Medicare and the American Health Care System: Report to the Congress.* Washington, DC: Prospective Payment Assessment Commission; June 1996.
17. Weissman J. Uncompensated hospital care: will it be there if we need it? *JAMA.* 1996; 276(10):8232–828.