

Physician Density and Location of Physician Training: The Impact on Avoidable Hospitalizations

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Research Question

Avoidable hospitalizations:

- Indicator of lack of appropriate access to primary care
- Indicator of quality of care and costly to both the health care system and the patient
 - Higher cost to treating chronic conditions in inpatient settings
 - Exposing patients to nosocomial infections

Research Question:

How does physician distribution and characteristics affect avoidable hospitalizations, accounting for selected community factors?

Identifying Avoidable Hospitalizations

- Identified by the Agency for Healthcare Research and Quality (AHRQ) using primary diagnosis
- Used by New York State Department of Health (NYSDOH) and placed into four categories
 - Diabetes
 - Circulatory
 - Respiratory
 - Acute
- Exclusions based on
 - Age
 - Transfers from other health care facilities
 - Secondary diagnoses
 - Procedures

Final Count of Avoidable Hospitalizations

Discharges from 2009, 2010 and 2011 SPARCS inpatient claims

		2009	2010	2011
Total SPARCS Records		2,665,235	2,621,602	2,583,619
Records with Avoidable Hospital Primary Diagnoses		347,675	327,721	323,720
Exclusion Criteria *	Abortion Indicator	20	16	14
	Bad/Missing/Out-of-State Zip Code	11,224	10,639	10,356
	Age	32,026	28,164	27,886
	Health Facility Transfers	16,184	19,319	20,064
	Secondary Diagnoses/Procedures	40,006	42,267	43,653
Total Records for Analysis		264,099	248,985	251,852

* Patients may have been excluded for more than one criterion. The "Total Records for Analysis" represents patients after all the exclusions were applied.

Study Variables

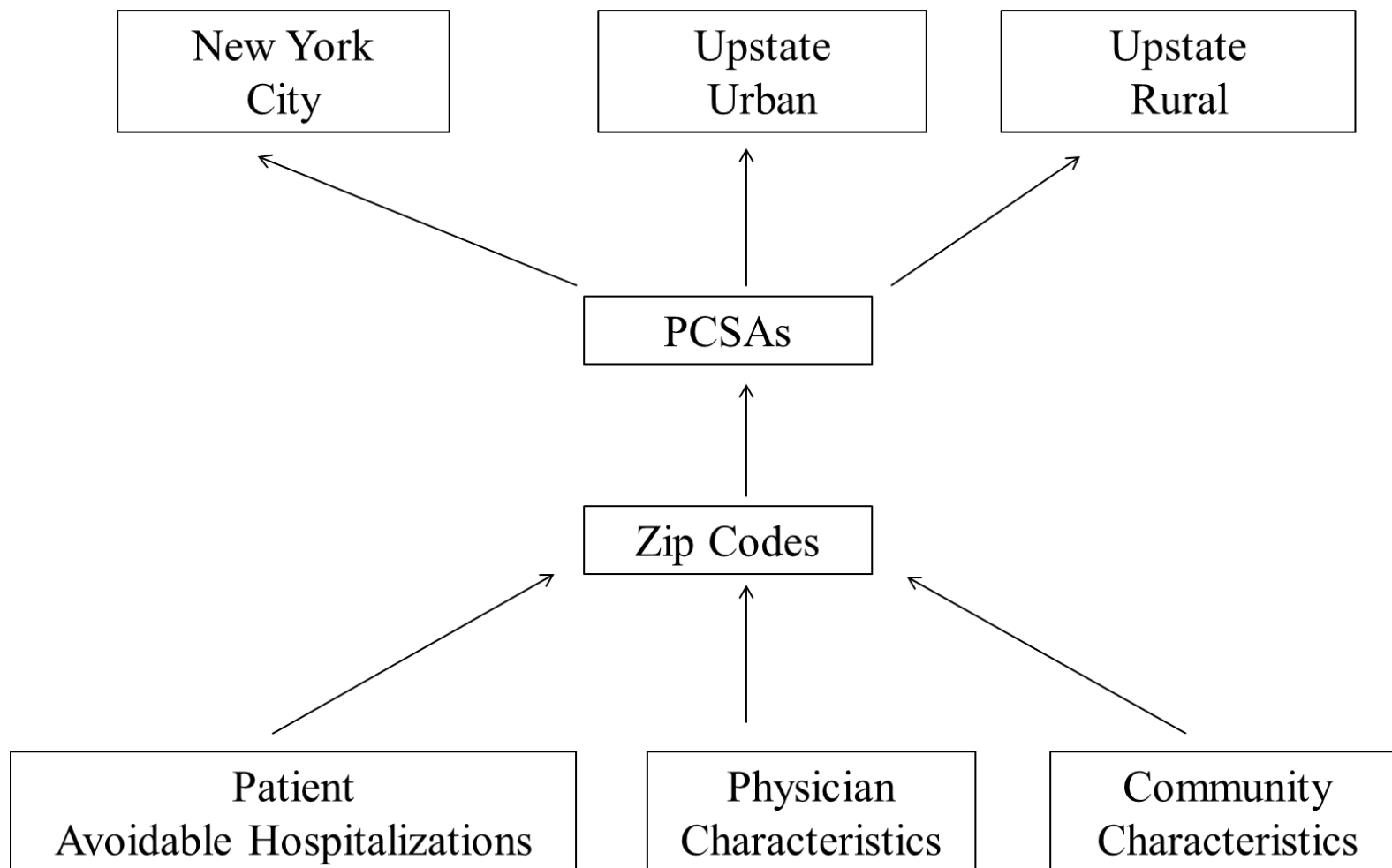
	Primary Care Provider (CHWS Data)	Community Indicators (2010 Census Data at Zip Code level)
Selection Criteria	<ul style="list-style-type: none"> • Primary care specialty • Community setting 	<ul style="list-style-type: none"> • None
Variables	<ul style="list-style-type: none"> • Population to Provider Ratio calculated using FTEs • Physicians IMG status • Physicians 40 plus • Physicians Female 	<ul style="list-style-type: none"> • Total Population (18 plus) • Percent underrepresented minorities • Percent elderly (65 plus) • Percent below the federal poverty line • Gini Coefficient (income inequality)

Center for Health Workforce Studies Physician Data

Followed HRSA HPSA Requirements

- Primary care specialty
 - General practice
 - Family practice
 - Internal medicine (general)
- Community setting
 - Private practice
 - Hospital outpatient
 - Clinics

Uses PCSAs as Unit of Geography



New York City Results: Total Avoidable Hospitalizations PCSA with Poverty and Minority Less than 20%

Variable	Category	Initial Rate of Avoidable Hospitalizations	Initial Rate Ratio	Adjusted Rate Ratio
Population 65 Plus	< 10%	81.2	1	1
	10% - 19%	108.4	1.33	1.62**
	20% and Higher	211.2	2.60	2.55***
International Medical Graduates	< 20%	86.1	1	1
	20% and Higher	135.5	1.57	1.62***
Physician Density	Less than 1,500:1	108.2	1	1
	1,500:1 to 1,999:1	123.7	1.14	0.92
	2,000:1 to 2,999:1	120.3	1.11	0.99
	3,000:1 and Higher	178.9	1.65	1.30***

* p < .05

** p < .01

*** p < .001

New York City Results: Total Avoidable Hospitalizations PCSAs with Poverty or Minority $\geq 20\%$

Variable	Category	Initial Rate of Avoidable Hospitalizations	Initial Rate Ratio	Adjusted Rate Ratio
Federal Poverty Level	< 10%	129.2	1	1
	10% - 19%	161.9	1.25	1.03
	20% - 39%	192.9	1.49	1.15
	40% and Higher	314.9	2.44	1.66**
Underrepresented Minorities	< 20%	147.8	1	1
	20% - 49%	141.5	0.96	1.05
	50% - 69%	171.1	1.16	1.27**
	70% and Higher	233.7	1.58	1.55***
Population 65 Plus	< 10%	199.2	1	1
	10% - 19%	175.4	0.88	0.98
	20% and Higher	259.1	1.30	1.32**
International Medical Graduates	<20%	176.4	1	1
	20% -59%	181.6	1.03	1.04
	60% and Higher	201.3	1.14	1.09
Physician Density	Less than 1,500:1	185.7	1	1
	1,500:1 to 1,999:1	181.8	0.98	0.91
	2,000:1 to 2,999:1	200.0	1.08	0.88
	3,000:1 and Higher	165.8	0.89	0.89*

* p < .05
 ** p < .01
 *** p < .001

Upstate Urban Results: Total Avoidable Hospitalizations

Variable	Category	Initial Rate of Avoidable Hospitalizations	Initial Rate Ratio	Adjusted Rate Ratio
Federal Poverty Level	< 10%	134.8	1	1
	10% and Higher	161.2	1.20	1.12 **
Underrepresented Minorities	< 20%	138.4	1	1
	20% - 49%	149.0	1.08	1.03
	50% and Higher	177.4	1.28	1.20**
International Medical Graduates	< 20%	132.1	1	1
	20% and Higher	154.6	1.17	1.10
Physician Density	Less than 1,500:1	145.2	1	1
	1,500:1 to 1,999:1	155.6	1.07	1.10
	2,000:1 to 2,999:1	146.8	1.01	1.05
	3,000:1 and Higher	147.7	1.02	1.08

* $p < .05$

** $p < .01$

*** $p < .001$

Upstate Rural: Total Avoidable Hospitalizations

Variable	Category	Rate of Avoidable Hospitalizations	Rate Ratio	Adjusted Rate Ratio
Federal Poverty Level	< 10%	128.4	1	1
	10% - 19%	176.9	1.38	1.35***
	20% - 29%	121.6	0.95	1.02
	30% and Higher	188.4	1.47	1.94***
Population 65 Plus	< 12%	109.9	1	1
	12% - 24%	167.3	1.52	1.33***
	25% and Higher	228.2	2.08	2.18**
International Medical Graduates	<20%	145.7	1	1
	20% and Higher	181.2	1.24	1.18**
Physician Density	Less than 1,500:1	165.8	1	1
	1,500:1 to 1,999:1	160.2	0.97	1.07
	2,000:1 to 2,999:1	150.6	0.91	1.05
	3,000:1 and Higher	157.5	0.95	0.97

* p < .05

** p < .01

*** p < .001

Study Limitations

- Does not include nurse practitioners and physician assistants in the analysis, which contribute to primary care capacity
- Community and physician data self-reported
- What does % of IMG mean?
 - Is it an issue of cultural differences or transient workforce?
- Unknown impact of snowbirds
- Definition of urban and rural limited
- PCSAs were developed using Medicare data. Other populations may have different commuting patterns.

Discussion

- Neighborhood characteristics, including poverty, race/ethnicity, and age distribution impact avoidable hospitalization rates more substantially than physician density and at least some physician characteristics.
- In resource rich areas (generally more affluent), workforce makes more of a difference than in less affluent areas with high avoidable hospitalization rates related to community factors.
- The impact of IMGs is not clear cut.
 - Lack of cultural competence
 - Transient workforce

Questions?

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