

Minority Serving Hospitals and Cancer Surgery Readmissions: A Reason for Concern

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Penalties for Readmissions After Surgery

- Readmissions have recently been evaluated as a metric of healthcare quality.
- Affordable Care Act 2010
 - Hospital Readmission Reduction Program (HRRP)
 - Penalized hospitals up to 3% Medicare repayment for higher than average readmission rates for medical conditions.
- Financial penalties have since been expanded for orthopedic procedures.
- These penalties will likely expand to other surgical procedures in the near future.

Fontanarosa PB. JAMA. 2013

Weber SM. Surgery. 2014

Minority Serving Hospitals are Vulnerable

- Minority Serving Hospitals (MSH)

- Provide care to large proportion of Blacks and Hispanics
- Compared to Non-MSH:
 - 2x as likely to be penalized for higher readmissions (61% vs. 32%)
 - Penalties are projected to be \$112M vs. \$41M
 - 2x higher operative mortality rates after major surgery
- However, little is known about readmission rates after major cancer surgery at Minority Serving Hospitals

Objectives

- Hypothesis

- Minority Serving Hospitals have higher readmission rates after major cancer surgery than Non-Minority Serving Hospitals.

- Primary Aim

- Quantify the impact of Minority Serving Hospitals on readmission rates after Major Cancer Surgery

- Secondary Aim

- Identify patient- and hospital- level contributors of readmissions

Data Source and Cohort

- Use of 2 complimentary Data sources:

- 2004 - 2011 State Inpatient Database of California:
 - Large and racially diverse population

Linked to

- Annual Survey Database of American Hospital Association:
 - Rich in hospital factors

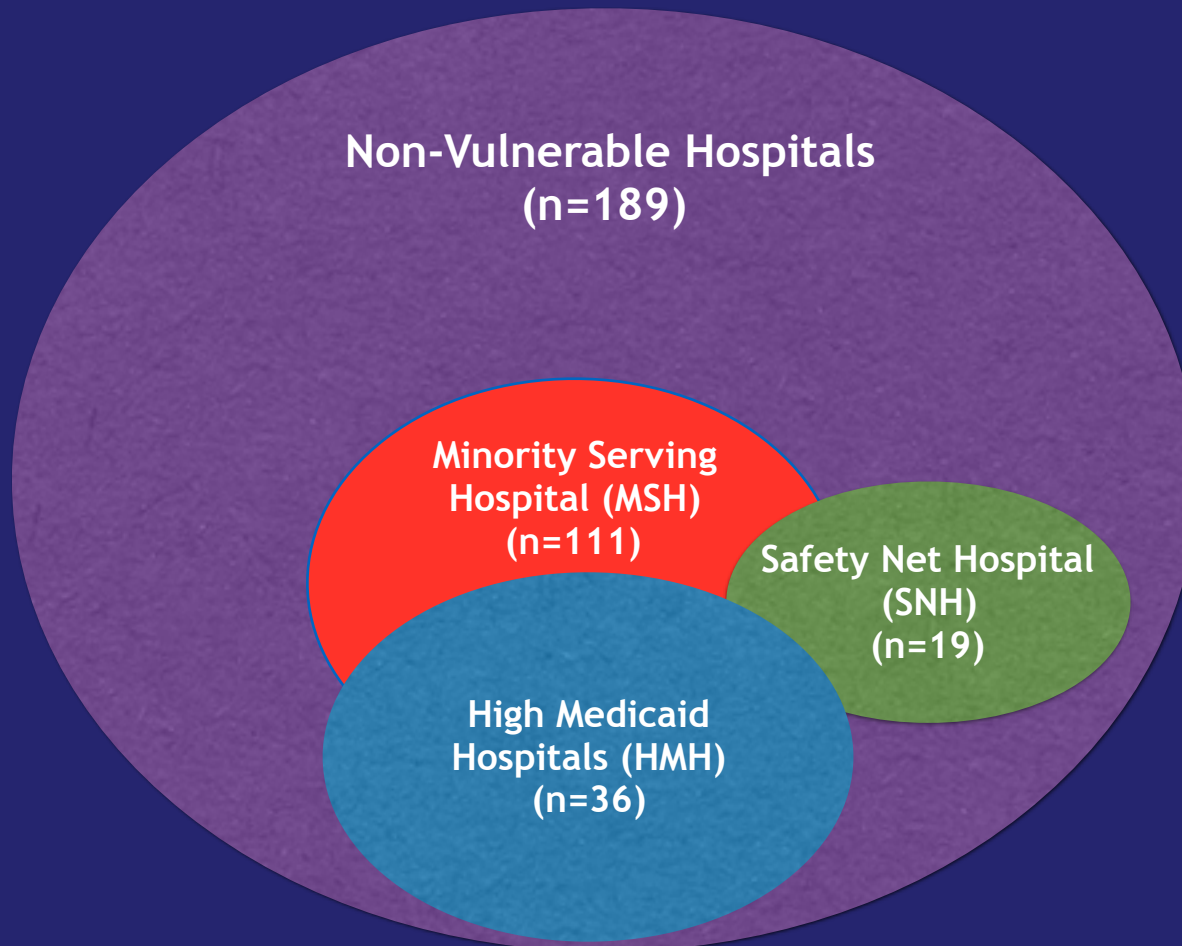
- Patient selection:

- 110,857 patients in 491 hospitals in California

- Operative procedures:

- Resections of lung, esophageal, gastric, pancreatic, hepatobiliary, rectal, and kidney cancers.

Vulnerable Hospitals in California Performing Major Cancer Surgery (n=355)



Minority Serving
Hospital (Top 25%)

High Medicaid
Hospital (Top 10%)

Safety Net Hospital
(California
Association of Public
Hospital and Health
System)

Statistical Methods

- Minority Serving Hospital

- Top quartile (25%) in proportions of Blacks and Hispanics served
- Asians were excluded due to improved SES/lower readmissions

- Covariates:

- **Patients**

- Age, Race/Ethnicity, Insurance, Multi-morbidity

- **Procedure status**

- Emergent

- **Hospitals**

- Bed Size, Teaching Status, Case Volume, Residency program

- **Readmission Diagnosis**

Statistical Methods

- Outcome (Dependent) Variables

- 30-day readmissions (Affordable Care Act priority)
- 90-day and repeated readmissions (clinical relevance)

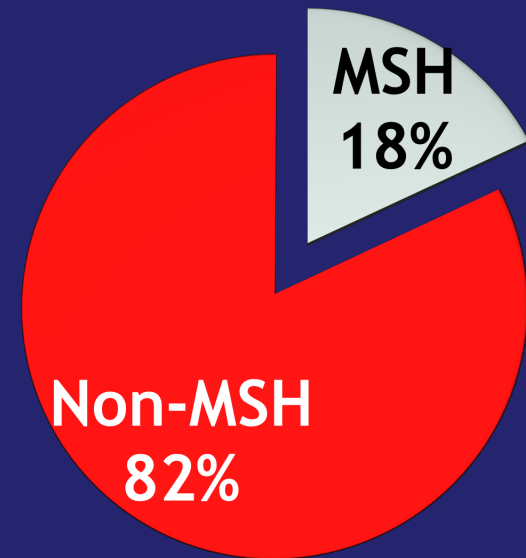
- Multivariable Analyses:

- MSH and readmission patterns (Hierarchical model with adjustment for case mix)
- Block-wise regression analyses by sequentially adding patient, procedure then hospital factors
- Repeated sensitivity analyses using different MSH proportional (top quartile or decile)

Results

Results

- 111 Minority Serving Hospitals (MSH)
- Performed 18% of all major cancer surgery



MSH patients are Younger, Multi-morbid and Undergo Emergency Surgery

		Non-MSH (%)	MSH (%)	P-Value
Age	18-49	18.2	19.7	<0.0001
	50-64	31.4	36.4	
	65-74	26.9	24.4	
	75+	23.5	19.5	
Charlson Comorbidity Index	0	59.5	56.0	< 0.0001
	1	26.2	26.7	
	2+	14.3	17.3	
Primary Insurance	Medicare	50.49	43.05	<0.0001
	Medicaid	5.09	16.43	
	Private	41.08	32.17	
	Other	3.34	8.36	
Emergency Status	No	92.36	83.69	<0.0001
Yes	7.64	16.31		

MSH are Teaching Hospitals, Non-Designated Cancer Program, and Low Procedure Volume

		Non-MSH (%)	MSH (%)	P-Value
Teaching Status	Teaching	17.5	31.0	0.0061
Designated Cancer Program	Yes	38.9	21.0	0.0016
Procedure Volume (Tertile/Year)	Low	28.63	53.33	<0.0001
	Medium	32.09	37.78	
	High	39.28	8.89	

Comparable Readmission Diagnosis

	Non-MSH (%)	MSH (%)
Septicemia	4.92	5.83
Intestinal Obstruction without hernia	4.61	4.14
Pneumonia	4	3.74
Complication of device; implant or graft	3.33	3.19
Hypovolemia	3.02	2.36
Acute and unspecified renal failure	2.27	1.77
Urinary tract		

Minority Serving Hospitals Had Higher Adjust Readmission Patterns

Percent of Minority Served at Hospital	30-Day Readmissions OR (95% CI)	90-Day Readmissions OR (95% CI)	Repeated Readmissions OR (95% CI)
2nd Quartile (vs. Q1)	1.05 (0.96-1.14)	1.06 (0.98-1.15)	1.06 (0.92-1.23)
3rd Quartile (vs. Q1)	1.13 (1.04 - 1.22)**	1.14 (1.06 - 1.22)***	1.20 (1.05-1.38)**
4th Quartile (MSH) vs. (Q1)	1.16 (1.05-1.29)**	1.18 (1.08,1.29)**	1.28 (1.10,1.50)**

Multivariable regression adjusted for age, sex, comorbidity, type of procedure, race, and year of admission.

** p < 0.01; *** p < 0.001.

Readmissions Predominately Driven by Patient Factors

Q4 vs. Q1-3	30 Day Readmissions		90 Day Readmissions		Repeated Readmissions	
	OR (95% CI)	% Change	OR (95% CI)	% Change	OR (95% CI)	% Change
Unadjusted	1.15 (1.06,1.24)		1.16 (1.09,1.25)		1.21 (1.09,1.34)	

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+HRRP	1.13 (1.04,1.23)	11.8%	1.15 (1.07,1.24)	9.0%	1.16 (1.05,1.29)	21.9%

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+Patient Factors	1.06 (0.96, 1.16)	50.9%	1.05 (0.96, 1.15)	59.0%	1.06 (0.93, 1.22)	47.8%

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+Hospital Factors	1.06 (0.96, 1.15)	0.0%	1.06 (0.97, 1.15)	-4.5%	1.08 (0.96, 1.22)	-9.4%

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Sensitivity Analysis using top decile/top quartile

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+Hospital Factors	1.12 (1.04,1.21)	6.0%	1.15 (1.07,1.24)	-0.4%	1.19 (1.08,1.32)	-11.8%
+Patient Factors	1.06 (0.96,1.15)	44.8%	1.06 (0.97,1.15)	55.0%	1.08 (0.96,1.22)	50.2%

Alternative order of block regression demonstrated similar outcomes.

Limitations and Strengths

- Limitations

- Administrative data are prone to variations in coding diagnosis (ICD)
- Lack of patient staging/treatments
 - Advanced stage may have higher readmissions

- Strengths

- Large and racially diverse cohort
- Results generalizable to many US states

Implications and Significance

- **HRRP program should account for social determinants**
 - Policy implications for adding race and socioeconomic factors into risk adjustment model of HRRP penalty system.
- **Explore readmission patterns after major cancer surgery at other vulnerable hospitals.**
 - High Medicaid Hospitals (HMH)
 - Safety Net Hospitals (SNH)
- **MedStar Surgical Readmission Risk Score (SR2) with link to Electronic Medical Record (EMR) decision support tool.**

Conclusions

- **Minority Serving Hospitals had higher readmission rates than Non-Minority Serving Hospitals.**
- **The increase in readmissions were driven more by patient rather than hospital factors.**
- **Unintended consequences of HRRP penalties place additional financial strain on MSH and may “crowd out” minorities.**

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