Do Expensive Hospitals Achieve Better Outcomes? Evidence from Ambulance Referral Patterns & Dispatch-Area Boundaries

Joseph Doyle, MIT
John Graves, Vanderbilt University
Jonathan Gruber, MIT
Samuel Kleiner, Cornell University

September 2011

Do Expensive Hospitals Achieve Better Outcomes?

- US spends vastly more than other countries on health care
- Within the US: Large regional variation in costs
- Little difference in health outcomes
- Hospital level: Mixed evidence for effects of treatment intensity on outcomes

Introduction

- Estimation Problem: Higher-cost hospitals may treat more expensive patients
- Our goal: Compare patients that are effectively randomly assigned to hospitals
- General idea: For emergencies, pre-hospital factors affect hospital choice
  - Ambulance referral patterns
  - Patient location

Introduction

- Idea 1: Use random assignment of ambulance companies within a ZIP code
    - Ambulance companies prefer certain hospitals (some are affiliated with hospitals)
    - The ambulance company dispatched is plausibly unrelated to patient characteristics

Introduction

- Idea 2: Compare patients on either side of service-area boundaries
  - Ambulance dispatch areas in New York State, coupled with exact patient address information.
  - Matched patients look similar and live near one another, yet go to different hospitals.
  - Strategy uses slight difference in time cost; ambulance dispatch rules.

Preview

- Ambulance referral patterns matter for hospital choice in emergencies
- High-cost hospitals associated with lower mortality across the strategies
- Spending effects persist conditional on measures of hospital quality

Plan of Talk

- Brief Background
- Data Description
- Empirical Frameworks
- Results
- Conclusions

Previous Evidence

- Dartmouth Atlas: huge variation in end-of-life spending; little difference in survival
- Hospital Literature:
  - Barnato (2010): reports mixed results; evidence of survival benefits but fade by 6 months
  - Skinner & Staiger (2009): how money is spent matters

Previous Evidence

- Literature recognizes unobserved patient differences could account for some of the variation in spending
- One idea: detailed patient controls (endogeneity concerns)
- Another idea: Use distance to hospitals as an instrument (McClellan, McNeil, & Newhouse, 1994): "high-tech" hospitals associated with lower mortality
- Tourists with health shocks in high- vs. low-spending areas

Data Description: Medicare Data

- 2002-2008
- Longitudinal claims data
- Key measure is hospital costs
  - Charges are reported in data
  - Multiply by cost-to-charge ratio
- Outcomes: Mortality (e.g. 1-year)
- Link to AHA data for teaching status & technology adoption index; CMS data for quality measures based on compliance with best practices

Sample Construction

- "Non-deferable" conditions to consider health shocks
- Main filters:
  - First emergency in 2002-2007
  - Uncensored 1-year mortality (exclude 2008)
  - Hospitals & Ambulance companies each with >30 observations (average >1000 for instrument calculation)

Medicare Data

- Key is matching to ambulance data from carrier files: 20% random sample of beneficiaries
- Include detailed information
  - Mode and method of transport (Advanced vs. Basic Life Support)
  - Specific pre-hospital interventions (intravenous therapy, cardiac pacing and defibrillation, administered drugs)
- Can control for "loaded miles" (distance ambulance traveled)
- Ambulance company identifier
  - Can use to construct empirical referral patterns

Data Description: NYS Data

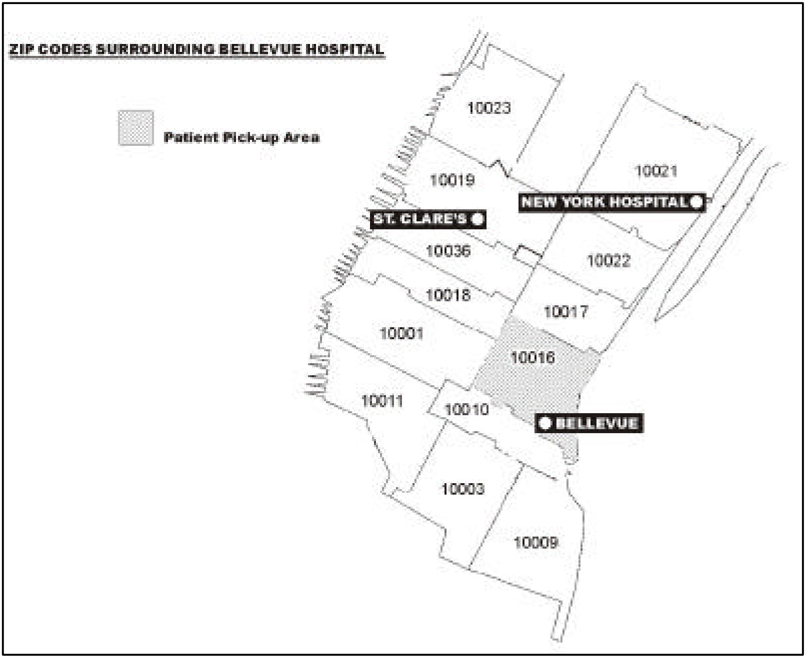
- Universe of inpatient Medicare hospital discharges
  - Do not observe ambulance transport
- Longitudinal: inpatient & vital statistics
- Exact Address field: 88% of patients
- Charges, procedures, diagnoses, age, sex
- Current results: 2000-2006; eventually 1995-2006
- Obtained ambulance dispatch boundaries for state of NY
  - Use GIS software to match addresses to boundaries
  - Consider census block groups (average 1500 persons) on either side of boundaries

Ambulance Company Approach

- Focus on patients arriving by ambulance (42% of emergency admissions)
- Level of ambulance service is targeted to patient severity
- Rotational assignment of competing ambulance services is increasingly common in the U.S.
  - NC & SC: Ambulances "race to the scene"
- Pilot survey of more than 30 communities
  - When multiple companies: rotational assignment or "closest"
  - When one company: mutual aid when busy

Ambulance Company Approach

- Ambulance companies show "preferences" in where they take patients
- SC example: ambulance take patients to affiliated hospitals
- Favorite Example: Giuliani privatizes ambulance service in NYC



Destination of Patients Picked Up In The Bellevue Hospital Zip Code Area

Destination	All Voluntary Hospital Ambulances	Fire Department Ambulances
Bellevue Hospital (HHC)	25%*	61%**
Any Voluntary Hospital	75%	39%

*157 taken to Bellevue/632 total. **815 taken to Bellevue/1,346 total

Ambulance Preferences: Empirical Evidence

- Want to know whether distribution of transports is the same for all ambulance companies that serve ZIP.
- χ^2 test of homogeneity in ambulance preferences.
- In each ZIP z, for $h = 1, ..., H$ Hospitals served and $a = 1, ..., A$ Ambulance companies serving the ZIP: $\sum_{a=1}^{A} \sum_{h=1}^{H} (n_{zha} - e_{zha})^2 / e_{zha} \sim \chi^2(A-1, H-1)$
- n_{zha} is observed frequency for each ambulance-hospital cell in ZIP; e_{zha} is expected frequency under H_0

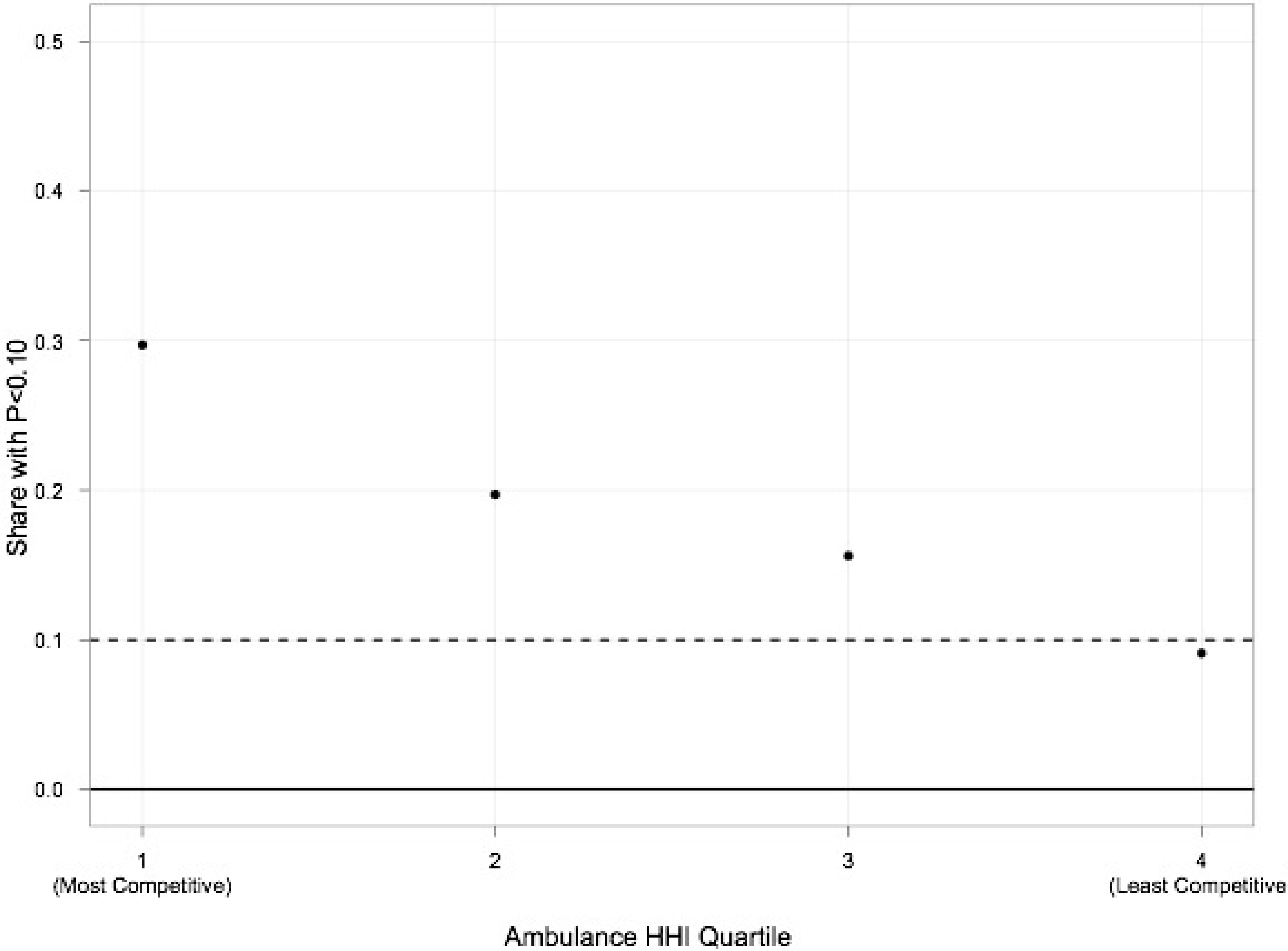
Ambulance Preferences: Empirical Evidence

- Distribution of ambulance transports in ZIP z:

	Ambulance A	Ambulance B	**Total**
Hosp. 1	10 (20%)	90 (60%)	100
Hosp. 2	5 (10%)	30 (20%)	35
Hosp. 3	25 (50%)	15 (10%)	40
Hosp. 4	10 (20%)	15 (10%)	25
Total	50	150	200

Ambulance Preferences: Empirical Evidence

- Under H_0, expect 10% of ZIPs to have $p < 0.1$.
- Among our sample, we observe 20% of ZIPs with $p < 0.1$.



Share with P<0.10
0.5
0.4
0.3
0.2
0.1
0.0
1
(Most Competitive)
2
3
4
(Least Competitive)
Ambulance HHI Quartile

Ambulance Strategy Structural Equation

For patient i residing in ZIP code z(i):

$$Y_i = \beta_0 + \beta_1 H_i + \beta_2 X_i + \beta_2 A_i + \theta_{z(i)} + \varepsilon_i$$

H_i is average hospital costs
X_i patient controls (indicators for age, race, sex, diagnoses, lagged costs)
A_i Ambulance controls (indicators for miles driven, ALS, IV administered, reimbursement level)

Ambulance Strategy Instrument

For patient i assigned to ambulance company a(i), calculate average hospital costs for other patients j:

$$Z_{a(i)} = \sum_{j}^{N_a - 1} Cost_j$$

Ambulance Strategy Estimating Equations

For patient i assigned to ambulance company a(i) residing in ZIP code z(i):

First Stage: $H_i = \gamma_0 + \gamma_1 Z_{a(i)} + \gamma_2 X_i + \gamma_2 A_i + \theta_{z(i)} + \nu_i$

Second Stage: $Y_i = \beta_0 + \beta_1 \widetilde{H}_i + \beta_2 X_i + \beta_2 A_i + \theta_{z(i)} + \varepsilon_i$

Potential Violations of Identifying Assumptions

- Ambulance companies select patients
  - Survey evidence gives us confidence this is not the case
  - Control for observables: including lagged outpatient cost
- Ambulance companies serve selected parts of ZIP code
  - Consider homogeneous/small ZIP codes
- LATE interpretation
  - Ambulance companies could transport higher-cost/sicker patients to public hospitals
    "Dumping" literature suggests is less of an issue for insured sample
  - Patients direct ambulances

Potential Violations of Identifying Assumptions

- Ambulance company directly affects health
    - Medical Literature: suggestive evidence that time-to-patient matters for low-tech interventions
    - Consider areas with only Advanced-Life Support ambulances
    - Innovation: we control for pre-hospital care
    - Consider mortality effects at short time horizons

Boundary Strategy Instrument

For patient i residing in ambulance-dispatch area a(i), calculate average hospital costs for other patients j in her area:

$$Z_{a(i)} = \sum_{j}^{N_a - 1} Cost_j$$

Boundary Strategy Estimating Equations

We match patients according to how close they are to particular borders, creating matched-cells.
For patient i residing in area a(i) in these matched cells, m(i)

First Stage: $H_i = \pi_0 + \pi_1 Z_{a(i)} + \pi_2 X_i + \theta_{m(i)} + \nu_i$

Second Stage: $Y_i = \beta_0 + \beta_1 \widetilde{H}_i + \beta_2 X_i + \theta_{m(i)} + \varepsilon_i$

Boundary Strategy: Potential Violations of Identifying Assumptions

- Boundaries are largely based on jurisdictions (e.g. counties)
  - Jurisdictions may differ along a number of dimensions
  - Subset: fire district boundaries

Results

Ambulance Results

Covariate Comparison

Table 2: Patient Characteristics Across Ambulance Companies

	Ambulance Company: Mean Hospital Costs vs. ZIP Code Average	
	<=Median	>Median
Mean Hospital log(Costs)	8.588	8.681
Predicted 1-year mortality	0.353	0.351
Age	78.3	77.9
Age < 65	0.093	0.099
Age >=65 & <70	0.087	0.091
Age >=70 & <75	0.122	0.126
Age >=75 & <80	0.175	0.174
Age >=80 & <90	0.389	0.382
Age >= 90	0.134	0.128
Observations	621780	

Table 2: Patient Characteristics Across Ambulance Companies

	Ambulance Company: Mean Hospital Costs vs. ZIP Code Average	
	<=Median	>Median
Male	0.395	0.397
Race: white	0.869	0.855
Race: African American	0.091	0.103
Comorbidity: Congestive Heart Failure	0.228	0.220
Comorbidity: COPD	0.253	0.250
Comorbidity: Diabetes	0.211	0.213
Comorbidity: Other	0.335	0.347
Lagged 1-year Outpatient Expenditure	1582	1661
Distance from ZIP centroid to hospital	7.15	7.04

Table 2: Patient Characteristics Across Ambulance Companies

	Ambulance Company: Mean Hospital Costs vs. ZIP Code Average	
	<=Median	>Median
Ambulance Payment	291	299
Ambulance Distance	7.38	7.32
Advanced Life Support	0.683	0.71
Ambulance: IV Administered	0.099	0.095
Ambulance: Outpatient Reimbursement	0.105	0.109
Ambulance: Emergency Transport	0.815	0.84
Observations	621780	

Ambulance Results

First Stage

Table 3: Ambulance Strategy: First Stage

Dependent Variable: Mean Hospital log(Costs)

	(1)	(2)	(3)
Ambulance: Mean Hospital log(Costs)	0.423	0.408	0.405
	(0.014)**	(0.014)**	(0.014)**
Year Controls	Yes	Yes	Yes
Patient Controls	No	Yes	Yes
Ambulance Controls	No	No	Yes
Observations	621780		
Mean of Dep. Var.	8.635		

Standard errors in parentheses, clustered at the HSA level. * significant at 5%; ** significant at 1%

Ambulance Results

Mortality

Table 4: Ambulance Strategy: 1-year Mortality

Dependent Variable: 1-year Mortality

	OLS		
	(1)	(2)	(3)
Mean Hospital log(Costs)	-0.025	-0.025	-0.025
	(0.004)**	(0.004)**	(0.004)**
Year Controls	Yes	Yes	Yes
Patient Controls	No	Yes	Yes
Ambulance Controls	No	No	Yes
Observations	621780		
Mean of Dep. Var.	0.352		

Table 4: Ambulance Strategy: 1-year Mortality

Dependent Variable: 1-year Mortality

	2SLS		
	(4)	(5)	(6)
Mean Hospital log(Costs)	-0.055	-0.054	-0.053
	(0.025)*	(0.017)**	(0.018)**
Year Controls	Yes	Yes	Yes
Patient Controls	No	Yes	Yes
Ambulance Controls	No	No	Yes
Observations	621780		
Mean of Dep. Var.	0.352		

Interpretation of Ambulance Results

- Structural Equation:
  For patient i: $Mortality_i = \beta_0 + \beta_1 Hospital\ Cost_i + \varepsilon_i$
- Instrument average hospital cost by ambulance measure
- A 2 s.d. increase in hospital costs is 0.7, and our estimate suggests such a move would reduce mortality by 3.5 ppt or 10% of the mean

Table 5: Ambulance Strategy: Mechanisms

A. OLS

Dependent Variable: 1-year Mortality

Teaching: AMA Recognized	-0.013			-0.011		
	(0.002)**			(0.002)**		
Technology Adoption: Top Decile		-0.012			-0.010	
		(0.002)**			(0.002)**	
CMS Quality Score			-0.063			-0.064
			(0.030)*			(0.030)*
Mean Hospital log(Costs)				-0.022	-0.021	-0.007
				(0.004)**	(0.004)**	(0.005)
Observations	621780	621780	423363	621780	621780	423363
Mean of Dep. Var.	0.352	0.352	0.349	0.352	0.352	0.349

Table 5: Ambulance Strategy: Mechanisms

B. 2SLS

Dependent Variable:	1-year Mortality					
Teaching: AMA Recognized	-0.036			-0.031	-0.034	
	(0.007)**			(0.007)**	(0.008)**	
Technology Adoption: Top Decile		-0.040				
		(0.007)**				
CMS Quality Score			-0.073			-0.068
			(0.145)			(0.145)
Mean Hospital log(Costs)				-0.045	-0.044	-0.056
				(0.018)*	(0.018)*	(0.031)
Observations	621780	621780	423363	621780	621780	423363
Mean of Dep. Var.	0.352	0.352	0.349	0.352	0.352	0.349

Competing Explanation

- Ambulance companies affiliated with high-cost hospitals may provide better EMS care
    - Observable ambulance services/distances are similar
    - 1-day mortality
    - Medical Literature: suggestive evidence that time-to-incident matters for low-tech interventions: CPR, defibrillators

Table 7: Ambulance Strategy: Mortality Horizons

A. OLS

Dependent Variable:	1-day	7-day	30-day	1-year	2-year
Mean Hospital log(Costs)	-0.0032	-0.0078	-0.015	-0.025	-0.033
	(0.0010)**	(0.0019)**	(0.0027)**	(0.004)**	(0.0044)**
Observations	714674	714674	707743	621780	522494
Mean of Dep. Var.	0.024	0.076	0.156	0.352	0.459

B. 2SLS

Dependent Variable:	1-day	7-day	30-day	1-year	2-year
Mean Hospital log(Costs)	0.0085	-0.0062	-0.036	-0.053	-0.059
	(0.0042)*	(0.0074)	(0.010)**	(0.018)**	(0.019)**
Observations	714674	714674	707743	621780	522494
Mean of Dep. Var.	0.024	0.076	0.156	0.352	0.459

Table A1: 2SLS Results for Subgroups

Dependent Variable: 1-year Mortality

Subgroup		Mean Hospital log(Cost) coefficient	S.E.	Obs	Mean of 1-year Mortality
A. Age	Age < 65	-0.042	(0.036)	59775	0.215
	Age 65 - 74	-0.035	(0.030)	131969	0.284
	Age 75 - 84	-0.038	(0.025)	237922	0.343
	Age 85 +	-0.056	(0.031)	192114	0.454

Table A1: 2SLS Results for Subgroups

Dependent Variable: 1-year Mortality

Subgroup		Mean Hospital log(Cost) coefficient	S.E.	Obs	Mean of 1-year Mortality
B. ZIP Code Characteristics					
Income: Standard Deviation	Bottom Quartile	-0.065	(0.026)*	151049	0.355
	2nd	-0.071	(0.030)*	151027	0.352
	3rd	-0.037	(0.030)	151140	0.352
	Top Quartile	-0.028	(0.030)	150890	0.351
Race HHI	Bottom Quartile	-0.025	(0.037)	151064	0.353
	2nd	-0.031	(0.029)	150989	0.356
	3rd	-0.073	(0.029)*	151084	0.351
	Top Quartile	-0.064	(0.026)*	150969	0.350

Table A1: 2SLS Results for Subgroups

Dependent Variable: 1-year Mortality

Subgroup		Mean Hospital log(Cost) coefficient	S.E.	Obs	Mean of 1-year Mortality
B. ZIP Code Characteristics					
Population Density	Bottom Quartile	-0.045	(0.025)	151212	0.363
	2nd	-0.106	(0.033)**	151008	0.351
	3rd	-0.108	(0.036)**	151112	0.351
	Top Quartile	0.056	(0.039)	151053	0.344
ZIP Code Area (sq miles)	Bottom Quartile	0.032	(0.039)	151106	0.344
	2nd	-0.074	(0.034)*	151119	0.350
	3rd	-0.087	(0.030)**	151068	0.353
	Top Quartile	-0.066	(0.028)*	151092	0.362

Table A3: Ambulance Strategy: Robustness

Dependent Variable: 1-year mortality

	Instrument Calculation:			
	Exclude own ZIP	Nondeferrable Sample	Hospital Charges	Nondeferrable Sample: Hospital Charges
Mean Hospital log(Costs)	-0.044	-0.118		-0.105
	(0.018)**	(0.020)**		(0.016)**
Mean Hospital log(charges)			-0.055	
			(0.015)**	
Observations	621780	621769	621780	621769
Mean of Dep. Var.	0.352	0.352	0.352	0.352

Table A3: Ambulance Strategy: Robustness

Dependent Variable: 1-year Mortality

		Sample:			
	IV Probit	Top 100 Most Common ER Admission Diagnoses	Exclude Patients who were transferred	Patient origin: home/nursing home	Teaching Hospital Definition
Mean Hospital log(Costs)	-0.054	-0.050	-0.062	-0.054	
	(0.025)*	(0.014)**	(0.019)**	(0.027)*	
Teaching: Member COTH					-0.049
					(0.0093)**
Observations	621780	1244108	598133	428735	621780
Mean of Dep. Var.	0.352	0.319	0.355	0.365	0.352

All models include full controls, except the IV Probit model. Standard errors in parentheses, clustered at the HSA level. * significant at 5%; ** significant at 1%

NYS Boundary Results

Covariate Comparison

Table 8: Patient Characteristics Across Borders

Sample:	Census Block Groups within 1-mile of a Border	
	Low Spending Side	High Spending Side
Mean Spending (list charges)	19707	22337**
Mean Log Spending	9.4003	9.492**
Avg Age	78.6424	78.434
Share Black	0.0670	0.1066**
Share Asian	0.0083	0.0219**
Share Hispanic	0.0274	0.0275
Share Other Race	0.0303	0.0385
Share Nat. Amer	0.0008	0.001
Share Male	0.3821	0.3858
Distance travelled	4.0845	3.6212*
Charlson Score	0.9144	0.9132
Median Income	53,301	52111
Mean Income	65602	66544
Share Owner Occupied Housing	0.8643	0.8597
Share Urban	0.9722	0.972

* significant at 5%; ** significant at 1%

NYS Boundary Results

First Stage

Table 9: NYS First Stage

Dependent Variable:	Mean Hospital Costs					
	1 mile		**2 miles**		**5 miles**	
	(1)	(2)	(3)	(4)	(5)	(6)
Ambulance Dispatch Area:	0.6360	0.6432	0.6650	0.6408	0.5815	0.5612
Mean Hospital log(Costs)	(0.2537)*	(0.2166)**	(0.2284)**	(0.1884)**	(0.1778)**	(0.1521)**
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Demographic Controls	No	Yes	No	Yes	No	Yes
Diagnosis Controls	No	Yes	No	Yes	No	Yes
Observations	140815	139573	214421	212894	284640	282735
Mean of Dep. Var.	9.4506	9.4488	9.4351	9.4337	9.4367	9.4354

Standard errors in parentheses, clustered at the ambulance-disptach area level. * significant at 5%; ** significant at 1%

NYS Boundary Results

Mortality

Table 10: NYS Strategy: 1-year Mortality & Hospital Costs

Dependent Variable: 1-year Mortality

	1 mile		2 miles		5 miles	
	OLS		OLS		OLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean Hospital log(Costs)	0.001	-0.022	0.004	-0.019	0.004	-0.023
	(0.011)	(0.007)**	(0.010)	(0.006)**	(0.008)	(0.007)**
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Full Controls	No	Yes	No	Yes	No	Yes
Observations	140815	139573	214421	212894	284640	282735
Mean of Dep. Var.	0.24	0.24	0.24	0.24	0.24	0.24

Table 10: NYS Strategy: 1-year Mortality & Hospital Costs

Dependent Variable: 1-year Mortality

	1 mile		2 miles		5 miles	
	2SLS		2SLS		2SLS	
	(1)	(2)	(3)	(4)	(5)	(6)
Mean Hospital log(Costs)	-0.071	-0.070	-0.044	-0.056	-0.046	-0.061
	(0.047)	(0.029)*	(0.035)	(0.028)*	(0.034)	(0.027)*
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
Full Controls	No	Yes	No	Yes	No	Yes
Observations	140815	139573	214421	212894	284640	282735
Mean of Dep. Var.	0.24	0.24	0.24	0.24	0.24	0.24

Interpretation of NYS Results

- Structural Equation:
  For patient i: $Mortality_i = \beta_0 + \beta_1 Hospital\ Cost_i + \varepsilon_i$
- Boundary Comparison: An estimate of -0.06 implies that a 2 s.d. increase in area costs (=0.76), and is associated with a 4.6 ppt reduction in 1-year mortality, or 19% of the mean.

Table 11: NYS Strategy: Horse Race w/ Teaching Status

A. OLS

Dependent Variable:	1-year mortality			
Sample:	1-mile		5-miles	
	(1)	(2)	(5)	(6)
Teaching: General Definition	-0.0157	-0.0061	-0.0069	-0.0015
	(0.0053)**	(0.0046)	(0.0042)	(0.0052)
Mean Hospital log(Costs)	0.0041	-0.0214	0.0048	-0.0226
from ER Admissions	(0.0108)	(0.0065)**	(0.0083)	(0.0071)**
Controls for Patient Characteristics	No	Yes	No	Yes
Observations	140815	139573	284640	282735
Mean of Dep. Var.	0.24	0.24	0.24	0.24

All models include border-pair fixed effects. Standard errors in parentheses, clustered at the district level. * significant at 5%; ** significant at 1%

Table 11: NYS Strategy: Horse Race w/ Teaching Status

B. 2SLS

Dependent Variable:	1-year mortality			
Sample:	1-mile		5-miles	
	(1)	(2)	(5)	(6)
Teaching: General Definition	-0.0149	-0.0101	-0.0600	-0.0342
	(0.0515)	(0.0404)	(0.0310)	(0.0298)
Mean Hospital log(Costs) from ER Admissions	-0.0537	-0.0587	0.0267	-0.0203
	(0.0872)	(0.0660)	(0.0658)	(0.0570)
Controls for Diagnoses and Demographics	No	Yes	No	Yes
Observations	140815	139573	284640	282735
Mean of Dep. Var.	0.24	0.24	0.24	0.24

All models include border-pair fixed effects. Standard errors in parentheses, clustered at the district level. * significant at 5%; ** significant at 1%

Table 12: NYS Strategy Results: Mortality Horizons

	OLS			2SLS		
Dependent Variable:	1-day	7-day	1-year	1-day	7-day	1-year
Sample: Census block-groups within 1-mile of border						
Mean Hospital log(Costs)	-0.0031	-0.0108	-0.022	0.0002	-0.0085	-0.070
	(0.0011)**	(0.0027)**	(0.007)**	(0.0076)	(0.0118)	(0.029)*
Observations	139573	139573	139573	139573	139573	139573
Mean of Dep. Var.	0.0151	0.0488	0.24	0.0151	0.0488	0.24
Sample: Census block-groups within 5-miles of border						
Mean Hospital log(Costs)	-0.0033	-0.0128	-0.023	-0.0076	-0.0268	-0.061
	(0.0006)**	(0.0024)**	(0.007)**	(0.0068)	(0.0127)*	(0.027)*
Observations	282735	282735	282735	282735	282735	282735
Mean of Dep. Var.	0.0153	0.0490	0.24	0.0153	0.0490	0.24

All models include full controls. Standard errors in parentheses, clustered at the district level. * significant at 5%; ** significant at 1%

Table A6: NYS First Stage- Nonelderly

Sample: Age 18-64

Dependent Variable: Mean Hospital log(Costs)

	1 mile		5 miles	
	(1)	(2)	(5)	(6)
Ambulance Dispatch Area:				
Mean Hospital log(Costs)	0.7318	0.6878	0.7502	0.6894
	(0.1706)**	(0.1433)**	(0.1333)**	(0.1222)**
Year Controls	Yes	Yes	Yes	Yes
Full Controls	No	Yes	No	Yes
Observations	114039	112611	236559	234413
Mean of Dep. Var.	9.1768	9.1758	9.1532	9.1523

Table A7: NYS Strategy: 1-year Mortality & Hospital Costs - Nonelderly

Dependent Variable: 1-year Mortality

	1 mile		**5 miles**	
	OLS		OLS	
	(1)	(2)	(5)	(6)
Mean Hospital log(Costs)	0.0054	-0.0097	0.0086	-0.0061
	(0.0035)	(0.0031)**	(0.0031)**	(0.0027)*
	2SLS		2SLS	
	(1)	(2)	(5)	(6)
Mean Hospital log(Costs)	0.0001	-0.0416	0.0080	-0.0243
	(0.0102)	(0.0185)*	(0.0124)	(0.0146)
Year Controls	Yes	Yes	Yes	Yes
Full Controls	No	Yes	No	Yes
Observations	114039	112611	236559	234413
Mean of Dep. Var.	0.0533	0.0532	0.0548	0.0548

Conclusions

- Ambulance Company assigned to emergency patients:
    - Affects hospital choice
    - Results in differences in care
    - Results in differences in mortality
- Similar results for boundary comparisons
- High-cost hospitals appear to achieve better outcomes in emergency situations
- Can we label the results as effects of higher cost?