Hospital Report Cards, Patients' Travel Distance, and Health Outcomes

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ABSTRACT

Public release of hospital report cards has two goals: to give hospitals an incentive to improve their services, and to give consumers the information they need to make informed choices about which hospital to use. One of the implications of the second goal is that patients may travel further than the closest available hospital if it has a poor grade. However, traveling to a hospital located farther away for treatment may affect a patient's health outcome in two ways: one, by improving it if they travel further to a hospital with a higher grade, second by degrading it, if the travel distance itself has a negative effect on outcomes. In this paper we study whether report card grades affected how far a patient traveled for cardiac artery bypass graft (CABG) surgery in Pennsylvania, and estimate the impact of that travel on health outcomes.

INTRODUCTION

Since early 1990s, Pennsylvania Health Care Cost Containment Council (PHC4) have published report cards for CABG outcomes based on the risk-adjusted in-hospital mortality rate.

In the report card, a hospital receives a medium grade if its risk-adjusted in-hospital mortality rate falls within a 95% confidence interval for the state. Similarly, a hospital receives a bad grade if its mortality rate is above the confidence interval, or receives a high grade if its mortality rate falls below the confidence interval. Since report cards provide rankings based on hospital performance that is two or three years ago, during the market expansion, the new entrants appeared to be "ungraded" in the latest report card.

METHODS AND DATA

1) Patients' hospital choice

$$CLOSEST_{it} = a + b_1 G_{it} + b_2 Margin_{it} + b_3 X_{it} + b_4 W_{it} + \delta_c + \tau_t + \varepsilon_{it}$$

$CLOSEST_{it}$=1 if patient i goes to the closest hospital at year t.

G is a set of three dummies used to represent the information contained in report cards about the patient's closest hospital.

2) Average marginal distance of patients

$$D_{jk} = a + b_1 G_{jk} + b_2 H_{jk} + b_3 W_{jk} + \theta_k + \tau_k + \varepsilon_{jk}$$

D_{jk} = log of average marginal distance the patients travel to hospital j in report card period k.

G is a set of three dummies that represent the information contained in report cards about the hospital.

3) Patients' health outcomes

$$OUTCOME_{it} = a + b_1 Travel_{it} + b_2 H_{it} + b_3 X_{it} + b_4 W_{it} + \delta_c + \tau_t + \varepsilon_{it}$$

$OUTCOME_{it}$ =1 if patient i died in the hospital for his/her CABG surgery at time t;

=1 if patient i was readmitted as AMI or heart failure during the year following his/her CABG surgery;

= log of total expense for CABG.

- Data on CABG patients are from PHC4. Our sample is patients undergoing CABG in PA hospitals during the period of 1995-2005.
- Data on PA hospitals are from AHA files.
- Sample size N=168364
- Health Outcomes: In-hospital mortality (0/1), one-year readmission (0/1), log of total hospital charges.
- Control variables: hospital choice, patient characteristics, hospital characteristics, county and year fixed effects.

REPORT CARDS AND TRAVEL DECISIONS

Table 1 shows the OLS estimation of equation (1), for the entire sample and then for scheduled patients only. The report card dummy variables all have positive coefficients, showing that a patient is more likely to go to the closest hospital if the hospital does enough CABG surgery to be graded, although the effect is usually not significant if the closest hospital received a low grade. This suggests that the volume of surgery at the closest hospital is a key determinant for patients, increasing the probability that they go to the closest hospital by about 20 percentage points.

Table 2 shows regression results for equation (2), where the dependent variable is the log of the average marginal distance patients traveled to the admitting hospital. The coefficients of the report card dummies show that hospitals that were graded drew patients further beyond the closest hospital to their homes. The marginal distance traveled beyond their closest hospital by an admitting hospital's patients increases, on average, by 35% if they receive a grade, and by an additional 23% if the grade is high. These results suggest that patients were more likely to travel further to more experienced and more highly graded hospitals.

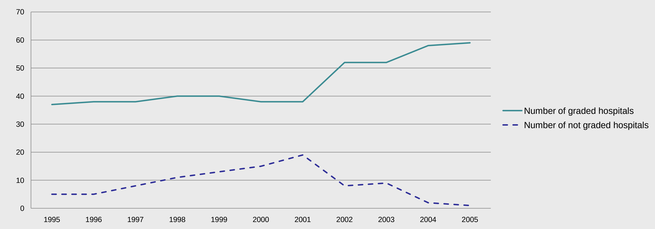

Figure 1. Number of Graded and Ungraded Hospitals.

	Whole Sample	Scheduled Patients
Closest hospital poor grade	0.181**	0.144*
	(0.081)	(0.085)
Closest hospital medium grade	0.214***	0.176**
	(0.069)	(0.069)
Closest hospital high grade	0.254**	0.229**
	(0.10)	(0.097)
Marginal distance to a hospital with grade	0.0200***	0.0134**
	(0.0055)	(0.0058)
Square of marginal distance to a hospital with grade	-0.000235**	-0.000116
	(0.00011)	(0.00010)
Scheduled	-0.0923***	
	(0.024)	
12-months Charlson Index=1	-0.0207***	-0.0108*
	(0.0058)	(0.0056)
12-month Charlson Index=2	-0.0198**	-0.0190
	(0.0096)	(0.012)
N	168364	110440
R-squared	0.20	0.22

Table 1
OLS Results on Patient's Hospital Choice

	Log Average Marginal Distance of Patients
Hospital's grade is Poor	0.299**
	(0.13)
Hospital's grade is Medium	0.299***
	(0.11)
Hospital's grade is High	0.462***
	(0.12)
Number of hospitals in the region	0.0435*
	(0.026)
Log # of beds	-0.343**
	(0.16)
For profit	-0.414**
	(0.17)
Teaching	0.142
	(0.14)
CIC beds	-0.0151
	(0.064)
R-squared	0.96

Table 2
OLS Results on Patients' Travel Distance

HEALTH OUTCOMES AND TRAVEL DISTANCE

Table 3 and Table 4 show OLS estimation of equation (3), where the dependent variable is either in-hospital mortality, readmission within twelve months, or the log of total cost. The results for the variable CLOSEST on Table 3 and for the distance dummies on Table 4 suggest that distance may be negatively related to health outcomes, ceteris paribus, but the evidence is not strong. There is stronger evidence that the travel decision affects total cost. On table 3 the coefficient of Closest is negative and significant, while on Table 4 the coefficients of the distance variables are positive and significant. Both tables suggest that shorter travel distance is associated with lower hospital expenditures.

Outcomes	In-hospital Mortality		1 Year Readmission		Log(Total Expenditure)	
	Whole	Scheduled	Whole	Scheduled	Whole	Scheduled
Go to closest hosp	-0.00136	-0.00178*	-0.00191	-0.00351**	-0.0604***	-0.0763***
	(0.00087)	(0.00096)	(0.0014)	(0.0015)	(0.012)	(0.012)
Scheduled	-0.00291***		-0.0102***		-0.144***	
	(0.00091)		(0.0013)		(0.0050)	

Table 3
OLS Regression of Outcomes on Patient's Hospital Choice

Health Outcomes	In-hospital Mortality		1 Year Readmission		Log(Total Expenditure)	
	Whole	Scheduled	Whole	Scheduled	Whole	Scheduled
Marginal distance >=1.5 miles	0.0007	0.0006	0.0015	0.0022	0.0335***	0.0509***
	(0.001)	(0.0011)	(0.0015)	(0.0018)	(0.013)	(0.013)
Marginal distance >=9 miles	0.0014	0.0018	0.0025	0.0038**	0.0922***	0.0908***
	(0.0011)	(0.0012)	(0.0018)	(0.0019)	(0.013)	(0.014)
Admitting hospital high grade	0.0014	0.002	-0.0059*	-0.0019	-0.0635***	-0.075***
	(0.0018)	(0.0021)	(0.0031)	(0.0033)	(0.016)	(0.017)
N	168364	110440	164568	108240	168364	110440
R-squared	0.01	0.01	0.02	0.02	0.91	0.90

Table 4
OLS Regression of Outcomes on Patient's Travel Distance

CONCLUSIONS

- Patients do respond to report card grades and travel further than their closest provider for better graded hospital services.
- Hospitals with higher grades serve more long-distance patients.
- Weak evidence that going to the closest hospital is associated with better health outcome.
- Strong evidence that going to the closest hospital saves medical care cost.