

Table 4 Variable coefficients used in the hospital mortality prediction models

Variable	Model 1		Model 2	
	B	OR (95% CI)	B	OR (95% CI)
(1) Age (Years)	0.02	1.02 (1.02 – 1.03)	0.02	1.02 (1.02 – 1.03)
(3) Hospital admission course				
Emergency	0.33	1.39 (1.12 – 1.72)	0.48	1.61 (1.28 – 2.01)
(4) Primary diagnosis on admission				
Hemopoietic malignancy	1.59	4.92 (2.15 – 11.24)	1.78	5.90 (2.51 – 13.90)
Other central nervous system disease	0.65	1.91 (1.08 – 3.36)	0.99	2.69 (1.49 – 4.85)
Stroke or cerebrovascular accident			0.81	2.25 (1.46 – 3.45)
Interstitial lung disease			0.77	2.16 (1.37 – 3.40)
Bacterial sepsis				
Lung malignancy	0.96	2.62 (1.49 – 4.58)	1.79	6.00 (3.41 – 10.55)
Intracranial hemorrhage	0.42	1.53 (1.20 – 1.95)	1.53	4.64 (3.61 – 5.96)
Pneumonia			0.63	1.88 (1.34 – 2.64)
Pneumoconiosis			0.84	2.32 (1.43 – 3.78)
Head injury	0.46	1.58 (1.06 – 2.37)	1.45	4.26 (2.79 – 6.52)
Respiratory failure			0.69	1.99 (1.32 – 2.99)
Drug poisoning	-1.99	0.14 (0.03 – 0.58)		
Cardiac failure	-1.06	0.35 (0.27 – 0.44)	-0.65	0.52 (0.41 – 0.67)
Myocardial ischemia	-0.59	0.55 (0.44 – 0.69)	-0.36	0.70 (0.56 – 0.86)
(5) Reason for entering ICU				
After emergency surgery	1.02	2.77 (2.03 – 3.79)	0.71	2.04 (1.47 – 2.83)
Medical disease	1.32	3.76 (2.86 – 4.94)	1.25	3.50 (2.63 – 4.66)
(6) Charlson score				
3	0.46	1.58 (1.26 – 1.98)	0.36	1.44 (1.13 – 1.83)
≥4	0.61	1.84 (1.35 – 2.50)	0.44	1.56 (1.12 – 2.16)
(7) Number of organ failures (except for respiratory failure) ≥1 (%)			0.63	1.88 (1.64 – 2.15)
(8) Renal replacement therapy (%)			1.05	2.86 (2.42 – 3.36)
(9) Pressors/vasoconstrictors (%)			1.27	3.55 (2.95 – 4.26)
Constant	-3.49		-5.41	

B:  $\beta$  coefficient; OR: Odds Ratio; CI: confidence interval

Predicted mortality risk =  $e^y / (e^y + 1)$ , where  $y = B_{(1)} * (1) + B_{(3)} * (3) + B_{(4)} * (4) + B_{(5)} * (5) + B_{(6)} * (6) + B_{(7)} * (7) + B_{(8)} * (8) + B_{(9)} * (9) + \text{constant}$ .

(1), (3), (4), (5), (6), (7), (8), and (9) = 1 if variables are applicable and 0 if variables are not applicable.

Table 5 Model discrimination for the mortality prediction equation in test and validation datasets

Model 1	2008 (test)	0.70	0.69 - 0.72
	2009 (validation)	0.69	0.68 - 0.70
	2010 (validation)	0.70	0.69 - 0.71
Model 2	2008 (test)	0.78	0.77 - 0.79
	2009 (validation)	0.78	0.77 - 0.79
	2010 (validation)	0.79	0.78 - 0.80

# Healthcare Accreditation and Quality Issues in Japan

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## Healthcare Quality/Safety Trend in Japan

- Medical accidents began to be frequently reported by mass media (late 1990s, 1999)
- Hospital accreditation introduced a new focus on patient right and safety, and care process (2000)
- National grand policy for patient safety (2002)
- Patient safety management system is formally required for hospitals (2003)
- Regional centers to promote patient safety started over the nation (2003, & legalized 2006)
- National DB for medical accidents (2004)
- Reimbursement system introduced additional fee points for patient safety system (2006)

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# Today's Outline

1. National Quality Initiatives and  
JCQHC (Japan Council for Quality Health Care)
2. Impact of Hospital Accreditation:  
A Study in Japan
3. National Data Infrastructures  
for Quality & their potentials

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## JCQHC History

Japan Council for Quality Health Care:  
National healthcare accreditor

- In 1985, Ministry of Health and Wealfare and Japan Medical Association  
“Study group of Hospital Accreditation”
- In 1993, Ministry of Health, Labor and Wealfare [MHLW]  
“Study group on Hospital Accreditation”
- Through the Collaboration between the Government and Medical Profession ,

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## JCQHC History

- In 1995, JCQHC was established. The major parts of the Set-Up Fund were from the MHLW and the Japan Medical Association, and also from hospital and professional associations
- In 1997, JCQHC started Hospital Accreditation. - Voluntary Basis -
- JCQHC has accredited about 2,500 hospitals (about half of the total hospital beds in Japan)

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## JCQHC History

- Starting from Hospital Accreditation Services,
- JCQHC has been carrying out several nation-level services.
- All of them are
  - \*To Improve Quality and Safety in Health Care

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# JCQHC's Mission

(Japan Council for Quality Health Care)

- **To improve the quality and safety of health care,**
- **and to contribute to improving the health and welfare of the people**
- **as a neutral, scientific, third-party organization**

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## JCQHC Functions

- **Hospital Accreditation**  
to improve the quality of hospital care
- **Patient Safety Promotion**  
to promote patient safety through networking and professional learning among accredited hospitals
- **No-Fault Compensation System on Obstetrical Adverse Events**  
to compensate childbirth cerebral palsy, and to improve the quality of obstetric care through RCA on adverse events
- **EBM medical information network/distribution services; "MINDS"**  
to distribute Clinical Practice Guidelines & improve their Q
- **National Database of Medical Adverse Events**  
to prevent errors/accidents and improve patient safety
- **Near miss Event in Pharmacy**

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## Quality Initiatives in Japan

- Initiated and Designed by the National-level collaboration & Government level
- Professional persons and organizations committed themselves at the initiation and for the development
- Steady steps; Great potentials for further strong movements and systems



# Professional Autonomy Works !

## ■ Patient Safety Promotion

voluntary networking for mutual learning & QI

## ■ No-Fault Compensation System on Obstetrical Adverse Events

lawsuits decreased

RCA for improvement at practice & system

## ■ EBM medical information NW/Dist services

improved Quality of CP Guidelines

fostered professional networking for quality

## ■ National Database of Medical Adverse

Events information helped professionals to prevent errors and improve safety

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## Today's Outline

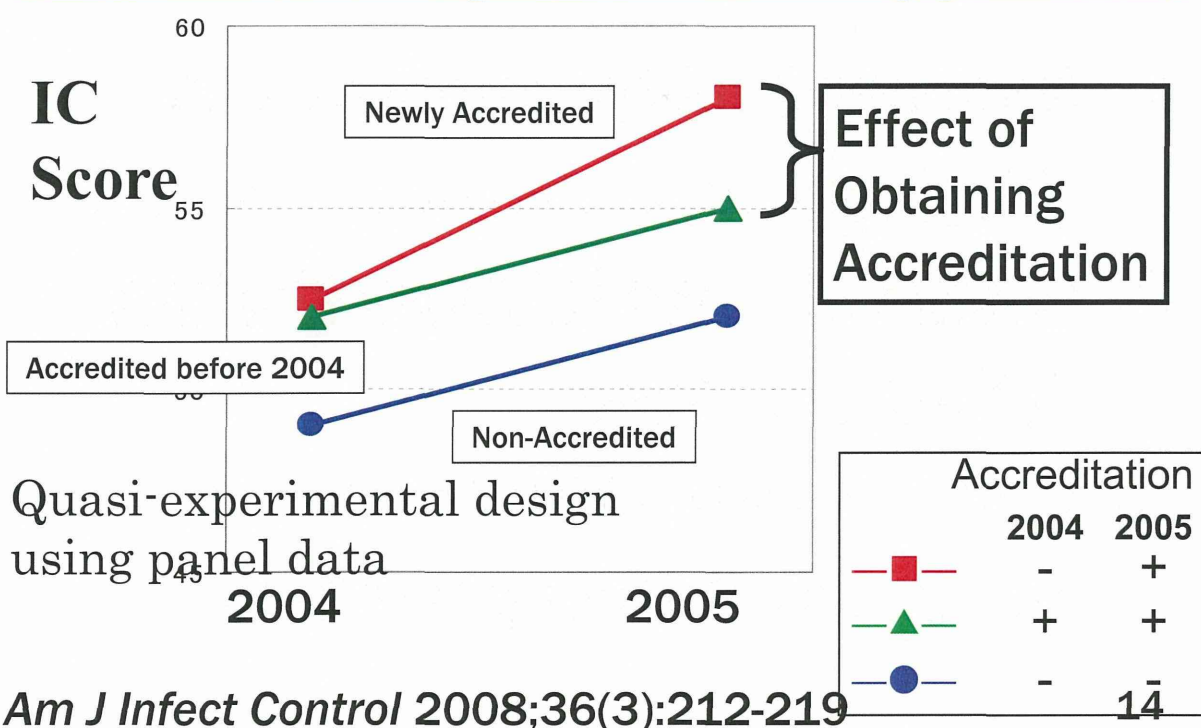
1. National Quality Initiatives and JCQHC (Japan Council for Quality Health Care)
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# Impact of Accreditation

- About five years ago, we showed “Accreditation Improved Quality” in infection control practices.
- This time, we examined “How hospital professionals consider the impact of accreditation on daily practice.”

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## Change in IC score\* by accreditation status (\*infection control practices following guidelines)



## **Impact of Hospital Accreditation A Survey in Japan**

- **The Study Objective :**  
To understand the impact of hospital accreditation on hospital services  
(to review 15-year achievement since its birth)
- **A Questionnaire Survey was conducted,**  
asking hospital medical directors,
- **Whether “hospital accreditation”**  
impacted your hospital on each area

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## **Impact of Hospital Accreditation: A Survey in Japan**

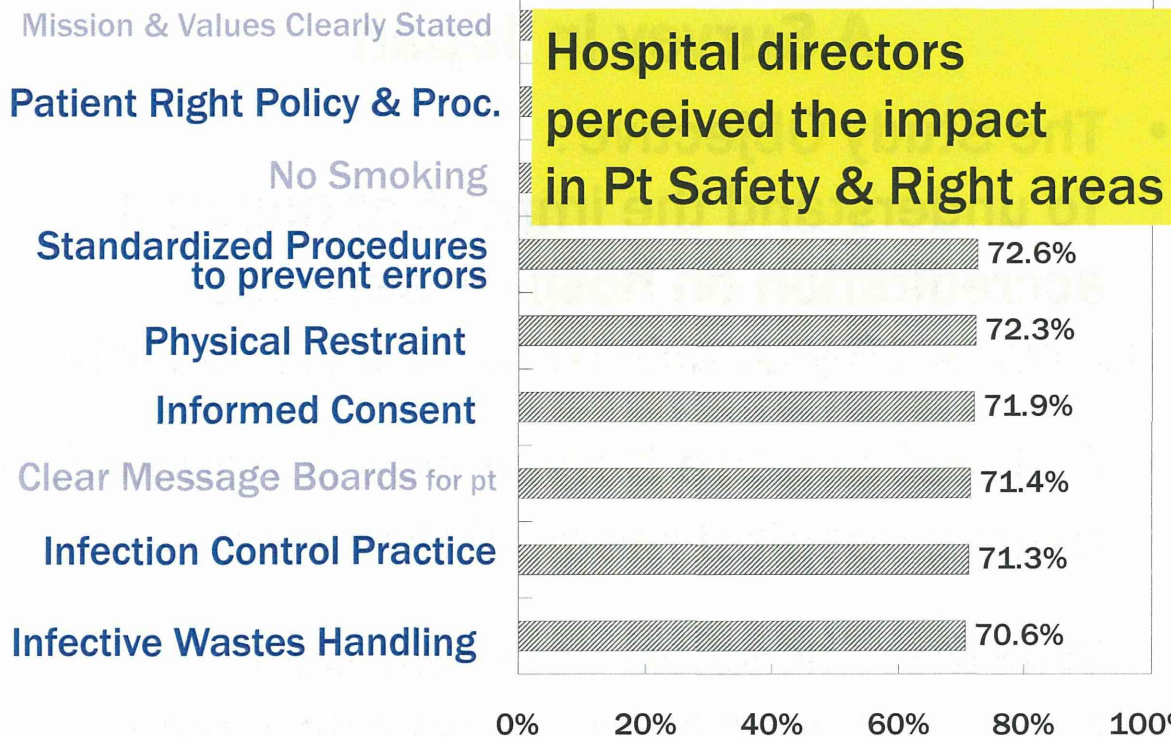
- **Method :**  
Questionnaire survey of 55 items,  
(Developed after a feasibility test)
  - > **administered to 2944 hospitals**  
2570 Accredited  
374 Non-surveyed-Non-accredited,  
stratified-randomly sampled
  - > **in January-February 2010**
- **Response rate : 59.8% (1761 / 2944)**

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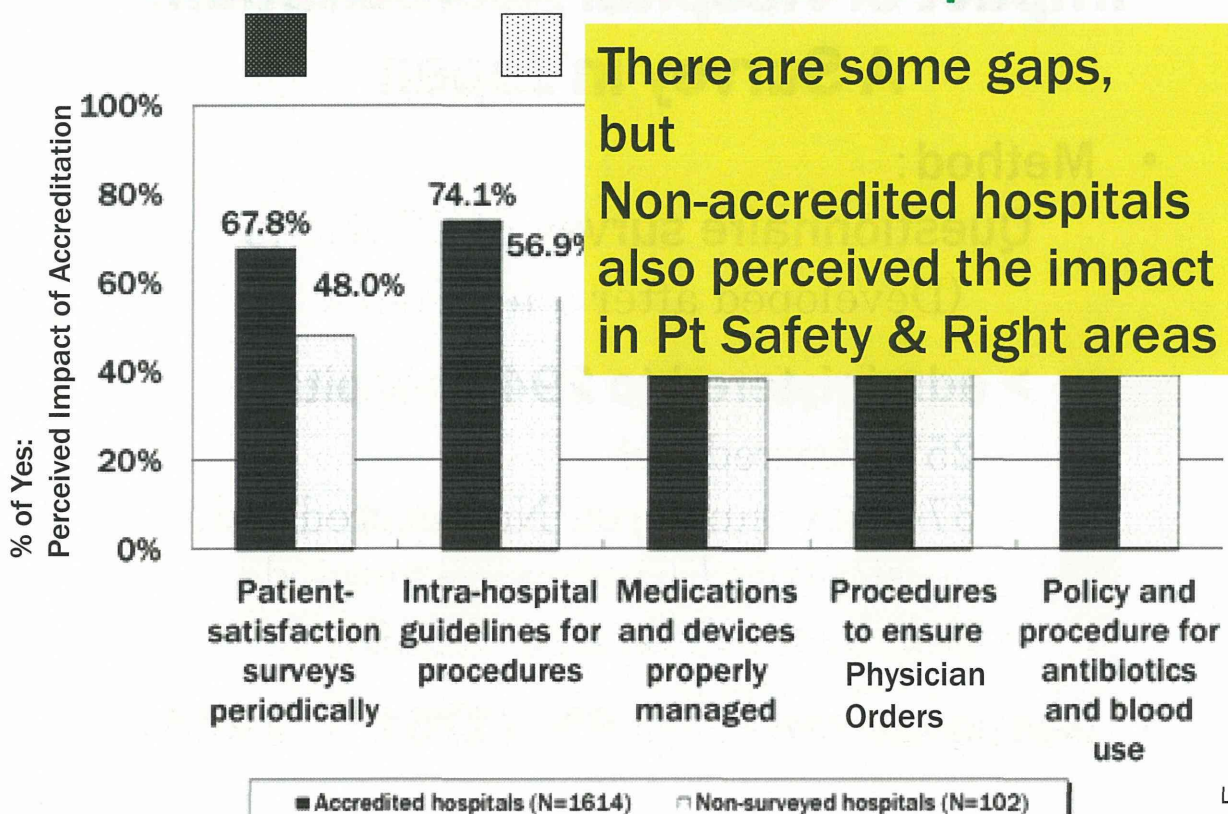
## Areas which Accreditation Impacted

Items with the highest %



Percent of hospitals who confirmed Accreditation Impacted their Hospital. (N=1761)<sup>17</sup>

## Accredited vs Non-Accredited hospitals



## Impact of Hospital Accreditation: Summary

The study suggested:

- Hospital accreditation impacted practices particularly in **Patient Safety and Patient Right** areas
- Hospital accreditation impacted also **Non-accredited hospitals**, probably through the hospital accreditation standard getting the de fact standard for the whole hospital/health care arena

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## For Future Directions of Accreditation

- More Interactive, more Value-creating survey
- More direct **values for Patients** (participation, provider choice, etc.)
- More focus on the Hospital Service **Region** (not only a hospital)
- Revisit **continuous/clinical(medical) quality improvement** based on professional autonomy (w/ QI)
- To support more explicitly **“Management”** (quality/safety/resources/finance/ w/visionary leadership, etc.) for sustainability and growth

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**National Data Infrastructure  
for Quality & their potentials  
(Measures/Design/Policy)**

**To Solve the issues of  
Quality vs. Cost/Resource**



## Well-designed DB needed

Administrative Data are promising for the system analysis

- One can obtain comprehensive database with low cost.
- One can measure Regional and Institutional performance
- Lack of clinical details is the weakness.
- Therefore, one need well-designed datasets & analysis (eg. clinical severity info.)

# Emerging administrative database

- **Diagnosis Procedure Combination Database**
  - Casemix classification systems
  - Detailed data with some severity info.  
(eg. CHF: NYHA, Stroke: Coma scale, m-Rankin Scale)
  - Voluntary participants, scattered all over Japan
- **National Database of claims** (healthcare & long-term care insurance claims, and health screening)
  - The comprehensive/exhaustive national DB
  - Just starting (Involved in a new design)
  - Some example outputs

## On-going Analysis Examples based on **emerging database** at the national level

- Quality is affected by  
Competition or Concentration ?
- Higher Spending (or Cost) is  
necessary for Higher Quality ?

# Question 1

## “Quality” is affected by Competition or Concentration ?

In health care, effects (positive or negative) of competition and/or resource concentration are not clearly known yet.

It is even difficult to distinguish between competition and resource concentration.

### Objective

To assess the effect of  
hospital competition and  
resource concentration  
on the quality of care for **AMI patients**



## Conceptual Framework 1/2





- **Competition at the hospital level** is likely to be more dominant than **concentration/co-operation** because hospitals have to compete for the limited patients for sustainability of their service.

On the other hand,

- **Concentration of cardiologists** within a hospital may result in more **cooperative effects** (besides **capacity** effects) than hospital concentration at the regional level.

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## Conceptual Framework 2/2

	Hospitals in a region	Cardiologists in a hospital
Competition		
Concentration		

## Methodology

### ■ The definition of hospital service area:

- Secondary medical district (~300million pop.)( >300 in Japan)
- This is often the unit of health care policies. (smaller than prefectures)

### ■ The definition of hospital competition

- We analyzed Diagnosis-Procedure Combination (DPC) hospitals with more than 10 AMI cases during the latter six months of 2008 (This covers eventually all hospitals which regularly treat AMI cases.)

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## Methodology

### ■ The definition of cardiologist concentration

- Estimated from the number of cardiologists in a hospital
- The cardiologist concentration of a hospital is a more valid index to measure than total physician concentration because treatments for AMI patients is primarily conducted by cardiologists

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# Methodology

## ■ Sample

□ 26,496 patients admitted for AMI from 179 hospitals enrolled in the QIP between April 2008 and March 2011 (Over 300 Hospitals participating from all the Prefectures in 2012)

## ■ Statistical Analysis

□ multilevel multiple logistic regression

## ■ Measures

□ **Outcomes Indicator:** 30-day in-hospital mortality (adjusting for patient [age, sex, co-morbidities], hospital, and regional variables as well as invasive procedures [PCI and CABG])

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# Result 1

	<u>Dependent Variable</u>			
	PCI		CABG	
<u>Explanatory Variables</u>	Odds ratio	P-value	Odds ratio	P-value
Patient Variables				
Hospital Variables				
Cardiologist concentration	1.06*	0.0158	1.12*	0.0273
Regional Variables				
Hospital competition	1.04	0.0852	1.04	0.3638

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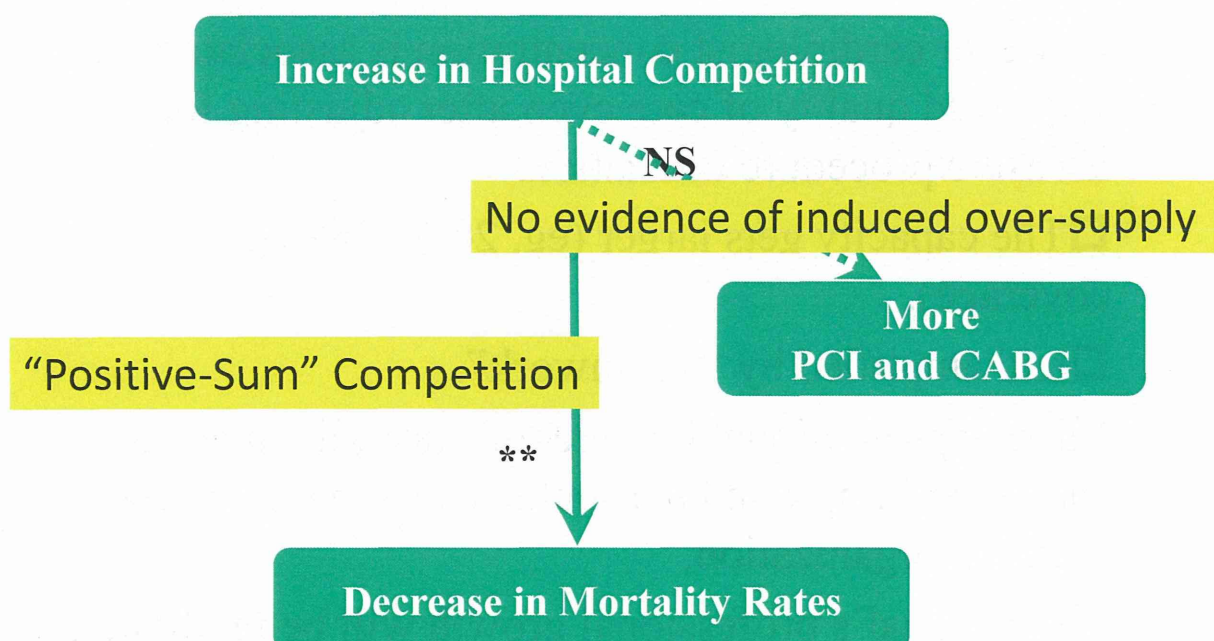
C-Statistics ~ 0.8  
w/ Pt Variables

## Result 2

	<u>Dependent Variable</u>	
	<b>in-hospital mortality</b>	
<u>Explanatory Variables</u>	Odds ratio	P-value
<b>Patient Variables</b>		
Treatments		
PCI	<b>0.11**</b>	< 0.0001
CABG	<b>0.17**</b>	< 0.0001
<b>Hospital Variables</b>		
Cardiologist <b>concentration</b>	<b>0.94**</b>	0.002
<b>Regional Variables</b>		
Hospital <b>competition</b>	<b>0.96*</b>	0.030

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## Mechanism of Hospital Competition on Quality of Care



\*p<.05, \*\*p<.01, \*\*\*p<.001.

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