

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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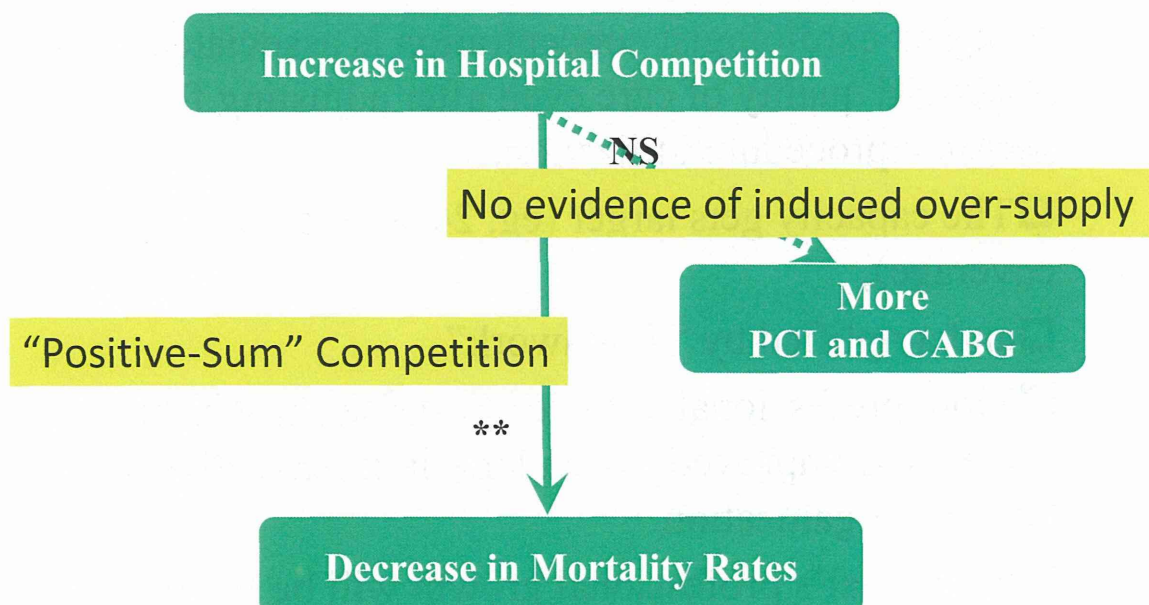
C-Statistics ~ 0.8
w/ Pt Variables

Result 2

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

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Mechanism of Hospital Competition on Quality of Care

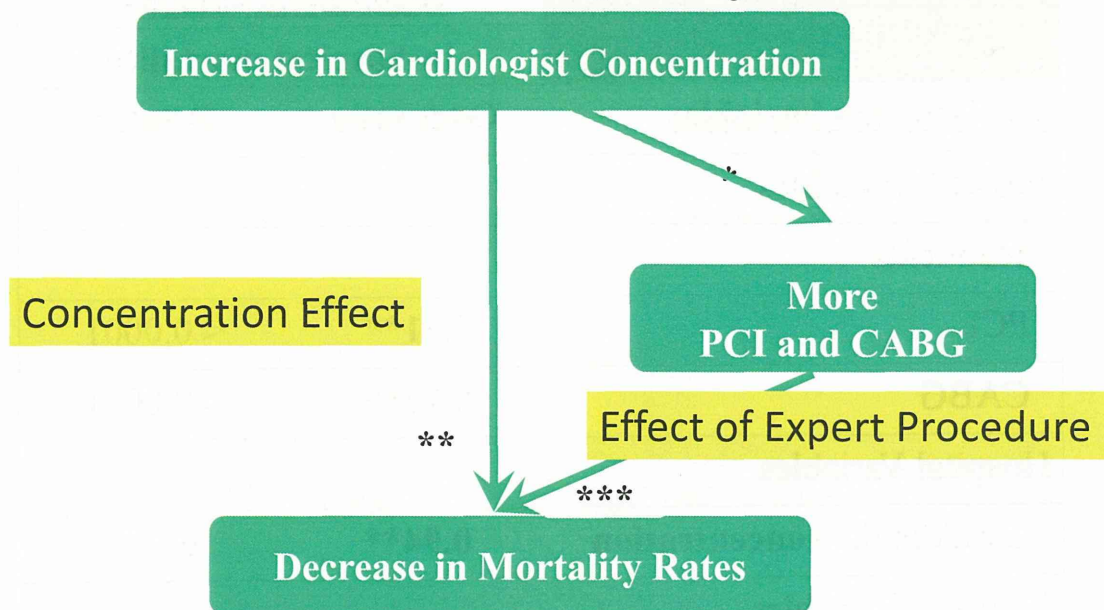


*p<.05, **p<.01, ***p<.001.

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Possible Mechanism of Cardiologist Concentration on Quality of Care



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

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Possible Mechanism of Cardiologist Concentration on Quality of Care

A higher cardiologist concentration is associated with improved quality of care even after adjusting for invasive procedure utilization.

- The capacity gets larger (eg, 24-hr 365-dy coverage),
- and amplified by “Teamwork”.
- More professional knowledge and skills will be shared and improved particularly in a interactively-learning organization.
- Individual’s professional growth will be facilitated

Conclusions

- Hospital competition and cardiologist concentration may independently have a favorable effect on **risk-adjusted mortality (quality)**.
- No evidence was found on supplier-induced over-supply due to hospital competition in a region
- Understanding these factors may guide us in formulating appropriate measures to reduce unwarranted variations.

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Question 2

Higher Spending (Cost) is
necessary for Higher Quality ?

In health care, the association between Quality and spending is not clearly known yet.

Hospital Spending & Quality of Care

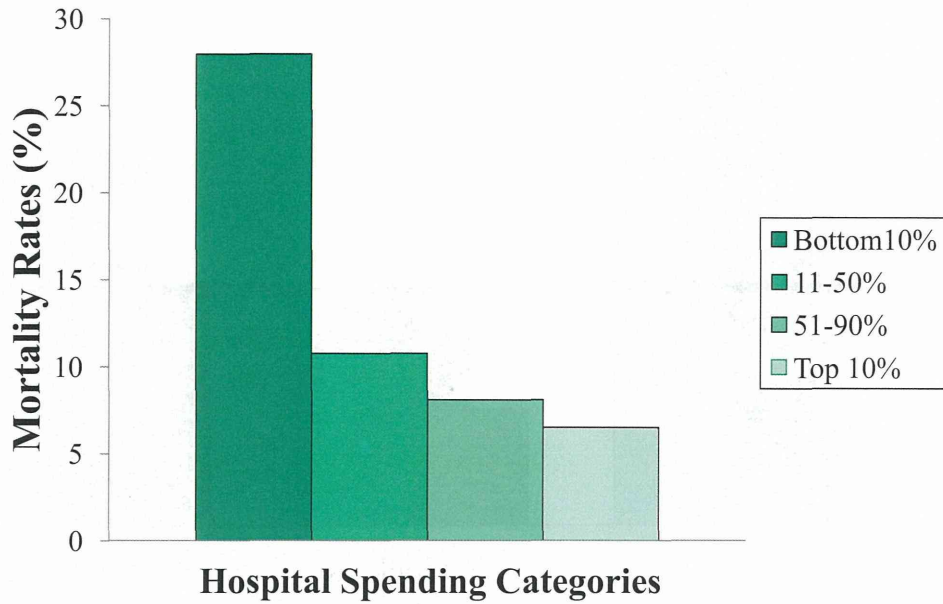
(1) Acute Myocardial Infarction / Hospital

(2) Ischemic Stroke / Region

(1) Acute Myocardial Infarction
Hospital Variation

AMI / Hospital Variation

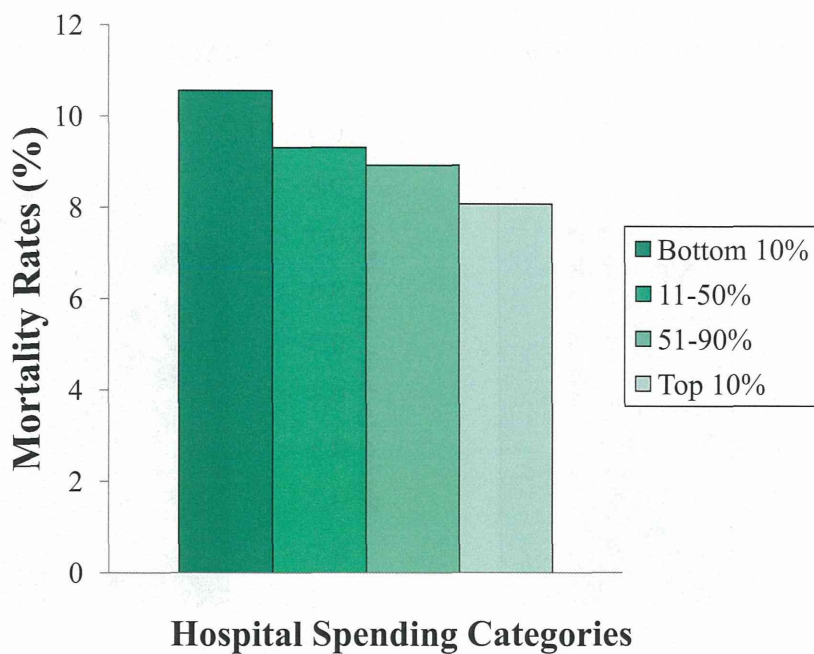
Observed(Crude) 30-day In-hospital Mortality Rates
by Hospital Spending Category



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AMI / Hospital Variation

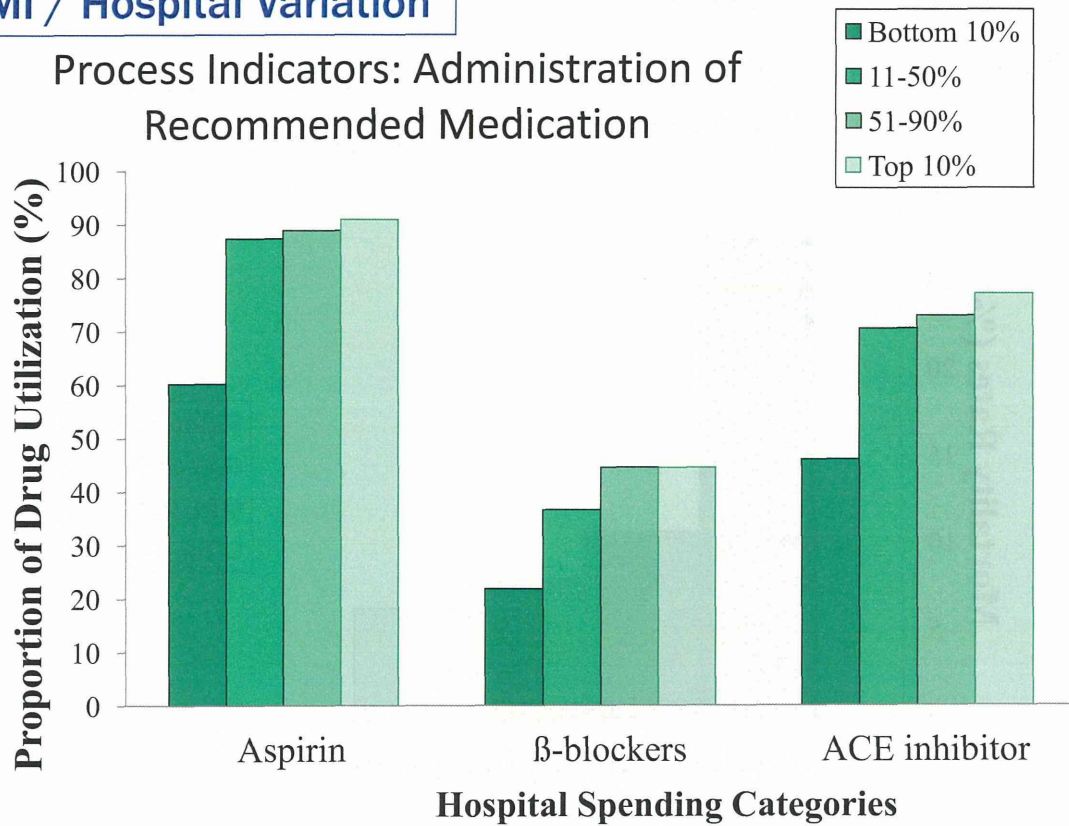
30-day Risk-adjusted In-hospital Mortality Rates



44 509

AMI / Hospital Variation

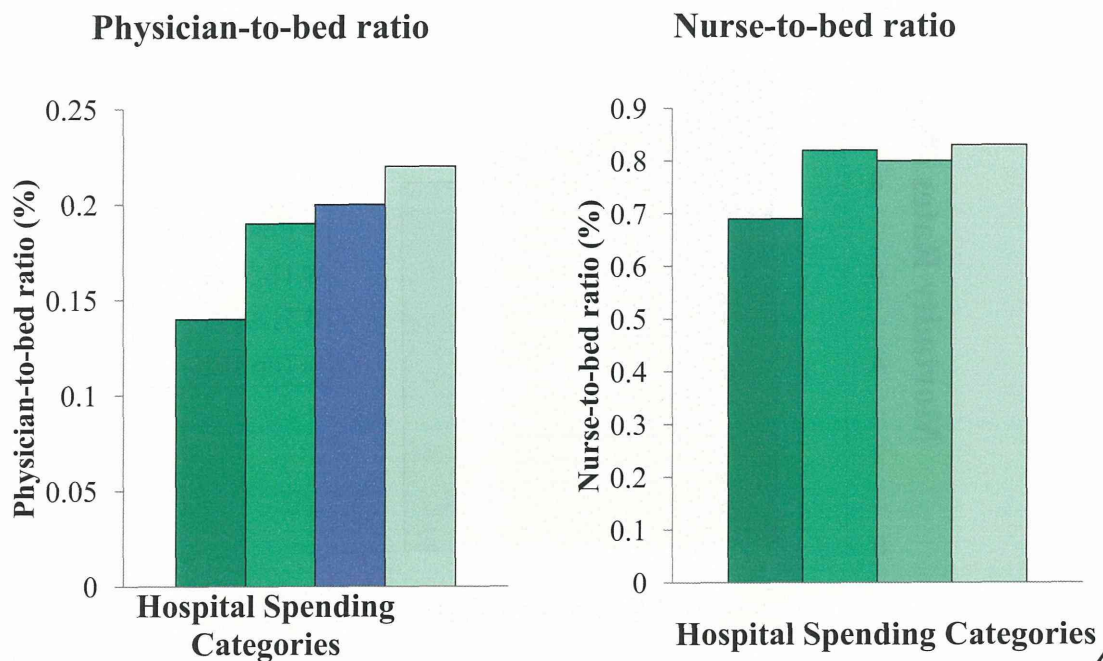
Process Indicators: Administration of Recommended Medication



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AMI / Hospital Variation

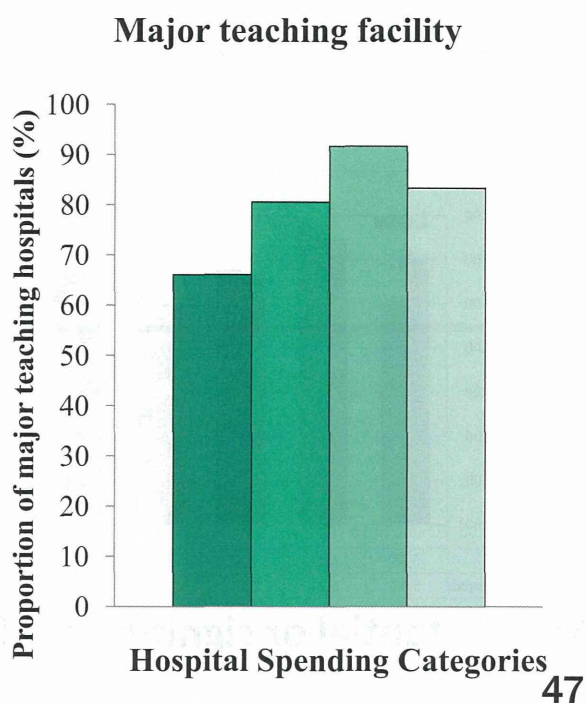
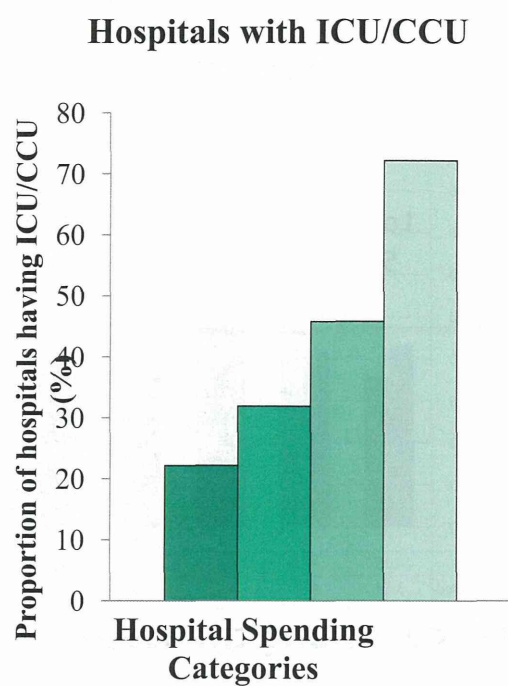
Hospital Characteristics According to Hospital Spending



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AMI / Hospital Variation

Hospital Characteristics According to Hospital Spending



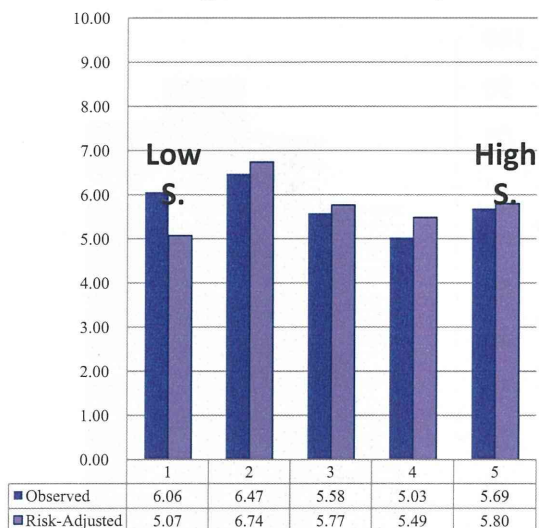
(2) Ischemic Stroke

Regional Variation

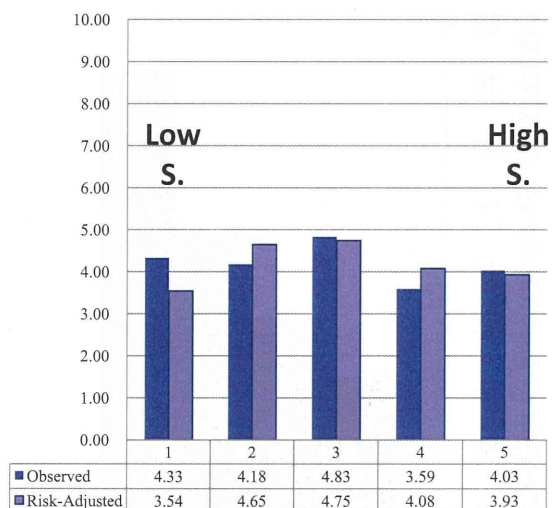
Stroke/ Regional Variation

Observed vs. Risk-adjusted Mortality

In-Hospital Mortality



C-statistics = .73-.74 30 day In-Hospital RA Mortality



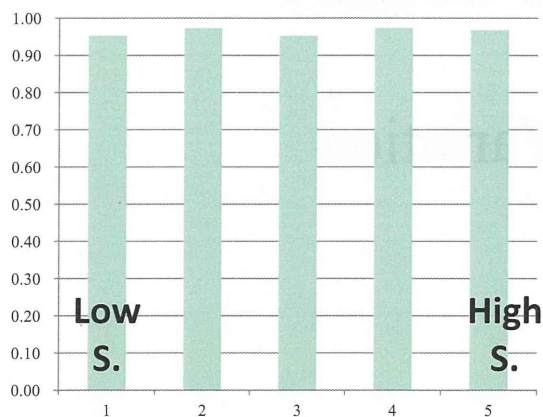
No substantial or significant difference among the Quintiles

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Stroke/ Regional Variation

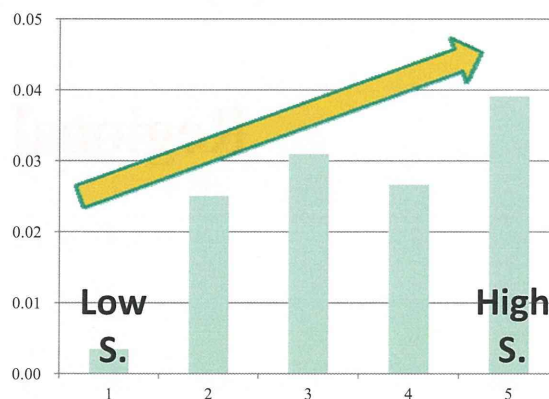
Variations in Process Indicators by Spending Quintiles

CT or MRI Scans



Spending Quintiles

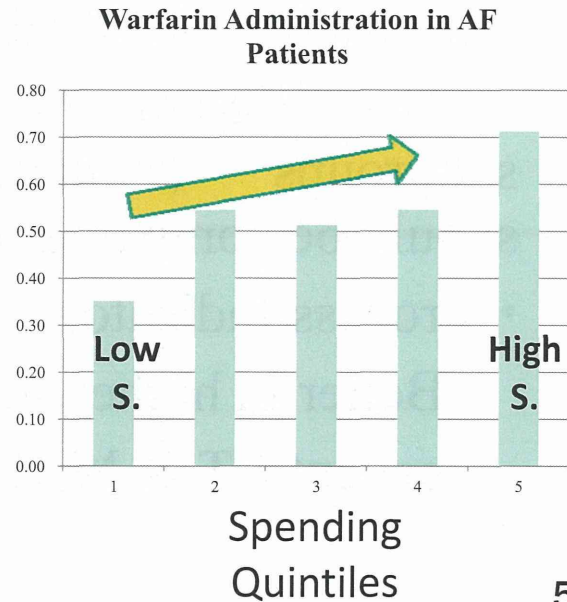
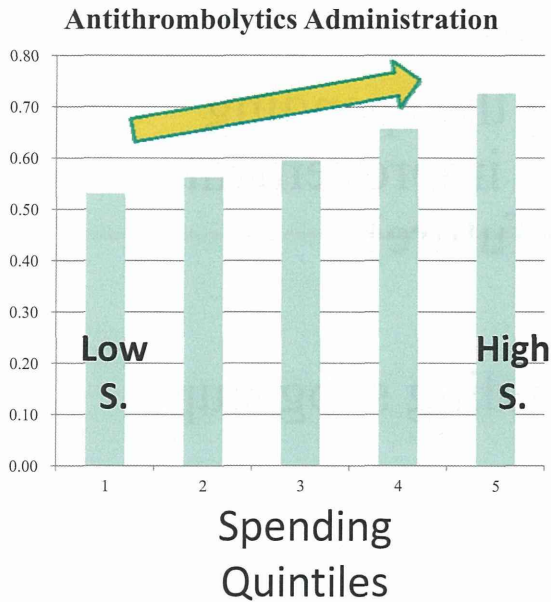
t-PA Administration



Spending Quintiles

Stroke/ Regional Variation

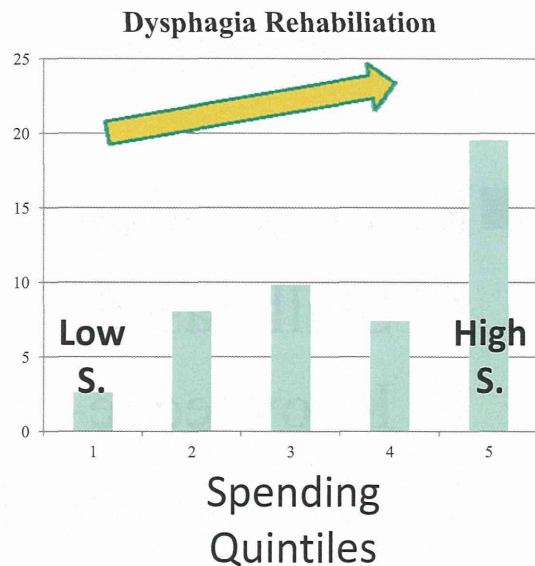
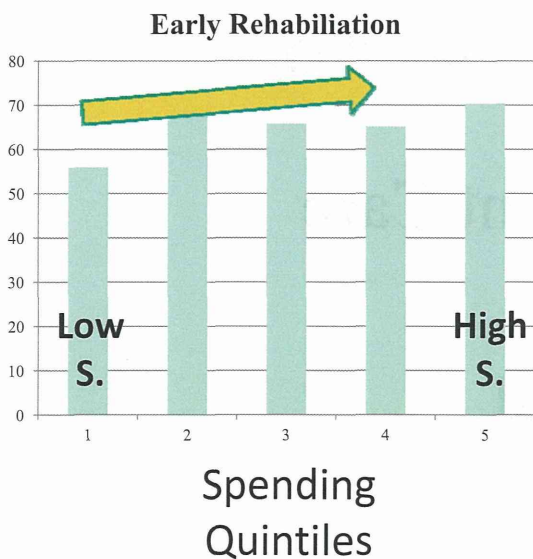
Variations in Process Indicators by Spending Quintiles



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Stroke/ Regional Variation

Variations in Process Indicators by Spending Quintiles



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Summary (Stroke/Regions)

- Mortality - already low -
Not different among the spending subgroups (Function improvement should be compared in future)
- Process Indicators
Better in higher spending subgroup, except CT & MRI

hypothetical concepts

to explain (some part of) quality variation

Resource → Quality

■ Resource-dependent Care

- Skill-based
- Knowledge-based
- Material-based

Resource-Dependent Care

- Resource-dependent care describes the type of care that is directly affected by the presence and quantity of resources available.
- These resources include expertise (e.g., cardiologists) and manpower, knowledge, medical materials such as medication and equipments, and facilities (e.g., catheterization laboratories and CCUs).
- Three components:
 - 1) Skill-based
 - 2) Knowledge-based
 - 3) Material-based

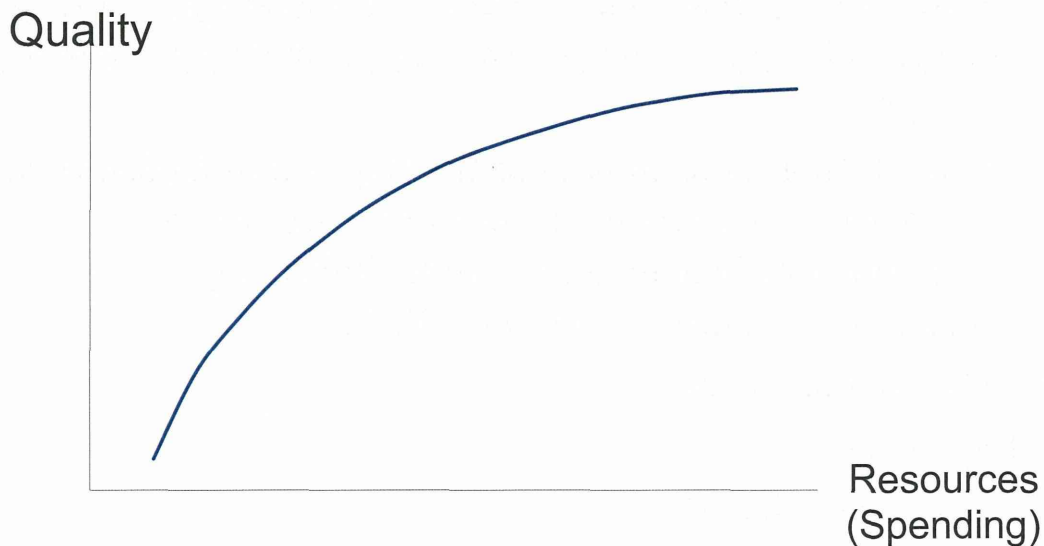
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Resource-Dependent Care (Skill-based)

- Dependent on the availability of resources such as cardiologists, PCI expert, stroke specialist, rehab therapists, etc.
- This type of care depends on **expert manpower**.
- It takes **time and energy** to acquire the skills.
- Quality of this type of care would be expected to rise with increased health care spending
- Usually, “dose-response” type

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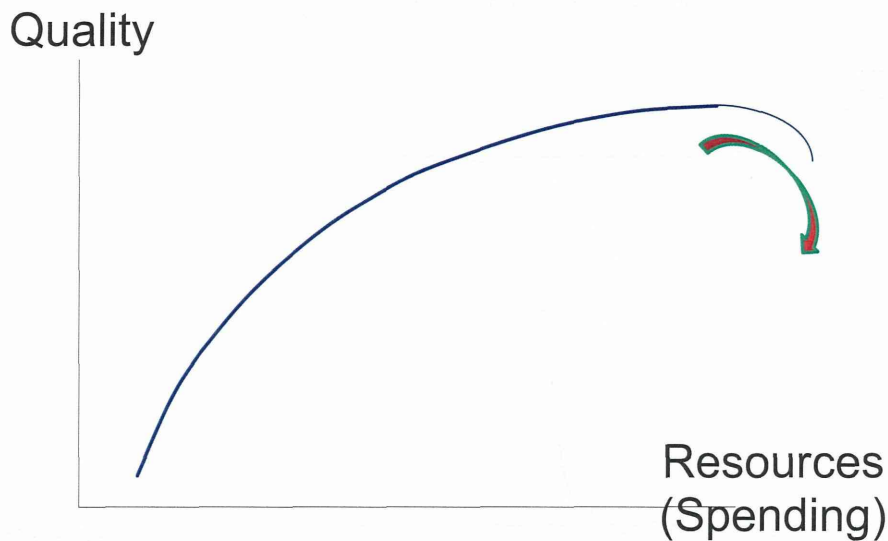
“Dose-response” Type



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- The lack of health care resources likely accounted for the observed underuse in treatment, resulting in **lower health care spending and quality** of care.
- In contrast, hospitals with **adequate medical resources** were more likely to provide sufficient care and were thereby associated with **higher spending and better quality** of care.
- However, incremental improvement may be getting **marginal**.

Supplier-Induced Oversupply



The criteria of over-resources are difficult to set, unless deteriorating effects are observed.

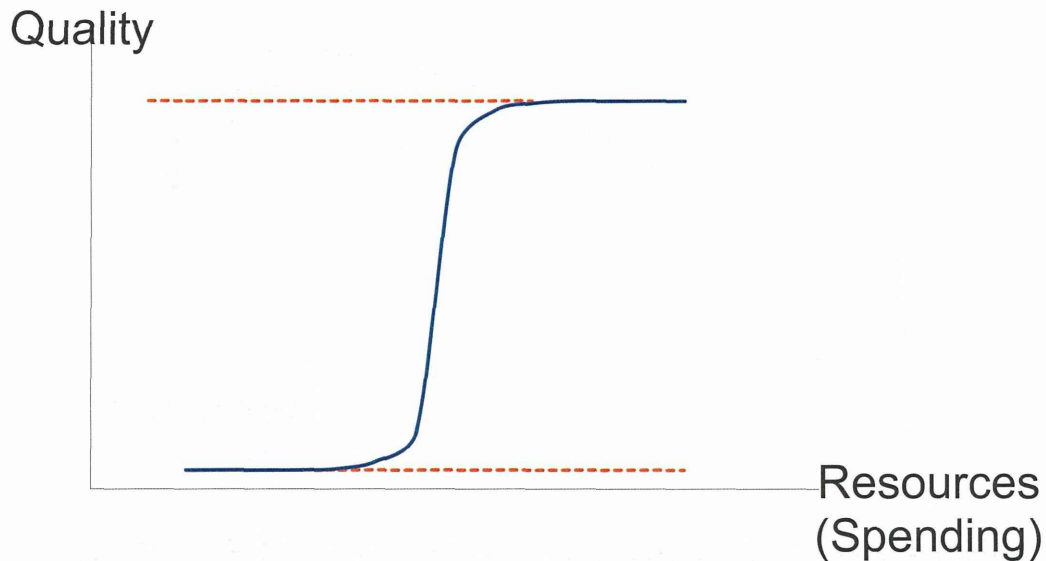
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Resource-Dependent Care (Knowledge-based)

- Quality of care dependent on the spread of knowledge for health care professionals (e.g., the use of aspirin for AMI)
- For this type of care, the introduction of effective treatment approaches can be implemented with minimal expenses (as far as the material is not expensive)
- spending Usually, “threshold” type

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“Threshold” Type



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Resource-Dependent Care (Material-Based)

- Dependent on the availability of resources such as CT scanners, MRIs, etc.
- Quality of this type of care would be expected to rise with increased health care spending (as far as the material is expensive)
- Usually, “threshold” type

Resource-Dependent Care

- A cause of **variation** of some practice is resource-dependency.
- We call such practice as “resource-dependent” care.
- This concept will explain variation well from the supply side
- rather in an **under-supply situation**
 - before supplier-inducement occurs
 - before patient preference occurs

Resource-Dependent Care

- Components :
 - Skill-based
 - Knowledge-based
 - Material-based
- Types of relation to **Quality**:
 - “dose-response” type
 - “threshold” type

SUMMARY

- **Accreditation** seems to have worked effectively for patient safety and quality.
- **Government** together with Professional Organizations initiated various Functions for quality & safety.
- **Professions** voluntarily facilitated and utilized these opportunities for quality/safety improvement
- **Data Infrastructure** for quality measures are being developed for forthcoming/promising effective utilization

**Thank you very much
for your attention**



研究成果の刊行に関する一覧表

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原著論文（英文）

1. Sasaki N, Lee J, Park S, Umegaki T, Kunisawa S, Otsubo T, Ikai H, Imanaka Y. Development and validation of an acute heart failure-specific mortality predictive model based on administrative data. *Canadian Journal of Cardiology* (in press)
2. Lee J, Morishima T, Kunisawa S, Sasaki N, Otsubo T, Ikai H, Imanaka Y. Derivation and validation of in-hospital mortality prediction models in ischaemic stroke patients using administrative data. *Cerebrovascular Diseases* (in press)
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4. Morishima T, Ikai H, Imanaka Y. Cost-effectiveness analysis of omalizumab for the treatment of severe asthma in Japan and the value of responder prediction methods based on a multinational trial. *Value in Health Regional Issues* (in press)
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8. Morishima T, Lee J, Otsubo T, Ikai H, Imanaka Y. Impact of hospital case volume on quality of end-of-life care in terminal cancer patients. *Journal of Palliative Medicine* (in press)
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13. Kunisawa S, Ikai H, Imanaka Y. Incidence and prevention of postoperative venous thromboembolism - Are they meaningful quality indicators in Japanese healthcare settings? *World Journal of Surgery* 2012;36(2):280-6.
14. Ikai H, Morimoto T, Shimbo T, Imanaka Y, Koike K. Impact of postgraduate education on physician practice for community-acquired pneumonia. *Journal of Evaluation in Clinical Practice* 2012; 18(2):389-95.
15. Umegaki T, Ikai H, Imanaka Y. The impact of acute organ dysfunction on patients' mortality with severe sepsis. *Journal of Anaesthesiology Clinical Pharmacology*. 2011;27(2):180-184.
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17. Umegaki T, Sekimoto M, Imanaka Y. Impact of intensive care unit physician on

- care processes of patients with severe sepsis in teaching hospitals. *Journal of Anesthesia & Clinical Research*. 2011;2:120.
18. Lee J, Imanaka Y, Sekimoto M, Nishikawa H, Ikai H, Motohashi T, The QIP Expert Group for Clinical Evaluation. The validation of a novel method to identify healthcare-associated infections. *The Journal of Hospital Infection*. 2011;77(4):316-320.
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