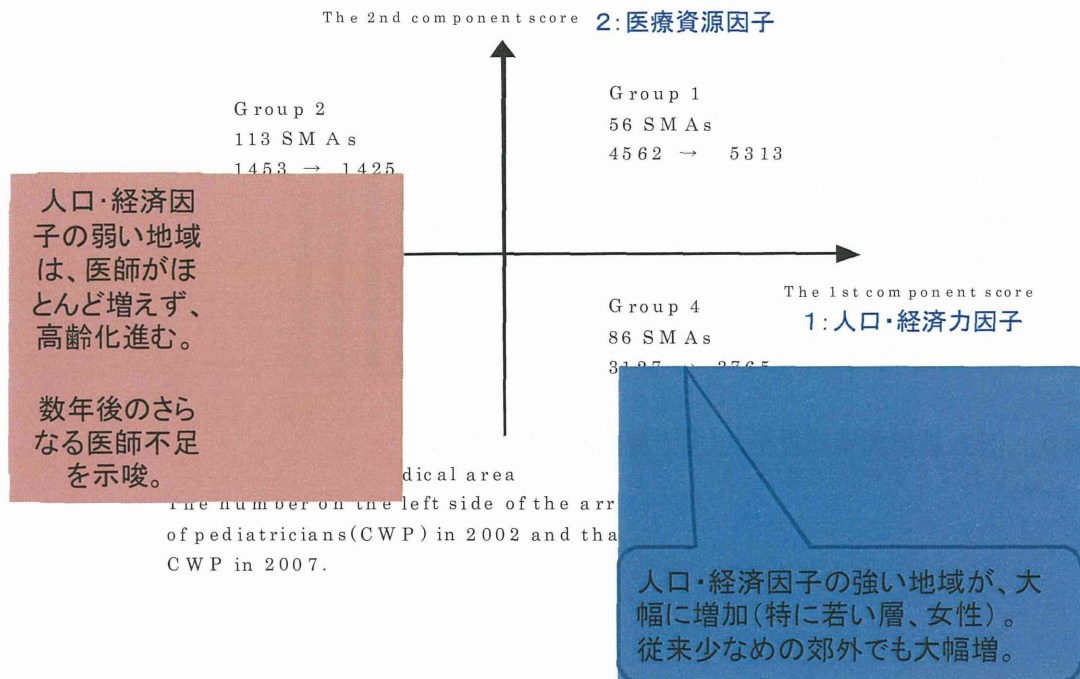


図10. 二次医療圏の4分類（2軸に基づく）と医師数の動向

Figure 1: The group definition by the signs of component scores and the number of SMAs and pediatricians in each group



Regional Variations in Spending and Quality in Ischemic Stroke Patients

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(1)

Spending ↔ **Quality**

(2)

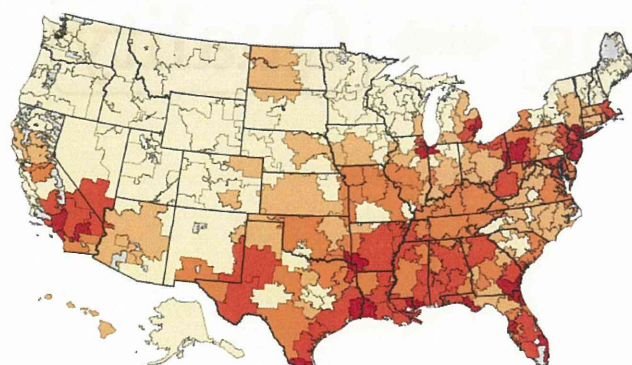
Introduction

- Japan seeks to contain rising health care costs while maintaining high quality of care amidst insufficient physician numbers and an aging population*
- Regional variations in health care spending and quality may indicate sub-optimal health care provision
- Although governing bodies are exploring cost-cutting measures, efforts must also be made to prevent **unwarranted regional variations**

*McCurry, 2006

Introduction

- Previous studies in the US have found **little or no associations** between the levels of spending and the quality of health care



Attributes of U.S. HRRs in Different Quintiles of the EOL-EI*

Quintile of EOL-EI

1	2	3	4	5
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*Fischer et al., 2003; Fischer and Wennberg, 2003; Figure source: Fischer et al., 2003

Table 1.1. Dartmouth Studies Comparing Regional Differences in Spending and the Content, Quality, and Outcomes of Care

	<i>Higher spending regions compared to lower spending*</i>
Health care resources ²	<ul style="list-style-type: none"> • Per capita supply of hospital beds 32% higher. • Per capita supply of physicians 31% higher overall: 65% more medical specialists, 75% more general internists, 29% more surgeons, and 26% fewer family practitioners.
Content and quality of care ^{2,3,4}	<ul style="list-style-type: none"> • Adherence to process-based measures of quality lower (quality worse). • Little difference in rates of major elective surgery. • More hospital stays, physician visits, specialist referrals, imaging, and minor tests and procedures.
Health outcomes ^{5, 6}	<ul style="list-style-type: none"> • Mortality over a period of up to five years slightly higher following acute myocardial infarction, hip fracture, and colorectal cancer diagnosis. • <u>No difference in functional status.</u>
Physician perceptions of quality ⁷	<ul style="list-style-type: none"> • More likely to report poor communication among physicians.

Regions of high spending are “overusing” health care

Between 1980 and 2002, regions with greater growth in spending had smaller gains in survival than those with lower growth in spending.

* High and low spending regions were defined as the U.S. hospital referral regions in the highest and lowest quintiles of per capita Medicare spending as in Fisher, 2003.²

(5)

Source: Dartmouth Atlas of Health Care, 2008

Introduction

- An observed association between spending and quality might therefore indicate **insufficient health care** in regions of low spending
- This may imply disparities in the availability of essential resources
- “Resource-dependent” health care would mean that cost containment measures must be designed and implemented with care in order to ensure that quality of health care is not detrimentally affected

(6)

Introduction

- Japan has both a universal insurance system and the Diagnosis-Procedure Combination (DPC) prospective payment system which **theoretically may reduce variations in spending and quality**
- However, there exists recorded variations in the distribution of resources such as physicians and high-cost technologies*
- **Do areas with fewer resources have poorer care?**

*Tanihara et al., 2001; Otsubo et al., 2011

Introduction

- Stroke and other cardiovascular diseases are the third leading cause of mortality in Japan*, as well as a major cause of disability
- The social and economic burdens of stroke are substantial, and quality of care may be dependent on access to resources
- Unequal distribution of such resources may result in regional variations in health care service utilization (and therefore spending) and quality

*MHLW, Japan; 2010

Introduction

- **What is known?**
 - Extensive regional variations in health care spending and quality have been reported in various countries
 - Spending and quality have been shown to have little or no association
 - Regional variations may be explained somewhat by differences in health statuses or demographics
- **What is not known?**
 - Is spending and quality associated in the Japan health care system setting?

Objective

The objective of this study was to explore the association between health care spending and quality in ischemic stroke patients in Kyoto prefecture, Japan.

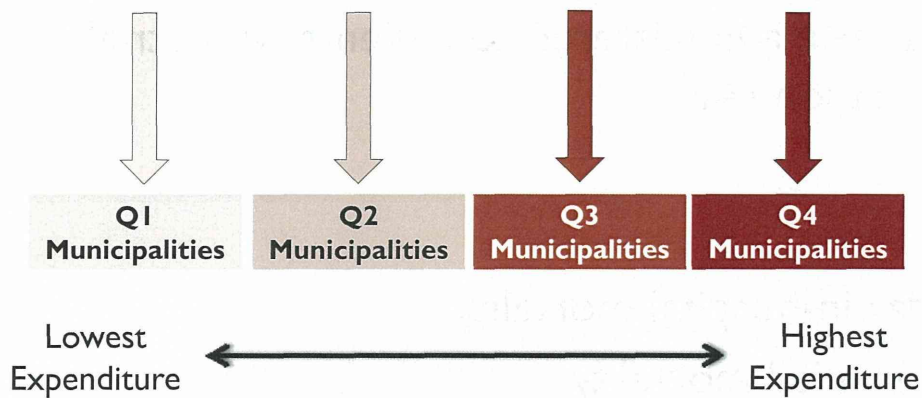
Methods – Data Sources and Selection

- Hospital claims data from all acute care hospitals in Kyoto prefecture from the Kyoto National Health Insurance Organizations, in a project conducted in collaboration with the Kyoto prefectural government
- Patients admitted between Feb 2009 to March 2010 due to ischemic stroke (ICD-10 code: I63.x)
- Patients were excluded if they had been hospitalized for a previous cerebral infarction within 30 days before the index admission, had LOS > 90 days, or were from municipalities with fewer than 10 cases

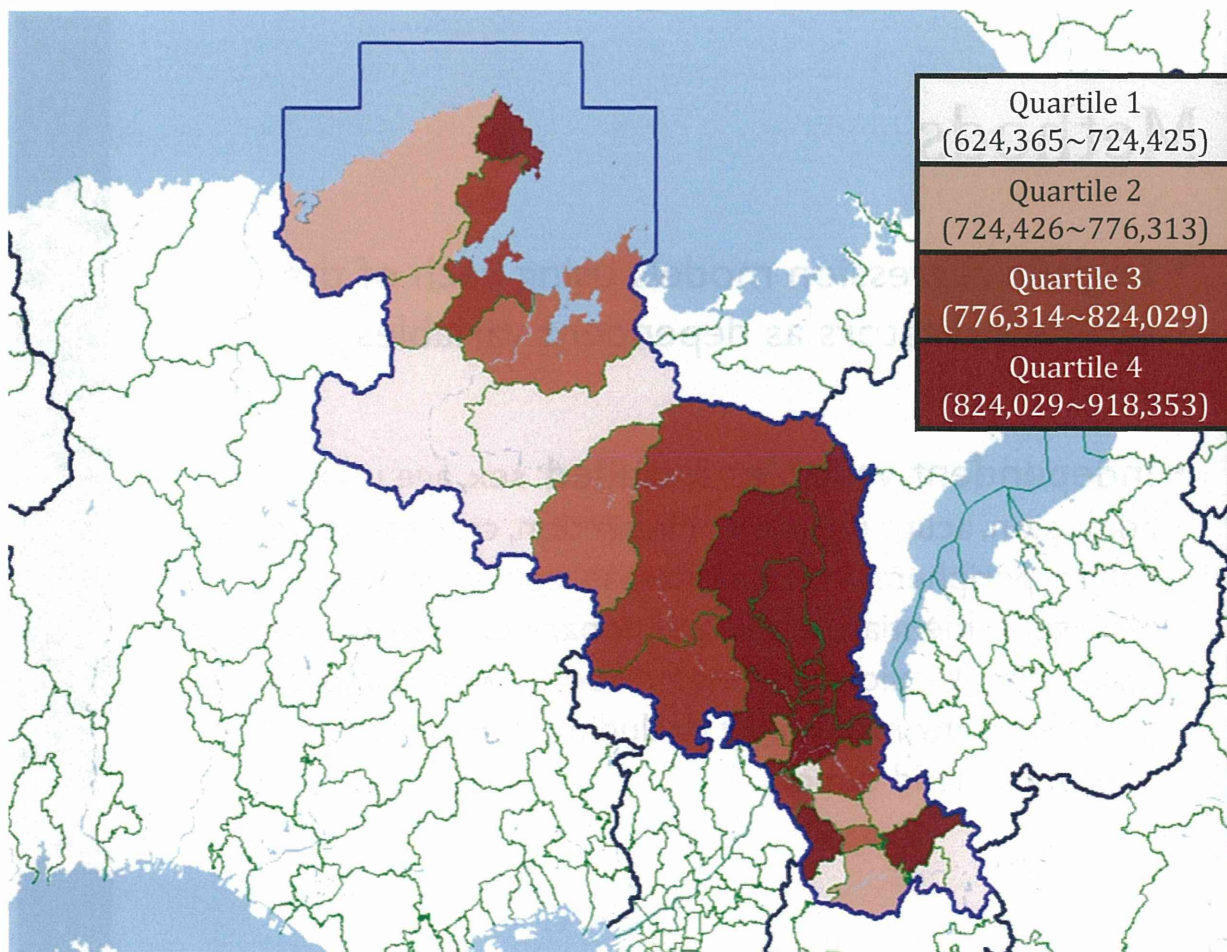


Methods – Spending Quartiles

Average age-sex-adjusted health care spending per hospitalization by ischemic stroke patients in each of the municipalities (patient residence) in Kyoto Prefecture.



(13)



(4)

Methods – Quality Indicators

- **Process**
 - Dysphagia rehabilitation
 - Warfarin administered to patients with atrial fibrillation (AF)
- **Outcome**
 - 7-day in-hospital mortality
 - In-hospital mortality

(15)

Methods

- Logistic regression models using each of the quality indicators as dependent variables
- Independent variables included: **sex, age upon admission, acute myocardial infarction, congestive heart failure, peripheral vascular disease, cerebrovascular disease, dementia, chronic pulmonary disease, connective tissue disease, ulcer, diabetes, diabetes with complications, paraplegia, any malignancy excluding skin cancers, and metastatic solid tumor.**

(16)

Methods

- To analyze the association between spending and the quality indicators, we included spending quartiles as independent variables:
 - the lower 3 quartiles were included as dummy variables to analyze if municipalities with lower spending had reduced performance when compared to the highest spending municipalities
- Regression models were tested for calibration with Hosmer-Lemeshow chi-square test, and discrimination using the C-statistic
- Statistical analyses were conducted with SPSS 19. Significance was set at $P < 0.05$

Results

- After exclusions, the final sample size for analysis was **3,958** admissions, **667** of which presented with AF
- Mean spending of municipalities in Quartile 4 (highest spending) was almost **30%** higher than that of municipalities in Quartile I

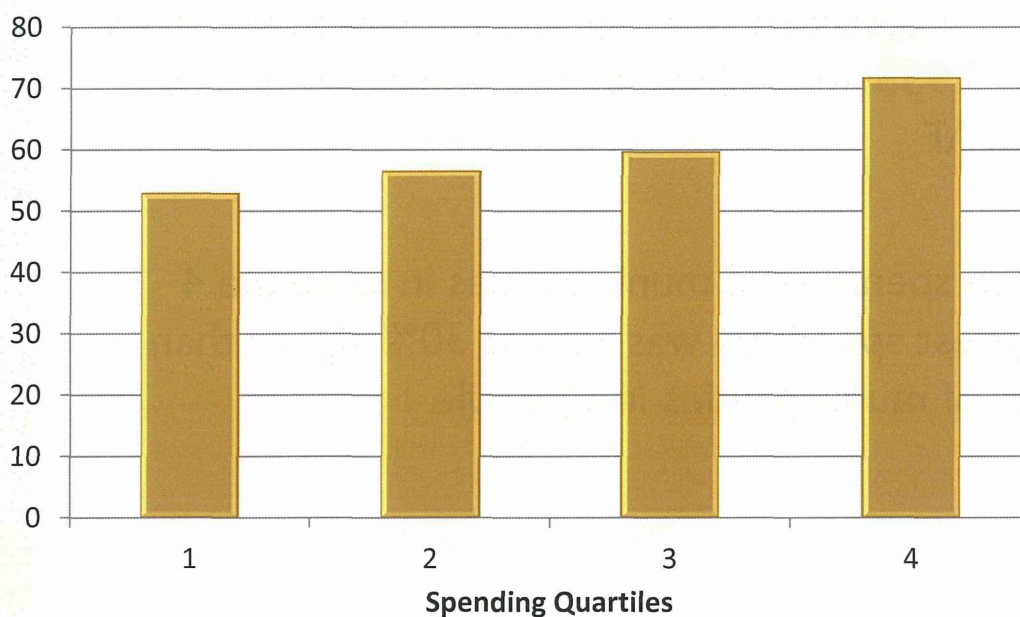
Results

	Health Care Spending Categories			
	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Spending (Mean, JPY)	675,618	750,101	806,696	865,343
Municipalities and Wards(N)	8	9	8	8
Patients (N)	629	952	1291	1086
Patient Characteristics				
Age (Mean, Years)	78.4	78.1	76.8	77.5
Female (%)	46.1	47.6	44.9	46.1
Length of Stay (Mean, Days)	25.8	27.0	25.9	25.7

Table 1. Characteristics of spending and patient characteristics of the various regions categorized by health care spending quartiles.

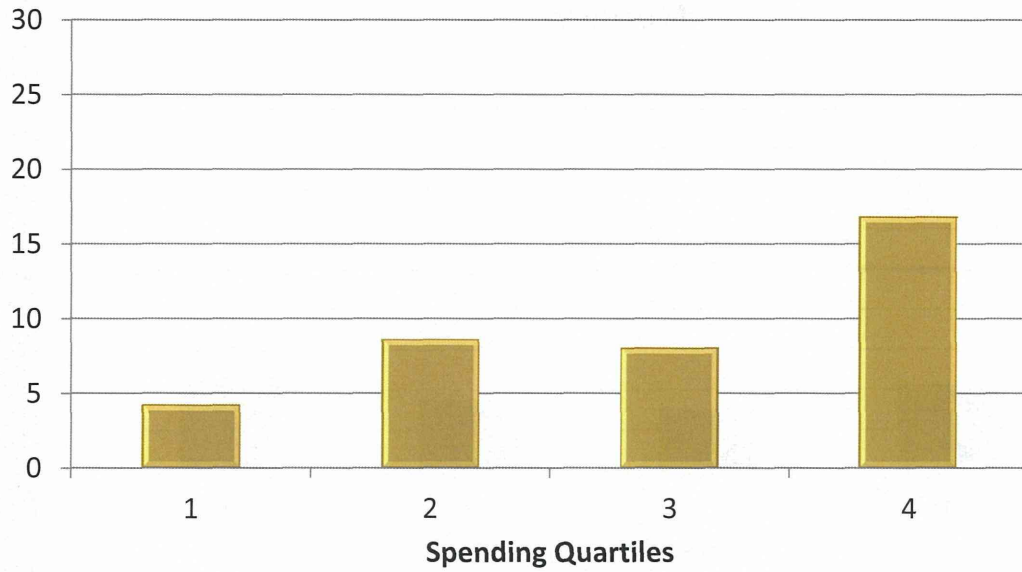
Results

Unadjusted Warfarin Administration to AF Patients



Results

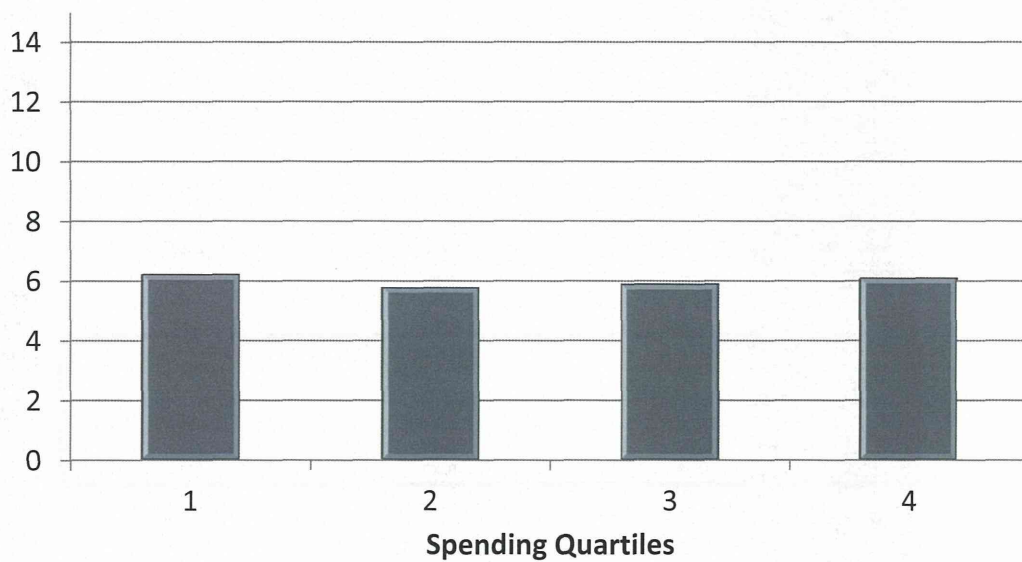
Unadjusted Dysphagia Rehabilitation



(21)

Results

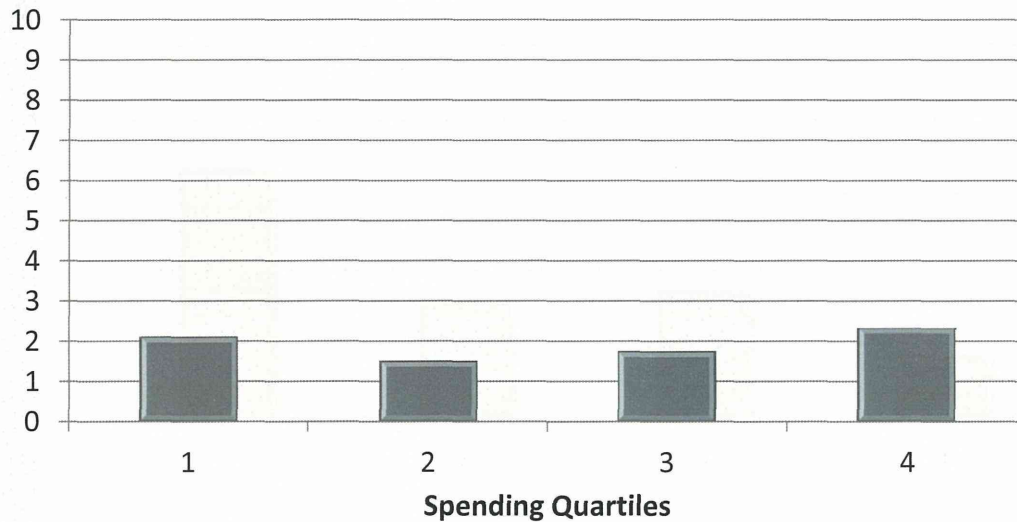
Unadjusted In-hospital Mortality



(22)

Results

Unadjusted 7-day In-hospital Mortality



23

	Warfarin administration to AF Patients		Dysphagia Rehabilitation		In-Hospital Mortality		7-Day Mortality	
	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P
Sex	0.932	0.690	1.109	0.371	0.842	0.250	1.672	0.052
Age	0.961	<0.001	1.028	<0.001	1.085	<0.001	1.059	<0.001
Acute Myocardial Infarction	0.568	0.229	1.097	0.785	1.257	0.536	2.806	0.037
Congestive Heart Failure	1.037	0.845	0.889	0.468	1.667	0.003	2.010	0.012
Peripheral Vascular Disease	0.786	0.870	0.746	0.632	2.081	0.140	1.357	0.768
Cerebrovascular Disease	1.751	0.452	0.445	0.137	0.167	<0.001	>100	0.998
Dementia	0.793	0.650	1.607	0.101	0.699	0.397	0.327	0.273
Chronic Pulmonary Disease	>100	1.000	5.652	0.065	5.949	0.063	<0.001	0.999
Connective Tissue Disease	0.188	0.021	0.794	0.673	2.196	0.097	2.101	0.322
Ulcer	0.769	0.185	0.751	0.051	0.778	0.165	0.801	0.482
Diabetes	0.654	0.050	0.958	0.765	1.157	0.423	0.765	0.450
Diabetes with Complications	1.457	0.557	1.045	0.875	0.707	0.461	1.493	0.515
Paraplegia	0.678	0.255	0.303	<0.001	0.622	0.181	1.363	0.486
Cancer	0.978	0.958	1.197	0.476	1.394	0.243	0.552	0.416
Metastatic Cancer	0.000	1.000	<0.001	0.998	7.994	<0.001	<0.001	0.998
Spending Quartiles								
Quartile 4 (Referent)								
Quartile 1	0.409	0.001	0.184	<0.001	0.979	0.924	0.900	0.765
Quartile 2	0.492	0.002	0.440	<0.001	0.936	0.738	0.582	0.114
Quartile 3	0.558	0.009	0.432	<0.001	1.031	0.866	0.798	0.452
Constant	53.083	0.001	0.046	<0.001	0.001	<0.001	<0.001	0.997
C-statistic	0.664		0.698		0.738		0.744	

Table 2. Results of logistic regression analyses of quality indicators and health care spending quartiles. Quartiles 1-3 are dummy variables, and Quartile 4 is used as the referent category. AF: atrial fibrillation.

24

Results

	Warfarin administration to AF Patients		Dysphagia Rehabilitation		In-Hospital Mortality		7-Day Mortality	
Spending Quartiles	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P	Adjusted Odds Ratio	P
Quartile 4 (Referent)								
Quartile 1	0.409	0.001	0.184	<0.001	0.979	0.924	0.900	0.765
Quartile 2	0.492	0.002	0.440	<0.001	0.936	0.738	0.582	0.114
Quartile 3	0.558	0.009	0.432	<0.001	1.031	0.866	0.798	0.452

Discussion

- In this study, we have conducted an analysis of the association between health care spending and quality of care in ischemic stroke patients in Kyoto prefecture, Japan.
- Our results showed a significant and substantial association between spending and process indicators.
- These results suggest an underuse of health care in lower-spending regions after adjusting for patient demographics and comorbidities

Discussion

- The two process indicators showed **significant positive association** with spending
 - Accurately assessing and conducting dysphagia rehabilitation requires trained staff with the necessary expertise
 - The risk involved with warfarin administration generally requires that the decision to use this medication is made by specialists.
- These results may therefore indicate the existence of “**resource-dependent variations**” in care, where an uneven distribution of resources has led to an **inadequate provision** of specialist expertise and rehabilitation services in the lower spending regions.

Discussion

- Mortality showed **no statistically significant association** with spending
- A previous study has indicated performances in process indicators are easier to improve than mortality rates*
- Mortality rates following ischemic stroke are already **very low** in Japan*
 - Current mortality rates may be difficult to be further improved upon with current health care services.

*Stukel et al., 2012; OECD, 2010

Possible Causes for Existing Variations in Spending and Quality of Care

- **Resource Distribution and Structure**
 - Stroke care specialists, Stroke units etc.
- **Technical Ability**
 - Physicians and other staff
- **Patient Casemix**
 - Stroke severity and Risks
- **Environmental factors**
 - Climate, Diet etc. leading to increased risk of stroke
- **Regional Variations** in Socioeconomic Statuses and Local Government Policies

Possible Measures for Reducing Unnecessary Variations

- **Structural Differences**
 - Fair distribution of necessary resources and manpower
- **Process Variations**
 - Clinical Pathways and Guidelines (Implementation and Adherence)
 - Performance Feedback (e.g. QIP)
 - Public Reporting
- **Clinical Outcome Variations**
 - Efficient Ambulatory Care
 - Access to Specialists
 - Patient Education Programs
- **Expenditure Outcome Variations**
 - Standardized Practice
 - Organizational Efficiency

Limitations

- Kyoto is not a closed-system – possible inter-prefectural movements of patients
- Unable to determine the directional nature of the relationship between spending and quality
- The limitations of administrative databases include lack of detailed clinical information and patient history

Conclusions

- Health care spending in Kyoto, Japan was unevenly associated with the quality of care provided:
 - regions with lower spending were shown to have poorer performance in process indicators, but not in mortality
- Although the two mortality indicators did not show significant association with spending, the overall low mortality rate in Japan may have influenced the results.
- Other process and outcome measures should be addressed in future studies

Conclusions

- A greater understanding of the relationship between health care spending and quality at a large scale may provide better insight into the balance between resource distribution, utilization and quality of care
- Although policy-makers strive to find cost-cutting measures, our results indicate that care must be taken to ensure that these measures do not diminish the quality of care

II

医療・介護資源の選択と集中、アクセス、連携

計画的な医療資源配備に資するシミュレーションの方法を開発して具体例を示した。これにより、拠点化・集中化のアクセスとその平等性に及ぼす影響を予測しながら施策を講じることが円滑となる。選択と集中とともに重視される連携については、レセプトデータにて医療間、医療・介護間の多施設横断パスにて可視化し、健診・医療データに基づき地域プロファイリングを行った。

拠点病院への患者の集中がアクセス時間とその不平等に及ぼす影響の評価

京都大学大学院 医学研究科 医療経済学分野

○小林大介 大坪徹也 今中雄一

平成24年7月21日

背景

医療機関までのアクセスに要する時間(以下、アクセス時間とする)を用いた研究

- 医療提供体制の地域差について、これまでの議論
 - ・医師の偏在や不足¹⁾
 - ・医療機関の所在や患者受療行動²⁾
 - ・生存率や死亡率³⁾ など
- 海外における研究
 - ・外傷⁴⁾
 - ・急性心筋梗塞⁵⁾
 - ・がん⁶⁾ など

アクセス頻度の高い外来医療や、アクセス時間そのものの平等性を客観的に評価した研究はほとんどみられない。

1) 厚生労働省. 2010.
2) あんしん医療制度研究会. 2010.
3) 服部昌和ほか. 2010.
4) Branas CC, *et al.* 2005.
5) Nallamothu BK, *et al.* 2006.
6) Baird G, *et al.* 2008.
7) 山田康夫ほか. 2009
8) 西條泰明ほか. 2011.