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Consolidation of perinatal care resources in Japanese regional care

~Demand side influences and political implications~

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Presentation agenda

1. Research background
2. Research Question
3. Empirical analysis
4. Result
5. Discussion
6. Conclusion and future challenge

Research background

Key points of Japanese health policy renovation

In order to rebuild high quality, efficient health care system…

1) Reallocation and building seamless network of regional health resources in accordance with medical function.

2) Reviewing health plan in five disease(cancer, stroke, AMI, DM, Psycho disease) and five projects(emergency medicine, disaster medicine, remote health, perinatal care).

3) Re integration of regional health system in emergency, pediatrics, perinatal care, disaster medicine and remote medicine.

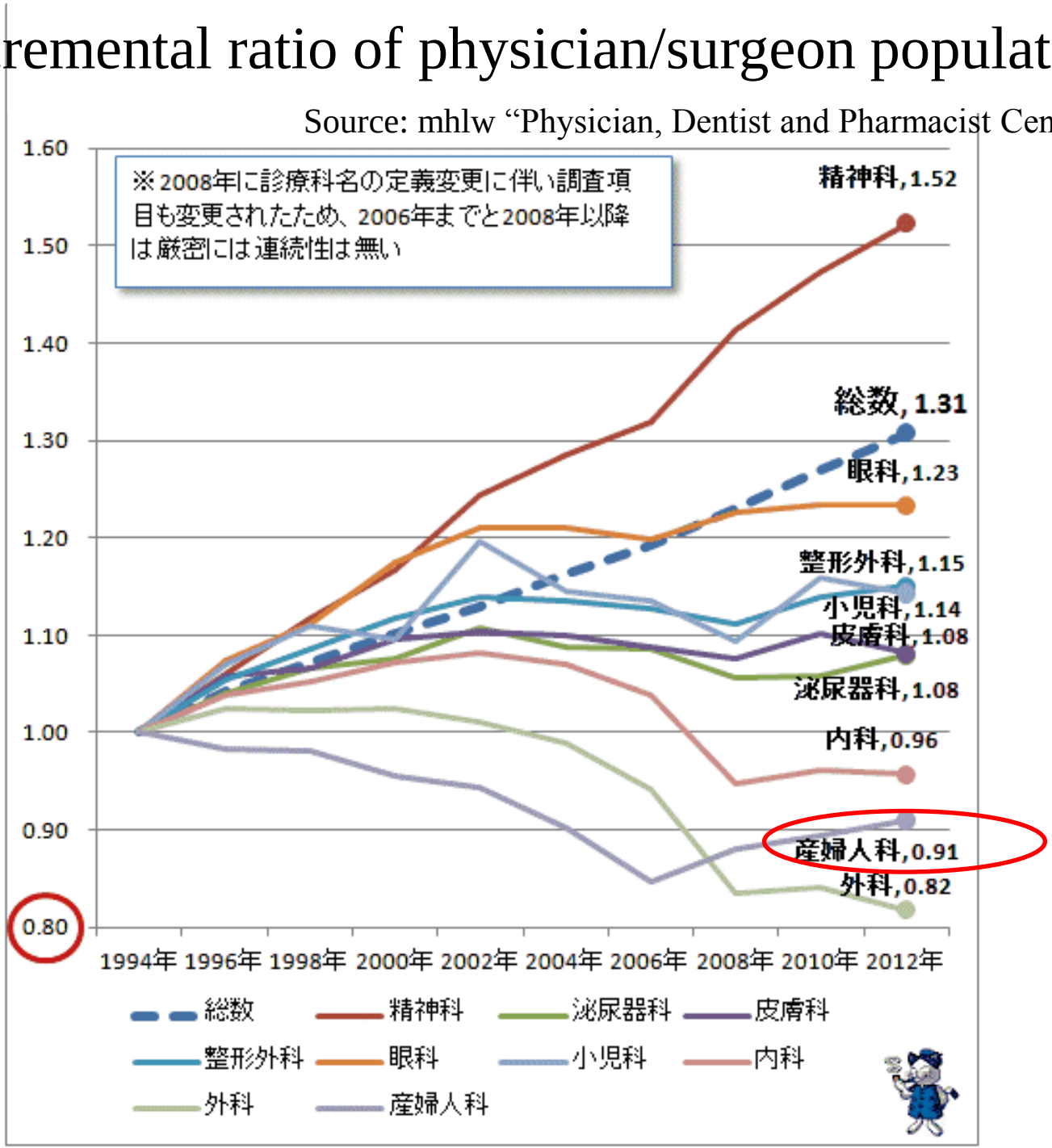
Research background (cont.)

	1996	1998	2000	2002	2004	2006	2008	2010	2012
Internal Medicine	93 141	95 006	97 422	99 189	100 144	98 057	92 644	93 933	95 496
dermatology	6 796	7 072	7 360	7 628	7 780	7 845	8 214	8 470	8 686
pediatrics	13 781	13 989	14 156	14 481	14 677	14 700	15 236	15 870	16 340
psychiatric	10 093	10 586	11 063	11 790	12 151	12 474	13 534	14 201	14 733
general surgery	25 879	25 810	25 424	24 850	24 355	22 630	22 532	23 481	23 507
respiratory surgery	745	818	899	1 033	1 110	1 255	1 445	1 527	1 655
cardiovascular surgery	2 027	2 243	2 409	2 513	2 632	2 585	2 889	2 812	2 893
neurosurgery	5 634	5 871	6 050	6 241	6 287	6 241	6 398	6 695	6 976
orthopedics	16 423	17 229	17 952	18 572	18 771	18 870	19 273	19 975	20 480
ophthalmology	10 982	11 408	12 060	12 448	12 452	12 362	12 627	12 797	12 835
OB/GYN	12 422	12 457	12 420	12 400	12 156	11 783	11 961	12 369	12 708

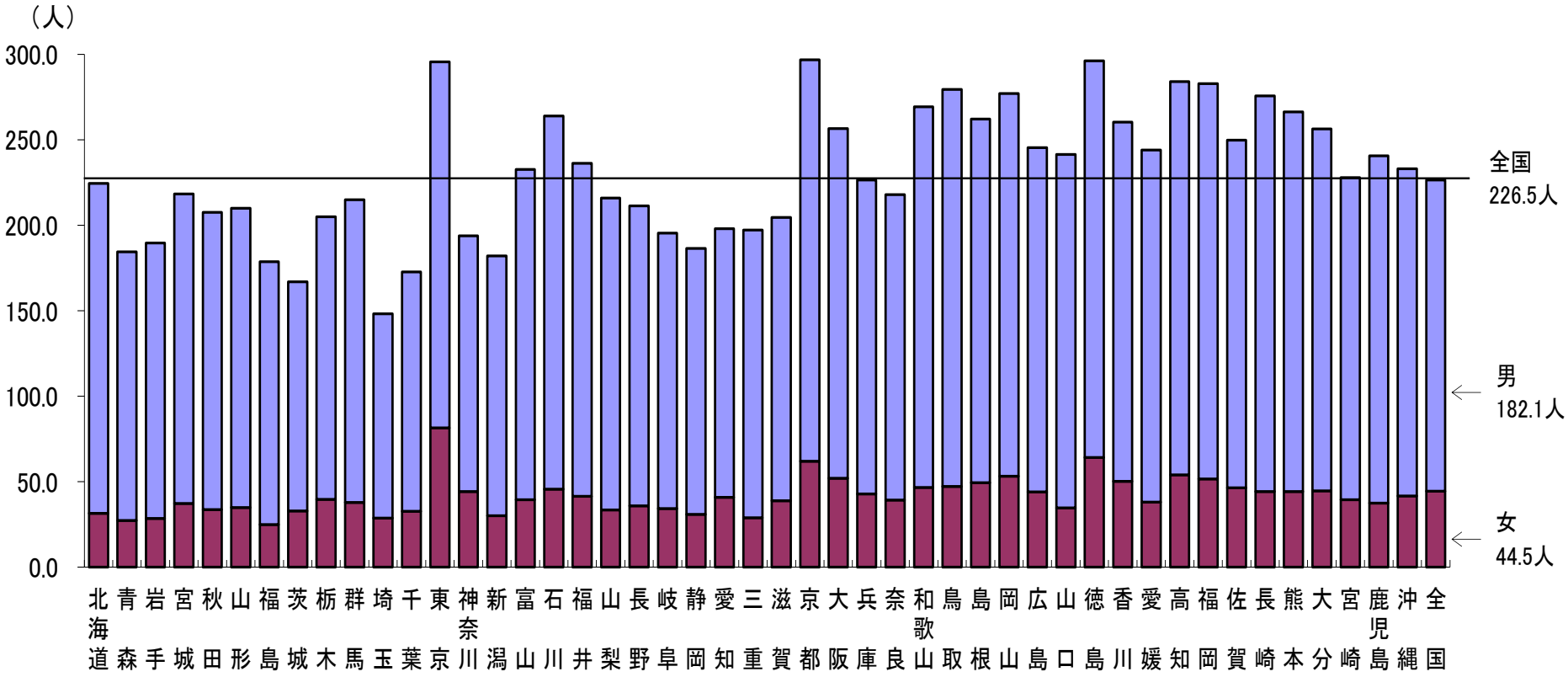
Source: mhlw “Physician, Dentist and Pharmacist Census 2012”

Incremental ratio of physician/surgeon population

Source: mhlw “Physician, Dentist and Pharmacist Census 2012”



Geographic mal distribution in physicians/surgeons allocation in Japan



Source: mhlw “Physician, Dentist and Pharmacist Census 2012”

Working time mal distribution among OB/GYN specialists

(%)

	Large scale hospitals		small hospitals		other facilities	
	OB/GYN total	OB only	OB/GYN total	OB only	OB/GYN total	OB only
～32h*	0	0	0	0	0	0
32~40h	10.7	0	50	0	11.8	0
41~48h	21.4	0	50	0	41.2	75
49~60h	39.3	0	0	0	23.5	0
61~80h	28.6	100	0	0	0	25
81~100h	0	0	0	0	5.9	0
101h~	0	0	0	0	17.6	0

* per week

Source: mhlw “Physician, Dentist and Pharmacist Census 2012”

OB/GYN surgeon may prefer to work at where good work-life balance would be secured.

They tend to move their workplace from large scale hospitals to small or private clinical facilities.

Regional perinatal care provision may shrink down to risky level.

Perinatal care system reform through resource re-allocation should be required.

Policy alternative

Resource decentralization V.S. consolidation

decentralization

small size facilities and medical resource dispersion

advantage ⇒
- shorter distance among patients and clinician
- quick response and flexible footwork to demand

disadvantage⇒
- lower level concentration of skilled clinician
- low response to high emergency case
- cost expansion rather than centralization

consolidation

concentrate a number of clinicians into one facility

advantage ⇒
- one stop treatment for clinical needs
- high response to emergency case
- cost containment rather than decentralization

disadvantage⇒
- longer distance among patients and clinician

While resource consolidation **had been** the trend for perinatal resource reallocation in UK and other European countries, decentralization **comes to be** more appropriate than centralization in Norway and other countries in terms of **patient safety and clinical quality.**

but

Japan may stand behind the recent trend because serious lack of OB /GYN clinicians in local hospitals push the government to introduce consolidation as a fitting policy in order to concentrate resources into representative facility in region for **safety and well response to emergency.**

Research question

Whether resource consolidation policy in Japanese perinatal care work well both for expectant mothers or potential pregnant (demand side) and hospitals (supply side) .

Demand side outcome : cognitive aspects for safe and convenience of perinatal care setting for patients.

Supply side outcome : better hospital financial condition.

Empirical analysis

1.Demand side analysis

by original questionnaire survey data

2.Supply side analysis

by public hospital census data

had been done to identify such questions.

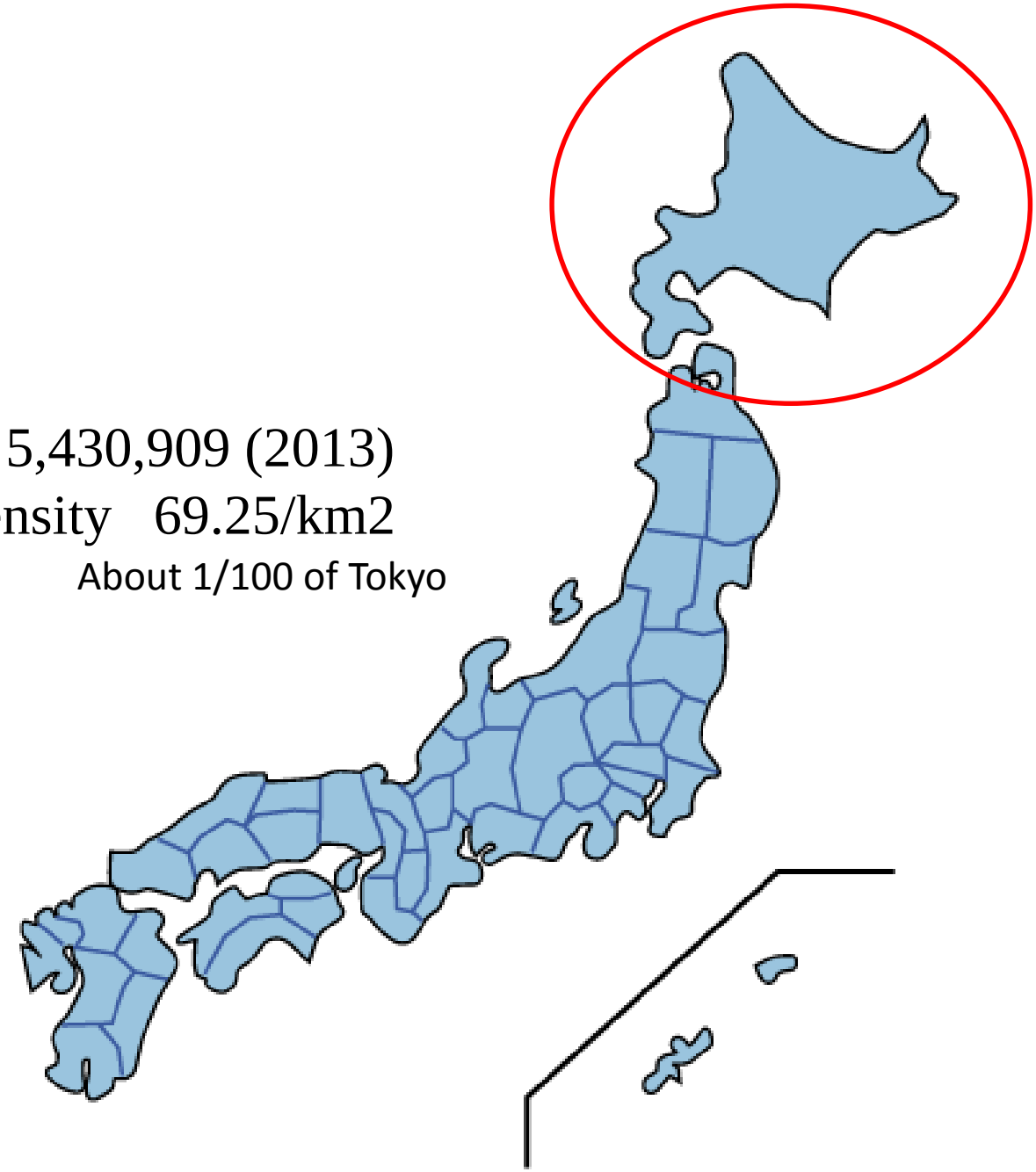
Research subjects

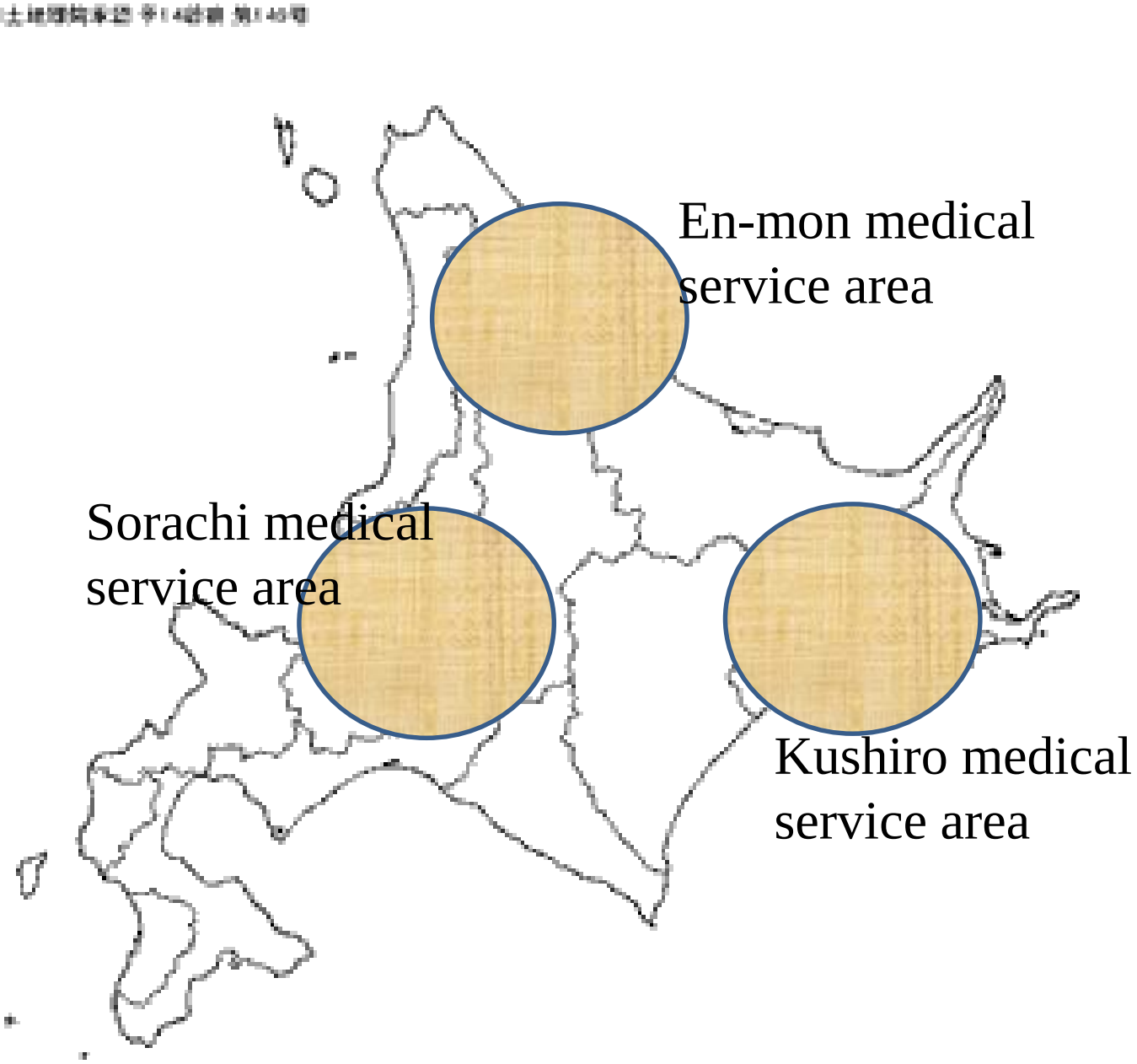
Residents and hospitals in Hokkaido area where consolidation tactics has been highly employed from around 2006.

Population 5,430,909 (2013)

Population density 69.25/km2

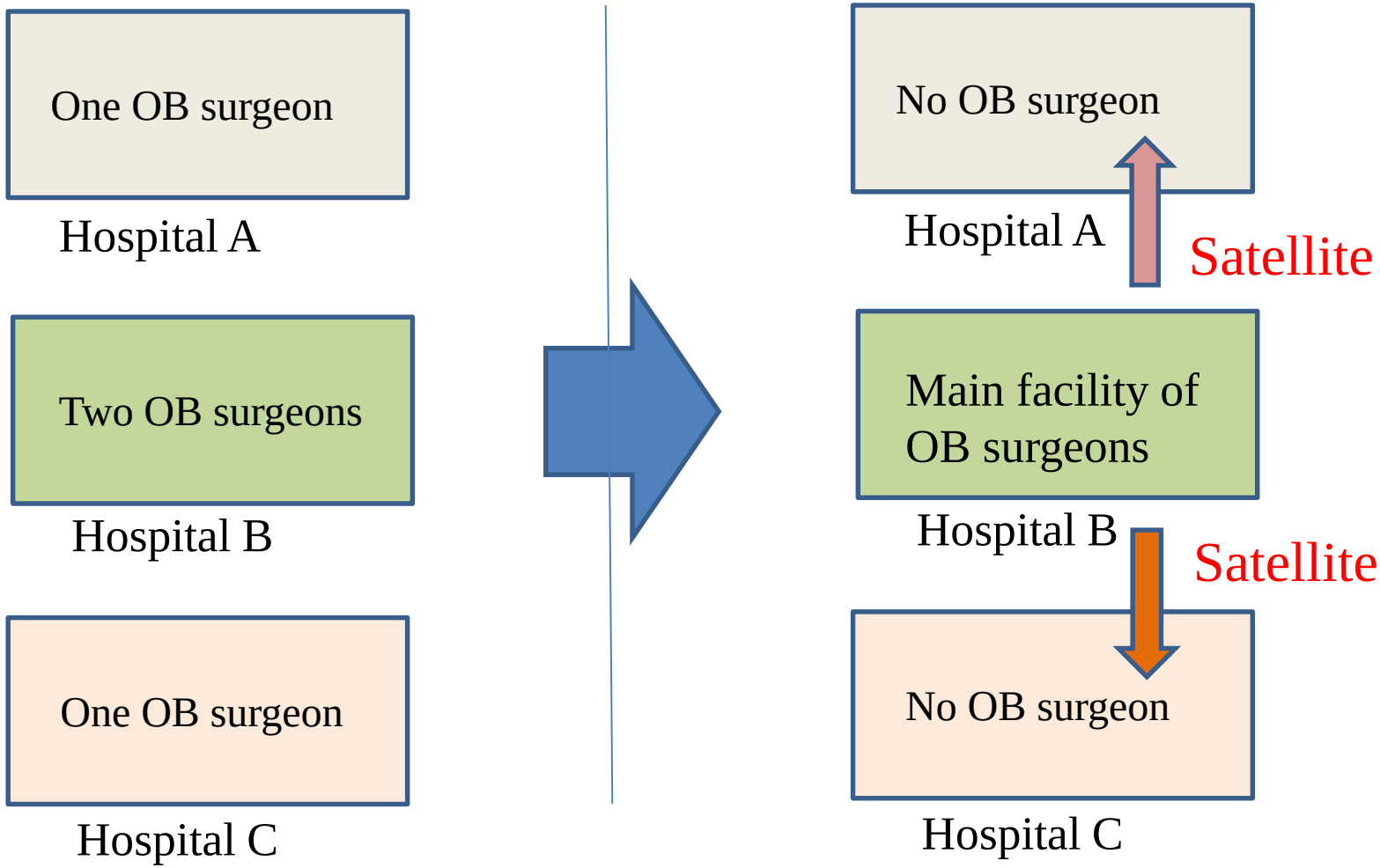
About 1/100 of Tokyo




En-mon medical
service area
Sorachi medical
service area
Kushiro medical
service area

Technique of consolidation of perinatal care resources

Functional reorganization



2004~2006

1.Demand side analysis

by using original data through online survey

Research subjects

Expectant mothers and pregnant living in Hokkaido

Research design

Comparing subjects' before - after cognitive evaluation of about safety and satisfaction of perinatal setting in regions by consolidation policy introduction.

Online questionnaire survey

Research periods	2014/02/13 0:00:00 ～ 2014/09/01 10:00:00
Total number of subjects	6299
Total number of response	2892
Valid response	45.9 %

after matching those who have experience pregnancy and delivery in Hokkaido before and after resource consolidation policy had introduced, 218 individual data are remained for analysis (3.4% of original subjects).

Question items and descriptive statistics

variables	n	average	SD	COV.	min	max
family structure (nuclear family D)	218	0.8578	0.3501	0.1225	0	1
region (where consolidation policy introduced D)	218	0.0917	0.2893	0.0837	0	1
level of mothers' anxiety for perinatal care setting (rank score)	218	1.8220	0.5791	0.3354	1	4
improvement score (difference between after evaluation and before one)	218	0.0697	0.3849	0.1481	-1	2.6
lack of perinatal specialists (rank score)	218	2.3303	0.7627	0.5817	1	4
lack of family support (rank score)	218	2.3119	0.8112	0.6580	1	4
lack of information (rank score)	218	2.0826	0.7755	0.6014	1	4
age	218	37.9358	4.0041	16.0327	27	50
flexibility of facility choice (rank score)	218	2.2798	1.3162	1.7324	1	4
reason of facility choice(convenience D)	218	0.3624	0.4818	0.2321	0	1
reason of facility choice(care provision D)	218	0.1697	0.3763	0.1416	0	1

Summary of regression analysis result

Independent variables	coefficient	SE	p-value	
Family structure	-0.1000	0.0753	0.1856	
Consolidated region	0.1906	0.1093	0.0826	*
Mothers' anxiety	0.1361	0.0465	0.0038	***
Lack of perinatal specialists	-0.0173	0.0329	0.6001	
Lack of family support	-0.2402	0.1680	0.1669	
Lack of information	-0.1161	0.2070	0.5805	
Age	-0.0050	0.0066	0.4509	
Flexibility of facility choice	0.1175	0.0712	0.1134	
Reason of facility choice (convenience)	0.3110	0.1835	0.1041	
Reason of facility choice (care provision)	0.3953	0.2564	0.1374	
constant	0.6143	0.3024	0.0434	**

Adjusted R2 .322

2.Supply side analysis

by using public hospital data

Analytical question

Since demand side impact of consolidation policy may work positively to many expectant mothers and potential pregnant, whether it also works really in improving hospital management conditions, particularly effectiveness in cost containment as well, is another question.

We assumed

Resource consolidation policy may positively affect in cost containment mission of hospitals.

Research design

Assess whether resource consolidation policy affect the cost containment or reduction in public hospital located in that area by estimating cost function of hospitals located both in consolidated area and satellite.

Data

Imported from ***Public Firms Annual Census : Public Hospital Volume 2004~2012*** published by *ministry of internal affairs and communication*(soumu-shou). Hospitals located in above areas are extracted.

Model

translog cost function is adoptable for analyzing hospital cost performance.

$$\ln C = \ln \alpha_0 + \sum_{i=1}^{n} \alpha_i \ln P_i + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \gamma_{ij} \ln P_i \ln P_j$$

$$+ \alpha_Y \ln Y + \frac{1}{2} \gamma_{YY} (\ln Y)^2 + \sum_{i=1}^{n} \gamma_{iY} \ln P_i \ln Y$$

for single output

Christensen, Jorgenson and Lau[1970]

Variables and descriptive statistics

variables	Average	SD
Total cost(ln) dependent variable	9.6196	.26558
Consolidated area D	.0828	.27647
Satellite area D	.2897	.45517
No.of inpatients per physician (ln)	2.1745	.36161
No.of inpatients per physician square	4.8582	1.65530
No.of outpatients per physician (ln)	2.9026	.31116
No.of outpatients per physician square	8.5214	1.82441
Physician salary (ln)	13.6717	.31228
Physician salary square	187.0105	8.54648
Nurse salary (ln)	12.5913	.08530
Nurse salary square	158.5488	2.15082
Drug costs(ln)	7.2459	2.18096
Drug costs square	57.2268	39.35551
No.of inpatient pp * physician salary	66.6706	23.60299
No.of outpatients pp * physician salary	39.7246	4.71953
No.of inpatient pp * drug costs	15.7288	5.31987

Summary of regression result

independent variables	coefficient	SE	P-value	
Constant	18.982	3.850	.000	***
Consolidated area D *	.181	.079	.023	*
Satellite area D *	.070	.037	.059	
No.of inpatients per physician (ln)	.113	.481	.814	
No.of outpatients per physician (ln)	-4.894	2.645	.067	
No.of outpatients per physician square	-.156	.181	.391	
Physician salary square	-.047	.024	.058	
Nurse salary square *	-.020	.008	.011	*
Drug costs(ln) *	.259	.081	.002	**
Drug costs square	-.014	.003	.000	***
No.of inpatient pp * physician salary	-.005	.007	.464	
No.of outpatients pp * physician salary	.420	.228	.068	
No.of inpatient pp * drug costs	-.006	.020	.764	
		Adjusted R2	.636	

*Time trend is controlled by year dummy ⇒no significant trend effect observed

Discussion

Does resource consolidation policy in perinatal service setting work well for improving regional perinatal services conditions?

$\Rightarrow$ Probably YES

While, hospital cost may unexpectedly increase in period ***after*** policy introduction.

If so, what happened?

1. Japanese public hospitals face crucial deterioration in financial management, which may not overcome even if resource consolidation policy introduced. Instead, intensive setting of OB clinicians may invite less cost –effective condition in providing perinatal care.

2. On the other hands, while satellite facilities for which resource consolidation would be considered for reviving financial cost-effective conditions, analysis indicated the policy may not work well (total cost also increased after policy introduction!).

3. As regional perspective, consolidation policy in perinatal care setting seems not to invite expected cost containment environment.

Conclusion and future challenge

Japanese perinatal care is enforced to do ***hard drive*** under scarce resources.

Consolidation, trial of concentration of perinatal resources into centralized function, seems to be ***so so effective measures*** for pregnant and expectant mothers. Hospitals, instead, face some ***unwelcome*** situation in terms of cost inflation.

That means more appropriate financial support by means of reimbursement scheme updating for consolidated facilities, or more effective matching mechanism for fostering young clinicians willing to enter the OB/GYN field should be required.

Conclusion and future challenge cont.

We need;

- extended research involving wider area of introduced similar policy all over Japan.

- comparative study with European countries where introduced or withdrew such consolidation model.

- exchange research output between China because, after quitting one child policy, breaking balances among potential mothers and OB clinicians will raise soon.

Thank you for your attention