Practical use of Digital Big Data to Evidence-based Health Policy

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Brief background
General account tax revenue, The total expenditure and government bond issues

(Trillion yen)

[Flow] (Unit: billion yen)
- Bond Dependency Ratio: 47.9%
- General Account Primary Balance: -22,748.9

[Stock] (Unit: trillion yen)
- As of end-FY2011 (Percentage of GDP)
  - Government Bonds Outstanding: 668 (138%)
  - Long-Term Debt Outstanding of Central and Local Governments: 891 (184%)

Jan., 1990: Collapse of the 'bubble' economy
April, 2001: Financial crisis and Structural reform
April, 2008: Subprime Loan Crisis
Oct., 2009: Sovereign Debt Crisis
Mar. 11, 2011: East Japan earthquake

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The Act on Assurance of Medical Care for Elderly People was enacted as a part of the Government’s 2006 reform of the health and medical care system.

1) The Government introduced a framework for the Plan to Optimize Medical Costs, which is aimed at making medical costs more reasonable from a mid- to long-term perspective.

2) A database is to be constructed for use in surveys and analysis by the Ministry of Health, Labour and Welfare to contribute to the preparation, implementation and evaluation of the Plan to Optimize Medical Costs.

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Transition of an electronic claim rate
(based on the number of institutions)

http://www.mhlw.go.jp/topics/2012/02/dl/tp120205-1-koudo_setumei.pdf (2013.5.9 accessed)

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Methods
Electronic Claim data

• Electronic Claim data include personal information such as patient’s name, sex, and date of birth, health insurance information of the patient, name of the medical institution that sends the bill, department, disease name, and points for medication, injections, procedures, surgeries, examinations, imaging, rehabilitation, and so on that were performed during the treatment month. Those are created by medical institutions for each insured patient on a monthly basis.
The road distance

• The national population census provided by the Ministry of Internal Affairs and Communications Statistics Bureau is used for the basic population data.

• For the road network, the numerical map25000 from the year 2002 is modified to create the original road network data in the target analysis period.

• The network distance is measured by the Geographic Information System (GIS), based on the population distribution, location of hospitals and road network.

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Results: Quality and Cost
The City of Mishima had a population of 112,000 as of April 2012, of whom 32,500 are beneficiaries of the city’s National Health Insurance program (those under age 75).

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Quality of primary care

Total amount of the cephem antibiotic drugs

A zone

C zone

B zone

D zone

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Quality of acute care

Fatality rates within 30 days after admission for AMI

Fatality rates within 30 days after admission for stroke

Accumulation number of deaths

Number of death

Days in the hospital

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Evaluation of the cost-benefit of the new policy

The cost-benefit of the new surcharge was 1,727,029 yen/159,080 yen = 10.86 (times).

Generic name prescription surcharge (20 yen)

Changes of number of Generic drug prescribed

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The cost = The total amount of the generic name prescription premium

The benefit = $\sum Gaps$

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Results : Access
The figure shows the map of network distance for Emergency Medical Services in Japan.

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Conclusion

It is technically possible to evaluate quality and cost of health care and accessibility of residents to the medical institutions by analyzing the new big data.

Although such infrastructure needs to be systematic and efficient to be capable of supporting linkages among data sources and to provide appropriate protection of the privacy and confidentiality of health information, we have to embrace the new electronic big data in order to promote evidence-based health policies and to improve the quality of health care.

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We can’t manage what we don’t measure.

Digital health care data
- Health insurance claim data
- Health checkups and Health guidance data
- Long-term care insurance claim data
- Accessibility data
- Medical record data
- Others

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