The Claim Database in Japan

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Abstract

Based on the Fee-For-Service tariff system, Japan has developed the National Database (NDB) that registers all health care insurance claims. Compared with the similar databases of other countries, NDB has more detailed data, i.e., insurer's code, insured ID number, diagnoses, age, sex, date of consultation for out-patient service, date of admission, date of discharge, procedures and drugs provided with information of date, volume and tariff. Annually more than 1,700 million records are registered into NDB. In this article, the authors will explain the detail of NDB and its future.

Key words: National database, claim data, fee-for-service, big health data, Japan

❖Introduction

Japan faces the ageing of society. In 2025, one of three Japanese will be over 65 years old. This demographic change will cause a fundamental change in disease structures, i.e., acute to chronic diseases dominant pattern and medical service delivery system, i.e., institutional to community care. Compared with the other developed countries, the Japanese health care system for the aged is rather institutional care dominant. It is estimated that Japan will have more than 1.6 million deaths after 15 years. Currently more than 80% of deaths occur at hospitals in Japan[1]. Considering the current difficult fiscal condition, it will not be possible to equip more beds to receive the increasing number of dying aged people. Thus we have to re-organize the health care delivery system from institution dominant pattern to community based one. In order to do this task, we need the objective information about the current and future situation.

Japan has developed a very detailed medical information system based on the fee-for-service payment scheme. For a long time, it has been very difficult to use

this useful information because most of the claims were paper-based. However, this situation has dramatically changed after the introduction of DPC (Diagnosis Procedure Combination, the Japanese original patient classification system). In 2008 the Ministry of Health, Labour and Welfare has started to construct the database of all claim data, so called the National Database (NDB). This database has been opened for research project and health policy making of local government. In this article, the authors will explain the detail of this database and its future development.

❖Health care system and claim data

Japan has a universal coverage of social health insurance as shown in Figure 1[2]. This system composes of three sub-systems; National Health Insurance (for self-employment), Society Health Insurance (for employee) and Special scheme for the aged (75 years old and more). People in Japan have an obligation to join one of three schemes according to their occupational status and age. The premium is set by each insurer, usually based on income. Although there are different insurance schemes, the tariff is unique that is set by MHLW. In principle, all medical facilities are paid by fee-for-service principle [Note 1]. The tariff table is very detailed. At the end of month, each medical facility sends a set of claims for reimbursement to insurers via the review organization. Insures have a right to refuse the payment if there are any incorrect or unnecessary
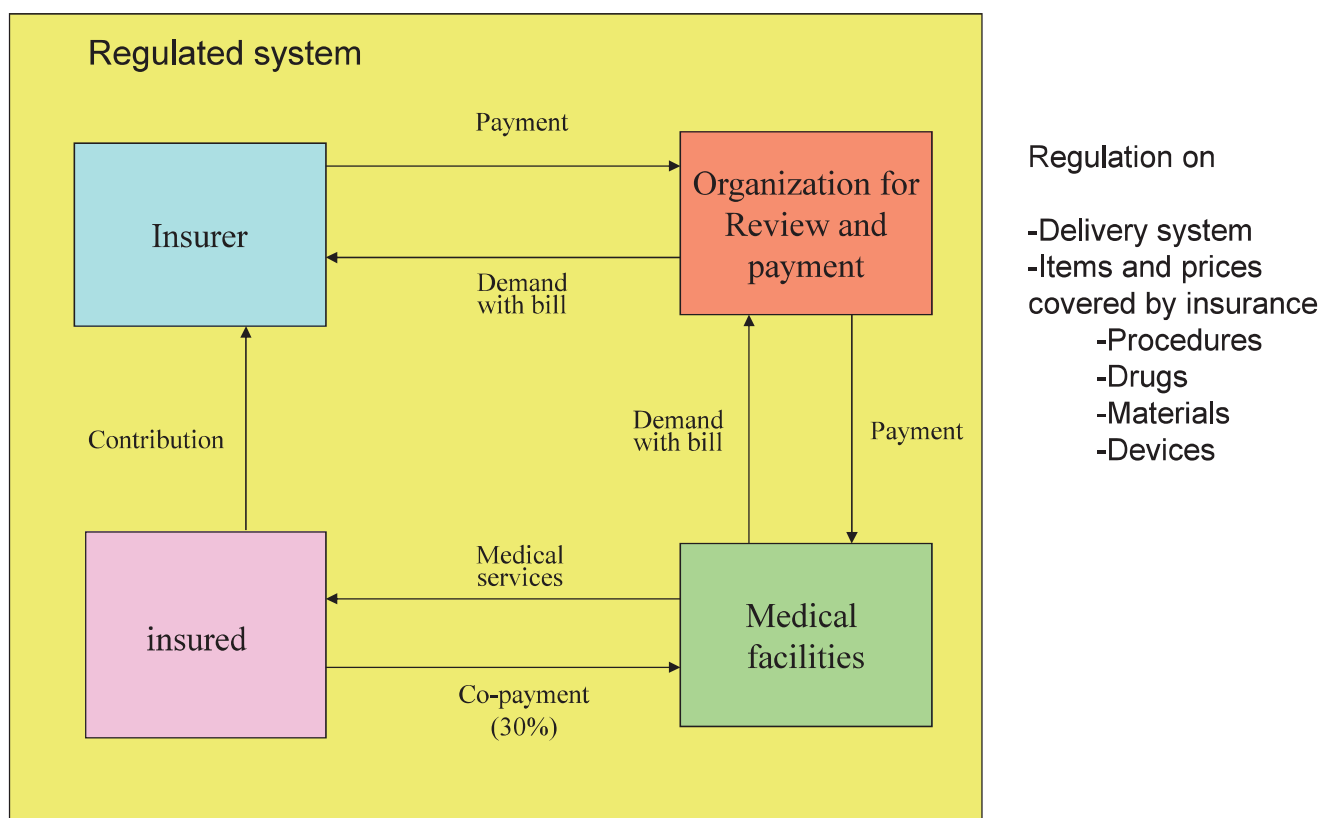
Figure 1   Basic structure of the Japanese Health Insurance Scheme

treatments. As Japan adopts the third payer system, a patient pays a part of cost on site (30% for general population, 20% for the insured between 65 and 74, and 10% for the aged more than 75 years old). The rest is paid to each institution by insurers. On average, the time lag between requirement and payment is two months. There is a monthly threshold of co-payment by patient, 80,000 yen in principle.

For the production of a claim sheet of each patient for reimbursement, medical facilities use a special computer system. In this computer system, all procedures, drugs and devices for reimbursement are registered for each patient by daily basis. There is a MHLW standard code for each of all procedures, drugs and devices.

❖ Diagnosis Procedure Combination (DPC)

DPC is the Japanese original patient classification system (PCS) that was developed by our research team[3]. The basic idea of DPC is to classify a patient by the combination of diagnosis and procedures conducted within the hospitalization. The first key of classification is diagnosis, and then types of procedures are considered to decide a particular group. For the development of DPC, we have grouped all diagnoses into about 500 diagnosis groups, so called Base DPC. Then the common procedures were extracted based on the detailed process information that was registered in the FFS based claim treating computer system. As explained by our previous literature[3], the DPC study gathers the detailed electronic data as E-file and F-file. The E-file has information of the bundled charge of procedures and F-file indicates the detail of bundled procedures. Based on this dataset, we can analyze the detailed process at the individual patient base. Using this characteristic, many organizations are participating to the benchmarking project for quality improvement. National Hospital Agency[4] and Saiseikai[5] are such examples.

The most important characteristic of DPC project is that it uses the already existed FFS based tariff table and claim processing computer system. This makes it possible to convert all electronic claim of out- and in-patient (both acute and chronic) into DPC based grouping. Our research team has developed a special logic for this conversion. We have applied this technic to the National database as mentioned below.

❖National database

In 2008, MHLW has started to gather all health care insurance claim data and to construct a database, so called National Database. This database is constructed by individual insured basis. The ID number is treated by the Hash function conversion twice in order to make it anonymous but being able to combine all data by individual insured. The NDB is called "database", but in fact it is a set of archives. Therefore we have to reconstruct a database specific to the objective of each research project. The database contains the detailed information such as insurer's code, insured ID number, diagnoses, age, sex, date of consultation for out-patient service, date of admission, date of discharge, procedures and drugs provided with information of date, volume and tariff. Annually more than 1,700 million records are registered into NDB.

As shown in the upper part of Figure 2, the format of electronic claim is rather complicated. The header indicates the type of data, i.e., IR=code of medical institution, RE=ID and name of insured, HO= insurer's code, SY=diagnosis, SI=code and name of procedure and its volume, IY=code and name of prescribed drugs and its volume. In NDB system, above mentioned data are registered by data type as archive. From this dataset, we have to reconstruct a canonicalized data for

analysis as shown in the lower part of Figure 2. One of the authors (Fujimori) has developed a computer program for this conversion and this method is used for reconstruction of database.

From 2011, MHLW has started to open this database for researchers and central and local governments for research and health policy discussion. In order to use the database, candidates must obtain the permission of MHLW. Figure 3 explains this process. At first, a candidate must participate at the seminar organized by MHLW. The detail of claim data and the content of guideline for application are explained at the seminar. Then a proposal document is reviewed at the Sage committee that composes of representatives of insurer and provider, persons from academics, and journalist. As NDB contains the delicate personal information, a candidate is required to have very secured physical environment. For example, the Information Security Management System (ISMS) like regulation is required. As the NDB program is in its embryo stage, MHLW requires a very strict rule for its public use in order to avoid the privacy issue. Because of this strict condition, only 7 to 10 proposals are accepted annually. Regarding the usefulness of data, this limited situation must be ameliorated. Actually, MHLW intends to introduce the US ResDAC[6] like organization.

Although the use of NDB is strictly limited actual-

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[Original format]
IR,2,40,1,2345678,01,Matsuda hospital,42204,00,
RE,3,1318,42203,Ken Suzuki,2,3240522,70,,,,,243,,,,,01,,,,,,,,,21203
HO,409999,999,123456789,2,2175,,,,,,,,
SY,2500015,3520613,1,,,01,
SY,8838071,3520613,1,,,,
SI,12,1,112011310,,70,2,,,,,,
SI,13,1,120002370,,10,1,,,,,,
IY,21,1,620002032,2,,,,,,,,
IY,,1,620002121,2,19,35,,,,,,
SI,25,1,120001210,,42,1,,,,,,
SI,60,1,160010010,,50,1,,,,,,
```

[Converted format for analysis]

InstitutionN	Name of patient	ProcCat	Order	Proc N	Proc code	Proc name	Volume	unit
	Tariff of proc	Tariff of drug	freq	date				
402345678	Ken Suzuki	12	0001	001	112011310	Consultation	1	0
	70	0	2	20100301				
402345678	Ken Suzuki	21	0001	001	620002032	Glimicron40mg	2	16
	0	59	35	20100301				
402345678	Ken Suzuki	21	0001	002	620002121	BasenODTab0.3mg	2	16
	0	132	35	20100301				
402345678	Ken Suzuki	25	0001	001	120001210	Prescription	1	0
	42	0	1	20100301				
402345678	Ken Suzuki	60	0001	001	160010010	HbA1c	1	0
	50	0	1	20100301				

InstitutionN: Institution number, ProcCat: Procedure category, ProcN: Procedure number for grouping, Proc code: Tariff code of Procedure, ProcName: Name of procedue, freq: frequency of procedure

Figure 2　An example of the current format of electronic claim and the converted format for the analysis
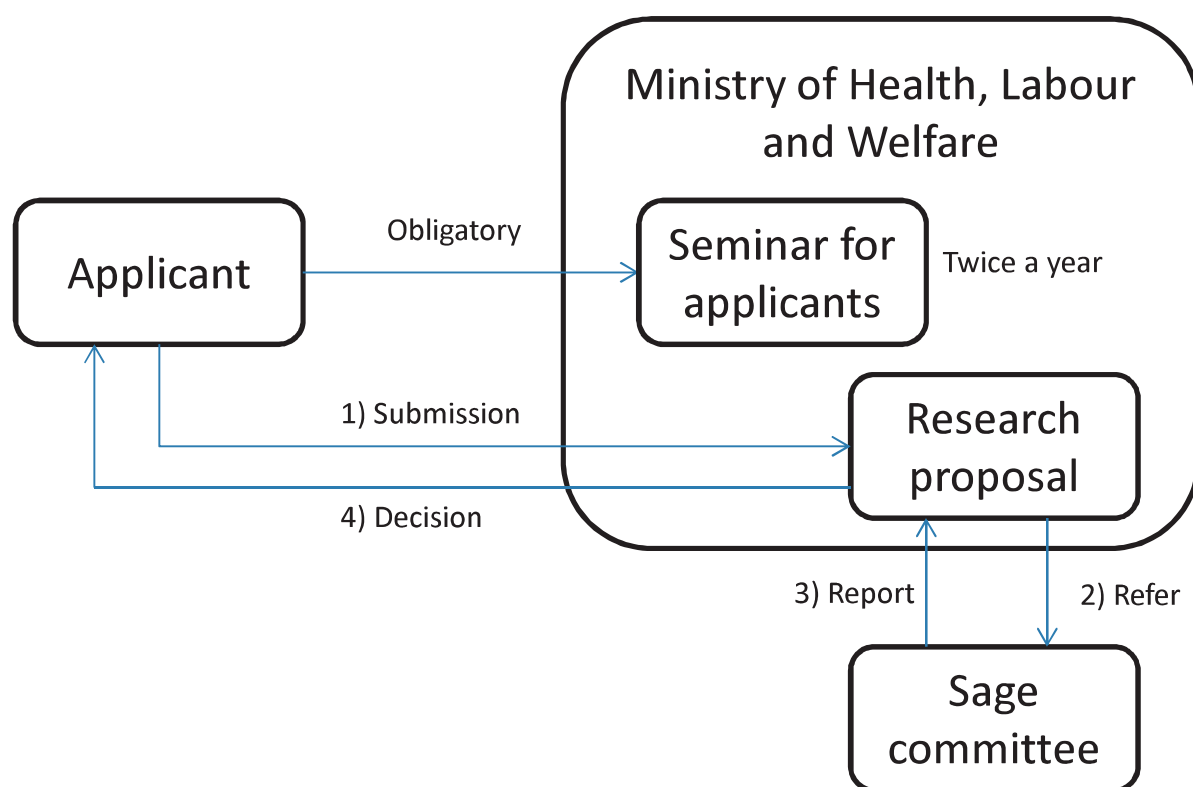
Figure 3   Evaluation process of NDB using research proposal

ly, the results of researches are very interesting and useful for health policy making. For example, we have developed a visualizing tool of disease structure for the planning of Regional Health Care Plan (RHCP) and distributed it for all prefectural government[7]. The profiling program of pharmaceutical use is also on going. Other articles of this volume are also a part of outputs of NDB based research programs[8)-10)].

❖Future of NDB

Under the difficult fiscal condition, it is an urgent task for policy makers and health service researchers to formulate suggestions for appropriate health resource allocations. Because of the rapid ageing, we will have more than 1.6 million deaths per year in 2025. This will require the organizational change of health system from the hospital to community based system. As the Japanese health system heavily depends on the private sector, it is very difficult for the government to force medical facilities to change their functions. Therefore it is very important to provide the objective information about the future change of disease structure for each region in order to make it possible for each private medical facility to make its decision for management. NDB will be a very strong tool for this purpose. Now

we are developing the all-patient DPC that covers all range of medical services including the long term care insurance (LTCI) users. Applying this new logic to NDB, we will be able to provide a more useful picture for future Japanese health system.

Second important field of NDB application is to use this database for research and marketing. For example, it is possible to describe the pharmaceutical use profiling according to several points of view, i.e., age, sex, existence of comorbidities (diagnoses and severities), region and location of treatment (out- and in-patient services). This kind of information will be useful for pharmaceutical companies for marketing and R&D activities. Big data analyses have possibilities to detect some unknown side-effects that would be caused by co-prescribing or interaction among age and co-morbidities. Furthermore if the permanent ID number is officially introduced in Japan, it will be possible to organize a total population based cohort study. It will provide very important information about the natural history of diseases and the effect of socio-economic factors on morbidities of particular ill-health, for example. The findings derived from these studies will be useful for development of new drugs and for establishing health policy.

As the claim data is a very sensitive personal data,

it is a presumption to have a nation-wide consensus how to guard the privacy and to balance it with public interest. We need a special organization to discuss this mater as like as CNIL of France[11].

Note 1: From 2005, the acute care hospitals have been paid by DPC based per-diem payment. The tariff of each DPC is determined based on the average of fee-for-service equivalent payment. For the out-patient care, all facilities receives the FFS based payment.

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