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A pilot study of developing the health data analysis system in the Japanese occupational setting

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Abstract

Along with the ageing of society, the social security expenditures continue to increase in Japan. In order to tackle this situation, the Japanese government intends to realize the active aged society where most of the 75 years old persons will be socially active. This requires a health related big data by which the government plans and evaluate the health programs. For this purpose, the authors have already constructed an integrated evaluation system of health data in the community setting. This system is now used among several local governments. Based on this experience, we have developed a similar system for the occupational setting.

The present study has clarified the feasibility and utility of our data analyzing system. Using this analysis system, occupational health nurses of the insurer can extract the target of intervention. Furthermore, they can evaluate the compliance level of insured who were advised to have consultation by clinicians.

The Japanese government has started the Data Health Plan in 2013. In this national project, the government intends to construct a big data that can be used for the health policy and the creation of new health related business. Our system can be one of the bases for this discussion.

Key words: Disease management, Population health management, Data Health Plan, ICT

❖Introduction

Along with the ageing of society, the social security expenditures continue to increase in Japan. Total fertility rate (TFR) has been around 1.2 for the past decades. This means that the rapid decline of workforce will happen in the future Japan. Considering this situation "The Economist" set alarm bells ringing about the future of Japanese society as "Japan syndrome"[1)]. More the aged and fewer the children, it is reasonable that the government, especially the Ministry of Finance, becomes very anxious about its sustainability. In order to tackle this situation, the Japanese government intends to realize the active aged society where most of the 75 years old persons will be socially active. As factors related to workability of the aged, Seike and Yamada have reported that health is one the most important factors[2)]. This requires the life-long health supporting system. The public health insurance scheme is one of such systems but the current system is too curative and lacks the proactive measures targeting life style related diseases. This is why the Japanese government has introduced the public disease management program in 2008[3)].

In order that the program works properly, it is indispensable to prepare the PDCA (Plan-Do-Check-Action) cycle based monitoring and evaluation system. Although the Japanese insurance scheme has very useful information, that is the claim data, its use has not been developed. As it is inappropriate to evaluate the effectiveness of preventive activity within a short term, it is indispensable to implement the life-long evaluation system. This requires to combine the information of disease management program with medical claim data. Currently, these data are treated under the different system. Considering the financial limitation that our social security system faces, it is an urgent task to construct an integrated evaluation system in order to implement a truly effective health policy under the correct priority setting.

For this purpose, the authors have already con-

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[Convertied format for analysis]

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402345678	Ken Suzuki 0	21 59	0001 35	001 20100301	620002032	Glimicron40mg	2	16
402345678	Ken Suzuki 0	21 132	0001 35	002 20100301	620002121	BasenODTab0.3mg	2	16
402345678	Ken Suzuki 42	25 0	0001 1	001 20100301	120001210	Prescription	1	0
402345678	Ken Suzuki 50	60 0	0001 1	001 20100301	160010010	HbA1c	1	0

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 1 An example of the current format of electronic claim and the converted format for the analysis

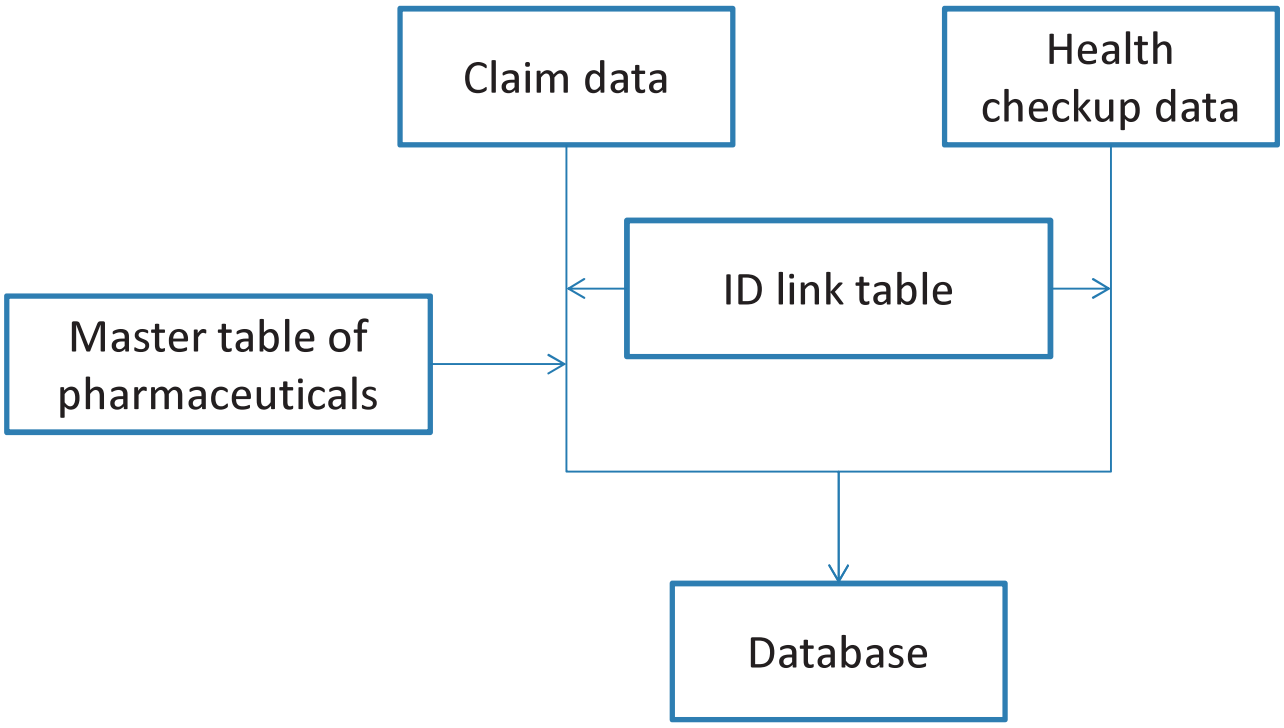

Figure 2 Data processing process

structed an integrated evaluation system of health data in the community setting[4]. This system is now used among several local governments. Based on this experience, we have developed a similar system for the occupational setting.

❖Data and methods

1. Data

We used the claim data of one enterprise managed health Insurance (EHI, medical services and pharma-

ceuticals) and the data of disease management program (including labo-data and questionnaire data). The data is the two years from 2011 to 2012.

The use of data was approved by the ethical committee of the University of Occupational and Environmental Health.

2. Methods

The upper chart of Figure 1 shows the format of current e-claim. This format is not canonicalized, so difficult to be processed. Therefore it is necessary to canonicalize the data. We developed a SQL program to change the format like as the under chart of Figure 1. In this way we have constructed a set of tables for further analyses as shown in Figure 2. As each claim data has its proper ID number, we asked to the EHI office to create the unique ID for each insured by the way we have defined.

For the diagnosis, we used the first diagnosis that was registered in each e-claim. The diagnosis was converted to the corresponding ICD code and then Major Diagnosis Category (MDC) of the Japanese Casemix system, so called DPC[5].

❖Results

Figure 3 shows an example of data analysis. Using this analysis system, an occupational health nurse of the insurer can extract the target group for intervention. In this example, the insured whose HbA1c was over 8.0 (mg/dl) and BMI was more than 30 were extracted. The lower part of Figure 3 shows the list of worker's ID who match to the extraction criteria with other labo-data and charged cost of pharmaceuticals for diabetes, dyslipidemia and hypertension. Using the pharmaceutical cost data, the occupational health nurse can check the treatment situation of each insured. If an extracted insured whose labo-data was HbA1c of 10.0 has not received any pharmaceutical for diabetes, it is highly possible that this insured have not receive any medical treatment. Apparently this is a highly inappropriate condition. Based on this result, the occupational health nurse of insured can advised to the checked insured to have an appropriate consultation of physician. In this way this system can be used for the monitoring of the insured for their compliance level of treatment.

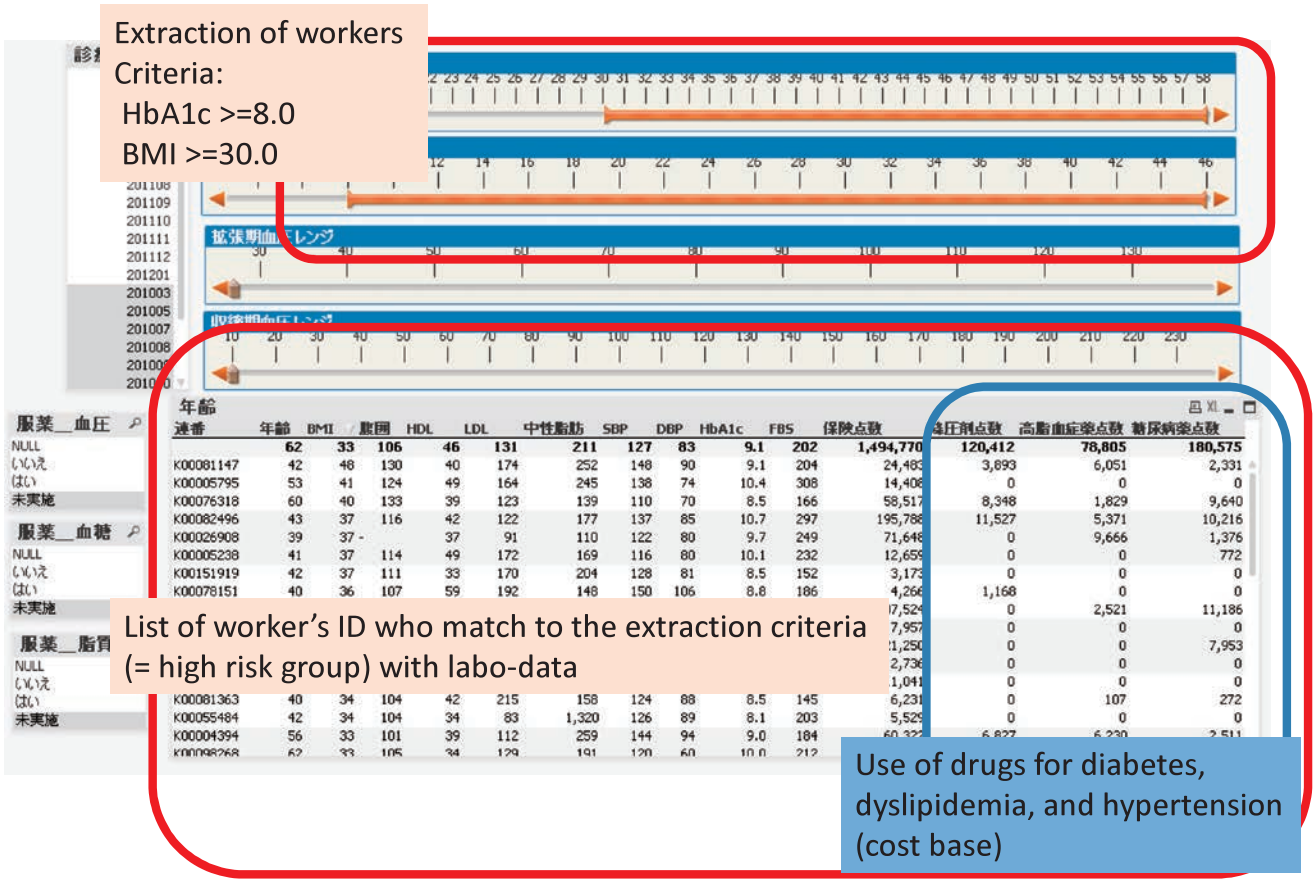

Figure 3 An example of data analysis

❖Discussion

The present study has clarified the feasibility and utility of an integrated information system that makes it possible to analyze the medical and disease management data by the individual client level. Now we are conducting a pilot project using this system in several insurers of the occupational setting. The purpose of feasibility study is to add the analyzing modules for better use in the field. Because of the long history of health promotion activities in the Japanese occupational setting, the occupational health nurses have a lot of experiences and know-hows for health management. However these experiences have merely been systematized nor informatized. Using the developed system, they can test their hypothesis on high risk groups and evaluate the effectiveness of their intervention, and then to stock their evidences by the standardized information format. This intellectual property will serve as the important basis of nation-wide disease management program and population health management program.

The Japanese government has started the Data Health Plan in 2013[6]. In this national project, the government intends to construct a big data that can be used for the health policy and the creation of new health related business. Our system can be one of basis for this discussion.

The database constructed in the occupational setting is very important because it covers the insured from 20s to 60s. As far as we know, there are few health related big data likewise the database we are constructing. Using this dataset, we can evaluate the natural history of various diseases. This will be very informative for development of new pharmaceuticals and health promotion programs including dietary education and physical fitness. We would like to report the results of our current projects in the future publications.

❖Literatures

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