Updated Information on NDB

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ABSTRACT

The Ministry of Health, Labour, and Welfare, Japan launched a national administrative claims database in 2009, which is called the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB). Detailed information on the NDB was reported in *Annals of Clinical Epidemiology* in 2019. The present report provides updated information on the NDB. In 2020, the provision of data to private companies, as well as public sectors and academic entities, was legislated. As of 2024, the Ministry of Health, Labour, and Welfare is planning linkage of NDB data with several other national databases. Our previous literature review identified a total of 126 original articles using the NDB and NDB Open Data published from 2013 to 2022. Our updated review identified 94 original articles using the NDB and NDB Open Data in the recent two years. Studies using the NDB are gradually increasing, but there is still room for enhancing NDB studies on various subject areas.

KEY WORDS

real-world data, administrative claims database, NDB, NDB Open Data

INTRODUCTION

I previously reported information on the National Database of Health Insurance Claims and Specific Health Checkups of Japan (NDB) in 2019 in *Annals of Clinical Epidemiology* [1]. Five years have passed and the situation around the NDB has changed; thus, the present report provides updated information on the NDB.

The term "real-world data" refers to data that are created and gathered during routine health care and can be used for clinical studies, epidemiological studies, health services research, and health economics and policy research. Real-world data include administrative claims data, electronic medical record data, and patient registry data.

The present report briefly describes the universal healthcare coverage in Japan, and overviews administrative claims data in Japan, particularly focusing on the NDB.

UNIVERSAL HEALTHCARE COVERAGE

Japan launched the universal healthcare insurance system in 1961 [2]. Nearly every Japanese citizen is required to enroll in one of the following five public insurance programs: (i) municipality-based National Health Insurance for nonemployees (individual proprietors; and retired pensioners aged less than 75 years), (ii) Japan Health Insurance Association administered Health Insurance for salaried employees in small companies, (iii) Association/union administered Health Insurance for salaried employees in large companies, (iv) Mutual Aid Association administered Health Insurance for civil officers, and (v) Advanced Elderly Medical Service System for people aged 75 or older. In 2021, the numbers of enrollees were approximately 28.1, 40.3, 28.4, 8.7, and 18.4 million in (i), (ii), (iii), (iv), and (v), respectively.

ADMINISTRATIVE CLAIMS DATA

The Ministry of Health, Labour, and Welfare (MHLW) sets the tariff, which is distinct even if there are several insurance plans. The fee-for-service payment model predominates in the reimbursement system; however, a lump-sum payment model is largely adopted for inpatients in acute care hospitals, which is called the

Table 1 Structure of administrative claims data

	Information
Medical facilities	Address*1, name*2
Individual identifiers	Insurer ID†, insurance ID†, name†, birth date†, age*3, sex
Outpatient claims	Diagnoses; date of visits, types of visits (day-time, off-hour, holiday, or night-time visit), home visit; medications (oral medication, topical medication, injection); examinations (laboratory, pathological, radiological, etc.); procedures; surgery and anesthesia; dates of medications, examinations, procedures, surgery and anesthesia; the number of days treated or prescribed; death; costs for medications, examinations, procedures, surgery and anesthesia
Inpatient claims	Diagnoses; dates of admission and discharge; types of visits (day-time, off-hour, holiday, or night-time visit); medications (oral medication, topical medication, injection); examinations (laboratory, pathological, radiological, etc.); procedures; surgery and anesthesia; dates of medications, examinations, procedures, surgery and anesthesia; the number of days treated or prescribed; death; costs for medications, examinations, procedures, surgery, anesthesia, basic hospitalization fee, and specific hospitalization fee
Prescription claims	Names of drugs, doses, dosage form, administration, dates of prescription, costs incurred
Dental Care	Diagnoses; date of visits, types of visits (day-time, off-hour, holiday, or night-time visit); medications (oral medication, injection); X-ray tests; procedures; surgery and anesthesia; crown prosthesis and prosthodontic treatment; costs incurred

*1: Information on addresses of medical facilities are not provided, but prefecture codes are provided in the NDB.
*2: Information on the names of medical facilities are not provided, but anonymized facility codes can be provided in the NDB.
†: These items are not provided, but Hash IDs are provided in the NDB.
*3: In the NDB, age is categorized to every 5 years and patients aged 85 years or more are categorized into a single group.

Diagnosis Procedure Combination/Per Diem Payment System (DPC/PDPS).

Every month, a set of administrative claims is sent by each medical facility to the Examination and Payment Agency. The Agency reviews the bills and determines the likelihood of payment; it may determine that certain medical treatments are not covered because they were used excessively or inappropriately. The checked bills are subsequently forwarded to the insurers by the Agency.

Administrative claims data include claims on outpatients, inpatients, prescriptions, and dental treatments. **Table 1** shows the structure of administrative claims data.

Various entities, governmental or non-governmental, academic or non-academic, commercial or non-commercial, collect administrative claims data and create administrative claims databases. Administrative claims data can be utilized for planning national and local policies of healthcare resource allocation, as well as for investigating disease epidemiology and analyzing healthcare practice patterns.

NDB

Based on the Act on Assurance of Medical Care for Elderly People, the MHLW implemented a huge national administrative claims database in 2009, so called the NDB. The NDB includes almost all the administrative claims data and health checkups data, collected from all the insurers across Japan. The NDB covers approximately 98% of data on healthcare services provided by medical institutions, with exceptions of accidents covered by automobile liability insurance or worker's accident compensation.

In the NDB, all the patient identifiers are removed, and Hash identifiers are created to anonymize data and to be able to combine data within each individual. NDB data also include data on Specific Health Checkups. The items of Specific Health Checkups are presented in **Table 2**.

The MHLW's primary purpose in establishing the NDB is to plan health policies to regulate national health expenditure by using national data. Furthermore, the MHLW enhances the secondary use of the database for research purposes. Provision of data to third parties has been implemented on a trial basis since 2011, with full-scale implementation beginning in 2013. In 2016, the MHLW started offering an open-access, free version of NDB (NDB Open Data) [3]. The NDB Open Data does not include patient- or facility-level information because it is developed by aggregating NDB data.

In 2020, the provision of data to a wide range of parties, including private companies, was legislated. As of 2024, cloud-based analysis platform (Healthcare Intelligence Cloud, HIC) is being developed for providing NDB and long-term care data. Also, linkage of NDB

Table 2 Items of Specific Health Checkups

	Information
Required items	
Interview or questionnaire	Past history, medication history, smoking history, subjective symptoms, objective signs
Physical measurements	Height, weight, waist circumference, body mass index
Blood pressure	Systolic/diastolic blood pressure
Liver function tests	GOT, GPT, γ-GTP
Blood lipid test	Fasting triglycerides or casual triglycerides, HDL cholesterol, LDL cholesterol
Blood glucose test	Fasting blood glucose or HbA1c or casual blood glucose
Urinalysis	Urine sugar, urine protein
Items to be performed selectively based on the physician's judgment	
Anemia test	Hematocrit level, hemoglobin level, red blood cell count
Others	Electrocardiogram, fundus examination, serum creatinine

data with other national databases is being planned by the MHLW, including the MHLW Diagnosis Procedure Combination database (DPCDB), Infectious Diseases Surveillance Database, Designated Incurable Disease Database, and Specific Chronic Pediatric Disease Database.

The NDB expert council discusses issues pertaining to the provision of the NDB data. Academic experts as well as representatives of insurers and healthcare providers make up the expert council. The expert council reviews applications for the NDB data provision based on the guideline for providing the NDB data and assess the propriety of providing the NDB data [4]. It is not permitted to request NDB data to conduct data analyses with a commercial interest. The application's acceptance or rejection is mainly based on criteria that prevent personal identification. The applicants are required to choose a minimal number of necessary data items.

Users contract with the MHLW for access to the NDB data. Before getting data, users must take a formal oath and accept the Terms of Use. Data loss, data leaks, and data use for unapproved purposes are examples of inappropriate use. Data providing will be forbidden for users who broke the terms of use, and their identities and associations will be revealed.

The MHLW extracts data from the NDB and formats them into datasets depending on researchers' requests (including special extraction, sampling dataset, and aggregated data in tabular form). Users can select to handle NDB data in NDB on-site research centers. Users need to be aware that personal information will not be disclosed while sharing the results of the studies conducted using the NDB. Users are required to display the results, with each unit's number not to go below ten. Before being made public, all reports—including original articles and abstracts for academic conferences—must be submitted to the MHLW. The NDB expert council checks the results and decides whether or not to make them public.

STUDIES USING NDB

We previously reported a review of studies using the NDB and NDB Open Data published from January 2013 to July 2022 [5]. In the previous review, we identified 95 studies using the NDB and 31 using the NDB Open Data for the 9 years and 7 months.

In the present report, we counted the numbers of studies using the NDB and NDB Open Data from August 2022 to July 2024 in the same way as that in the previous study [5]. We only included original articles written in English and published during the period (2 years). We excluded review articles or non-English articles. As a result, we identified 69 original articles using the NDB and 25 original articles using the NDB Open Data. The list of the 94 articles is presented in **Supplementary Material**. **Table 3** shows the subject areas of the 94 articles. Of them, 30 articles were included in internal medicine, 15 in orthopedic surgery, and 15 in pharmacy.

Table 3 The numbers of studies using the NDB and NDB Open Data

Subject area	NDB (n = 69)	NDB Open Data (n = 25)	Total (n = 94)
Internal Medicine	27	3	30
Pediatrics	2	1	3
Psychiatry	2	1	3
Surgery	2	0	2
Orthopedic Surgery	11	4	15
Obstetrics and Gynecology	2	1	3
Ophthalmology	4	1	5
Urology	1	1	2
Radiology	0	2	2
Rehabilitation Medicine	5	2	7
Nursing care	1	0	1
Dentistry	3	0	3
Pharmacy	6	9	15
Others	3	0	3

We were unable to find NDB studies on dermatology, otolaryngology, anesthesiology, neurosurgery, or plastic surgery.

The results indicate that the number of studies utilizing the NDB is steadily rising, but there is still opportunity to improve NDB research across a range of topics.

CONFLICT OF INTEREST

I have no conflicts of interest to declare.

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