



Initiatives to achieve data portability in Japanese healthcare

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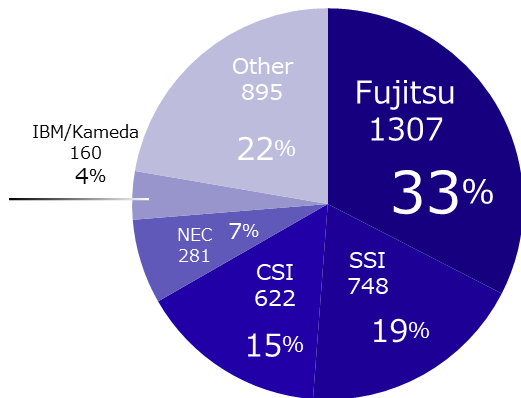
Healthy Living, Fujitsu



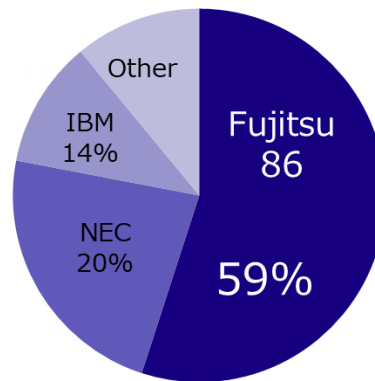


About Fujitsu

All Hospitals (4013)



University Hospitals (145)



Hospitals: Medical institution with 20 or more beds

EMR share No.1 in Japan

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Background



Current Issues and Solutions

Current Issues



Medical Institutions

- Difficulty in sharing information
- Labor-intensive data management



Patients

- Restricted access to treatment details
- Intermittent care between facilities



Well-being Companies

- Creating new drugs is costly
- Hard to tailor personal products

Solutions and Policies Needed

Utilization of Medical Data

- Unify standards for EHR
- Structuring medical data



Standardization of Medical Data

Utilization of Health Data

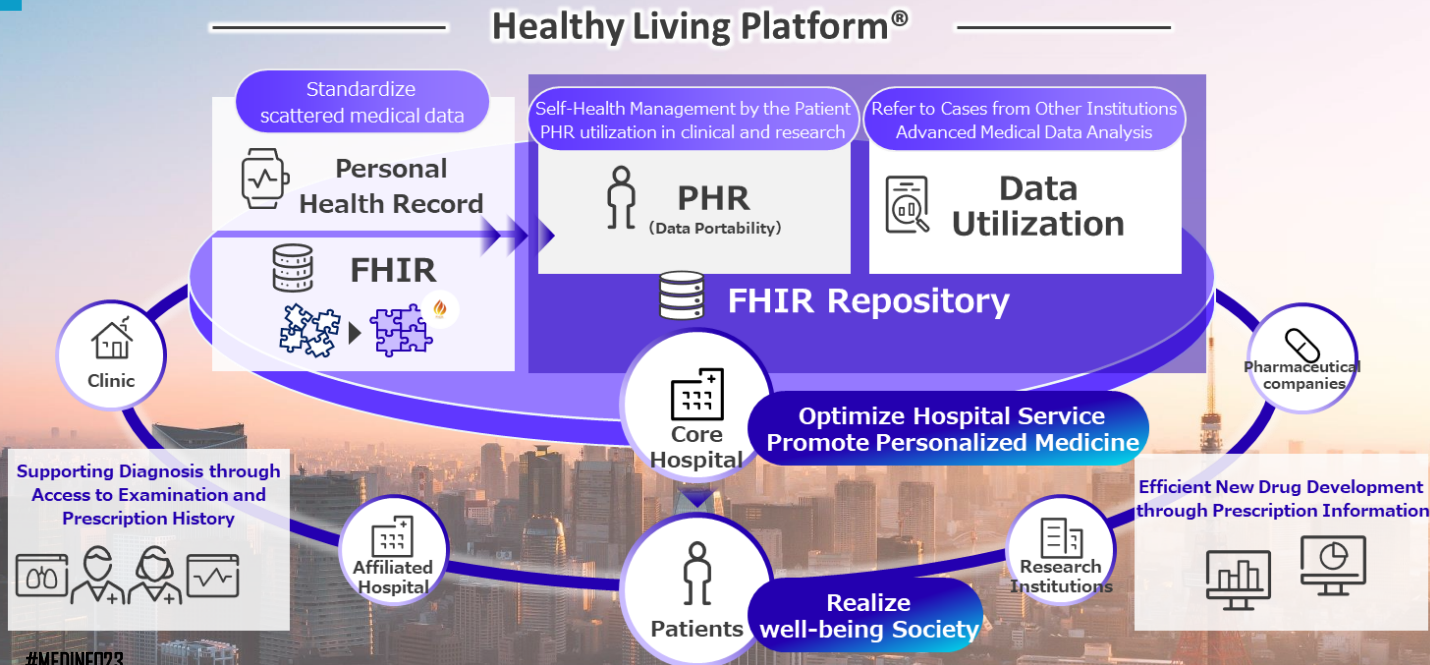
- Centralize health data
- Create a system for patients to **handle data easily and securely** for effective, patient-centered information sharing



Environment to Use Health Data



Building a Healthcare Data Utilization Society





The era of utilizing clinical data, not just storing it

Realizing the Potential of Healthcare Data Utilization with a Next-generation Solution, Enabled by the Healthy Living Platform[®]

Data Standardization



Creating value through data utilization, starting with medical institutions

Data Portability



Towards a world where patients can autonomously make decisions

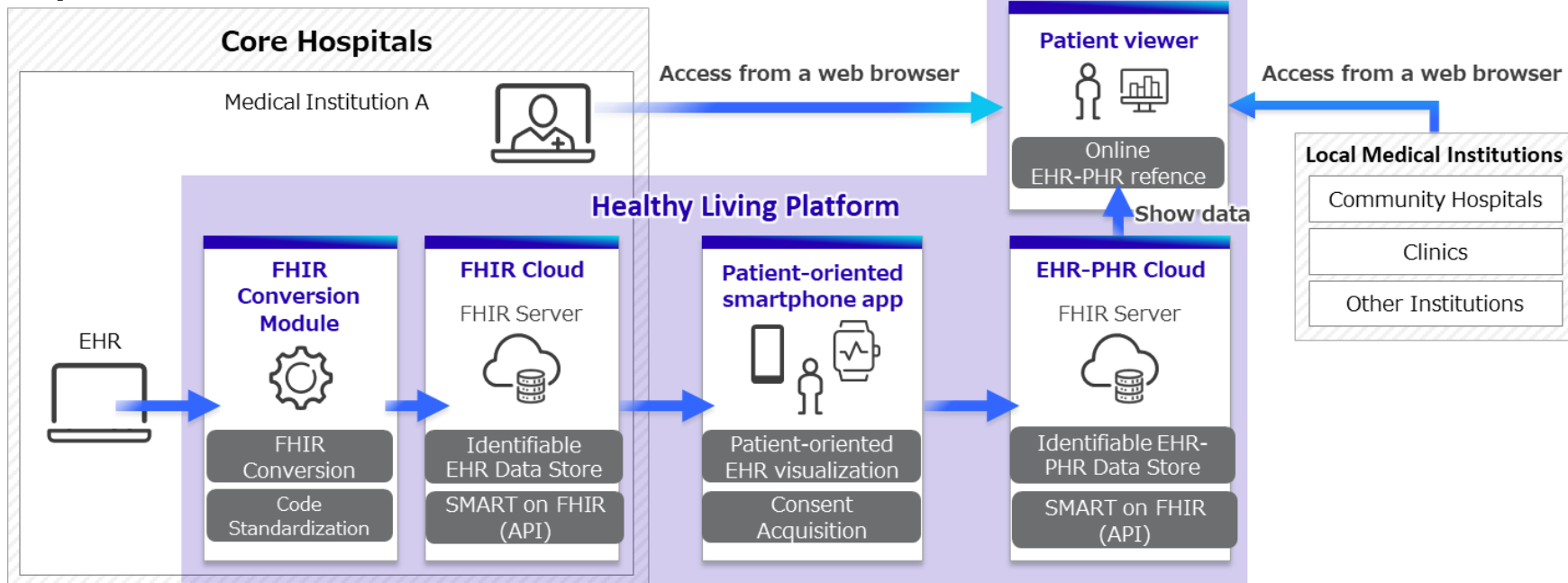
Data Utilization



Realize next-generation healthcare with advanced health data analysis



System Architecture and Data Flow



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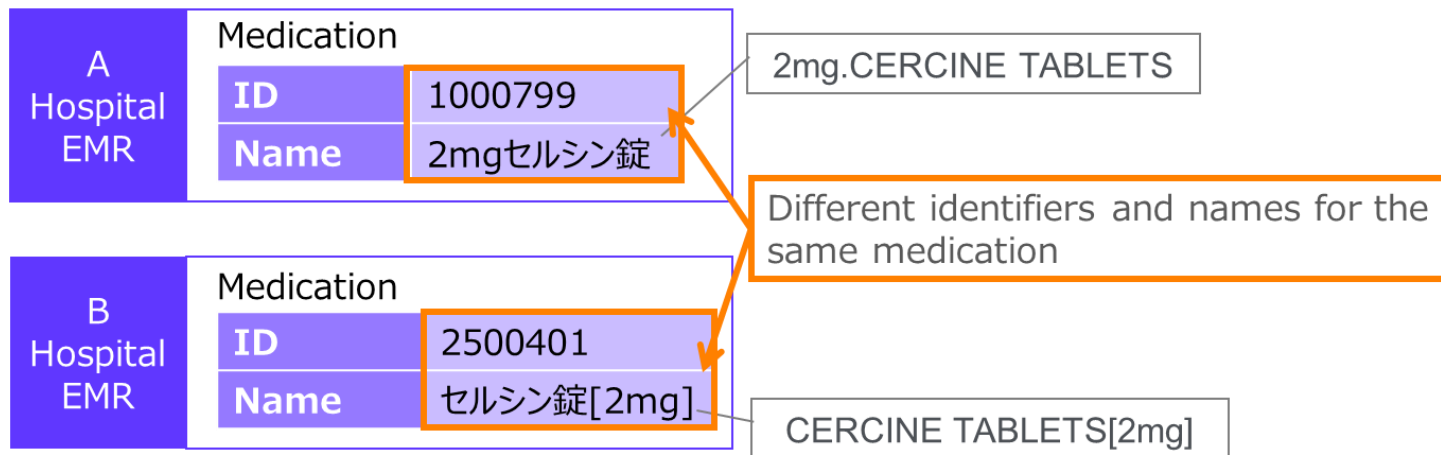
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Data Standardization



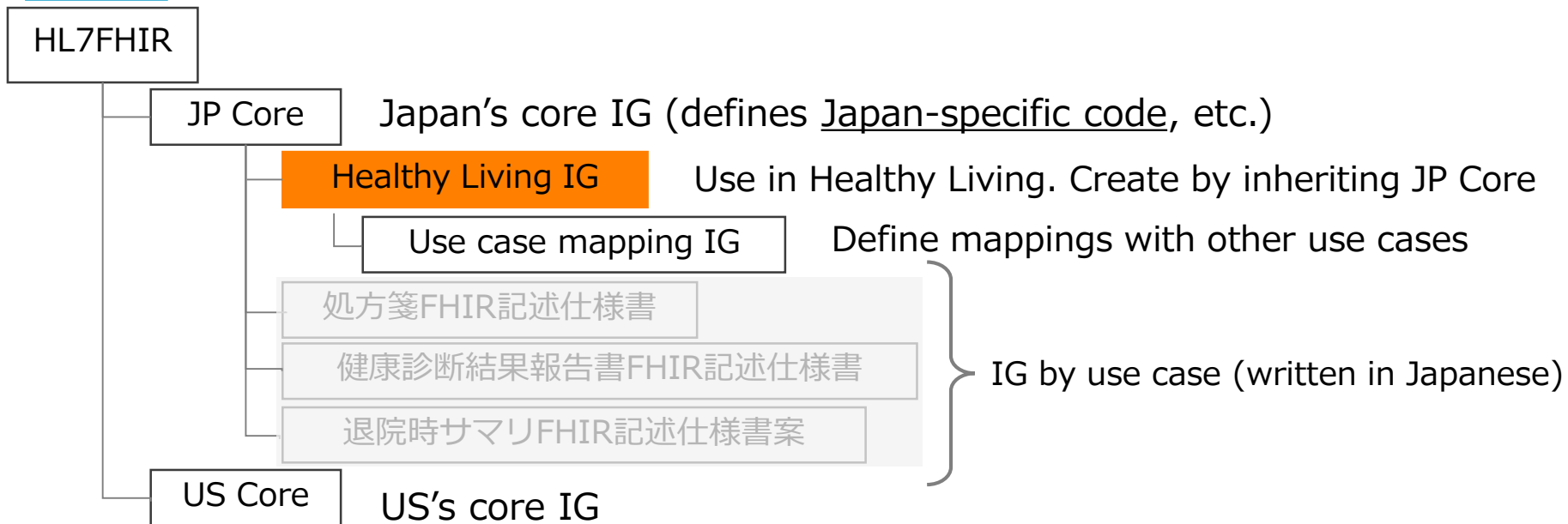
EMR Data Interoperability problem in Japan



Each hospital uses different identifiers and names, which makes integration difficult

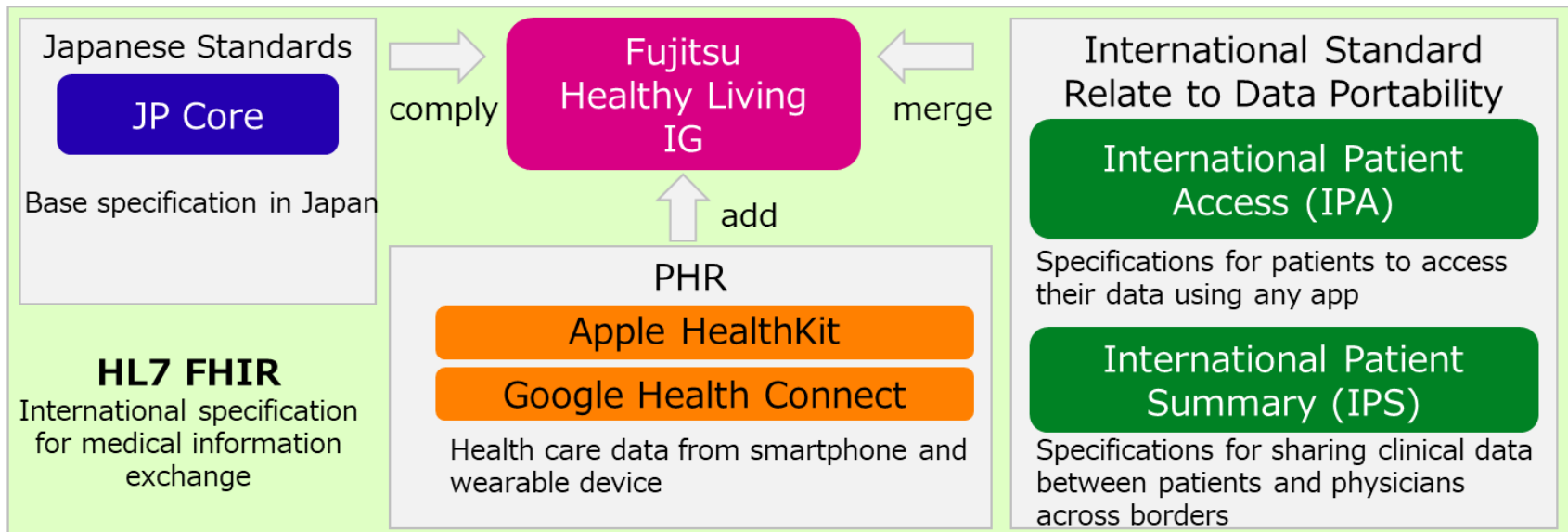


Healthy Living Implementation Guide



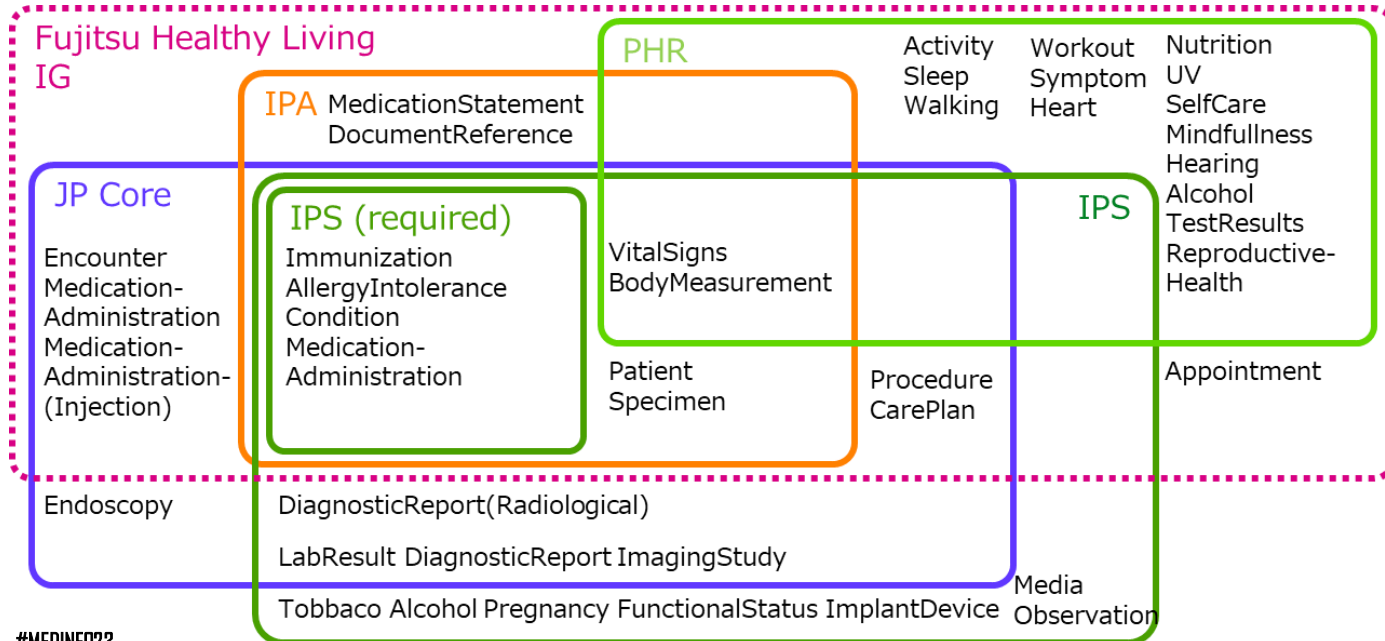


Healthy Living IG Composition





Data covered by Healthy Living IG



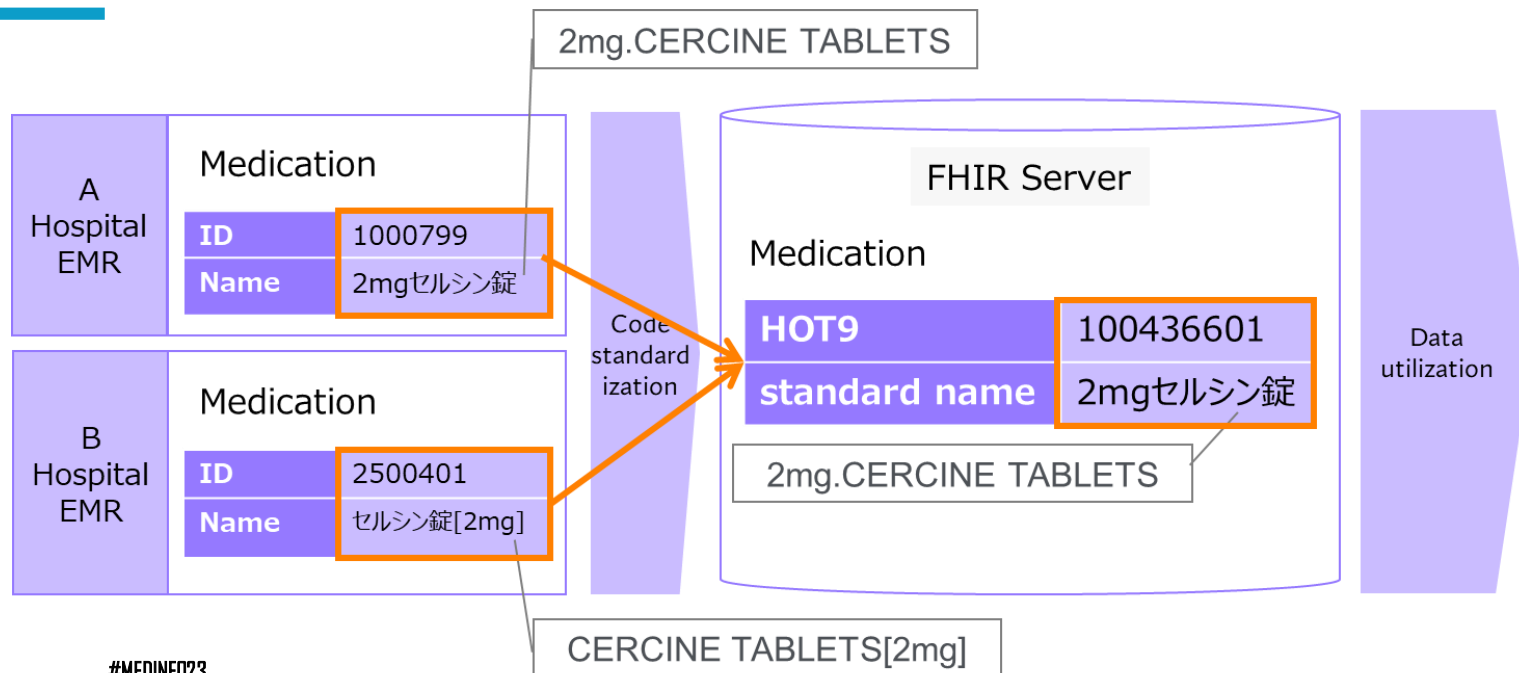


Code Standardization (CodeSystem correspondence table)

Profile	Code	Healthy Living	JP Core	IPS	HL7FHIR/US
Observation	Test (Body Measurement, Vital Sign)	MEDIS nursing practice term standard master		LOINC	LOINC
	Test (Specimen)	JLAC10		LOINC	LOINC
	Unit	Unified Code for Units of Measure (UCUM)			
Specimen	Specimen	JLAC10 (Material)	Undefined		HL7 Version 2
Medication	Medication	HOT9	HOT7,9,13,YJ Code, Common Prescription name master	SNOMED CT, RxNorm	SNOMED CT, RxNorm
	Medication Unit	MERIT-9(Unit)		Undefined	Undefined
	Medication Method	JAMI Standard Dosage Code		SNOMED CT	SNOMED CT
Immunization	Vaccination	HOT9	HOT7,9,13,YJ Code	SNOMED CT IPS, WHO ATC	CVX
AllergyIntolerance	Allergen	J-FAGY	J-FAGY	SNOMED CT IPS, WHO ATC	SNOMED CT
Procedure	Surgery	Medical practice master surgery	Medical practice master surgery, Gaihoren surgery core code (STEM7)	SNOMED CT IPS	SNOMED CT
	Radiotherapy	Medical practice master radiation therapy		SNOMED CT IPS	SNOMED CT
	Site	MEDIS standard disease name master (modifier table)		SNOMED CT	SNOMED CT
Condition	Name	ICD-10	ICD-10,ICD-11	SNOMED CT IPS	SNOMED CT, ICD-10

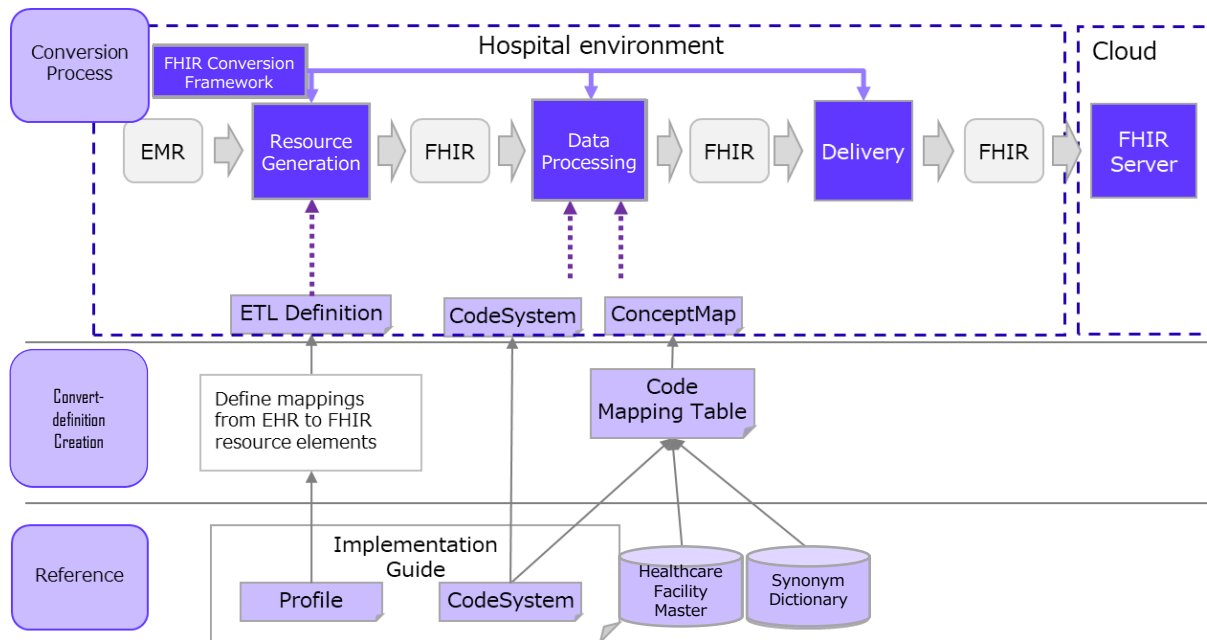


Code conversion (Standardization of ID and name)





FHIR Conversion Framework





Current Capacity of Code Standardization

Unknown • Need Confirmation 5258 4.3%

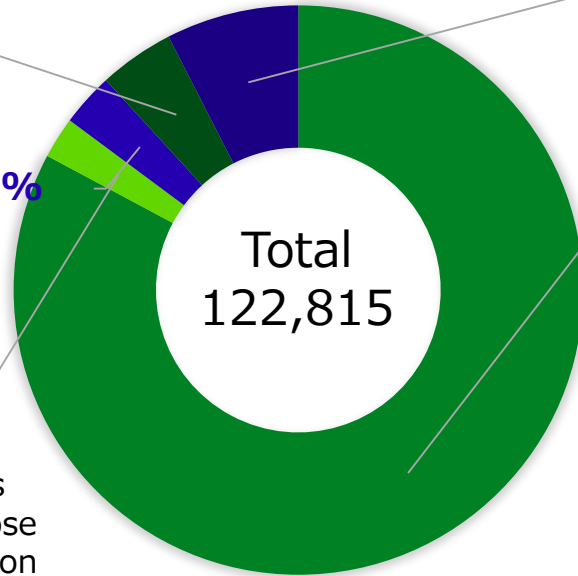
Codes whose name differs from the code to be standardized and requires expert confirmation

Semantically Match 3713 3.0%

Codes with different names than the code being standardized, but determined to be semantically identical

Partial Match 2890 2.4%

Codes whose name partially matches the code to be standardized and whose match is confirmed by visual inspection



No Mapping 9248 7.5%

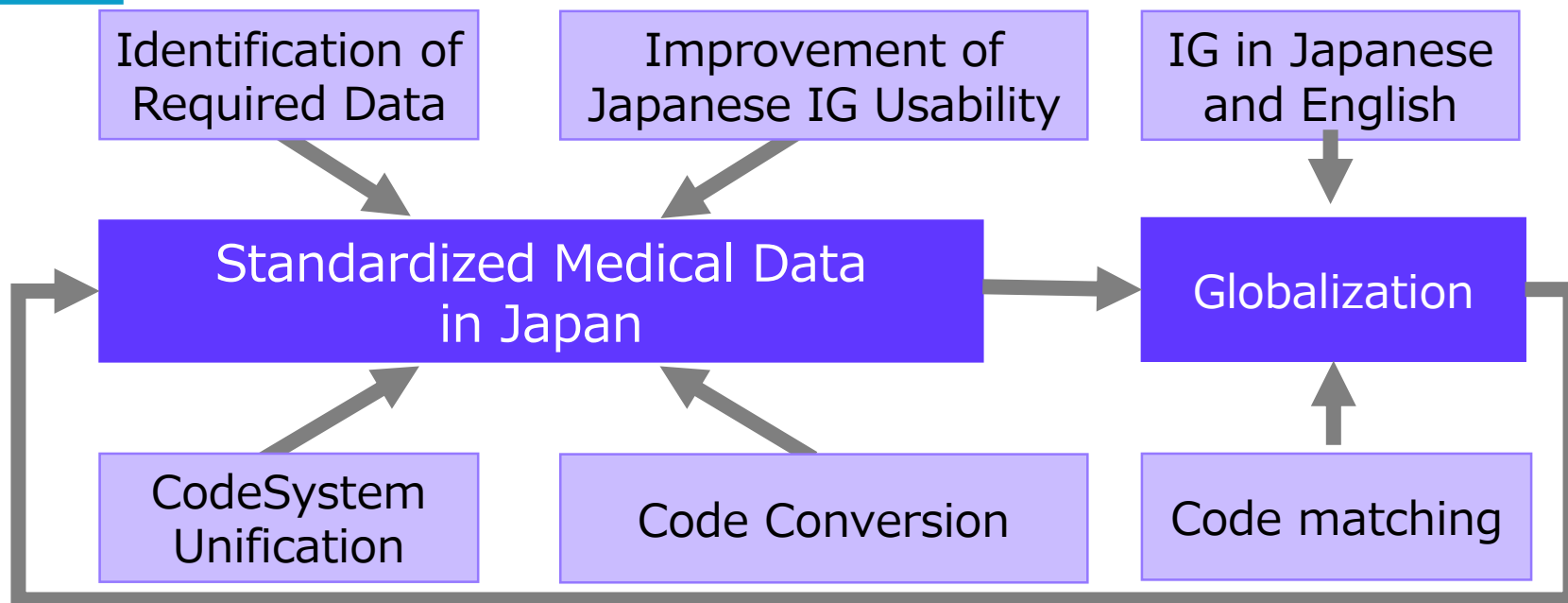
Codes that do not map to a standardized target code

Match 101,706 82.8%

Codes whose names match the code to be standardized



Our Approach for Data Globalization/Standardization





Code Matching (Standardized Medical Data in Japan phase)

Definition of IG

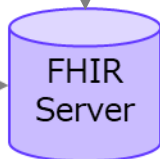
Create IG with Japanese standard code only

```
code
coding[JLAC10]:Japanese Standard Code
```

① Register IG to the FHIR server

Medical Institution env.

FHIR Cloud

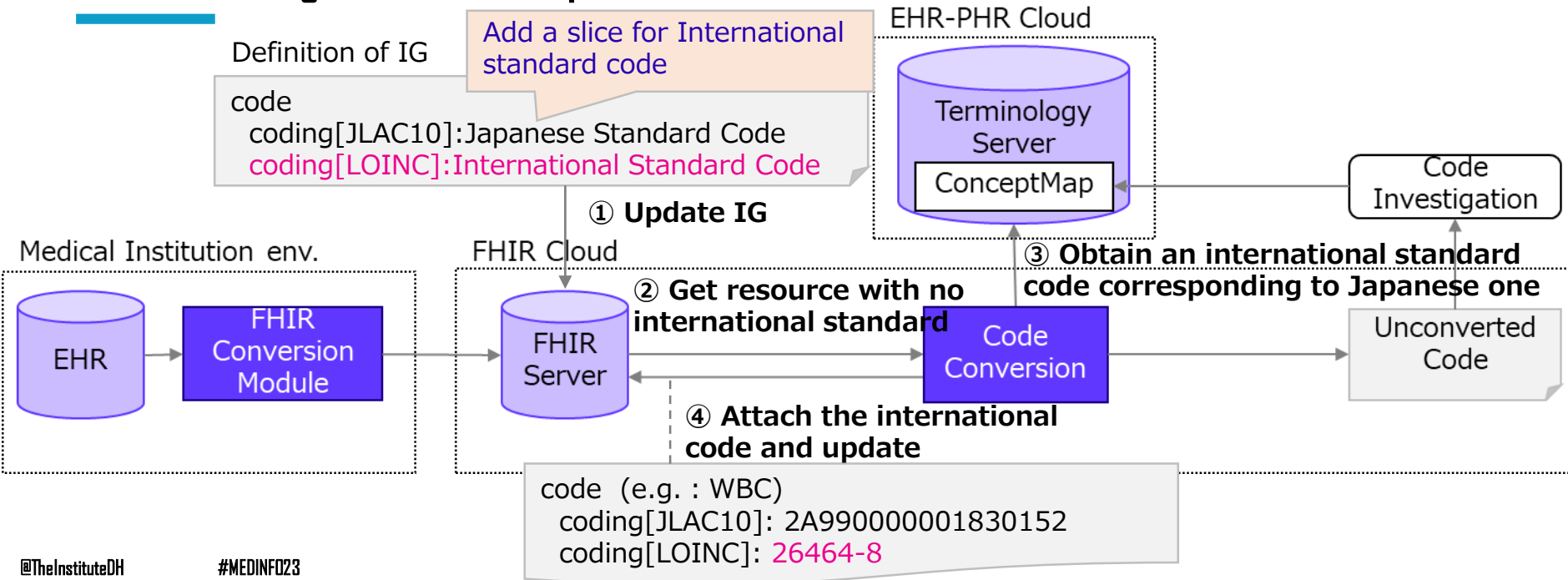


② Register the code with Japanese standard code

```
code (e.g. : WBC)
coding[JLAC10]: 2A990000001830152
```



Code Matching (Globalization phase)





Data Portability



Advanced medical service and increased transparency

Patients



Advanced medical service
Utilizing daily vital data



Transparency through patient's
own medical information management

Core hospital



Medical development through
Use of patient's PHR for
clinical research/education



Regional hospitals



Improvement of medical care
through cooperation among
hospitals



Access control of data
with patient consent



Healthcare data platform

Fujitsu



Patient Application



Activity Screen



EHR Detail Screen

Easily review your health history at any time, empowering you to take charge of your own health

- Aggregate your own medical exam results (EHR data) into activities, making it easy to understand the status at a glance.
- User interface design that organizes information and clearly identifies areas of focus

Function Description

- Activity screen shows timeline of EHR (Encounter)
- The EHR detail screen allows the patient to review test results and other medical examination details, promoting patient-proactive understanding of their health status.



Patient Viewer (for Physicians)

- EHR and PHR are placed on the left and right side of the screen for high visibility and reference on the same screen
- High usability for easy access to the information you want to see

病院名称
白旗院

フジ タロウ
富士 太郎

1971年5月25日
51歳 4か月

男性
ID:00000000

178.00 cm
105.00 kg

B型
Rh(+)

アレルギー
ワクチン接種
病歴

診療履歴

絞り込み条件 リセット

2022年10月

日	月	火	水	木	金	土
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

全ての医療機関

外来 入院

検査 注射 処置 処方

予定

2022年10月23日(日) 外来
富士通医科大学付属病院 内科

履歴

2022年10月19日(水) 外来
富士通医科大学付属病院 内科
検査 血液一般 / 尿検査 / ...

2022年10月17日(月) 入院
富士通医科大学付属病院 内科
注射 中心静脈注射 / 中心...

2022年10月16日(日) 入院

2022年10月19日(水) 外来

富士通医科大学付属病院 内科 富士通 一郎

検査 血液一般 / 尿検査 / 聴覚 / 血液一般 / 尿検査 / 聴覚 / 血...

糖尿病

血液一般		記録時刻: 19:00	[詳細]
白血球数 (WBC)	6100 / μ l		
赤血球 (RBC)	481 *10 ^{^4} / μ l		
血色素量 (Hb)	14.8 g/dL		
ヘマトクリット値 (Ht)	↓ 44.3 %		
血小板数 (PLT)	↓ 21.2 μ 3		
平均赤血球容積	92.1 10 ^{^4} / μ L		
平均血色素濃度平均血色素濃度平	↑ 30.8 p		
平均血色素濃度平均血色素濃度平	33.5 %		

尿検査		記録時刻: 16:00	[詳細]
尿蛋白定性	-		
尿糖定性	-		

体温		記録時刻: 15:00	[詳細]
体温	37.5 °C		

身長		[詳細]
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PHR

日 週 月 6か月 年

2022年 9月23日 - 10月21日

10月5日 検査 / 処置 / 処方 / 注射 10月19日

心拍数

範囲 45-150 拍/分 2022/10/2 Apple watch 8

歩数

平均 4,962 歩/分 2022/10/21 19:00

睡眠

平均 7.2 時間 2022/10/21 19:00

手首体温

平均 -0.01 °C 2022/10/21 19:00

Activity

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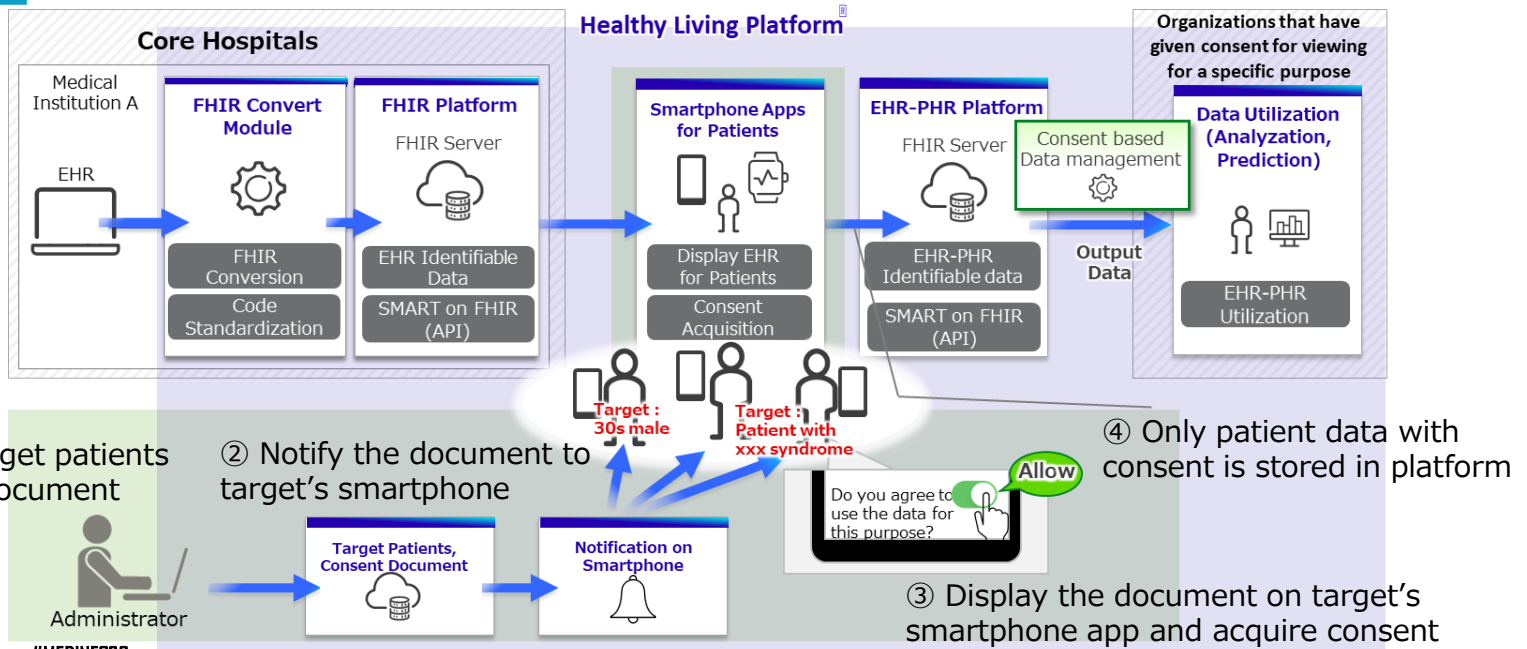
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Data Utilization



Consent Management



① Register target patients and consent document

② Notify the document to target's smartphone

④ Only patient data with consent is stored in platform

③ Display the document on target's smartphone app and acquire consent



Summary

- Technology Points
 - Solve EMR data interoperability problem in Japan
 - Convert PHR data (Apple HealthKit and Google Health Connect) to FHIR
 - Integrate EMR and PHR data
 - Implement code internationalization mechanism
 - Implement Dynamic Consent management mechanism for data utilization
- Business Points (to promote the global utilization of Japanese medical data)
 - Accelerate hospital deployments
 - Handle more global use-cases and clarify the data you need

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Thank you



Case Study: Sapporo Medical Univ.

Toward the utilization of PHRs in medical practice, the realization of patient-centered health management, and regional medical cooperation by cross-referencing of medical information with medical institutions in Hokkaido

Issue

- Want to utilize in the treatment and research of chronic diseases
- Patients themselves are not able to grasp their own health and treatment status
- Medical care often completes within the prefecture, but hospitals are not able to coordinate medical information with each other

Press Release

- <https://www.fujitsu.com/global/about/resources/news/press-releases/2023/0116-01.html>



Fujitsu and Sapporo Medical University launch joint project to realize data portability in the healthcare field

Fujitsu Limited, Sapporo Medical University

Tokyo and Sapporo, January 16, 2023

Fujitsu and Sapporo Medical University today announced the launch of a joint project starting in April 2023 to realize data portability ^① for patients' healthcare data including electronic health records (EHRs) ^② and personal health records (PHRs) ^③.

As part of the joint project, Fujitsu will develop a mobile app that enables users to view healthcare data on their iPhones ^④ and a cloud-based healthcare data platform to manage patients' health data. This project marks the first initiative in Japan to link electronic medical records with Apple's Health app under Apple's support.

EHR data stored on the newly developed external healthcare data platform will be converted to a format in accordance with JP Core (FHIR JP Core Implementation Guide Version 111) ^⑤, the latest Japanese guideline under the next generation standards framework HL7 FHIR for health information exchange.

By empowering patients to access their medical data from anywhere at any time and play a more active role in managing their own health, the project aims to contribute to the provision of optimal medical care and services tailored to the health conditions of individual patients while simultaneously improving patient engagement ^⑥.

Sapporo Medical University Hospital, the affiliated hospital of Sapporo Medical University, aims to introduce the system in April 2023.



Case Study: Takeda Pharmaceutical

Aiming to support personalized medicine by validating the effectiveness of the analytical environment through the Healthy Living Platform

Purpose

- Extraction of clinical issues that contribute to the improvement of the quality and treatment effectiveness of individualized treatment for ovarian cancer

Abstract

- In joint research with Takeda Pharmaceuticals and the National Cancer Center, analyzes and visualizes the patient journey of ovarian cancer patients
- The joint research results of the three parties were announced at "ISPOR2023" held in Boston.

Press Release

- <https://www.fujitsu.com/global/about/resources/news/press-releases/2023/0512-01.html>



Fujitsu conducts project with Takeda and National Cancer Center Japan to analyze and visualize of patient journey with ovarian cancer

Providing validated analysis environment on Fujitsu's cloud-based platform for healthcare sector to empower patients with a personalized experience

Fujitsu Limited

Tokyo, May 12, 2023

Fujitsu today announced that it has conducted a joint research project with Takeda Pharmaceutical Company Limited and the National Cancer Center Japan to analyze patient journeys, the process that leads from the recognition, diagnosis, treatment, and subsequent life of ovarian cancer patients based on electronic medical record data. The collaboration successfully visualized a wide range of treatment patterns.

The three organizations presented the results of the joint research at International Society for Pharmacoeconomics and Outcomes Research (ISPOR) 2023 held on May 9, 2023 in Boston, Massachusetts.

The three organizations analyzed data related to patient journeys from examination to initiation of treatment to post-treatment chronologically on a patient-by-patient basis for patients with ovarian cancer who were registered on the electronic medical record system at the National Cancer Center Hospital East in Japan and visualized a wide range of treatment patterns. These treatment patterns are expected to assist physicians and patients in jointly selecting optimal treatment.

This study was conducted based on a joint research agreement that Fujitsu concluded with Takeda and the National Cancer Center Japan in May 2021 with the aim of identifying clinical challenges that will contribute to improving the quality and therapeutic efficacy of personalized ovarian cancer treatment. In this study, Fujitsu extracted and standardized medical data including time series information such as anonymized treatment histories of 574 ovarian cancer patients between May 2013 and October 2020 recorded on the electronic medical record system of the National Cancer Center Hospital East and added medical knowledge of the physician's choice of treatment to create a dataset. Takeda used it to select data to analyze patient journeys.