

OMOP Common Data Model and Vocabulary

OHDSI APAC Symposium 2022



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Why a Common Data Model



Why a Common Data Model

Break of Gauge: https://en.wikipedia.org/wiki/Break_of_gauge





Why a Common Data Model - A Singapore Story

Singapore's Healthcare System



Yong Loo Lin
School of Medicine

NUHS
National University
Health System

LEE KONG CHIAN
SCHOOL OF
MEDICINE



Imperial College
London



DukeNUS
Medical School

From hospital...

Primary Care

The foundation of our healthcare system and the first line of care in the community is provided through a network of outpatient polyclinics and clinics run by private general practitioners (GPs) island-wide.

Polyclinics

Provide subsidised primary care which includes medical treatment, preventive healthcare and health education.

GPs

Provide preventive, acute and chronic care.

Family Medicine Clinics

Provide medical care with support services for chronic disease management.

Community Health Centres

Work with GPs to support patients with chronic illnesses within the community.



Hospital Care

Singapore has eleven public hospitals comprising nine general hospitals, a women's and children's hospital, and a mental health hospital as well as nine speciality centres.

General Hospitals

Provide multi-disciplinary inpatient and specialist outpatient services, with 24-hour accident and emergency departments.

Specialised Hospitals

Provide specialised care for maternal and child health (KK Women's and Children's Hospital) and mental health (Institute of Mental Health).

Specialty Centres

Provide treatment for cancer, cardiac, eye, skin, neuroscience and dental issues.

Community Hospitals

Provide care for patients who require a period of recuperation, usually after discharge from a general hospital.





Why a Common Data Model - A Singapore Story



5,000
T2DM Patients



10,000
T2DM Patients



Why a Common Data Model - A Singapore Story

Singapore's Healthcare System



Yong Loo Lin
School of Medicine



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What was the solution?

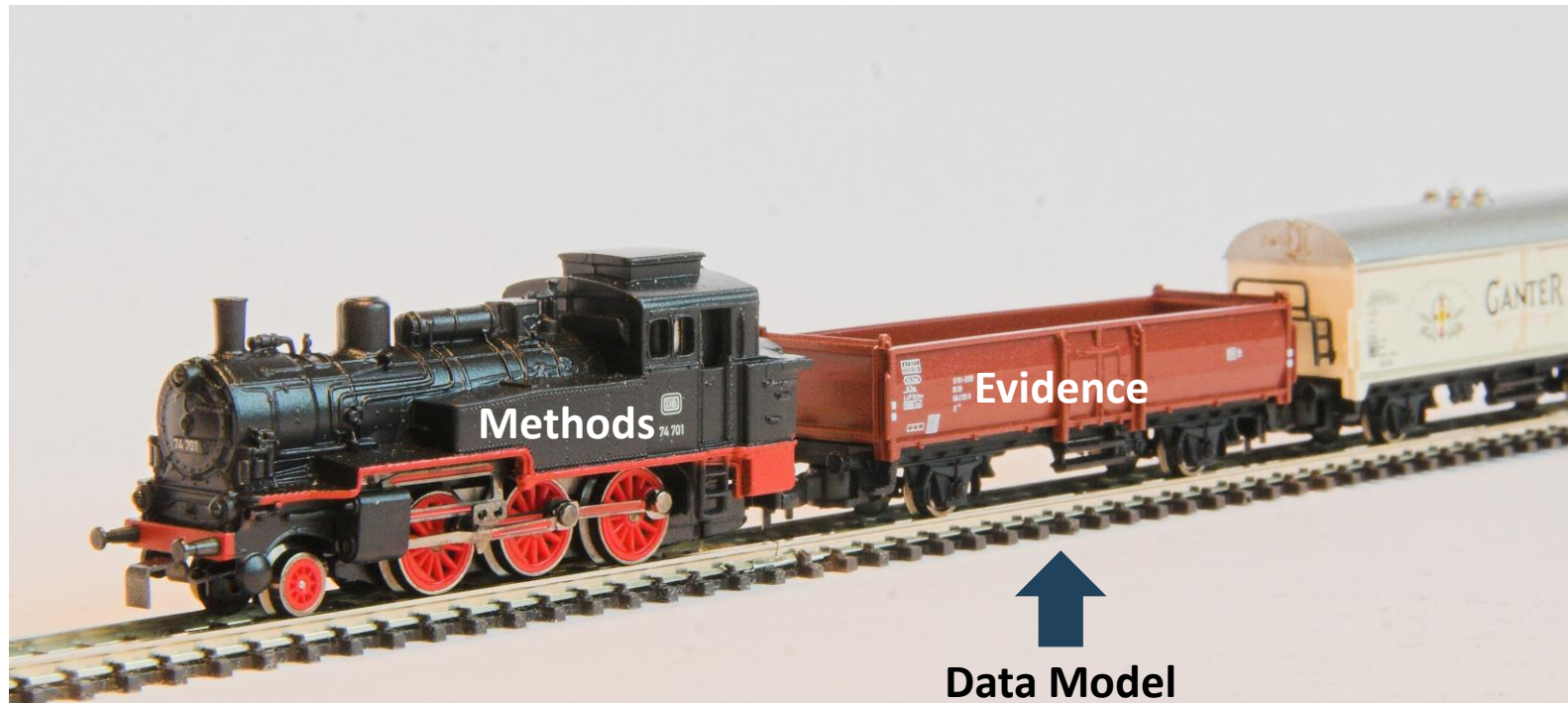


OHDSI
OBSERVATIONAL HEALTH DATA SCIENCES AND INFORMATICS



Why a Common Data Model

- CDM is the foundation





Why a Common Data Model

- Fruits came after CDM

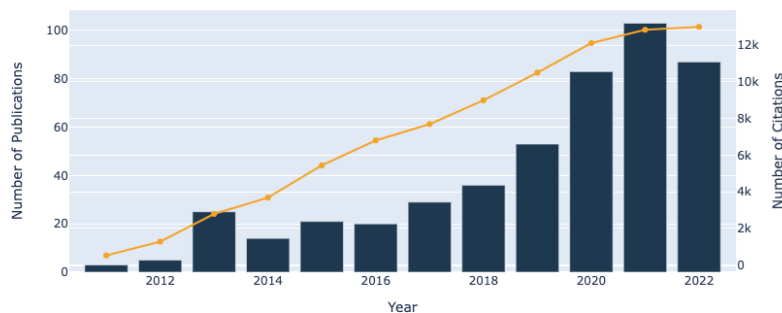


Community Dashboard Dashboards ▾

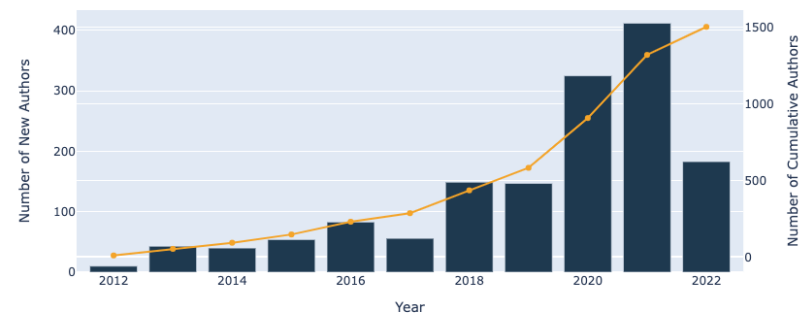
Publication Analysis

PubMed Publication Tracking highlights scholarship generated using the OMOP Common Data Model, OHDSI tools, or the OHDSI network. These publications represent scientific accomplishments across areas of data standards, methodological research, open-source development, and clinical applications. We provide the resource to search and browse the catalogue of OHDSI-related publications by date, author, title, journal, and SNOMED terms. We monitor the impact of our community using summary statistics (number of publications and citations), and the growth and diversity of our community with the number of distinct authors. Searches for new papers are performed daily, and citation counts are updated monthly.

OHDSI Publications & Cumulative Citations



New and Cumulative OHDSI Researchers





Why a Common Data Model - Fruits came after CDM



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Original Investigation | Cardiology



March 24, 2022

Analysis of Dual Combination Therapies Used in Treatment of Hypertension in a Multinational Cohort

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Zhengfeng Chen, MBBS, MMed⁶; Jaehyeong Cho, PhD⁷; Sreemanee Raaj Dorajoo, PhD⁸;
Mengling Feng, PhD^{9,10}; Min-Huei Hsu, MD, PhD¹¹; Jason C. Hsu, PhD¹²; Usman Iqbal, PharmD, MBA, PhD¹³
; Jitendra Jonnagaddala, PhD¹⁴; Yu-Chuan Li, MD, PhD¹⁵; Siaw-Teng Liaw, MBBS, PhD¹⁴; Hong-
Seok Lim, MD, PhD¹⁶; Kee Yuan Ngiam, MBBS, MMed¹⁷; Phung-Anh Nguyen, PhD^{18,19}; Rae
Woong Park, MD, PhD^{20,21}; Nicole Pratt, PhD²²; Christian Reich, MD, PhD²³; Sang Youl Rhee, MD²⁴; Selva
Muthu Kumaran Sathappan, MSc^{9,25}; Seo Jeong Shin, PhD⁷; Hui Xing Tan, MTech²⁶; Seng Chan You, MD,
PhD²⁷; Xin Zhang, MS⁴; Harlan M. Krumholz, MD, SM^{1,2,28}; Marc A. Suchard, MD, PhD²⁹; Hua Xu, PhD³⁰

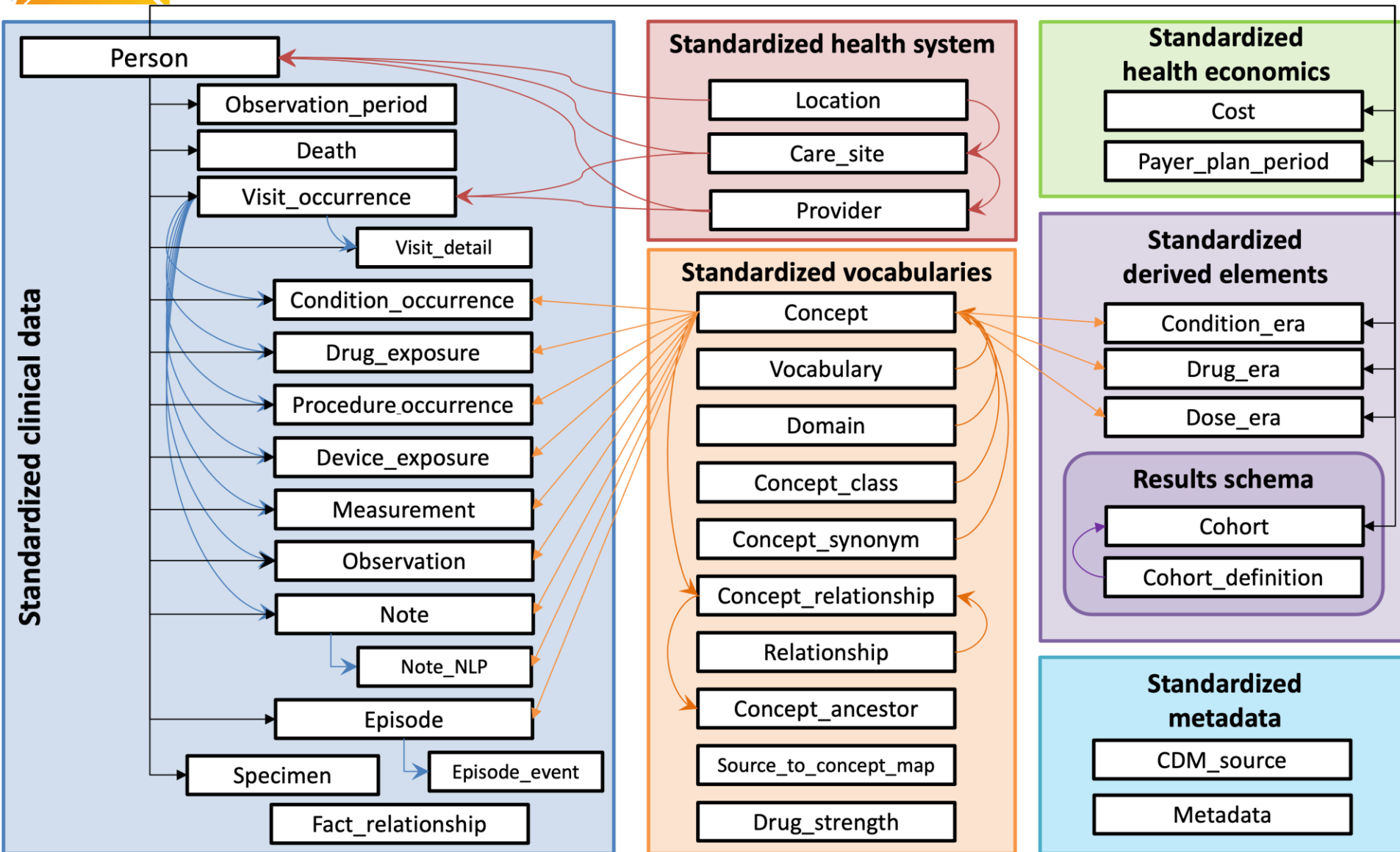


OMOP CDM

The OMOP CDM is a system of tables, vocabularies, and conventions that allow observational health data to be standardized. It is this standard approach that facilitates rapid innovation in the areas of open-source development, methods research, and evidence generation.

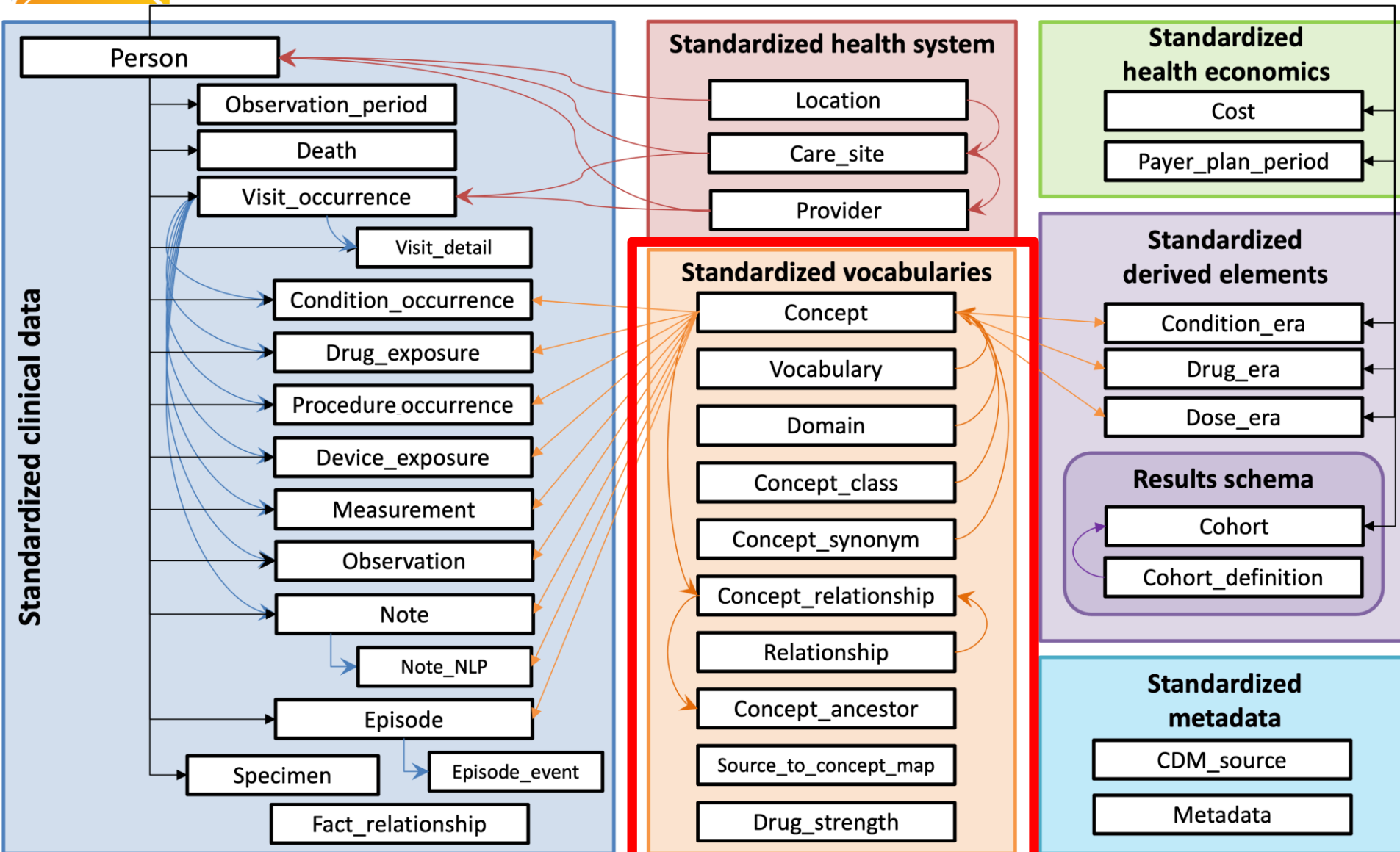


OMOP CDM & Vocabulary





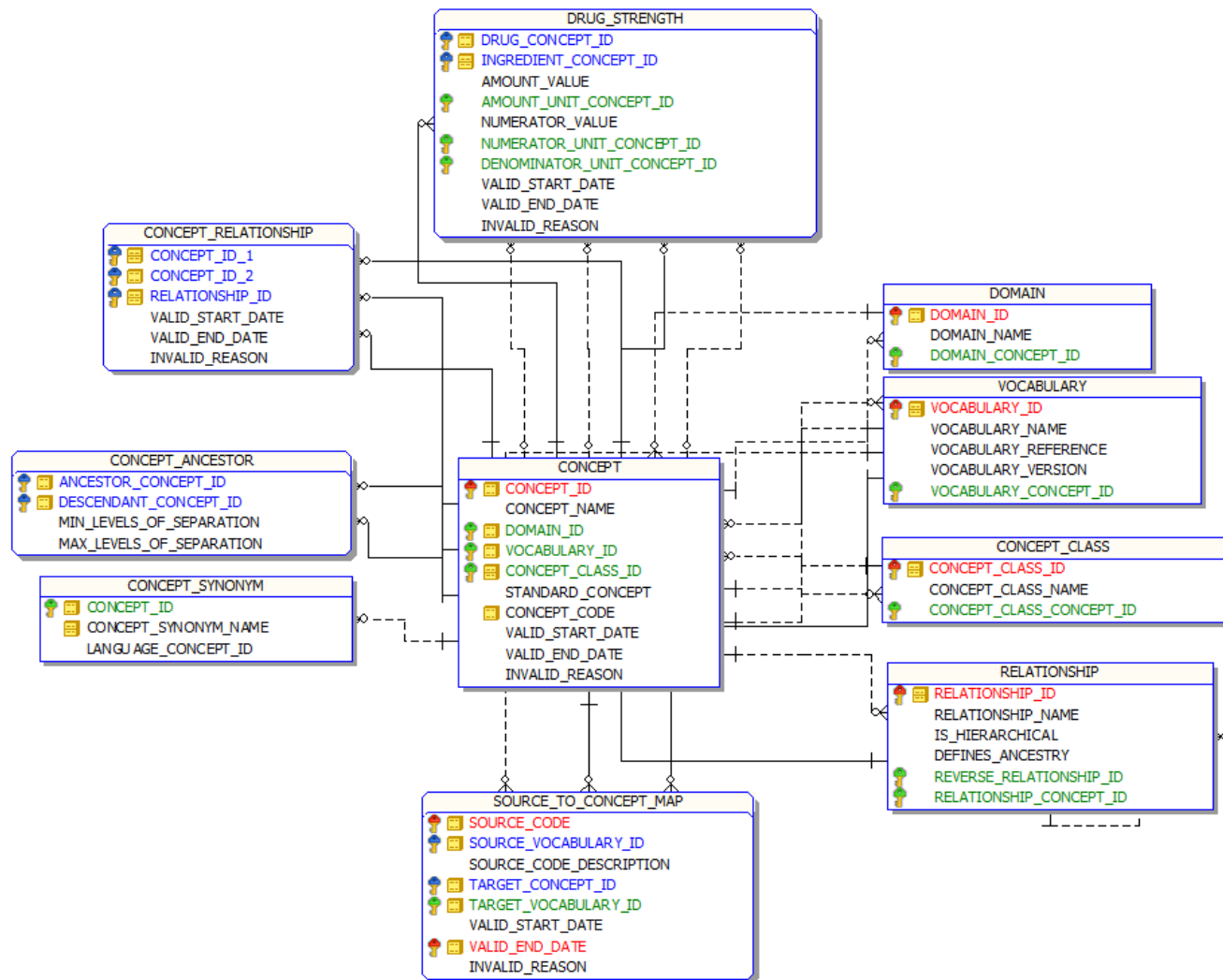
OMOP CDM & Vocabulary





OMOP Vocabulary

More than 8 Million concepts





OMOP Vocabulary

- A Quick Demo

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Search

[Search](#)

1. Usage of quotation marks forces an exact-match search
2. In case of a typo, or if there is a similar spelling of the word, the most similar result will be presented

Explore domains



Drugs

5,391,909



Conditions

698,141



Procedures

737,007



Devices

493,782



Observations

585,559



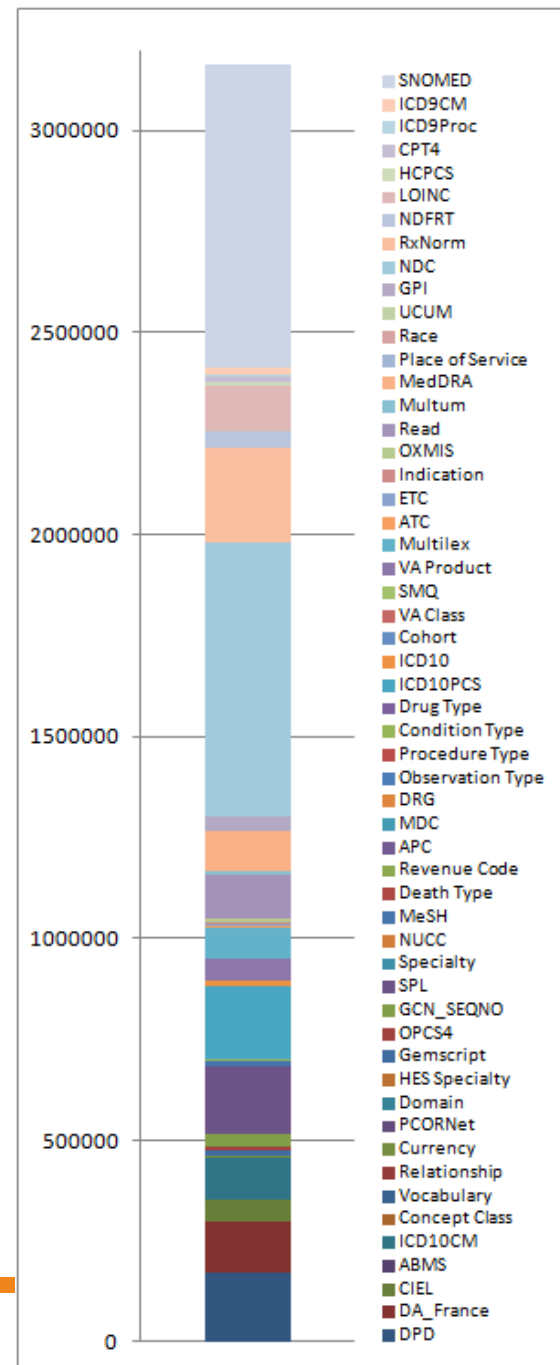
Measurements

368,765



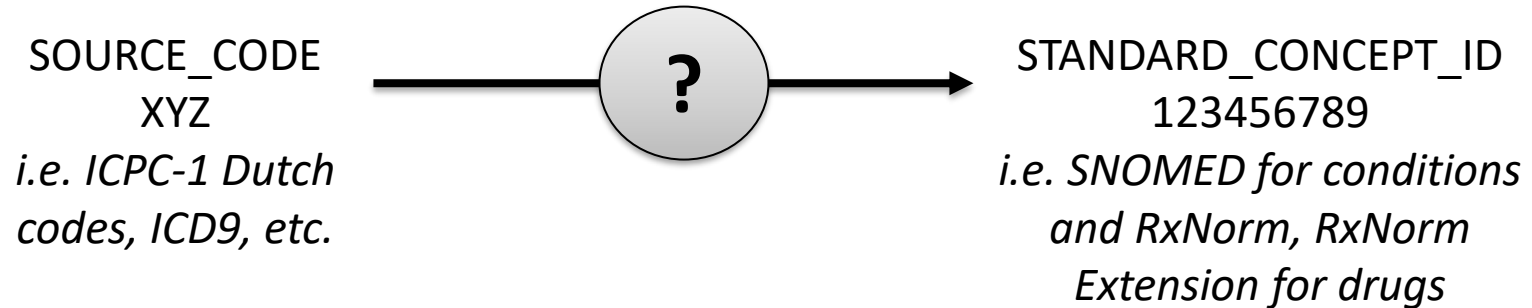
OMOP Vocabulary

- If your source data's codes are in the OMOP Vocab you can use it to translate to a standard
- For example:
 - ICD9 → SNOMED
 - NDC → RxNORM





Vocabulary Mapping



What is standardized:

1. `TABLE_CONCEPT_ID`
standard concept the source code maps to, **used for analysis**
2. `TABLE_SOURCE_CONCEPT_ID`
concept representation of the source code, **helps maintain tie to raw data**
 - a. `TABLE_SOURCE_VALUE`
original source code as given in the source table, **helps to review data quality**


Ways to get a source code to standard code:

1. OMOP Vocabulary (Concept_Relationship)
2. USAGI



Vocabulary Mapping

<https://www.ohdsi.org/web/wiki/doku.php?id=documentation:software:usagi>



Observational Health Data Sciences and Informatics

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Documentation

Getting Started with OHDSI

Common Data Model (CDM)

- CDM Specifications
- CDM Vocabulary

Convert Database to CDM (ETL)


- ETL creation best practices
- Example ETLs
- ETL Tools
- ETL Support

Tool Specific Documentation

- ATLAS
- ACHILLES
- White Rabbit
- [Usagi](#) documentation:software:whiterabbit
- Methods Library
- WebAPI
- Common Evidence Model

Usagi

NOTICE APRIL 2021: this page is not updated anymore, the most recent documentation can be found on Github
<http://ohdsi.github.io/Usagi>



Introduction

Usagi is a software tool created by the Observational Health Data Sciences and Informatics (OHDSI) team and is used to help in the process of mapping codes from a source system into the standard terminologies stored in the Observational Medical Outcomes Partnership (OMOP) Vocabulary (<http://www.ohdsi.org/data-standardization/vocabulary-resources/>). The word Usagi is Japanese for rabbit and was named after the first mapping exercise it was used for; mapping source codes used in a Japanese dataset into OMOP Vocabulary concepts.

Table of Contents

- Usagi
 - Introduction
 - Scope and purpose
 - Process Overview
 - Installation and support
 - Using the Application Functions
 - Importing Source Codes into Usagi
 - Reviewing Source Code to OMOP Vocabulary Concept Maps
 - Export the Usagi Map Created
 - Updating an Usagi mapping
 - Menu Options

documentation:software:usagi

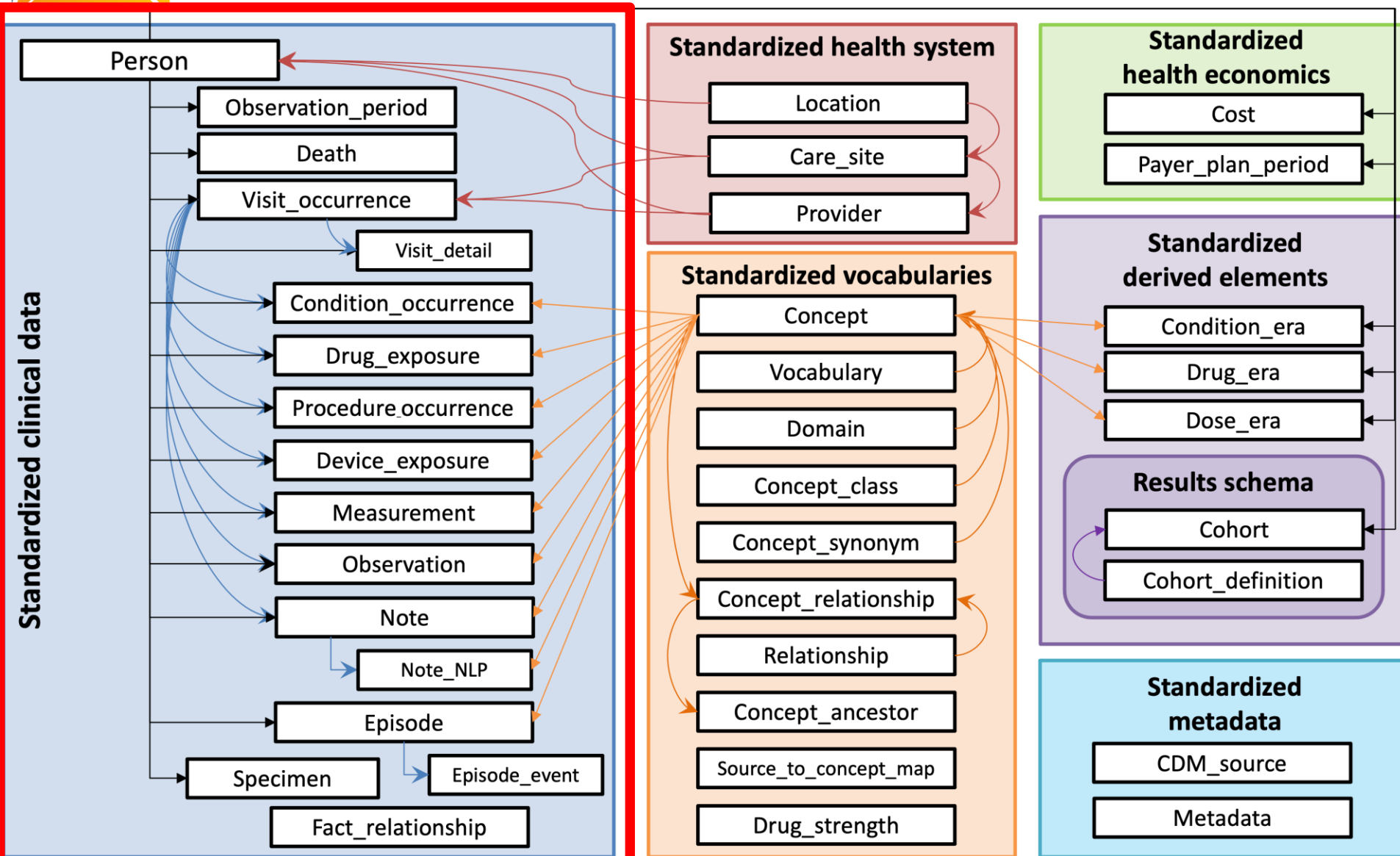


Vocabulary Mapping

- USAGI

- Mapping process
 - Load codes from your source system "source codes"
 - USAGI will map the "source codes" into OMOP vocabulary concepts based on term similarity matching
 - One then can use the USAGI user interface to check, adjust or create mapping
 - Load the finalized mapping to the SOURCE_TO_CONCEPT_MAP

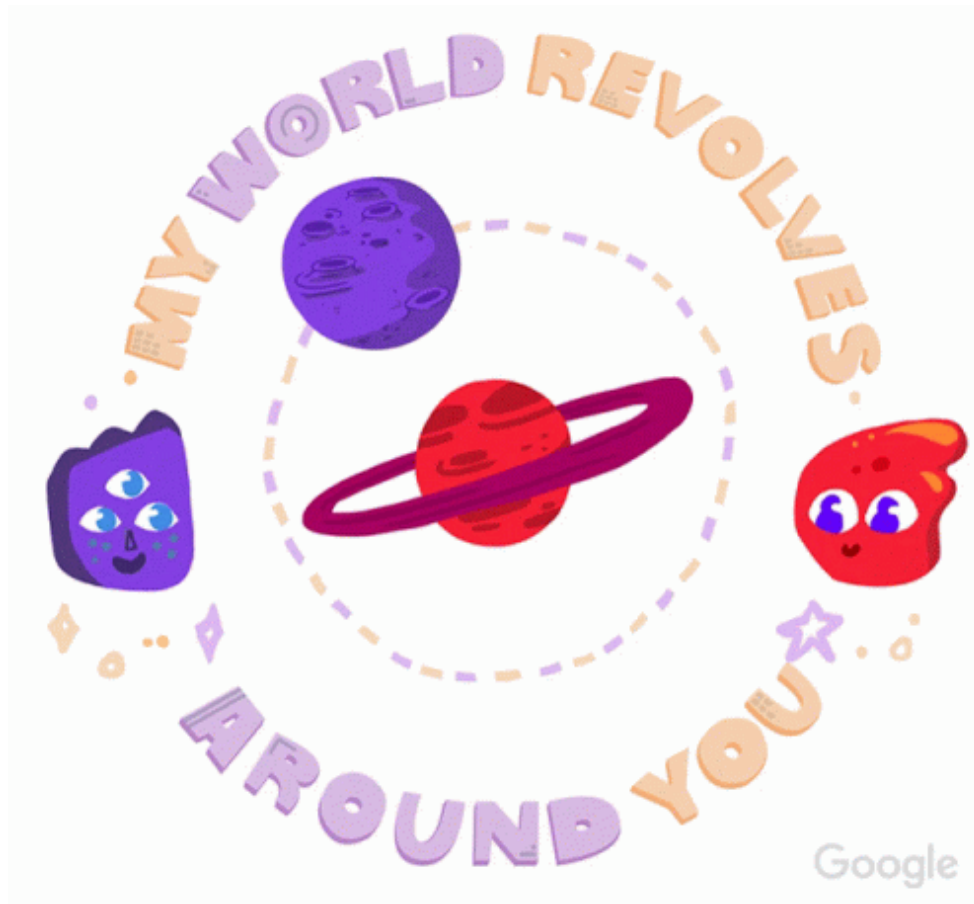
OMOP CDM - Data Schema





OMOP CDM - Data Schema

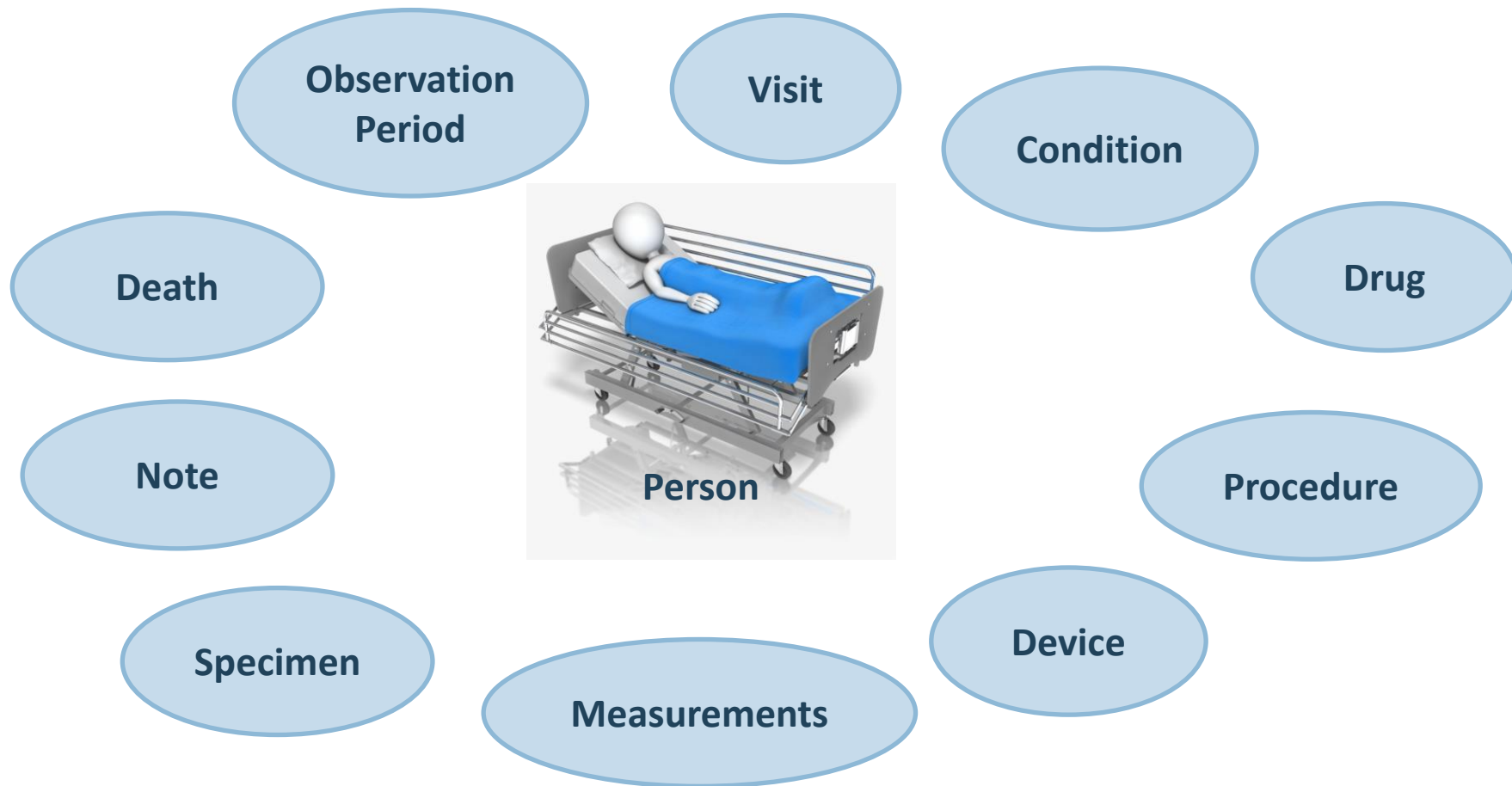
The OMOP CDM is a Patient Centric Model





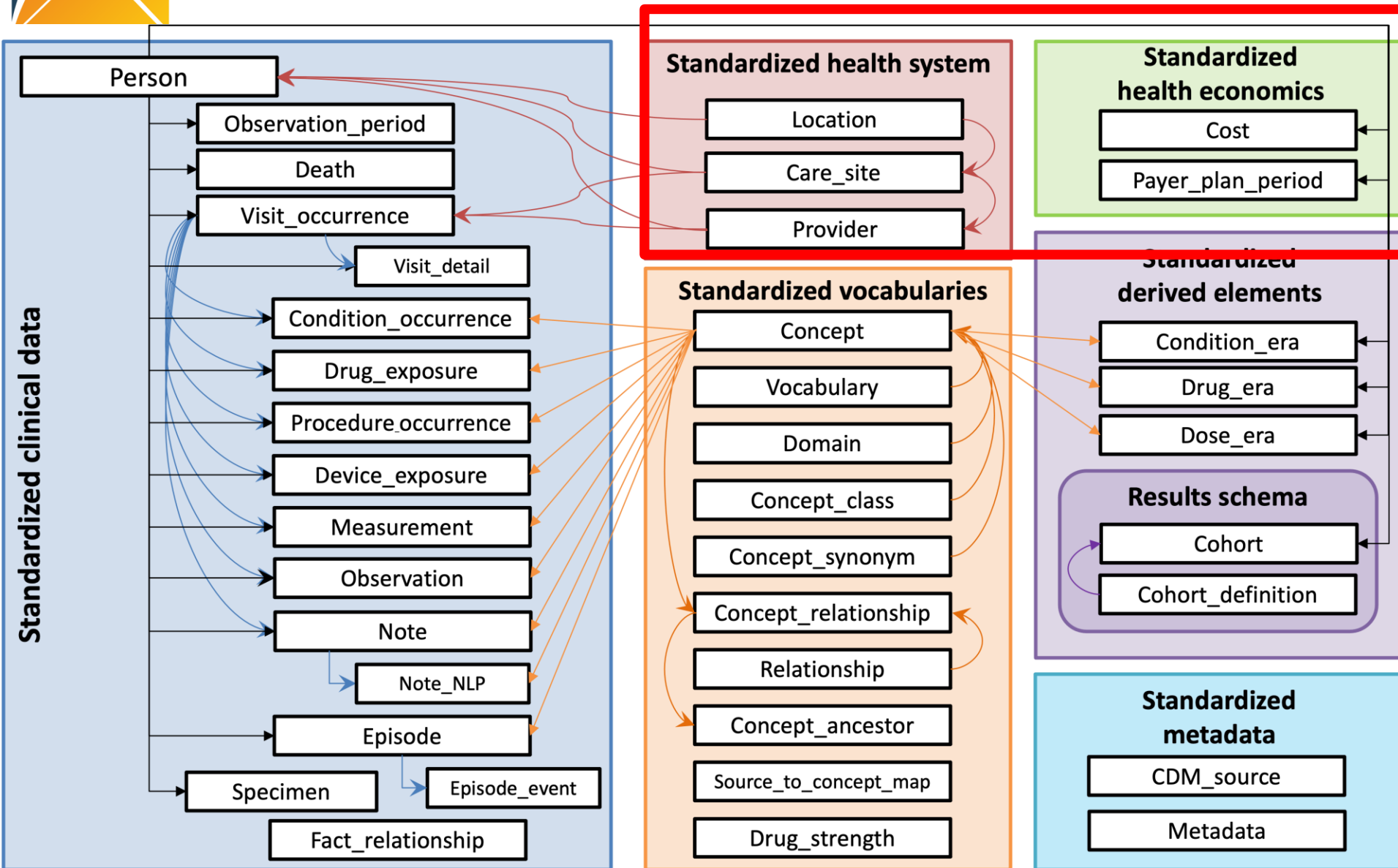
OMOP CDM - Data Schema

The OMOP CDM is a Patient Centric Model





OMOP CDM - Data Schema





Helpful Bookmarks

<https://ohdsi.github.io/CommonDataModel/>



OMOP Common Data Model

The Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM) is an open community data standard, designed to standardize the structure and content of observational data and to enable efficient analyses that can produce reliable evidence. A central component of the OMOP CDM is the OHDSI standardized vocabularies. The OHDSI vocabularies allow organization and standardization of medical terms to be used across the various clinical domains of the OMOP common data model and enable standardized analytics that leverage the knowledge base when constructing exposure and outcome phenotypes and other features within characterization, population-level effect estimation, and patient-level prediction studies.

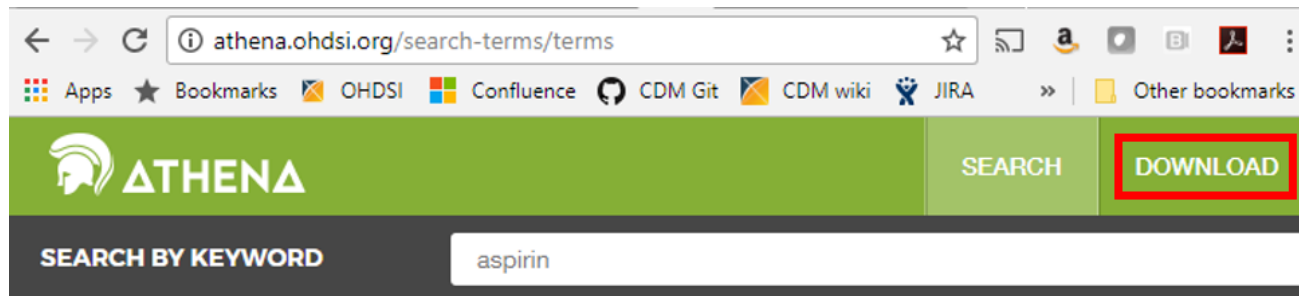
This website is meant to serve as a resource describing the specification of the available versions of the Common Data Model. This includes the structure of the model itself and the agreed upon conventions for each table and field as decided by the OHDSI Community. The vocabulary tables are part of the model and, as such, are detailed here. To download the vocabulary itself, please visit <https://athena.ohdsi.org>. For more information about the OHDSI suite of tools designed to implement best practices in characterization, population-level effect estimation and patient-level prediction, please visit <https://ohdsi.github.io/Hades/>.

Current CDM Version

The current CDM version is [CDM v5.4](#), depicted below. This CDM version was developed over the course of a year by considering requests that were sent via our [issues page](#). The list of proposed changes was then shared with the community in multiple ways: through discussions at the weekly OHDSI Community calls, discussions with the OHDSI Steering Committee, and discussions with all potentially affected workgroups. The [final changes](#) were then delivered to the Community through a new R package designed to dynamically generate the DDLs and documentation for all supported SQL dialects.

- [Link to DDLs for CDM v5.4](#)
- [Link to ReadMe for instructions on how to use the R package](#)

<https://athena.ohdsi.org>



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