Unlocking the Potential of Healthcare Informatics through Disease Code Mapping
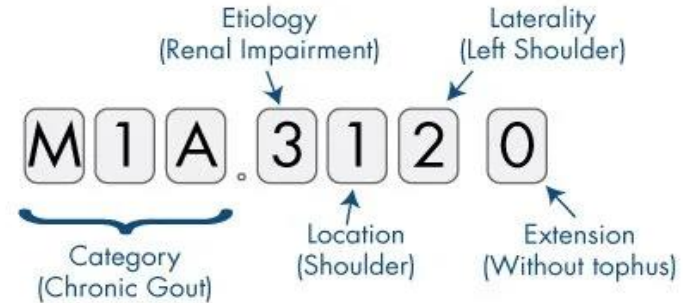
Bridging the Gap Between Disease Names and Standardized Codes

An example of ICD-10-CM (diagnosis code)

Etiology (Renal Impairment)

Laterality (Left Shoulder)

M 1 A . 3 1 2 0

Category (Chronic Gout)

Location (Shoulder)

Extension (Without tophus)

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Problem Statement

Objective: Create comprehensive mapping system; streamline process of identifying accurate and standardized codes

Start-up companies lack corresponding codes for disease names, hindering the construction of comprehensive patient cohorts

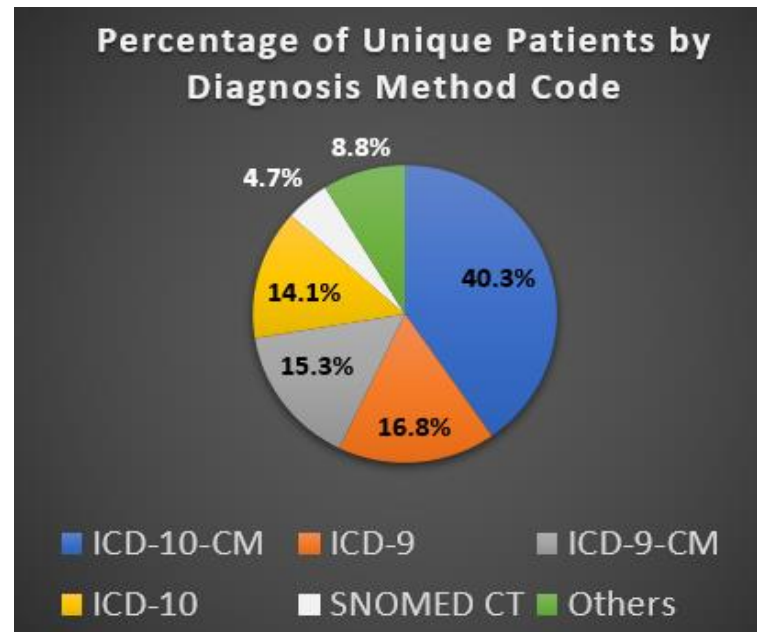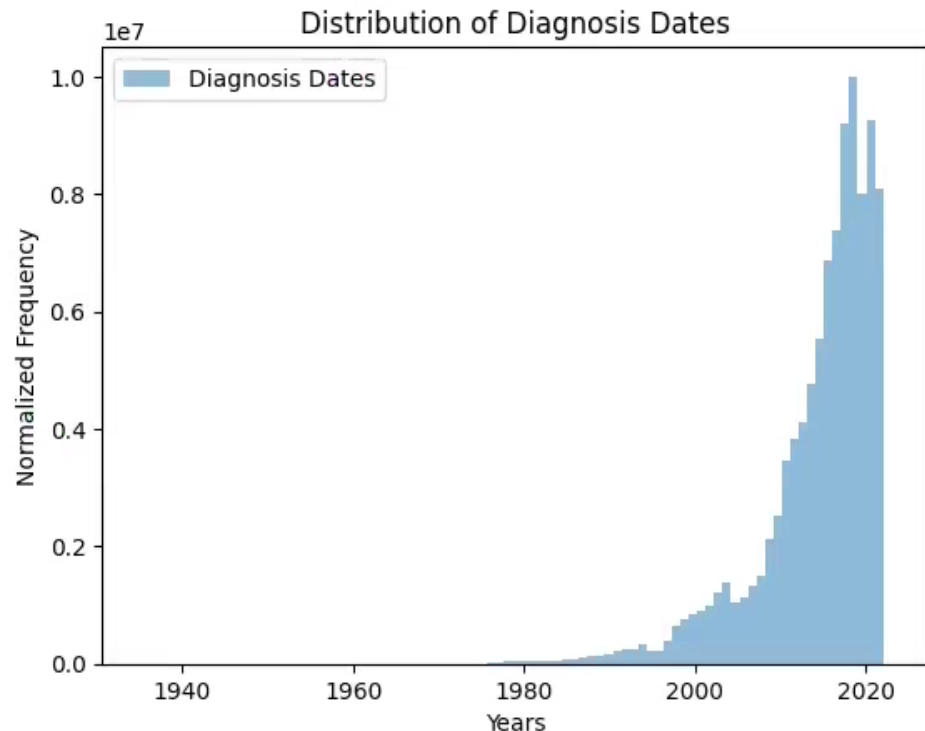Efficient mapping technique is needed to identify the appropriate codes

Expected result:

An algorithm that can be deployed in MCP data to extract/find patients with any diagnosis code

MCP Patient Data Analysis: Overview

2.3 million unique patients
Data spans approximately 87 years (1935 to 2023)

OMOP
(Observational Medical Outcomes Partnership)

OHDSI
(Observational Health Data Sciences and Informatics)

Mapping UMLS CUI into the OHDSI Voc.*

Approach:
- Identify matching vocabularies on both sides
- Obtain CUI (UMLS) via OHDSI and reverse

* Challenge: OHDSI concept_code can overlap

Standardized framework for conducting research
Standard analytical methods, tools, OMOP CDM, and Standardized Vocabularies.

How does OHDSI/OMOP create value?
OMOP CDM transforms data into a standardized format

Common Data Model (CDM)
Eliminates requirement for data extraction and enables standardized analytics

Overview of Reference Table

ICD-10 & ICD-10-CM to CUI

- Source: ICD-10 from CMS.gov; ICD-10-CM from AHRQ
- Original number: **72,836** ICD-10 codes & **74,549** ICD-10-CM codes
- **71,537** ICD-10 codes mapped to CUI (1299 unmapped; **1.78%** unmapped)
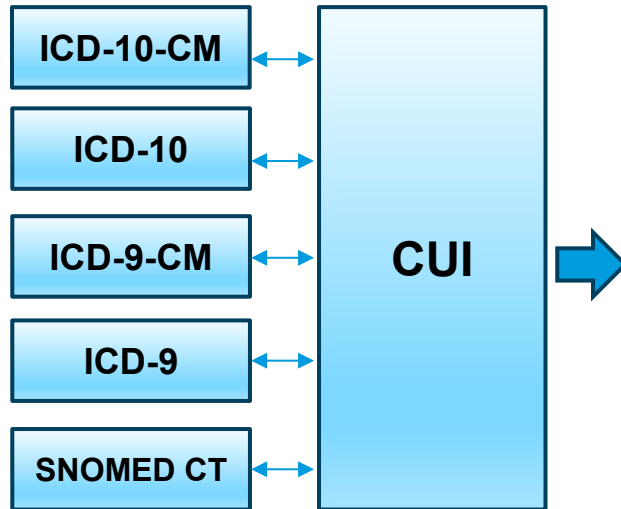- **73,610** ICD-10-CM codes mapped to CUI (939 unmapped **1.26%** unmapped)

ICD-9 & ICD-9-CM to CUI

- Source: ICD-9 & ICD-9-CM from CMS.gov
- Original number: **13,521** ICD-9 codes & **14,567** ICD-9-CM codes
- **11,046** ICD-9 codes mapped to CUI (2475 unmapped; **18.3%** unmapped)
- **13,171** ICD-9-CM codes mapped to CUI (1396 unmapped; **9.58%** unmapped)

SNOMED CT

- Source: UMLS
- Original number: 508,540 SNOMED CT concepts
- **325,816** SNOMED CT concepts mapped to CUI (182,724 unmapped; **35.9%** unmapped)

Overview of Conversion Process

Reference table

CUI	ICD-10-CM	ICD-10	ICD-9-CM	ICD-9	SNOMED	Description
C0494021	A00.0	A00.0				Cholera due to Vibrio cholerae 01, biovar cholerae
C0008354	A00.0	A00.0	001.9	001.9	63650001	Cholera, NOS
C0343372	A00.1	A00.1	001.1	001.1		Cholera due to vibrio cholerae el tor
C0041466	A01.00	A01.00	002.0	002.0		Typhoid fever
C2880086	A01.01	A01.01				Typhoid meningitis
C0340351	A01.02	A01.02			194929007	Endocarditis - typhoid (disorder)
C2880087	A01.02	A01.02				Typhoid fever with heart involvement

Utilize queries for data retrieval

Example: Querying the Reference Table

- Search based on the Description column:
  - Identify a keyword, e.g., 'Hypertrophic'

```
ICD-10-CM ICD-10 ICD-9-CM ICD-9 SNOMED
2842 A66.6 A66.6 102.6 102.6 54549000
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496698 Hypertrophic inflammation              585266 Acquired nonhypertrophic constriction of pylorus
506843 Hypertrophic dystrophy                 586918 Hypertrophic osteoarthropathy (disorder)
509490 Pseudohypertrophic dystrophy           586960 Hypertrophic nonunion of fracture (disorder)
512091 Hypertrophic synovitis                 598441 Hereditary hypertrophic neuropathy with paraproteinaemia
513552 Chronic hypertrophic pyloric gastropathy  605081 Hypertrophic oral lichen planus
531451 Gastritis hypertrophica gigantea       605463 Hypertrophic scarring of skin donor site
533730 Pituitary hypertrophic amphophil cell  606029 Primary generalised hypertrophic osteoarthrosis
543574 Hypertrophic glandular gastritis       617984 Familial hypertrophic osteoarthropathy
544271 Hypertrophic granulation tissue        618311 Hypertrophic actinic keratosis
545869 Primary familial hypertrophic cardiomyopathy  645841 Hyperplastic-hypertrophic obesity
560496 Hypertrophic stenosis                  647279 Hypertrophic obesity
```

Future Steps

Clinical Validation

1

Double-check reference table with clinical expert

Further investigation of unmapped codes

Transfer to Discover

2

For users to increase efficiency

Mapping to OMOP Data Model

3

Valuable and important step for MCP