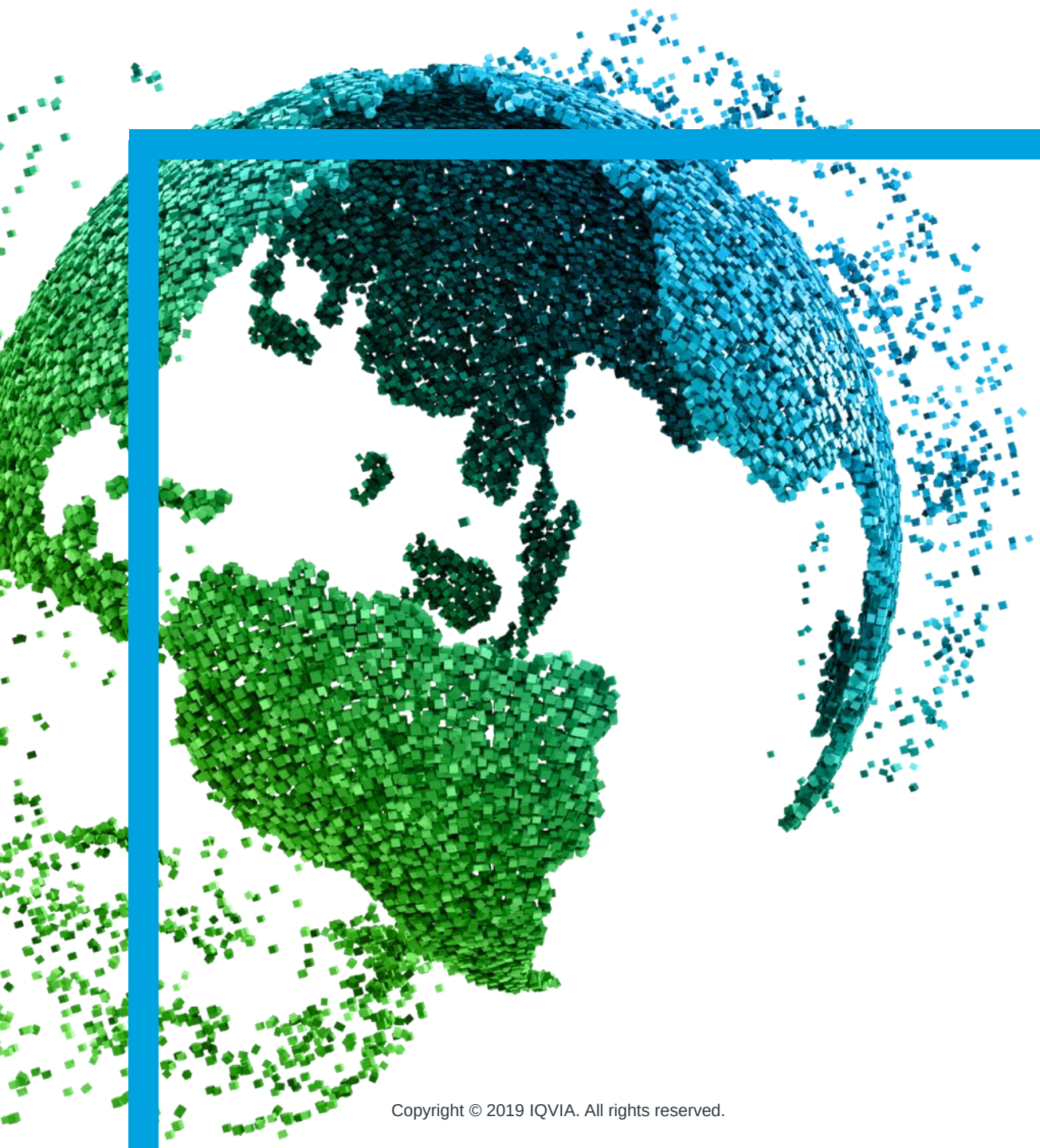

IMS Health & Quintiles are now IQVIA™

Introduction to OMOP

CDISC French User Group Meeting
Paris, 24 June 2019

Sonia Araujo
Director Product Management, IQVIA UK

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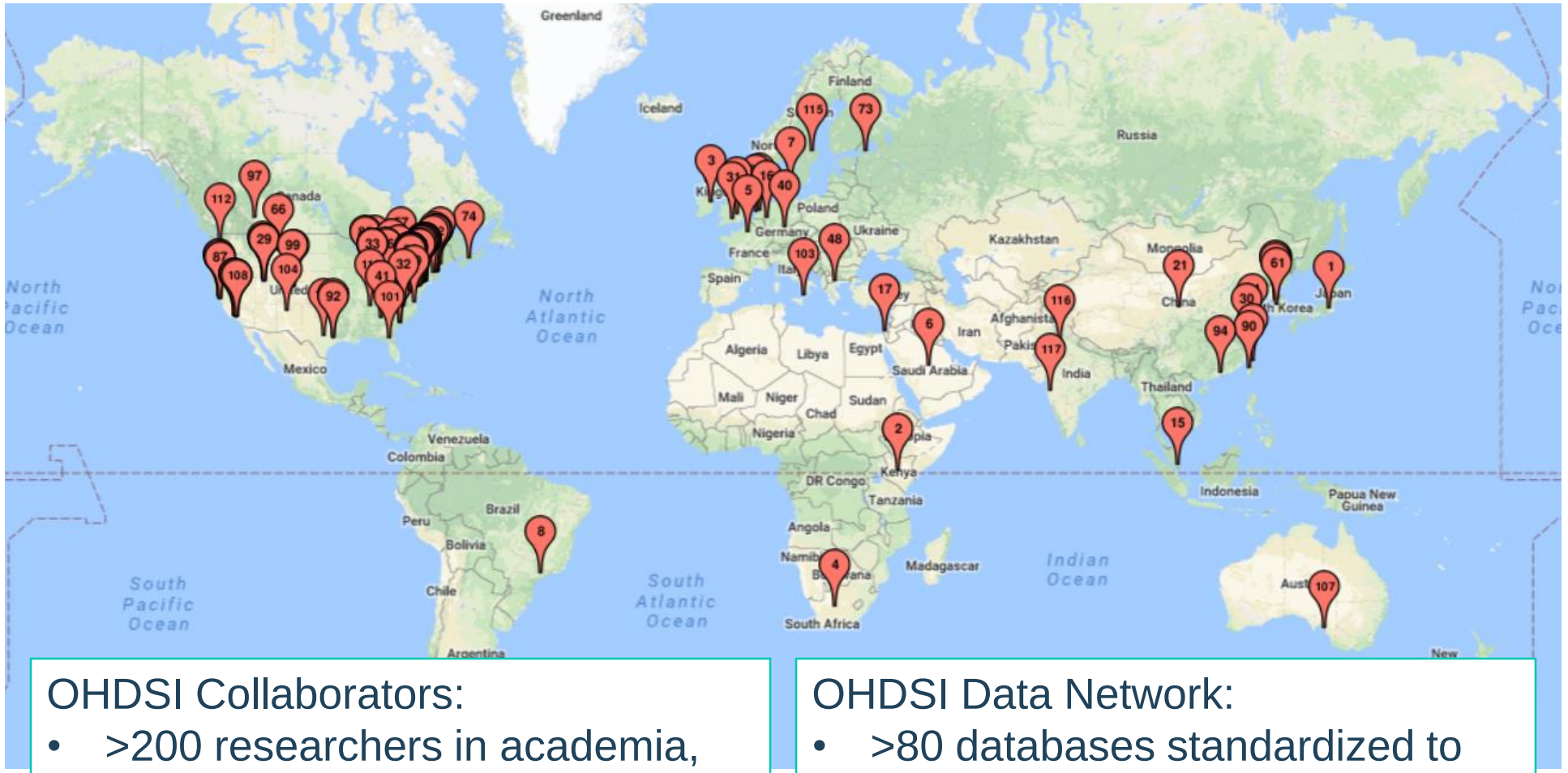
+ OMOP CDM
+ Conditions & Drugs
+ ETL

OHDSI: a global community



OHDSI Collaborators:

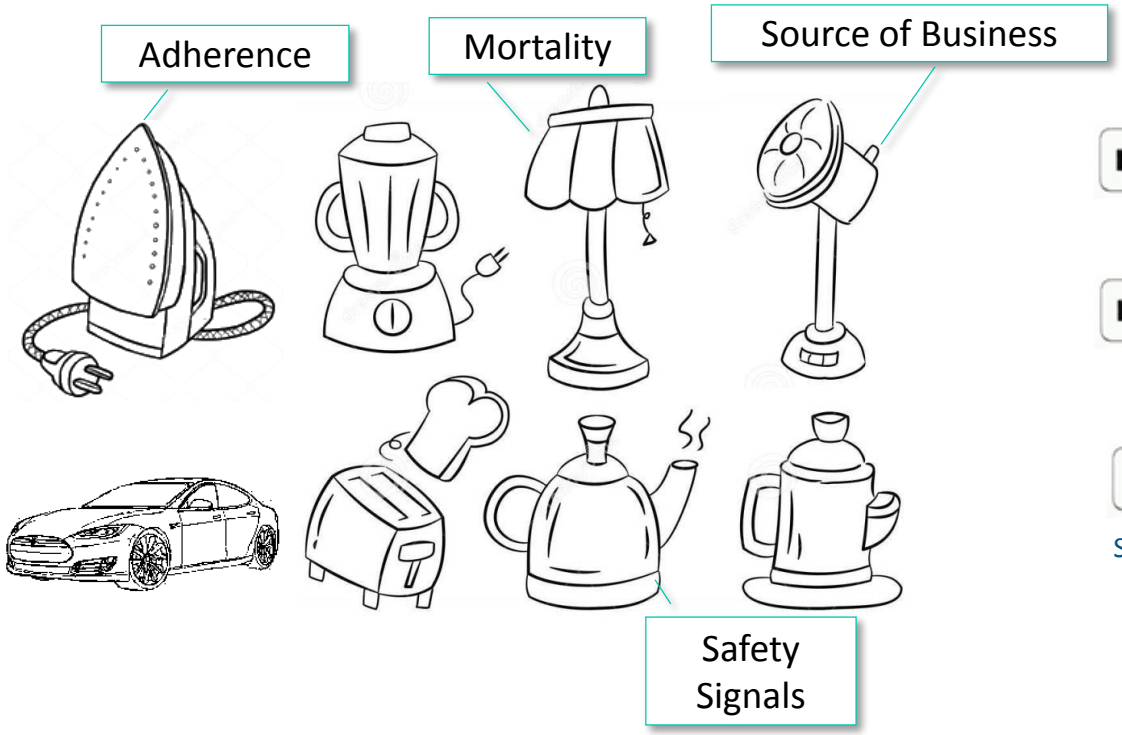
- >200 researchers in academia, industry and government
- >15 countries

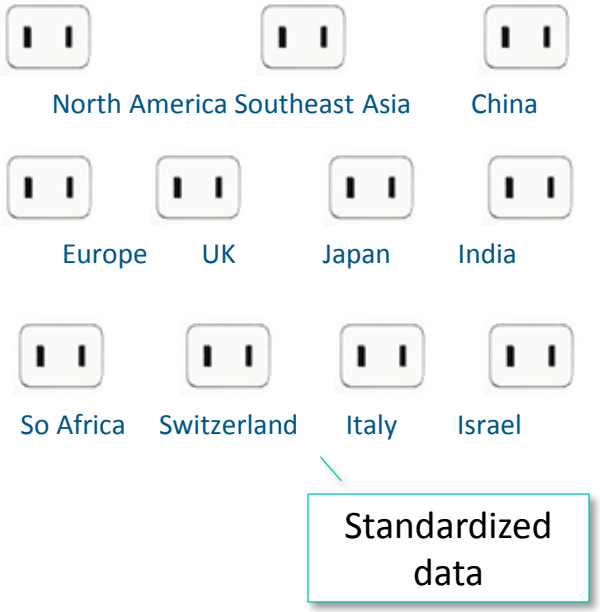
OHDSI Data Network:

- >80 databases standardized to OMOP common data model
- >1.2 billion patients

http://ohdsi.org

Data Standardization Enabling Systematic Research





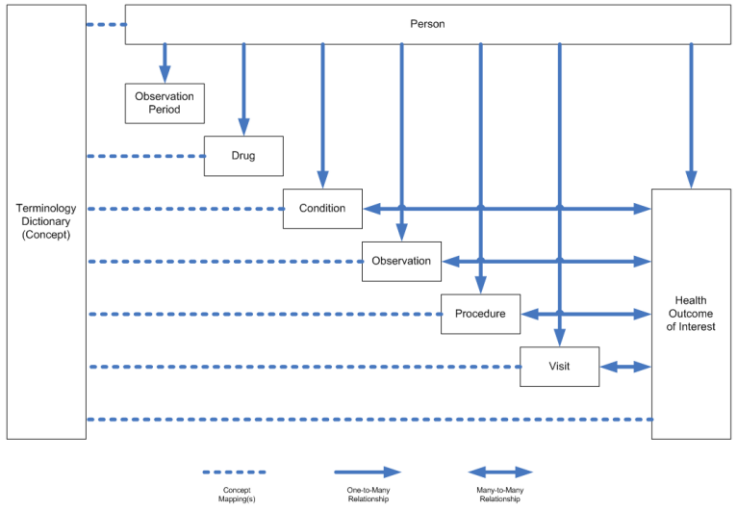
OHDSI Tools

OMOP CDM

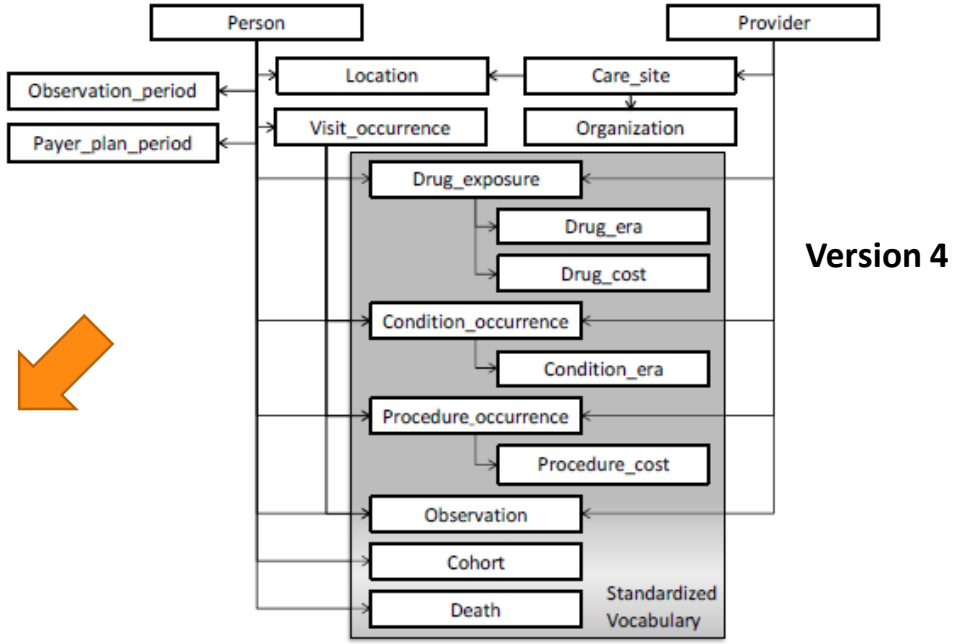
Evolution of the OMOP CDM

Multiple iterations of implementation, testing, modifications and expansion based on the experiences of the OMOP community who bring on a growing landscape of research use cases.

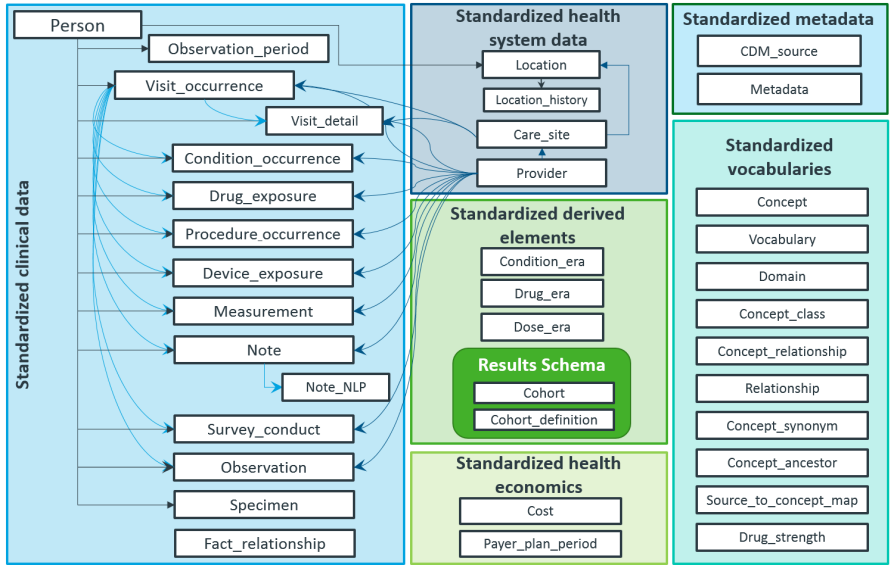
Version 2



Version 4

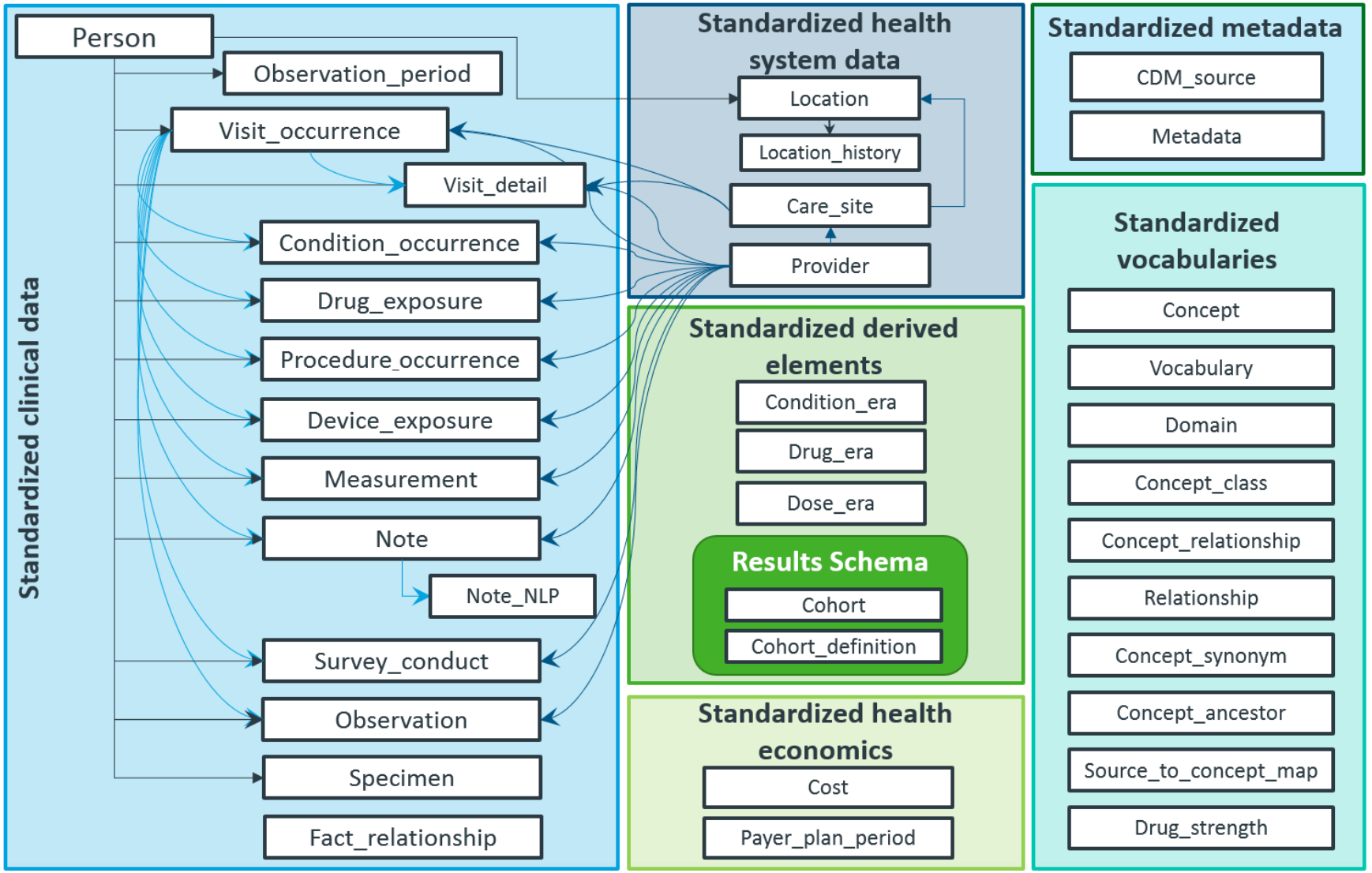


Version 6



http://omop.org/CDM

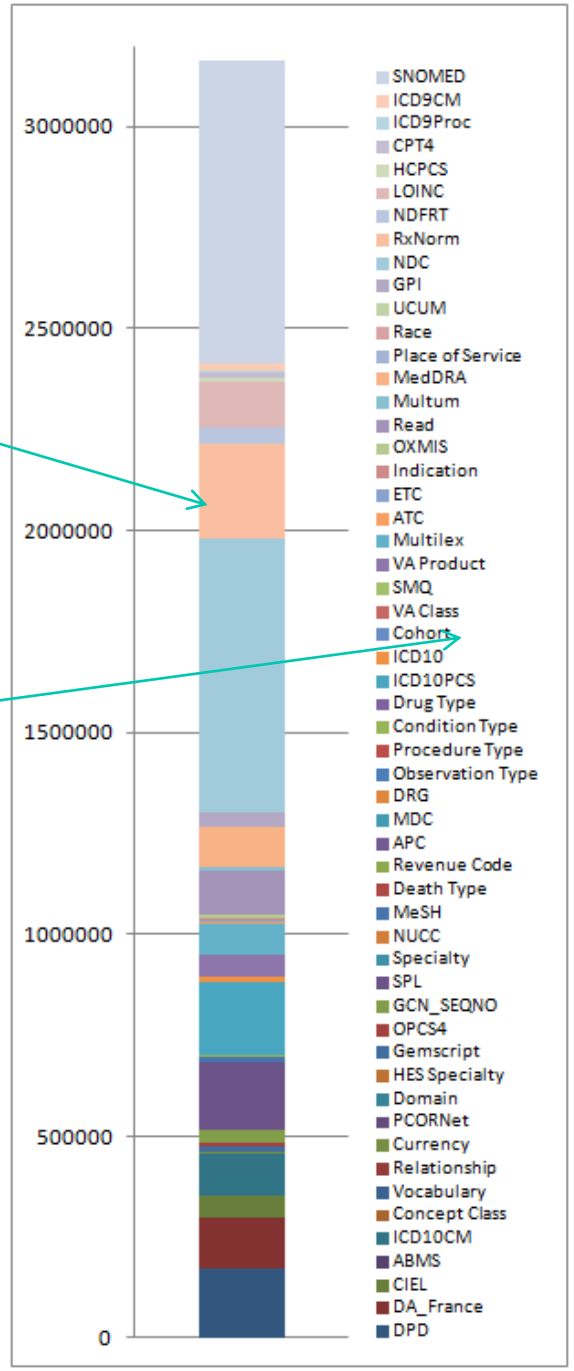
CDM Version 6: Key Domains



Single Concept Reference Table

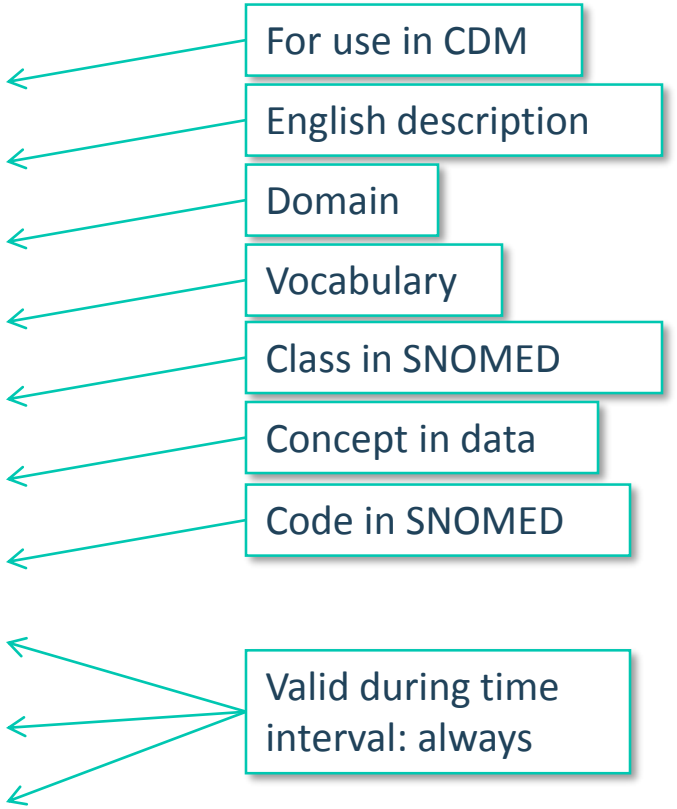
All vocabularies stacked up in one table

Vocabulary ID

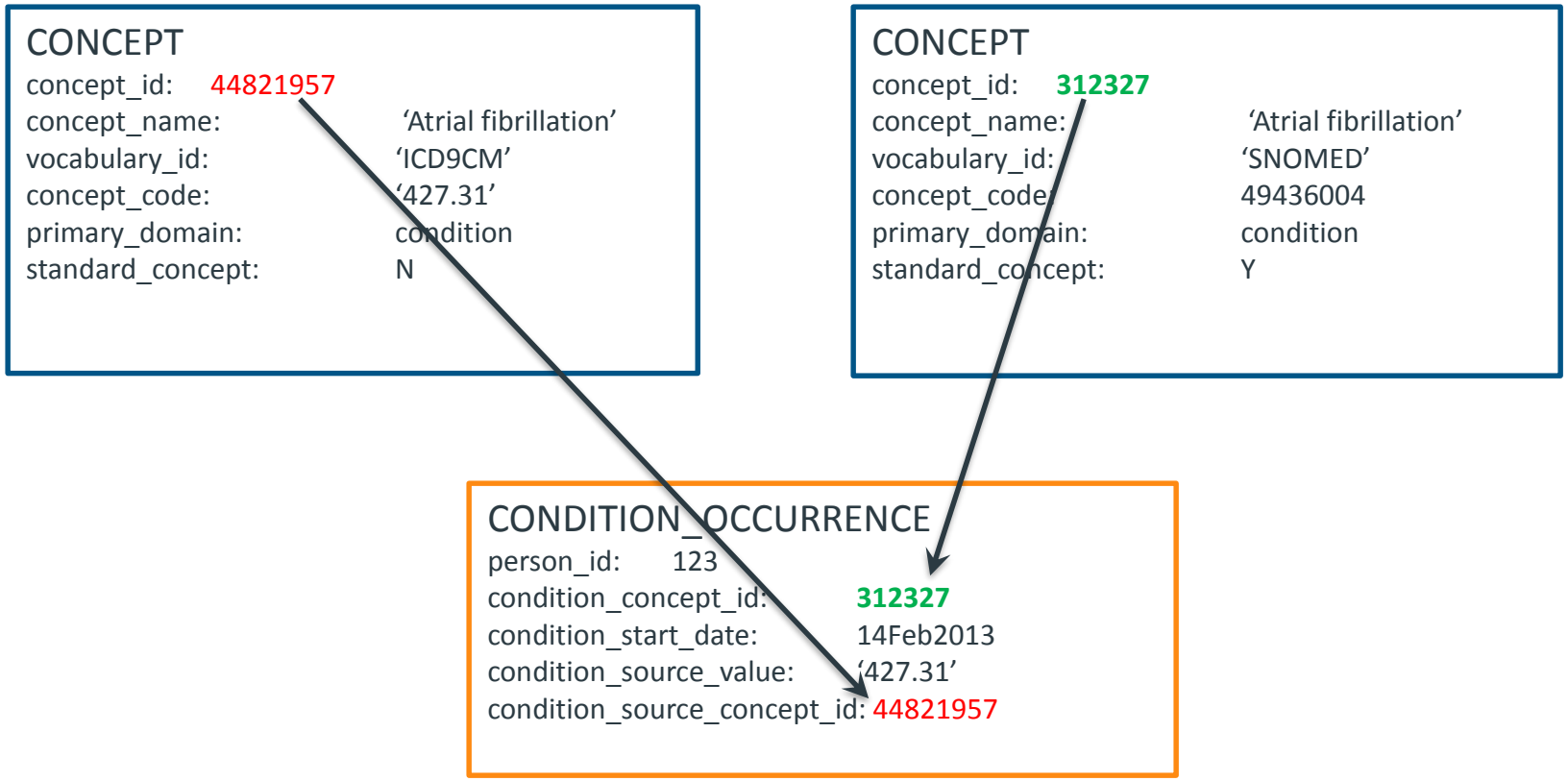


What's in a Concept

CONCEPT_ID	313217
CONCEPT_NAME	Atrial fibrillation
DOMAIN_ID	Condition
VOCABULARY_ID	SNOMED
CONCEPT_CLASS_ID	Clinical Finding
STANDARD_CONCEPT	S
CONCEPT_CODE	49436004
VALID_START_DATE	01-Jan-1970
VALID_END_DATE	31-Dec-2099
INVALID_REASON	



Integration of CDM and Vocabulary

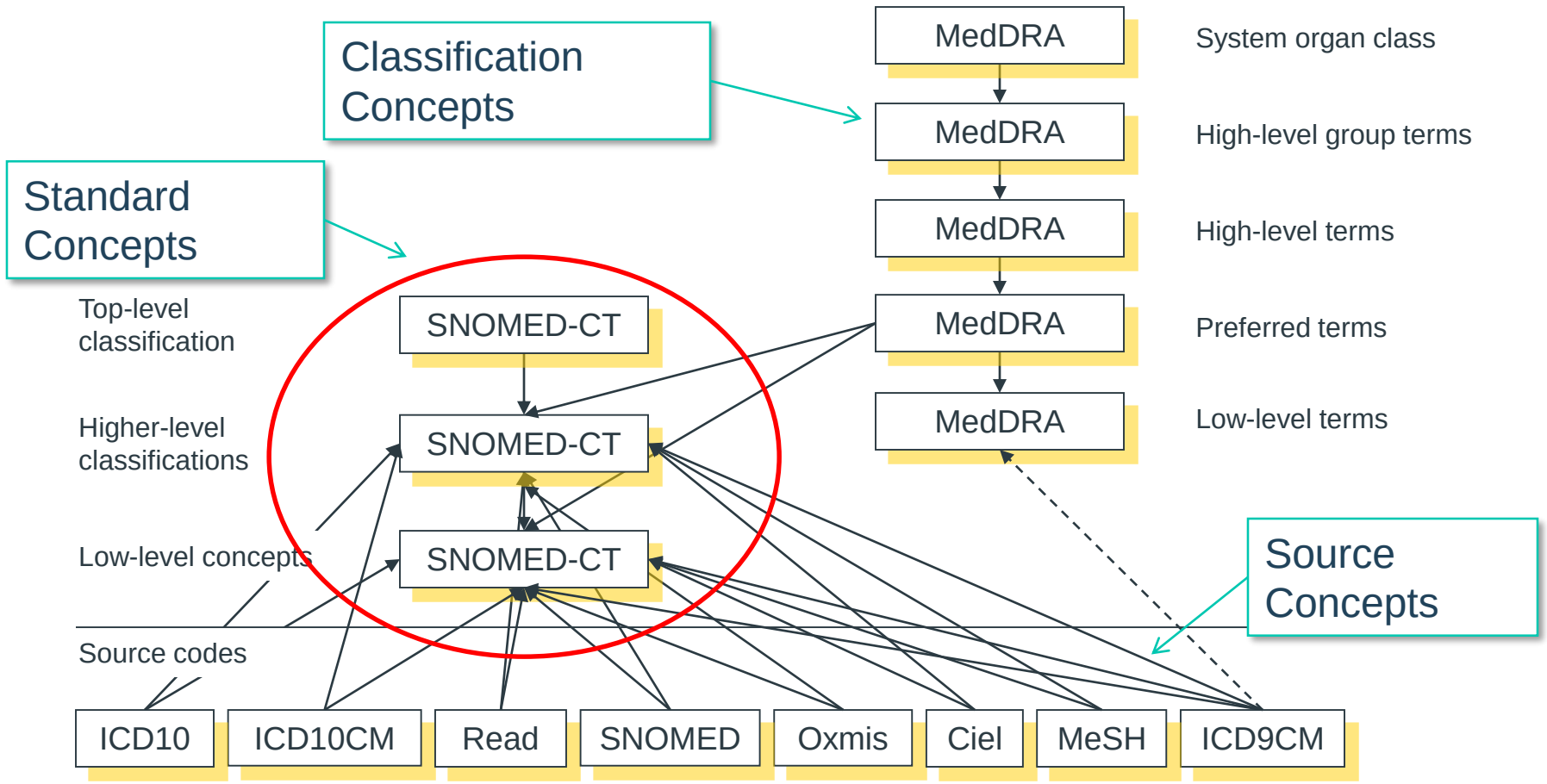


+ OMOP CDM

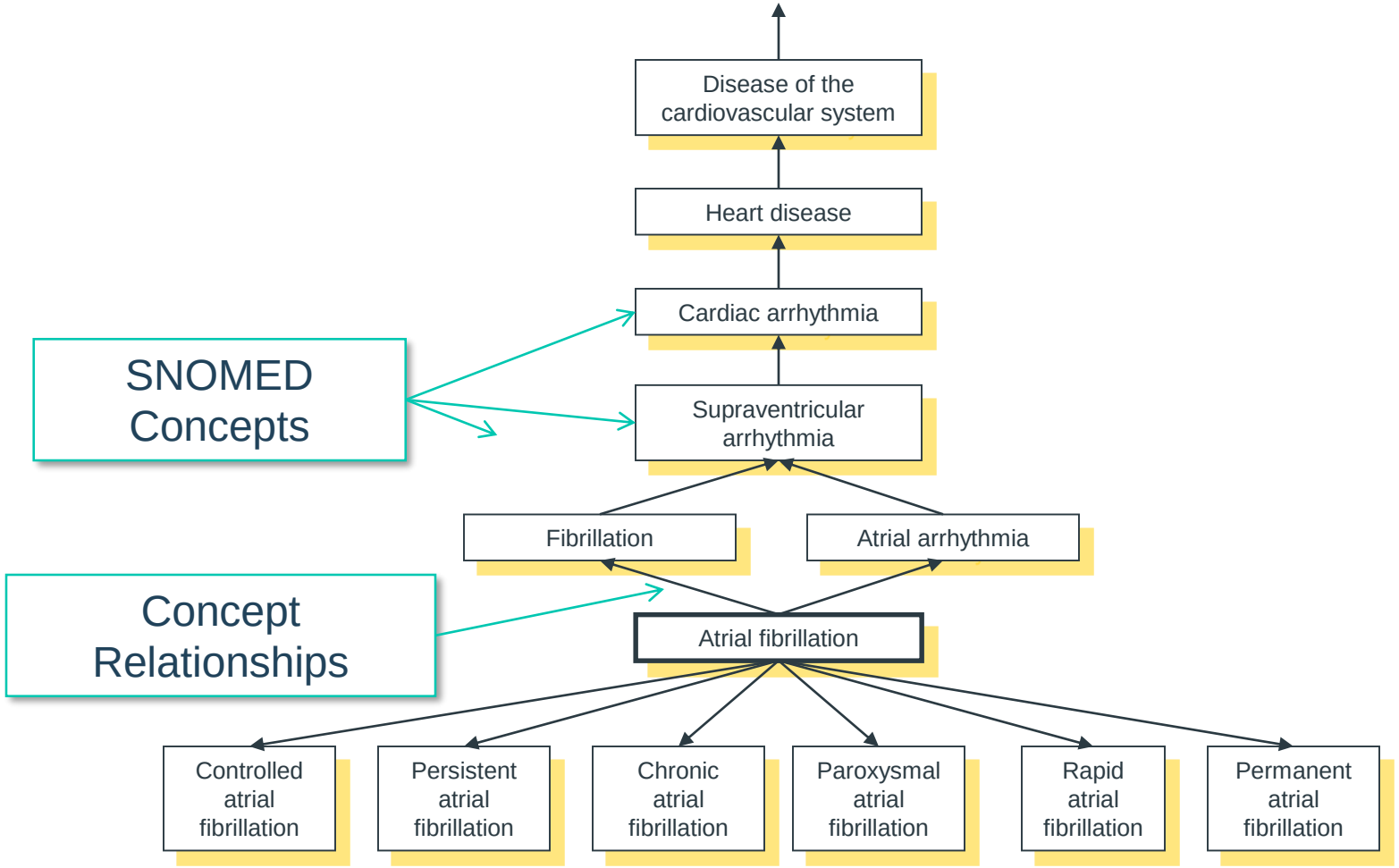
+ Conditions & Drugs

+ ETL

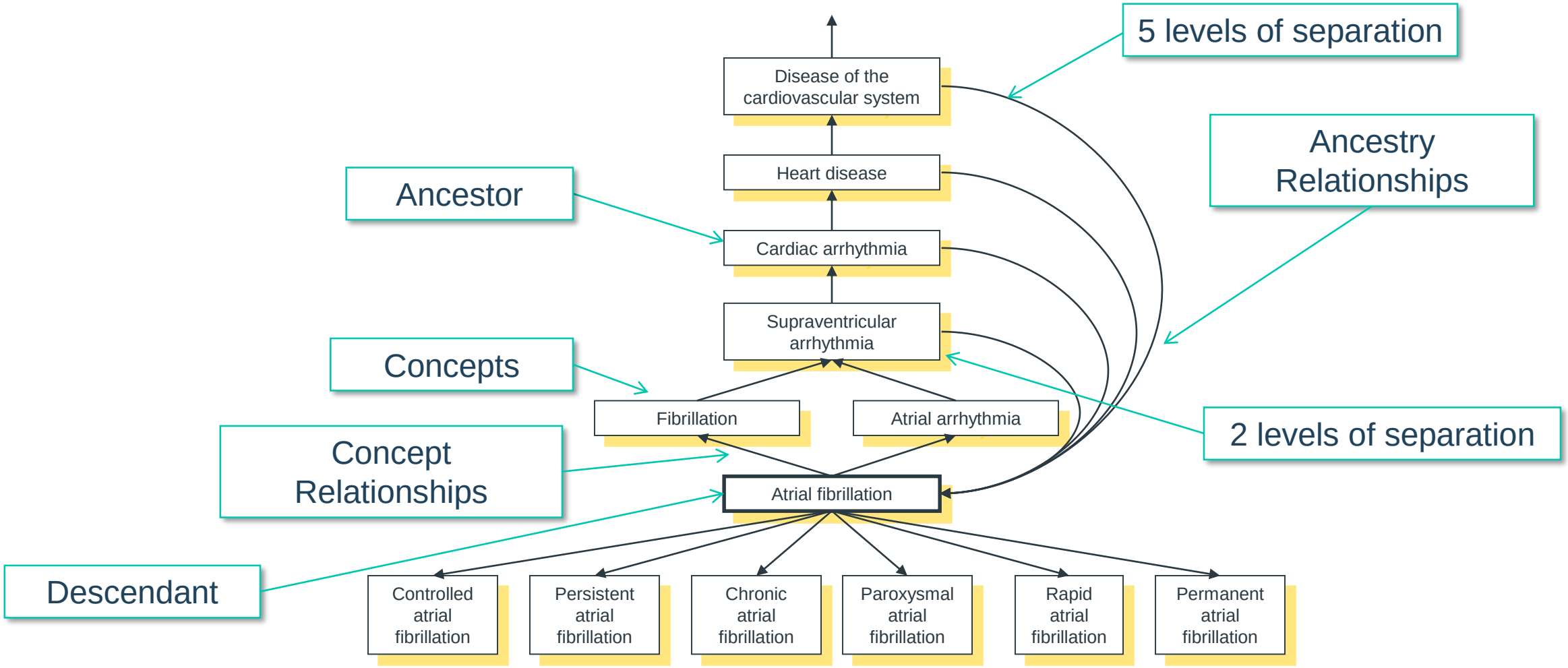
Condition Concepts



Disease Hierarchy (SNOMED)



Ancestry Relationships



Exploring Relationships

```
SELECT cr.relationship_id, c.*
FROM concept_relationship cr
JOIN concept c ON cr.concept_id_2 = c.concept_id
WHERE cr.concept_id_1 = 313217
```

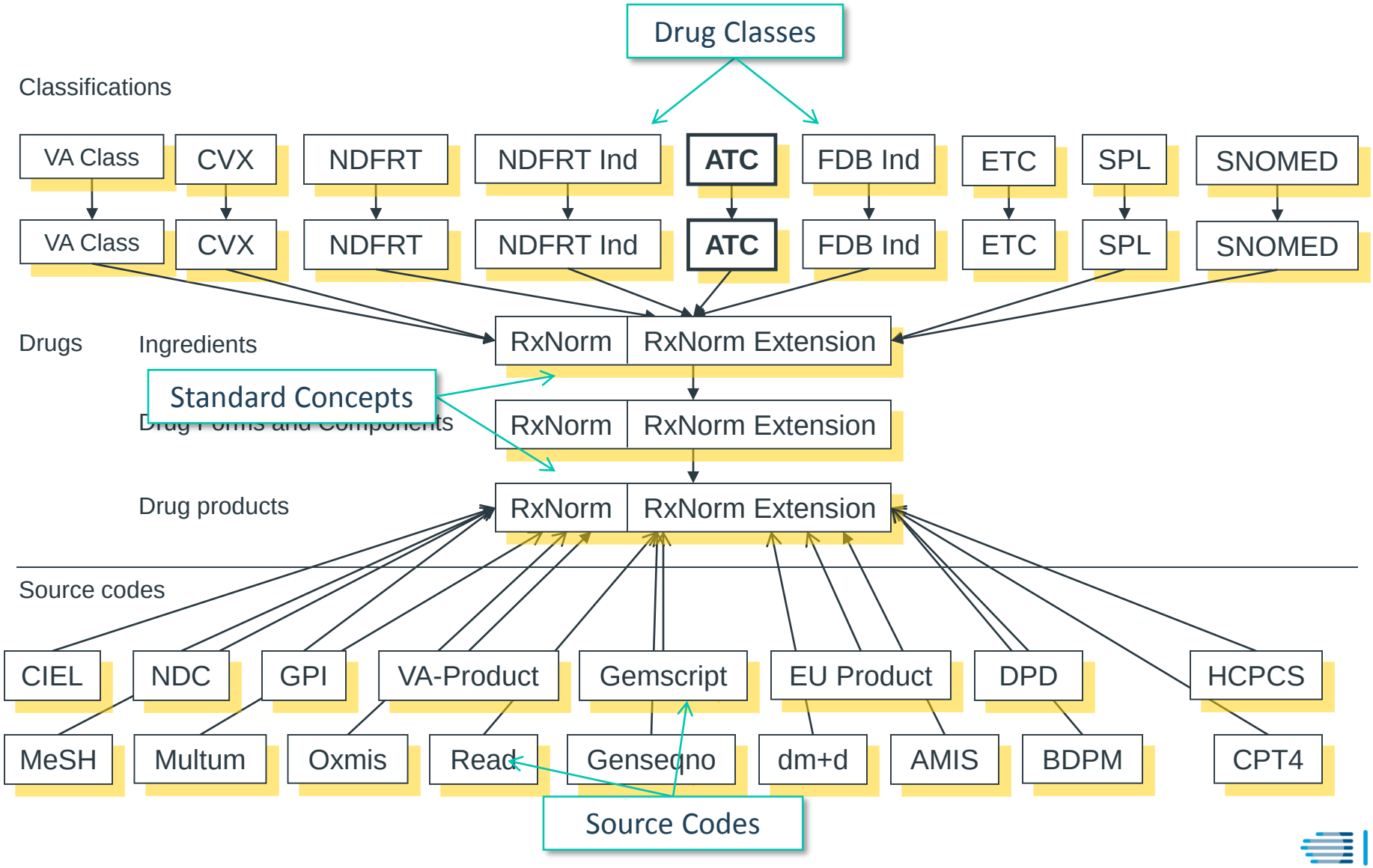
Find out related concept

relationship_id	concept_id	concept_name	domain_id	vocabulary_id	concept_class_id	standard_ concept	concept_code	valid_start_date	valid_end_date	invalid_ reason
Asso finding of	4194288		Observation	SNOMED	Context-dependent	S	312442005	1/1/1970 0:00	12/31/2099 0:00	NULL
Asso finding of	4203375		Observation	SNOMED	Context-dependent	S	433276002	1/31/2009 0:00	12/31/2099 0:00	NULL
Asso finding of	42689685		Observation	SNOMED	Context-dependent	S	1.06706E+15	4/1/2017 0:00	12/31/2099 0:00	NULL
Asso finding of	44807374		Observation	SNOMED	Context-dependent	S	8.16401E+14	4/1/2014 0:00	12/31/2099 0:00	NULL
Concept poss_eq from	40323929		Condition	SNOMED	Clinical Finding	NULL	155364009	1/1/1970 0:00	3/11/2016 0:00	U
Concept poss_eq from	40345197	[illegible]	Condition	SNOMED	Clinical Finding	NULL	266306001	1/1/1970 0:00	3/11/2016 0:00	U
Due to of	4139517	Transient cerebral ischemia due to atrial fibrillation	Condition	SNOMED	Clinical Finding	S	426814001	1/1/1970 0:00	12/31/2099 0:00	NULL
Focus of	42709991	Insertion of pacemaker for control of atrial fibrillation	Procedure	SNOMED	Procedure	S	449863006	1/31/2012 0:00	12/31/2099 0:00	NULL
Has finding site	4242112	Atrial structure	Spec Anatomic Site	SNOMED	Body Structure	S	59652004	1/1/1970 0:00	12/31/2099 0:00	NULL
Is a	4226399	Fibrillation	Condition	SNOMED	Clinical Finding	S	40593004	1/1/1970 0:00	12/31/2099 0:00	NULL
Is a	4068155	Atrial arrhythmia	Condition	SNOMED	Clinical Finding	S	17366009	1/1/1970 0:00	12/31/2099 0:00	NULL
Mapped from	40323929	Fibrillation - atrial	Condition	SNOMED	Clinical Finding	NULL	155364009	1/1/1970 0:00	3/11/2016 0:00	U
Mapped from	2617597	Patient with heart failure and atrial fibrillation documented to be on warfarin therapy	Observation	HCPCS	HCPCS	NULL	G8183	1/1/1970 0:00	11/11/2014 0:00	D
Mapped from	45576876	Unspecified atrial fibrillation	Condition	ICD10CM	5-char billing code	NULL	I48.91	12/30/2006 0:00	12/31/2099 0:00	NULL
Mapped from	45500085	Atrial fibrillation	Condition	Read	Read	NULL	G573000	1/1/1970 0:00	12/31/2099 0:00	NULL
Mapped from	45611600	Atrial Fibrillation	Condition	MeSH	Main Heading	NULL	D001281	1/1/1970 0:00	12/31/2099 0:00	NULL
Mapped from	40345197	Fibrillation - atrial	Condition	SNOMED	Clinical Finding	NULL	266306001	1/1/1970 0:00	3/11/2016 0:00	U
Mapped from	45951191	Atrial Fibrillation	Condition	CIEL	Diagnosis	NULL	148203	11/3/2007 0:00	12/31/2099 0:00	NULL
Mapped from	313217	Atrial fibrillation	Condition	SNOMED	Clinical Finding	S	49436004	1/1/1970 0:00	12/31/2099 0:00	NULL
Maps to	313217	Atrial fibrillation	Condition	SNOMED	Clinical Finding	S	49436004	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - HOI	500002401	OMOP Atrial Fibrillation 1	Condition	Cohort	Cohort	C	500002401	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - HOI	500001801	OMOP Qt Prolongation/Torsade De Pointes 1	Condition	Cohort	Cohort	C	500001801	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - ind/CI	21005673	Prevention of Thromboembolism in Chronic Atrial Fibrillation	Drug	Indication	Indication	C	5673	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - ind/CI	21003176	Tachyarrhythmia	Drug	Indication	Indication	C	3176	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - ind/CI	21001542	Supraventricular Tachycardia	Drug	Indication	Indication	C	1542	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - ind/CI	21001594	Disease of Cardiovascular System	Drug	Indication	Indication	C	1594	1/1/1970 0:00	12/31/2099 0:00	NULL
SNOMED - MedDRA eq	35204953	Atrial fibrillation	Condition	MedDRA	PT	C	10003658	1/1/1970 0:00	12/31/2099 0:00	NULL
Subsumes	4117112	Controlled atrial fibrillation	Condition	SNOMED	Clinical Finding	S	300996004	1/1/1970 0:00	12/31/2099 0:00	NULL
Subsumes	4119601	Lone atrial fibrillation	Condition	SNOMED	Clinical Finding	S	233910005	1/1/1970 0:00	12/31/2099 0:00	NULL
Subsumes	4232697	Persistent atrial fibrillation	Condition	SNOMED	Clinical Finding	S	440059007	1/31/2009 0:00	12/31/2099 0:00	NULL
Subsumes	4141360	Chronic atrial fibrillation	Condition	SNOMED	Clinical Finding	S	426749004	1/1/1970 0:00	12/31/2099 0:00	NULL
Subsumes	44782442	Atrial fibrillation with rapid ventricular response	Condition	SNOMED	Clinical Finding	S	1.20041E+14	1/31/2014 0:00	12/31/2099 0:00	NULL
Subsumes	4199501	Rapid atrial fibrillation	Condition	SNOMED	Clinical Finding	S	314208002	1/1/1970 0:00	12/31/2099 0:00	NULL
Subsumes	4119602	Non-rheumatic atrial fibrillation	Condition	SNOMED	Clinical Finding	S	233911009	1/1/1970 0:00	12/31/2099 0:00	NULL

Ancestor concepts

Descendant concepts

Drug Hierarchy



+ OMOP CDM

+ Conditions & Drugs

+ ETL

Real World Scenario

PharMetrics Plus

CLAIMS

pat_id	claimno	from_dt	to_dt	diagprc_ind	Diag_admit	diag1
05917921689	IPA333393946	1/5/2006	1/5/2006	1	41071	41071

LRx/Dx

MEDICAL_CLAIMS

md_clm_id	ims_pat_nbr	dt_of_service	rxer_id	diag_cd
95963982102	80445908	8/1/2012 0:00	680488	41071

German DA

Problem Events

db_country	international_ practice_num	international_ doctor_num	international_ patient_num	age_at_event	date_of_event	international_ diagnosis_num
GE	GE6326	GE8784	GE46478747	20	11/19/2014 0:00	GE2397573

Diagnosis

db_country	international_diagnosis_num	diagnosis_num	icd10_4_code	icd10_3_text	diagnosis_confidence
GE	GE2397573	2397573	I21.4	Non-ST elevation (NSTEMI) myocardial infarction	Confirmed

Ambulatory EMR

Problem

Patient_id_synth	Diag_dt	Icd10_cd
271138	4/11/2013	I214

4 real observational databases, all containing an inpatient admission for a patient with a diagnosis of ‘acute subendocardial infarction’

- Not a single table name the same…
- Not a single variable name the same….
- Different table structures (rows vs. columns)
- Different conventions (with and without decimal points)
- Different coding schemes (ICD9 vs. ICD10)

What does it mean to ETL to OMOP CDM?

PharMetrics Plus

Inpatient Claims

pat_id	claimno	from_dt	to_dt	diagprc_ind	Diag_admit
05917921689	IPA333393946	1/5/2006	1/5/2006	1	41071

Structure optimized for large-scale analysis

Standardize Structure

PharMetrics Plus

CONDITION_OCCURRENCE

PERSON_ID	CONDITION_ START_DATE	CONDITION_ SOURCE_VALUE	CONDITION_TYPE_CONCEPT_ID
05917921689	1/5/2006	41071	Inpatient claims - primary position

Content using international vocabulary standards

Standardize Content

PharMetrics Plus

CONDITION_OCCURRENCE

PERSON_ID	CONDITION _ START _DATE	CONDITION_ SOURCE _VALUE	CONDITION _TYPE _CONCEPT_ID	CONDITION _ SOURCE _CONCEPT_ID	CONDITION _ CONCEPT_ID
05917921689	1/5/2006	41071	Inpatient claims - primary position	44825429	444406

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Thank You