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Applying the OMOP common data model across administrative claims and electronic health records

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on behalf of OMOP research team
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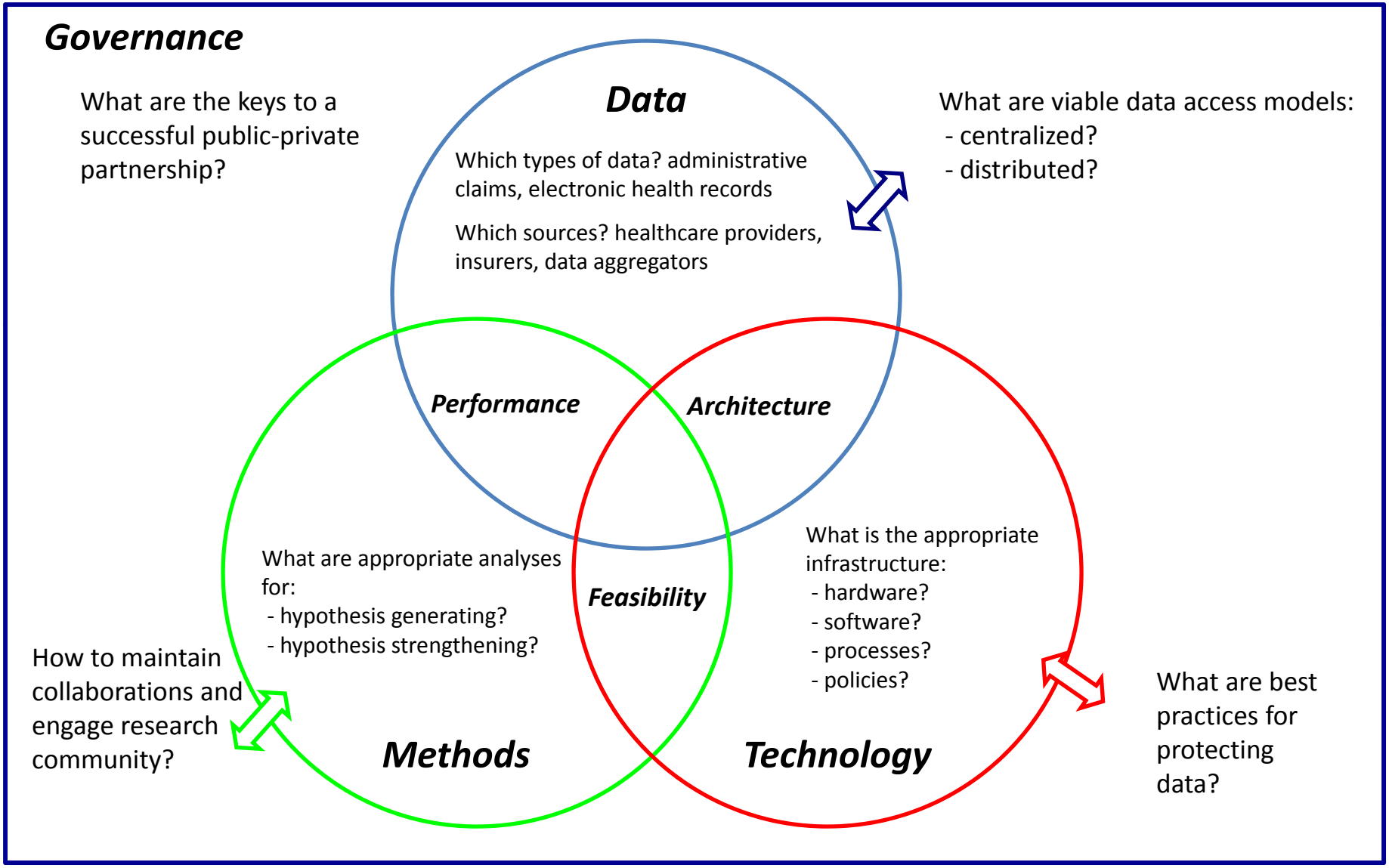
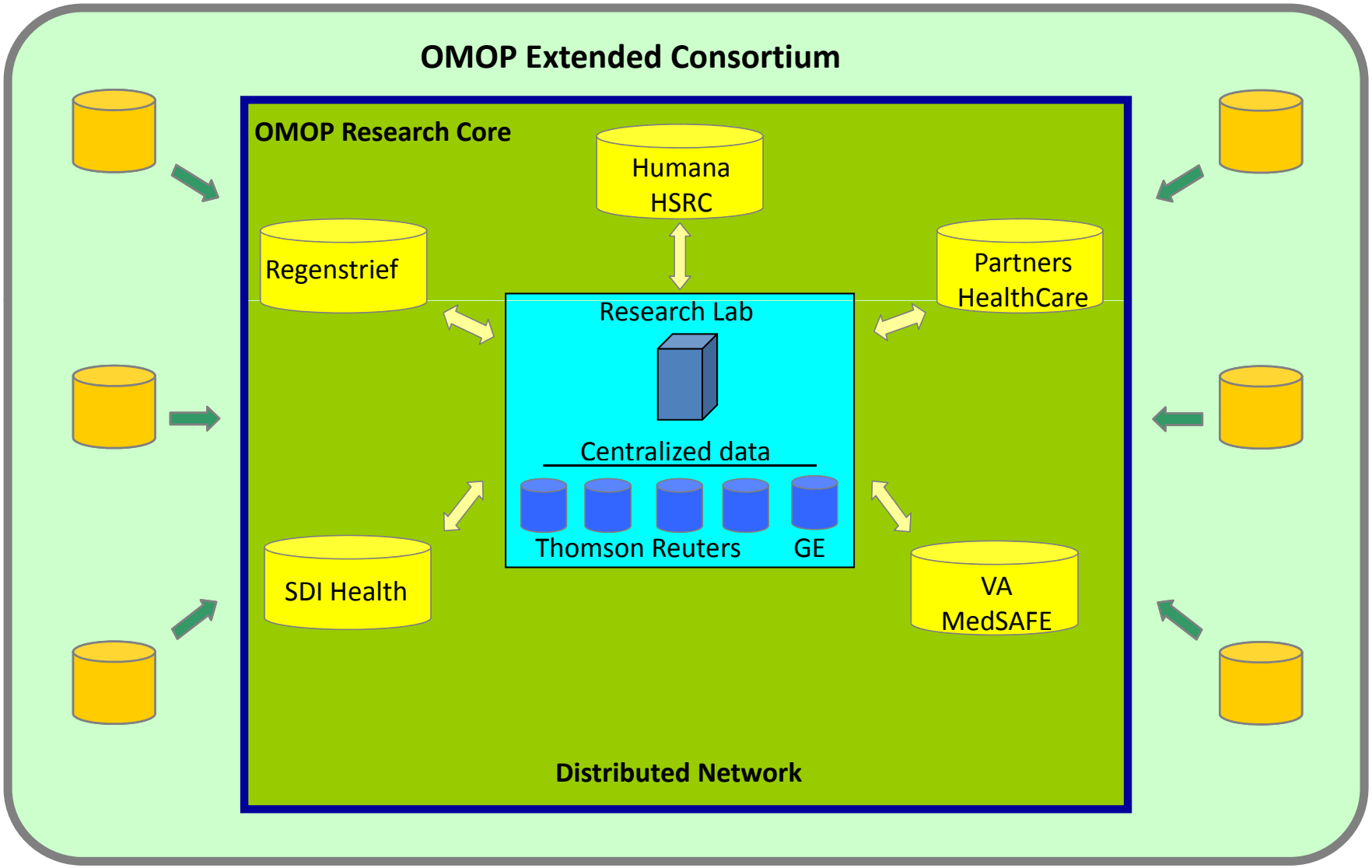
Outstanding questions for active surveillance



Disparate data across OMOP community



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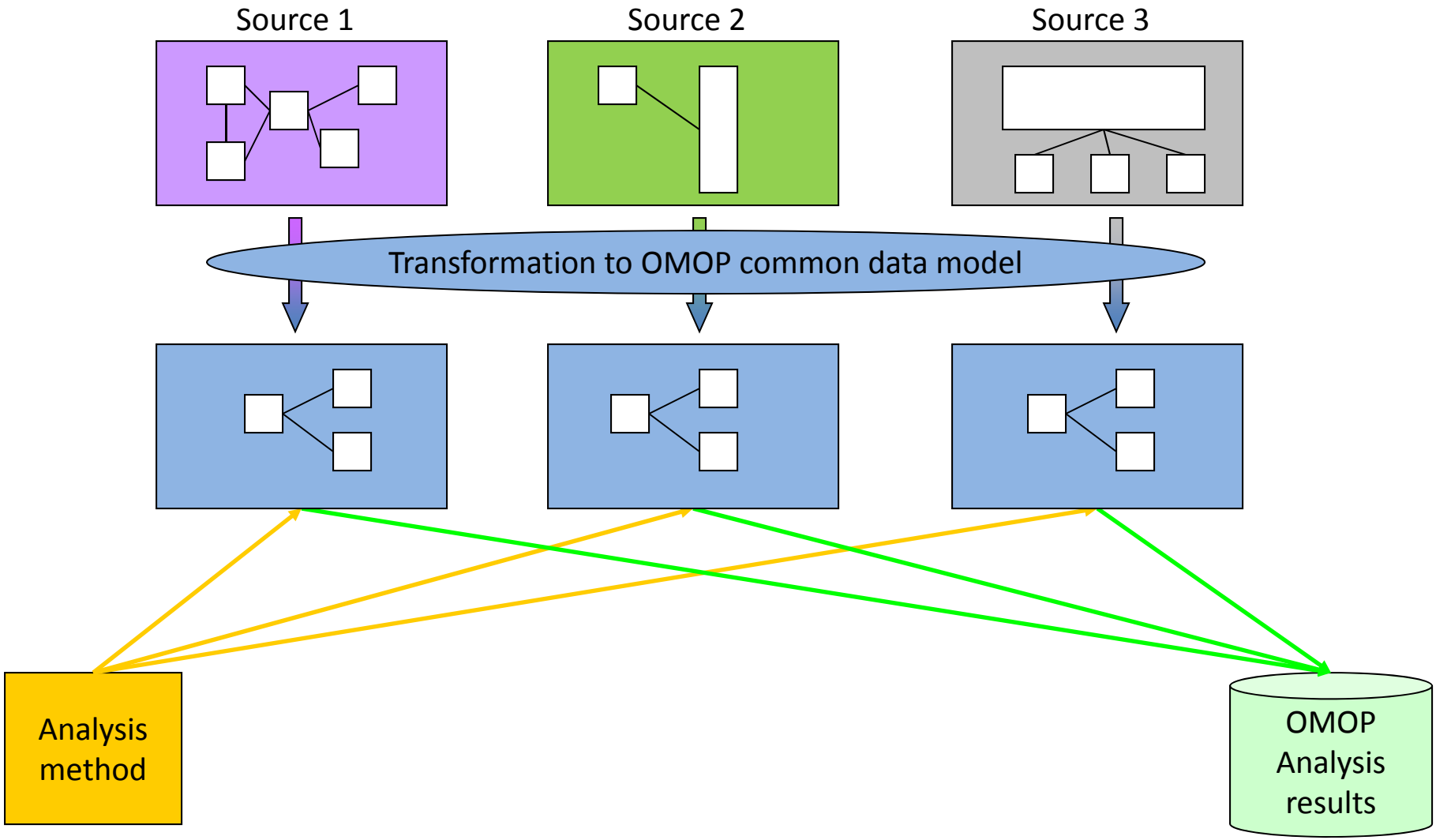
Role of common data model in OMOP Analysis process



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Common Data Model

- The common data model includes:
  - A single data schema that can be applied to disparate data types
  - Standardized terminologies
  - Consistent transformation for key data elements
- A common data model can:
  - Enable consistent and systematic application of analysis methods to produce comparable results across sources
  - Create a community to facilitate the sharing of tools and practices
  - Impose data quality standards
  - Create implementation efficiencies

Common Data Model	
What We Are Doing	**What We Are Not Doing**
• Creating one model that could accommodate any relevant type of observational data • Facilitating comparison of analysis results across sources • Providing a conceptual model to allow researchers to develop analysis methods that are be portable across data sources	• Combining multiple datasets into one centralized database • Trying to force claims data into a EHR model or vice versa • Developing a graphical user interface to automatically create structured queries

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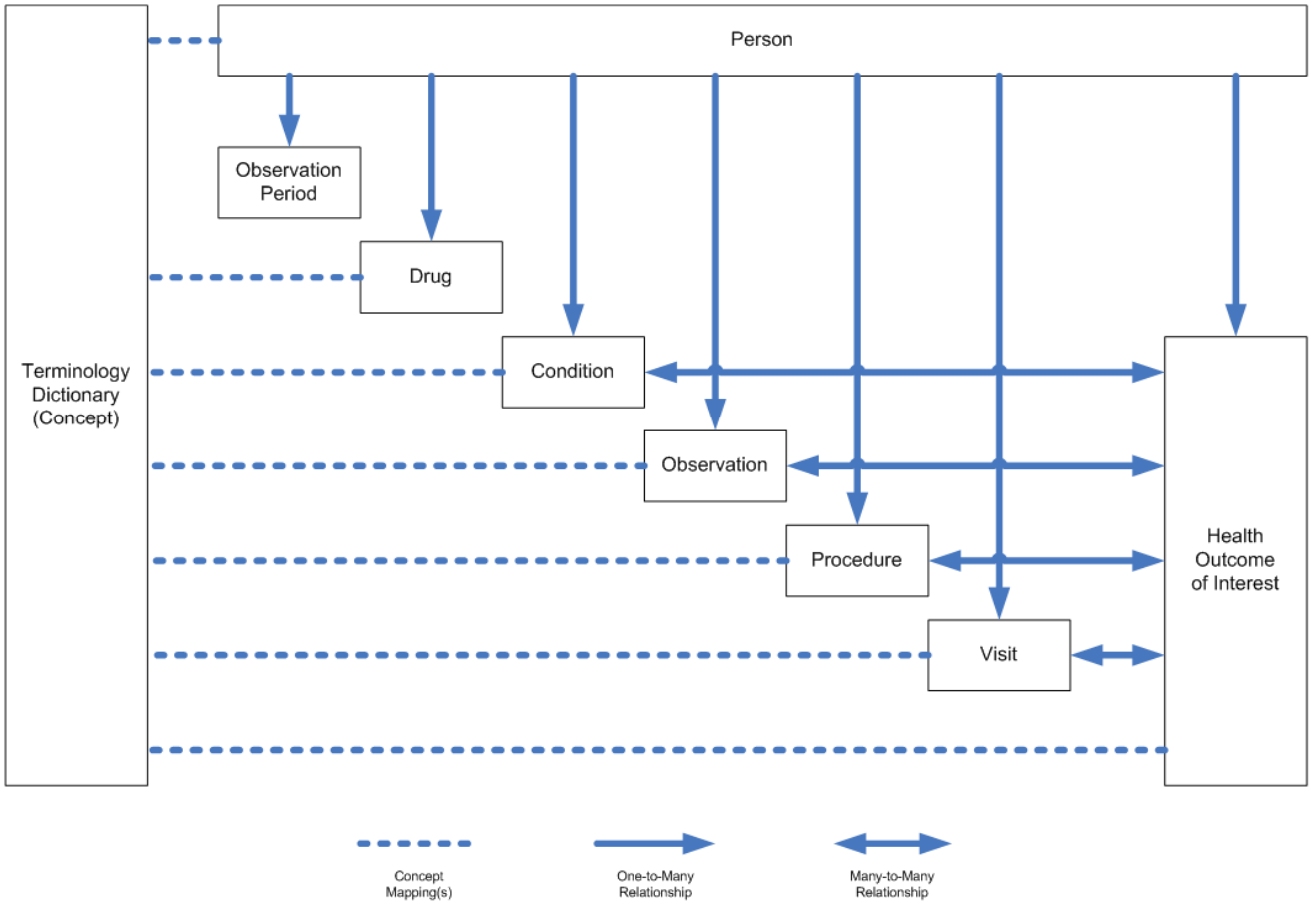
Establishing a common data model



- Developed with broad stakeholder input
- Designed to accommodate disparate types of data (claims and EHRs)
- Applied successfully across OMOP data community

http://omop.fnih.org/CDMandTerminologies

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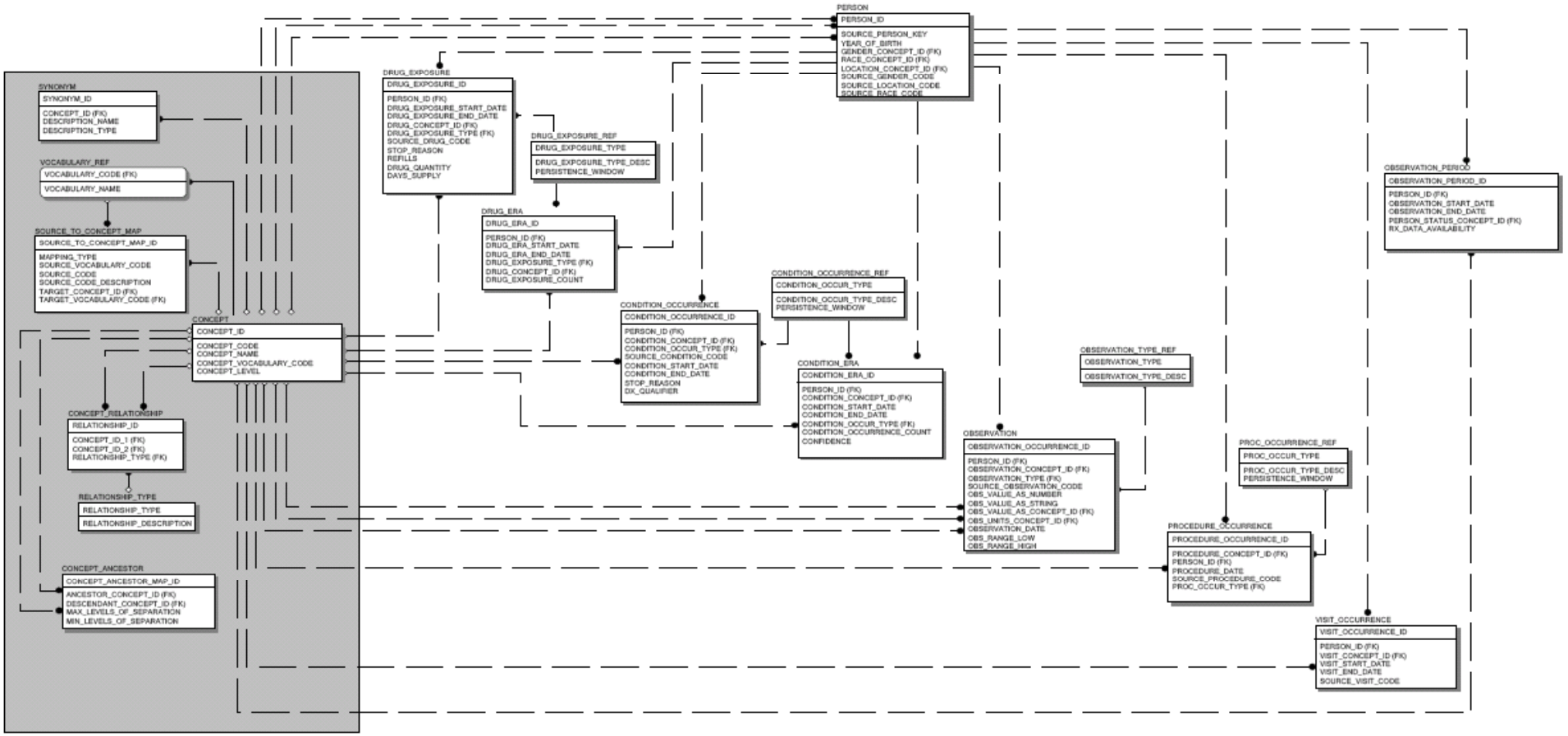
Common Data Model ER diagram



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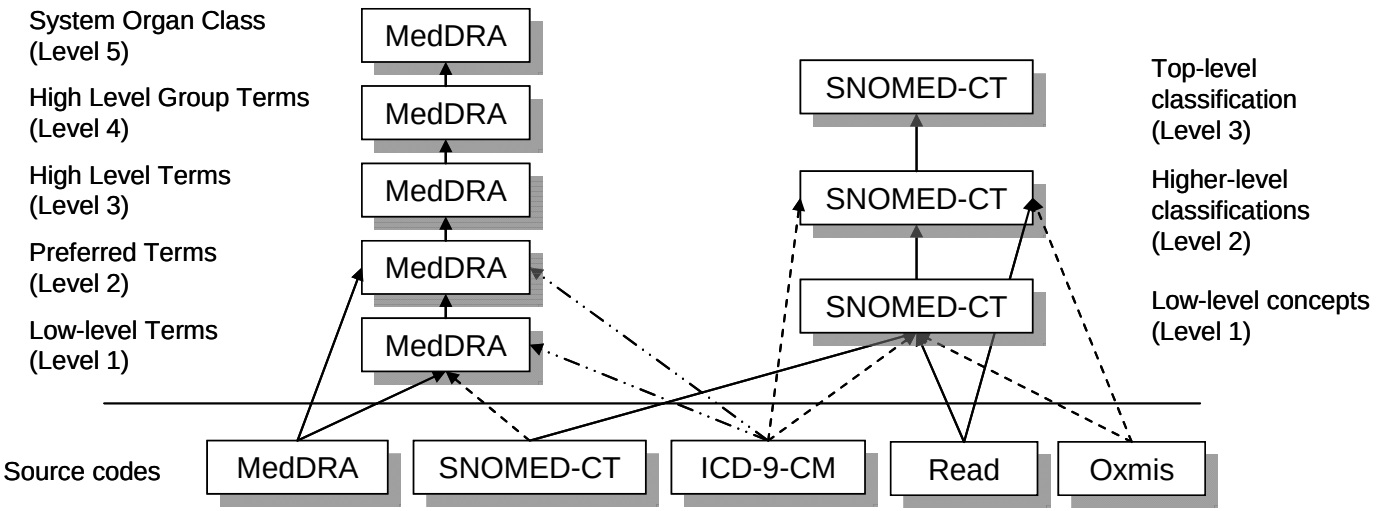
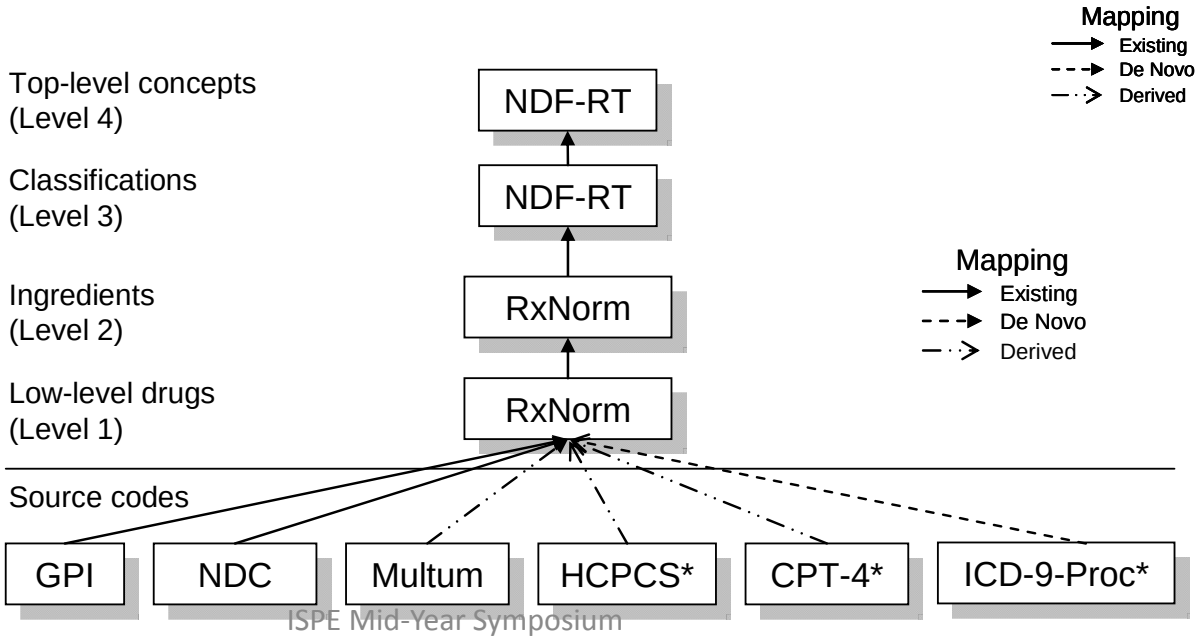
Standardizing terminologies to accommodate disparate observational data sources

Standardizing conditions:



Standardizing drugs:



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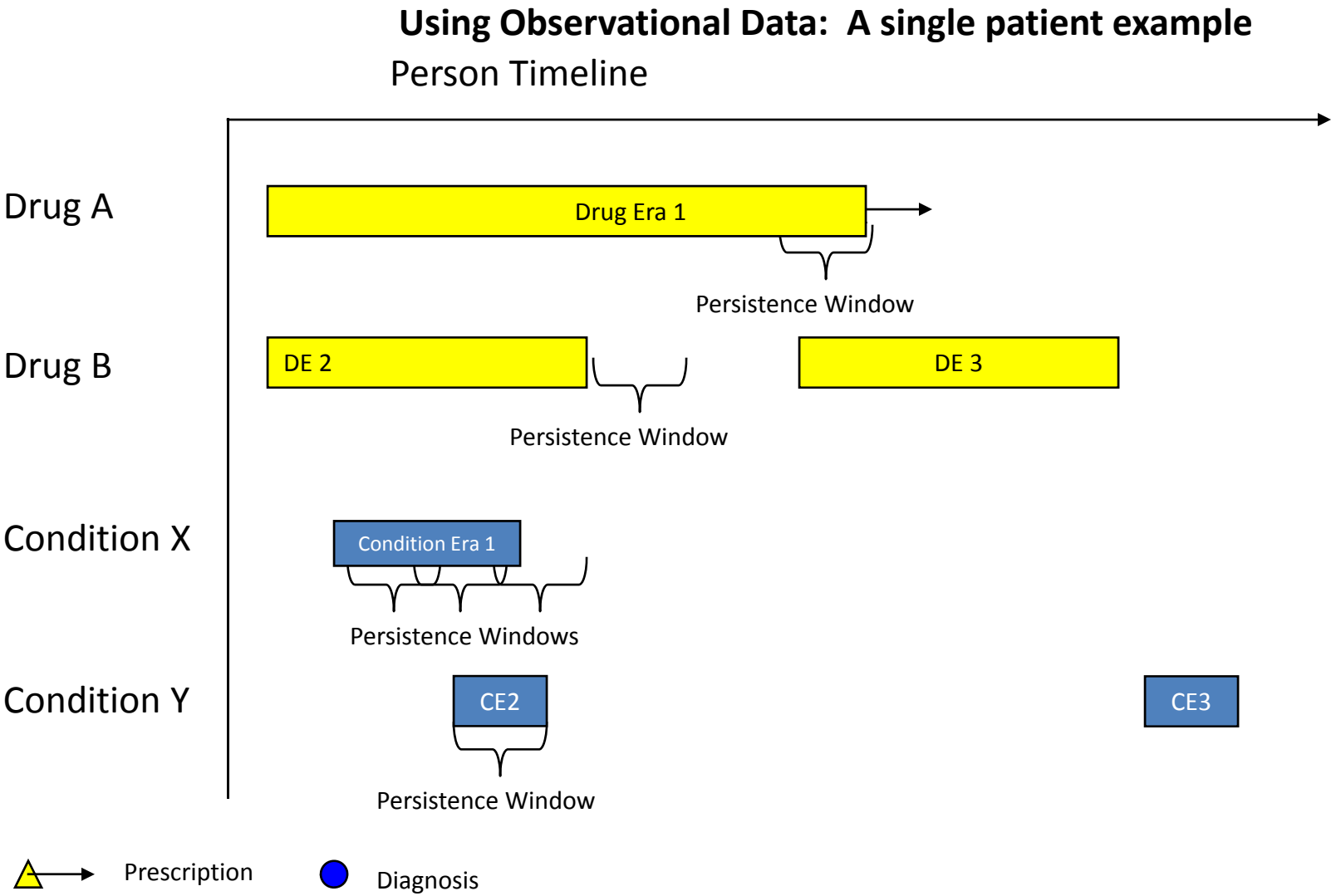
Constructing drug and condition eras



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Key principles in OMOP CDM design

A common data model should:

- ***accommodate*** and ***distinguish*** between data elements from disparate sources useful for active surveillance
  - Ex: DRUG_EXPOSURE table is used to store elements of different types that could be useful for defining medical product exposure
    - Pharmacy Claims: Prescription dispensings
    - Medical claims: Procedural administrations
    - Electronic Health Records: Prescriptions written, medication history
- be ***granular*** enough to store verbatim source data but ***extensible*** to allow standardized approach for drawing inferences from the source data
  - Ex: DRUG_EXPOSURE stores all prescription dispensing information (person identifier, source drug code (NDC), dispensing date, days supply, and quantity);
    DRUG_ERA infers period of exposure based on available information (e.g. end date = start date + days supply)
- be ***usable*** to stakeholders conducting analyses
  - Ex: Methods developers need to be able to implement efficient procedures for summarizing data and estimating drug-condition associations

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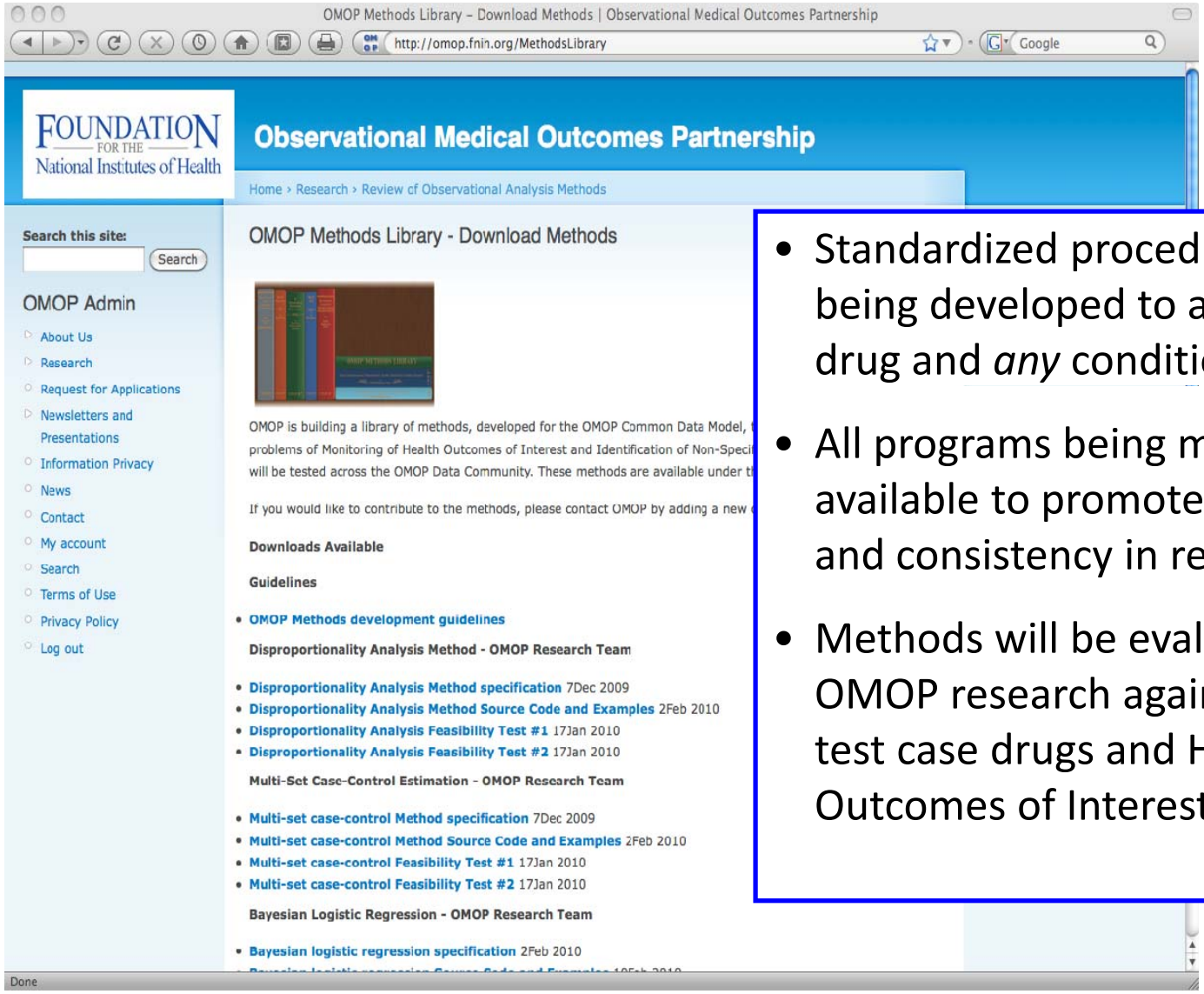
OMOP Methods Library



- Standardized procedures are being developed to analyze *any* drug and *any* condition
- All programs being made publicly available to promote transparency and consistency in research
- Methods will be evaluated in OMOP research against specific test case drugs and Health Outcomes of Interest

OMOP Methods Library at: http://omop.fnih.org/MethodsLibrary

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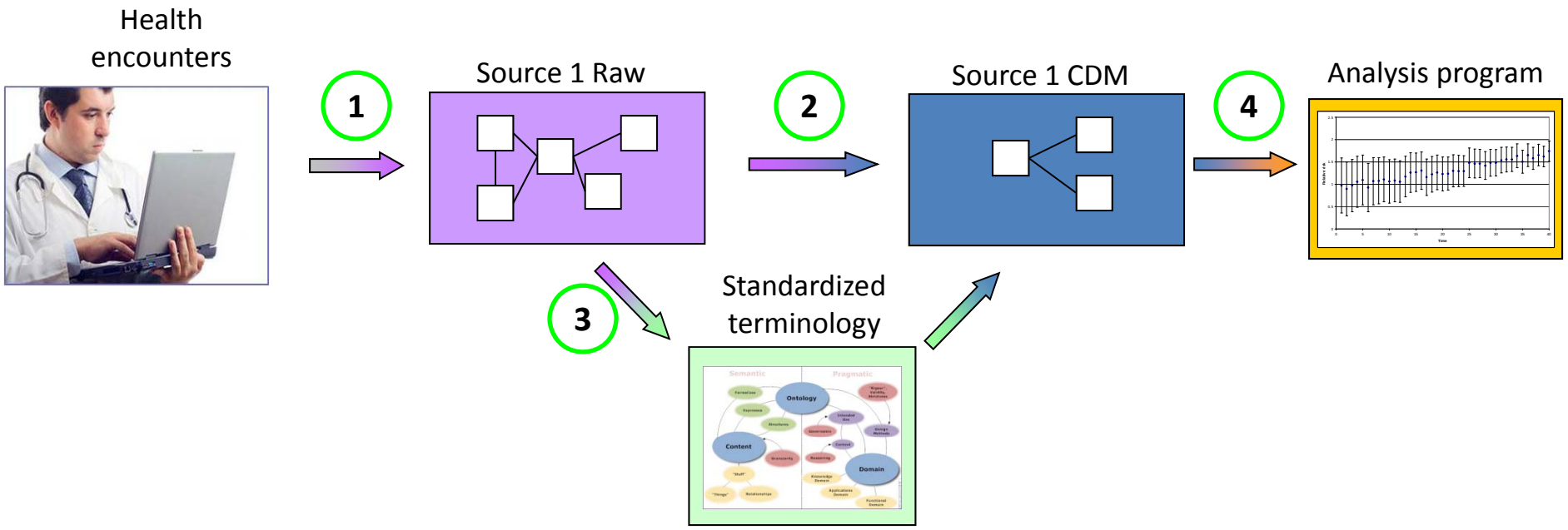
Validation throughout active surveillance



Goal: Establish a reproducible process that provides consistent and reliable analysis results to meaningfully inform drug safety monitoring

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Conclusions

- OMOP CDM successfully applied across OMOP data community
  - Accommodating disparate data sources (claims and EHR) from various data holders (payers, healthcare organizations, data aggregators, resource organizations)
- Methods and tools have been developed to enable drug safety research across a network of disparate data sources
- Common data model can enable a transparent, reproducible process for active surveillance analyses
- Outstanding need to establish a validated standard that can be truly 'common' for all stakeholders

FOUNDATION FOR THE National Institutes of Health

Thank you

http://omop.fnih.org