Development of a Common Data Model to Promote Interoperable Systems and Reuse of Public Health Data: The Utah Department of Health Case Study

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Objective

This poster presents the preliminary efforts at Utah Department of Health to create an extensible common data model, based on public health data within the framework of the Observational Medical Outcomes Partnership (OMOP) models, to promote public health data integration, population health analysis and use of public health data for translational research.

Problem and Proposed Solution

❑ Despite the increase push for data exchange within and between health departments **many health departments are experiencing challenges** in moving past data silos and creating the **envisioned** i**ntegrated/interoperable** health department.

❑ Most public health **information exists in many places**: vital record systems, individual case reports, data files and surveillance systems.

❑ These **disparate databases** have different logical organizations and physical formats, and the terminologies used to describe drug information or clinical conditions vary from source to source.

❑ The limited ability to **integrate**, **aggregate**, and **"harmonize"** data is challenge for the organization to fulfill the population-based missions of public health and requires:
  ❑ A flexible **common data model (CDM)**[1]
  ❑ **Mapping** of idiosyncratic **domains**, such as demographic information, to **standardized terminologies**

❑ A CDM allows shared data is to have **syntactic and semantic interoperability** through standardized terminologies such as ICD, NDC, SNOMED-CT, CPT, and LOINC.

Modifying OMOP Common Data Model To Meet The Needs of UDOH

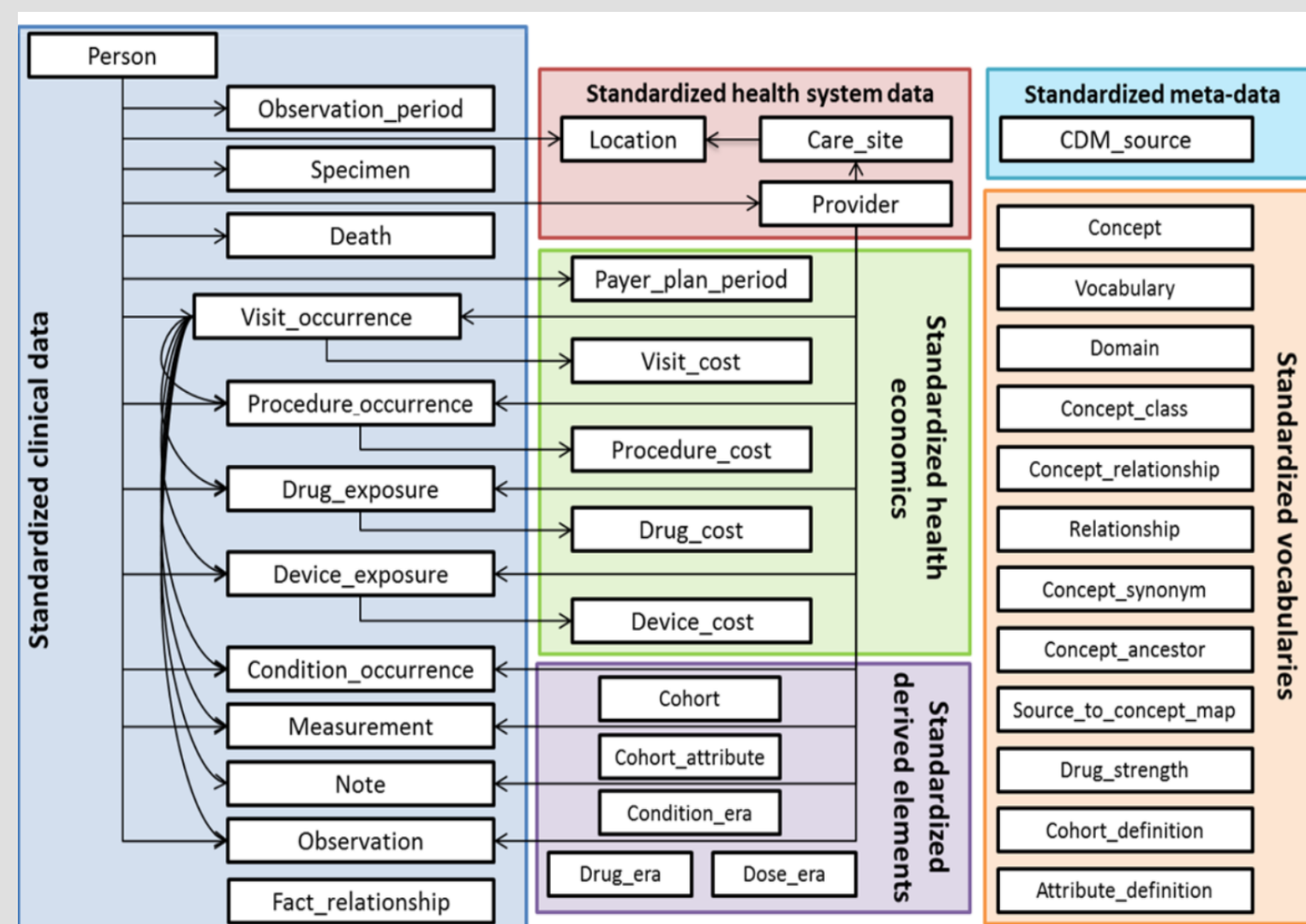### Figure 1: OMOP Common Data Model (CDM v5)[2]
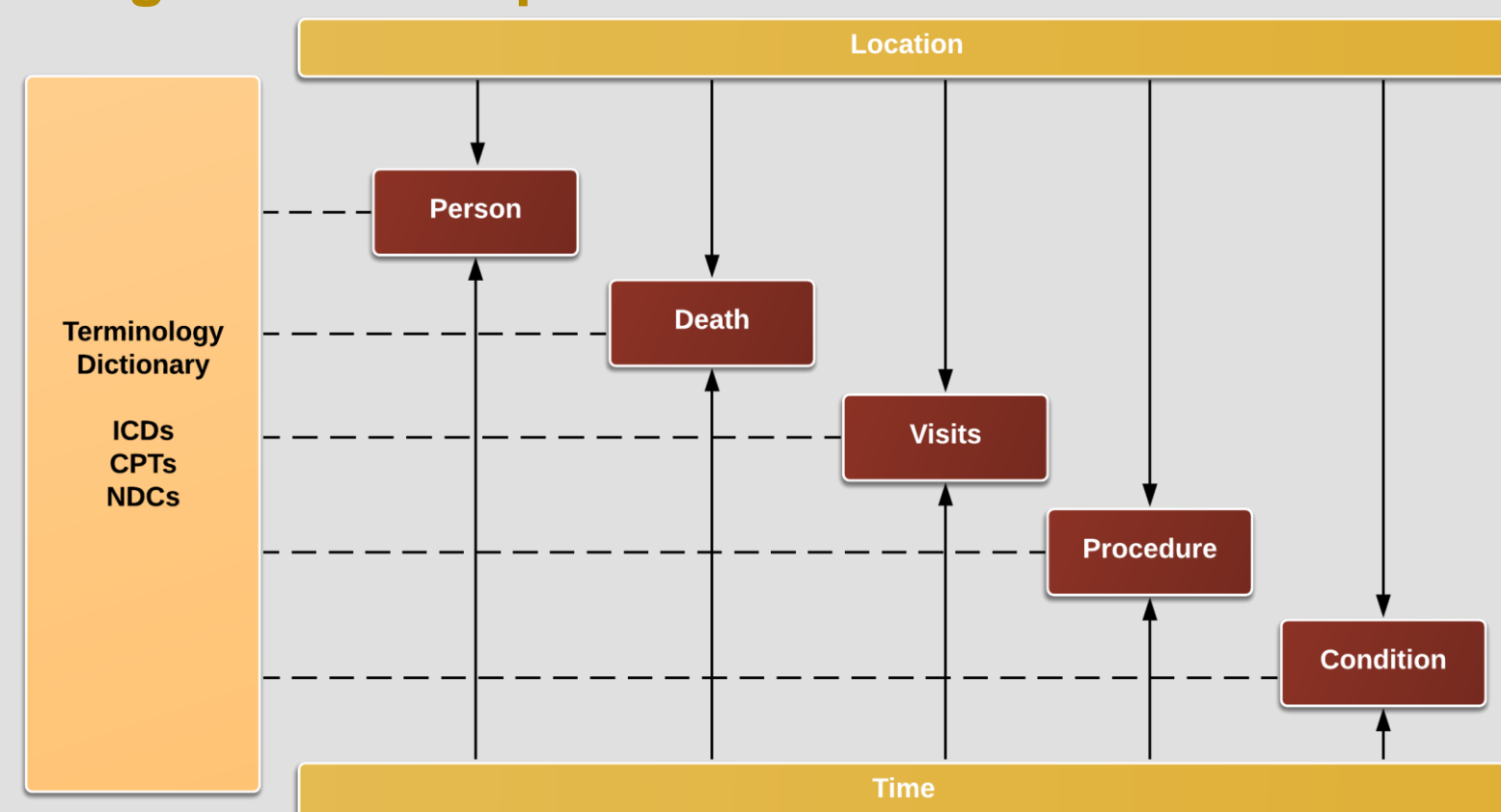

Figure 2: Example of Modification of OMOP

Table 1: Example OMP Vocabularies[2]

Domain	Type	Vocabulary
Demographic	Standard terminology	HL7 Administrative Sex
		OMB Ethnicity
		CDC Race
Drug	Standard terminology	RxNorm
		VA Class
		NDF-RT
		NDC
		FDA SPL
		FDB Drug Product
		VA Product
Condition	Standard terminology, classification	SNOMED-CT
	Mapped coding scheme	ICD-10-CM
		ICD-9-CM
Procedure	Standard classification	SNOMED-CT
	Standard terminology	ICD-9-Procedure
		HCPCS
		CPT-4
	Mapped coding scheme	ICD-10-PCS
Provider	Standard terminology	CMS Specialty
Visit	Standard terminology	OMOP Visit
		CMS Place of Service
Cost	Standard classification	MDC
	Standard terminology	Revenue Code
		DRG
		APC

Discussion

❑ OMOP schema provides many of the **necessary domains for many public health use**
❑ The model provides the ability to characterize and link **patients**, **practices**, **providers**, **encounters**, and other aspects of health care delivery.
❑ The health economic tables provides the ability to **map cost related data**, such as the All Payer Claims database (APCD) to this CDM.
❑ Some source tables, such as specimen, device exposure and notes were deemed irrelevant for public health data
❑ The root of the model was changed to be **more location and time-centric** (Figure 2). This change would improve it's use to analyze public health data.

Next Steps

❑ Continue modifying OMOP for public health use
❑ Validate final CDM through a series of use cases

References

1. Moiuddin, Adil. "Assessing the status and prospects of state and local health department information technology infrastructure." In *141st APHA Annual Meeting and Exposition (November 2-November 6, 2013)*. APHA, 2013.

2. OMOP Common Data Model Specification Version 5. [Accessed 2016-07-27]; https://github.com/OHDSI/CommonDataModel/blob/master/OMOP%20CDM%20v5.pdf

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