Building a Data Model for Healthcare Data Standards

UNC CHIP Learning Implementation Science team Internship Presentation

Se Min (Danny) Jin, 07 April 2022

Agenda

1. Introduction of the team and its goals
2. Background
3. Work Progress
4. Challenges

Learning Implementation Science Team

- Multidisciplinary team members with multiple projects
- Weekly meetings
- Goal
  - Build an online resource that demonstrates implementation in healthcare

Background

- Data Standards: "*principal informatics component necessary for information flow through the national health information infrastructure"*[1]
- Covid-19 pandemic emphasized the importance of health information exchange and healthcare data standards
- Ensures all systems be on the same page in storing, sharing, and interpreting information[2]

Background

- More than 40 accredited Standard Developing Organizations (SDOs)
  - HL7 (Health level 7 International) - HL7
  - NCDPD (National Council for Prescription Drug Programs) - HIPAA
  - IHTSDO (International Health Terminology Standards Development Organizations) – SNOMED CT
  - CDISC (Clinical Data Interchange Standards Consortium) - SDTM
- Newly developed and updated data standards
  - ICD-6,7,8a,9,10,11
  - SNOMED CT – Newer versions released every year

Purpose/Vision

- Build a database of healthcare data standards containing essential information for implementation
  - 4 dimensions of information

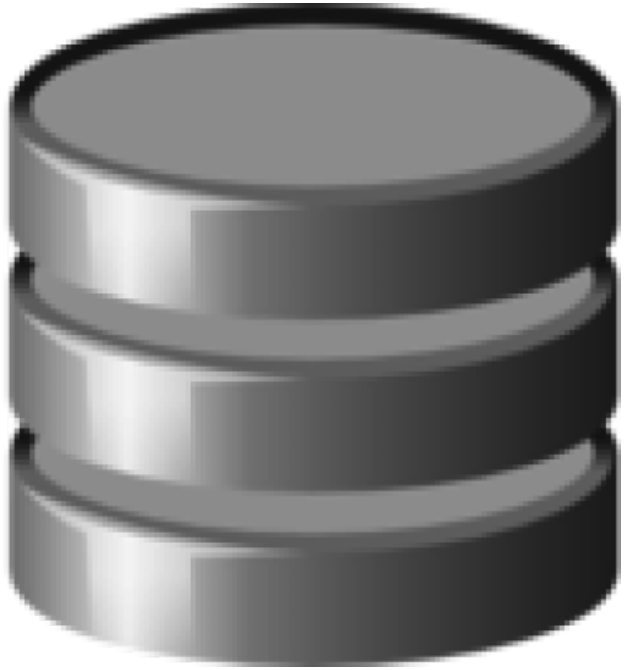
Definition	Who developed it and who maintains this standard?
Who uses it?	How to use it?

Work Progress

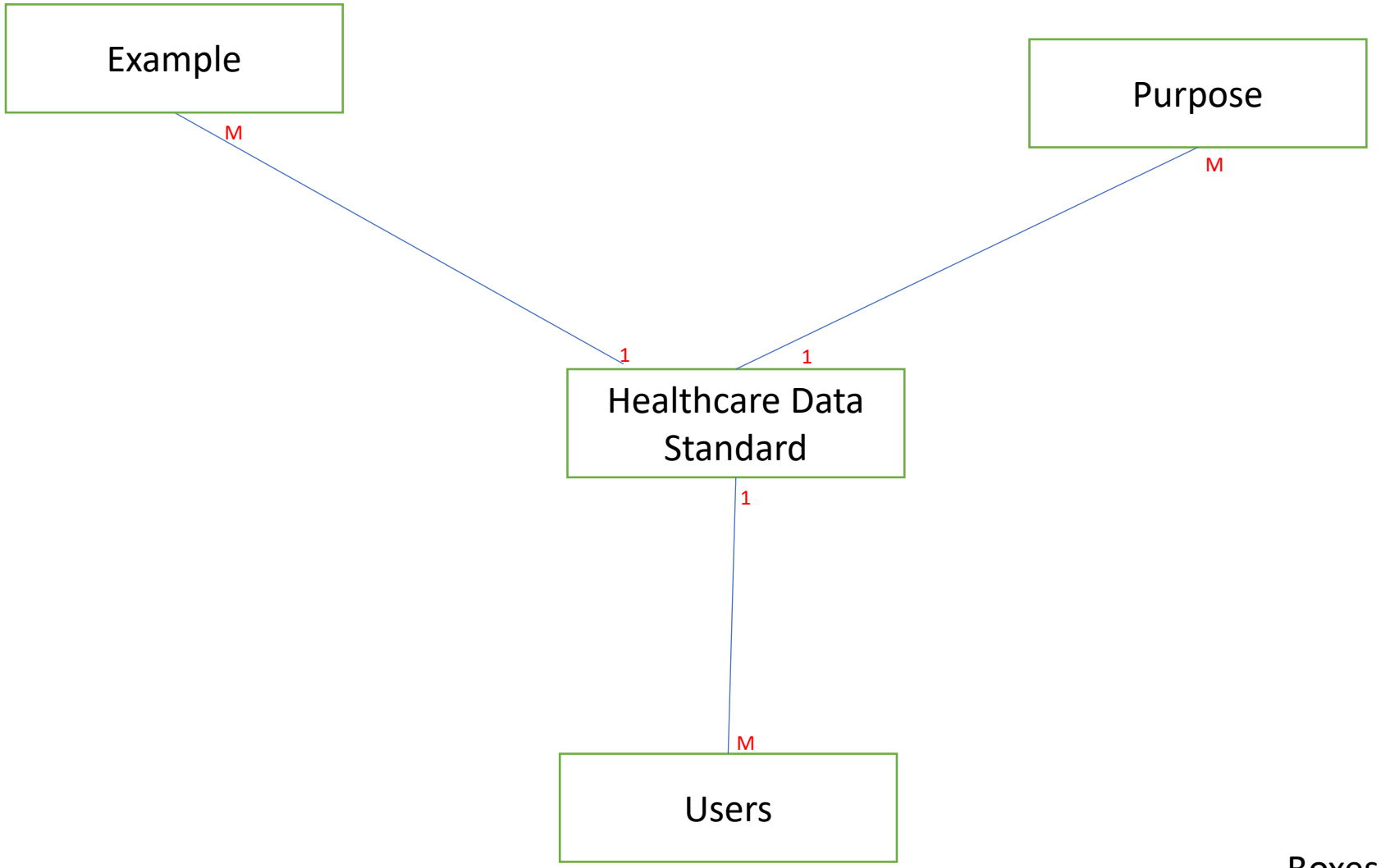
1. Research
2. Select Database engine
3. Build an Entity Relationship Diagram (ERD)
4. Develop Data Schema and Data Dictionary
5. Build Data Model using Database Engine
6. Insert Data or Content
7. Test - queries
8. Revise

Database Engine

- DB Browser for SQLite
  - Familiarity
  - Compact, portable, reliable
  - Serverless – for individual and local use
  - Open source
  - Free, and easy to use



Entity Relationship Diagram (Entities)



Boxes = Entities

User Perspectives (Developing User Profiles)

Research

- Clinical Researcher
- University Health Informatics Researchers

Hospital

- EHR Implementation Coordinator

Government Agency

- Public Health Agencies
- Policy Makers

EHR Vendor

- Systems Developers

Hospital
EHR Implementation coordinator

Which data standard does this EHR vendor use?	What kinds of data standards exist that can be implemented into our system for billing?
Which data standard do other hospital organizations utilize for billing?	Can these data standards be implemented together and interoperate in a single healthcare system?
What are the functionalities or capabilities of this data standard?	What are the technical requirements for this Data Standard?
Which EHR vendors utilize the C-CDA standard?	Does this data standard fulfill Meaningful Use Stage 2 (MU2) objectives?

Hospital
EHR Implementation coordinator

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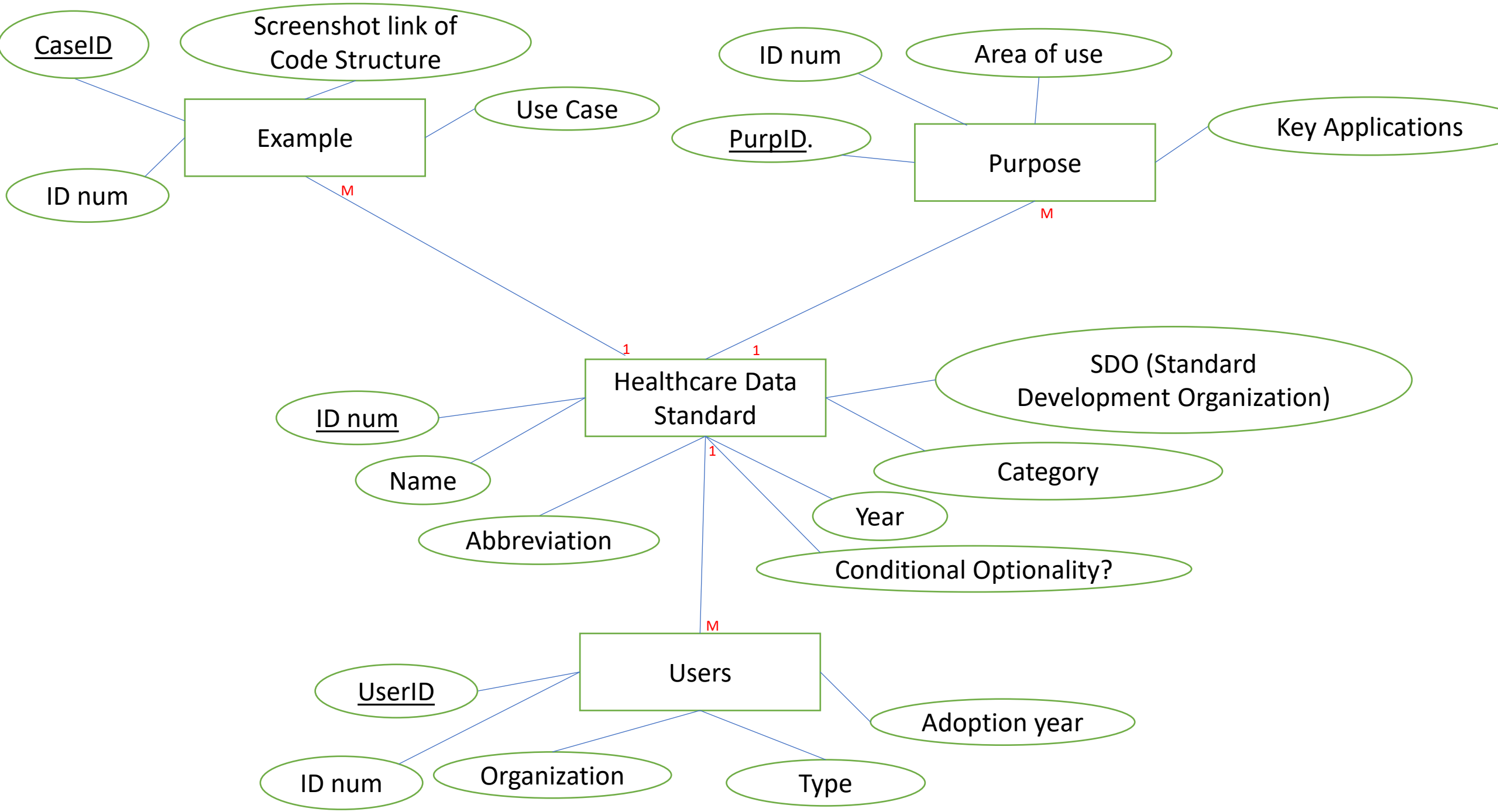
CaseID
Screenshot link of Code Structure
Example
Use Case
ID num
M
ID num
Area of use
PurpID.
Purpose
Key Applications
M
1
1
Healthcare Data Standard
SDO (Standard Development Organization)
ID num
Name
1
Category
Year
Abbreviation
Conditional Optionality?
M
Users
UserID
Adoption year
ID num
Organization
Type

Future Work

1. Research
2. Select Database engine
3. Build an Entity Relationship Diagram (ERD)
4. Develop Data Schema and Data Dictionary
5. Build Data Model using Database Engine
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7. Test - queries
8. Revise

Challenges

- Individualized project
- Weekly meetings
- Vague finish line

Questions?

References

1) Aspden P, Corrigan JM, Wolcott J, et al., editors. Patient Safety: Achieving a New Standard for Care. Washington (DC): National Academies Press (US); 2004. 4, Health Care Data Standards.Available from: https://www.ncbi.nlm.nih.gov/books/NBK216088/

2) Altexsoft. (2020, October 23). *Data Standards in Healthcare: Codes, Documents, and Exchange Formats*. Retrieved February 17, 2022, from https://www.altexsoft.com/blog/data-standards-healthcare/