OpenMRS Data model

Some context : OpenMRS & Bahmni

- OpenMRS - Open Medical Record System
- Key aspects of openMRS
  - Open-source
  - Big community of developers and contributors
  - Designed for resource-poor environments
  - Supports addition of new data items, forms and report without programming
- Bahmni
  - Adds a UI on top of openMRS
  - Stores data in openMRS database
- So it’s important to know and understand openMRS for a Bahmni implementer - at least the key entities!

What data would typically be recorded in a Medical Record System?

Data typically recorded in MRS

- Demographics details of Patient visiting hospital
- When all did patient visit hospital?
- History & Examination and other observations made by clinicians
- Lab results, drug orders, Radiology orders
- X-rays/Sonography/ECG images/videos?
- Basically all the clinical information that would be present in a patient file/folder

So, how does this data get stored in openMRS?

First a challenge - Lot of heterogeneity!

- 1000s of different lab tests
- 1000s of different drugs
- Millions of possible clinical questions and answers
- Different sizes of implementations
- Different nomenclature
- Not everything makes sense for everyone
- Can’t have column for everything!

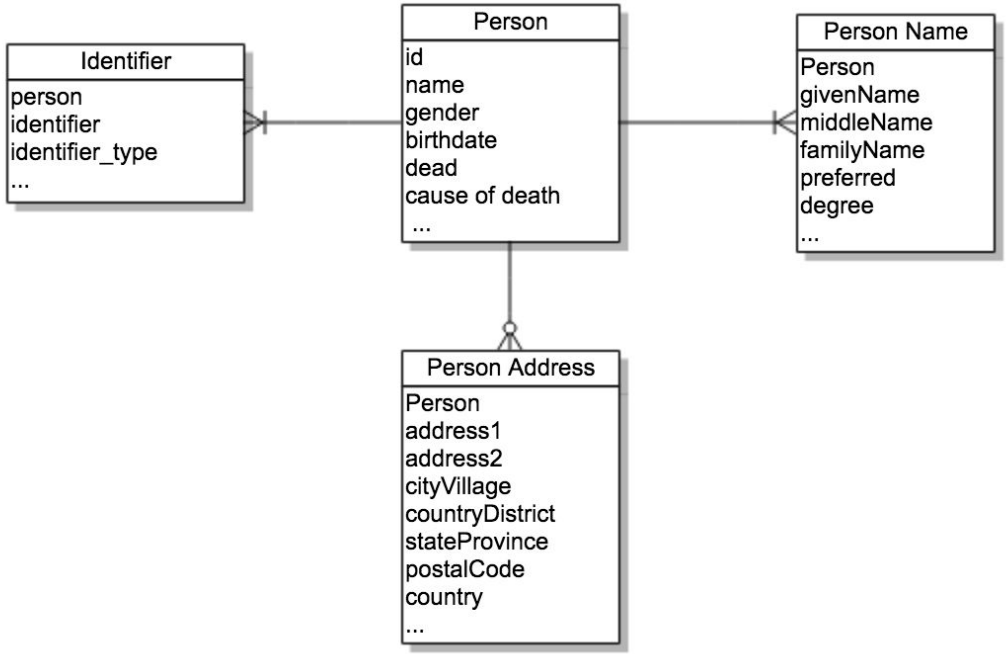
NEEDED - a flexible way to define own data elements and store them

OpenMRS caters to the need

Let's look at key entities

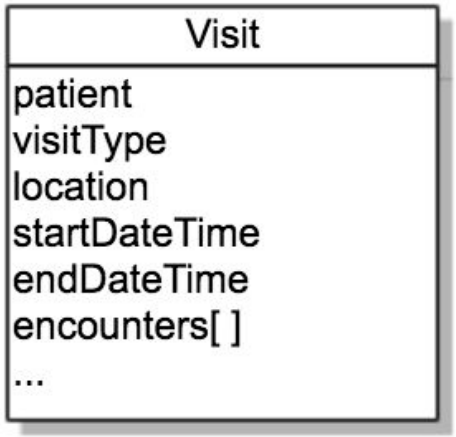
Patient Demographics

- Descriptive characteristic of person
- E.g. : Name, age, gender, address



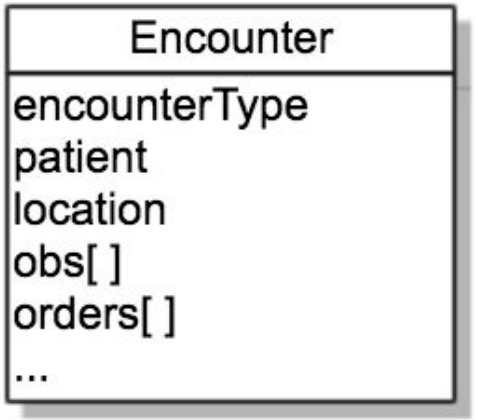
Visit

- A Visit in OpenMRS represents what it is in real life : a time period when a patient is actively interacting with a healthcare system, typically a location
- Visit could be of different types like OPD, IPD
- A visit contains **Encounters**, which contains more granular data about the interactions in the visit



Encounter

- A single specific interaction between the patient and provider
- E.g :
  - Patient visiting a hospital
  - patient meeting a doctor
  - doctor visiting a patient
  - laboratory test
- Data filled on a physical form/s during any such interaction can be considered as the data captured against an encounter in openmrs



Visit vs Encounter

Visits

- Patient
- Visit Type
- Location (optional)
- Start Date Time
- End Date Time
- Contains **Encounters**

Encounter

- Patient
- Encounter Type
- Location (optional)
- DateTime
- Providers
- Contains **Observations, Orders**

Observations

- Anything observed / measured / recorded during an encounter
- E.g:
  - Patient’s height, weight, BMI
  - History and Examination details of patient
  - Finding from a X-ray, ECG, sonography
- Flat schema - show table and data

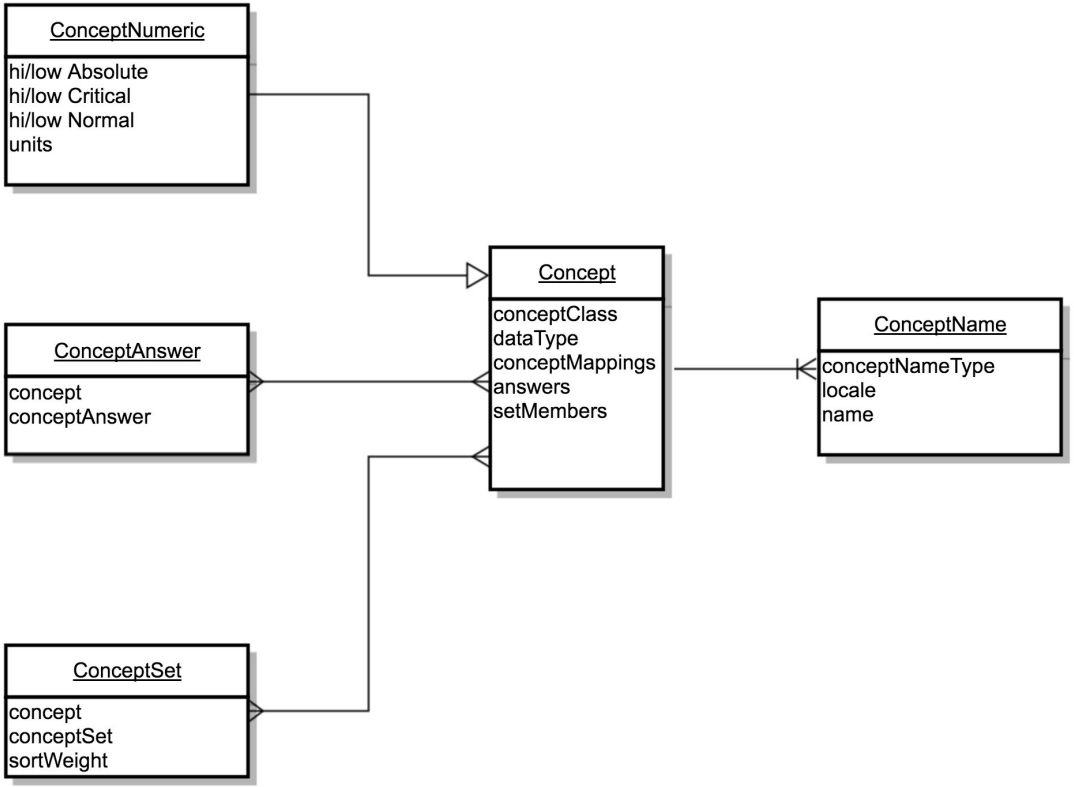
Concept

- Basic element to represent questions and listed answers
- Imagine a printed form in a hospital. Everything printed on the form can be considered a concept

Concept Definition

- UUID
- Fully specified name
- Shortname
- Class
  - E.g. : Diagnosis, Radiology Order, Procedure
- Datatype
  - Numeric
  - Text
  - Boolean
  - Date
  - Coded
  - N/A
- IsSet & Set Members

Concept Composition

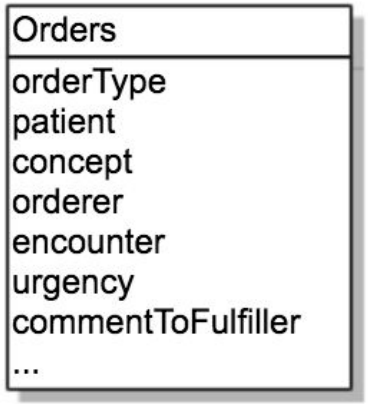


Concept Dictionary

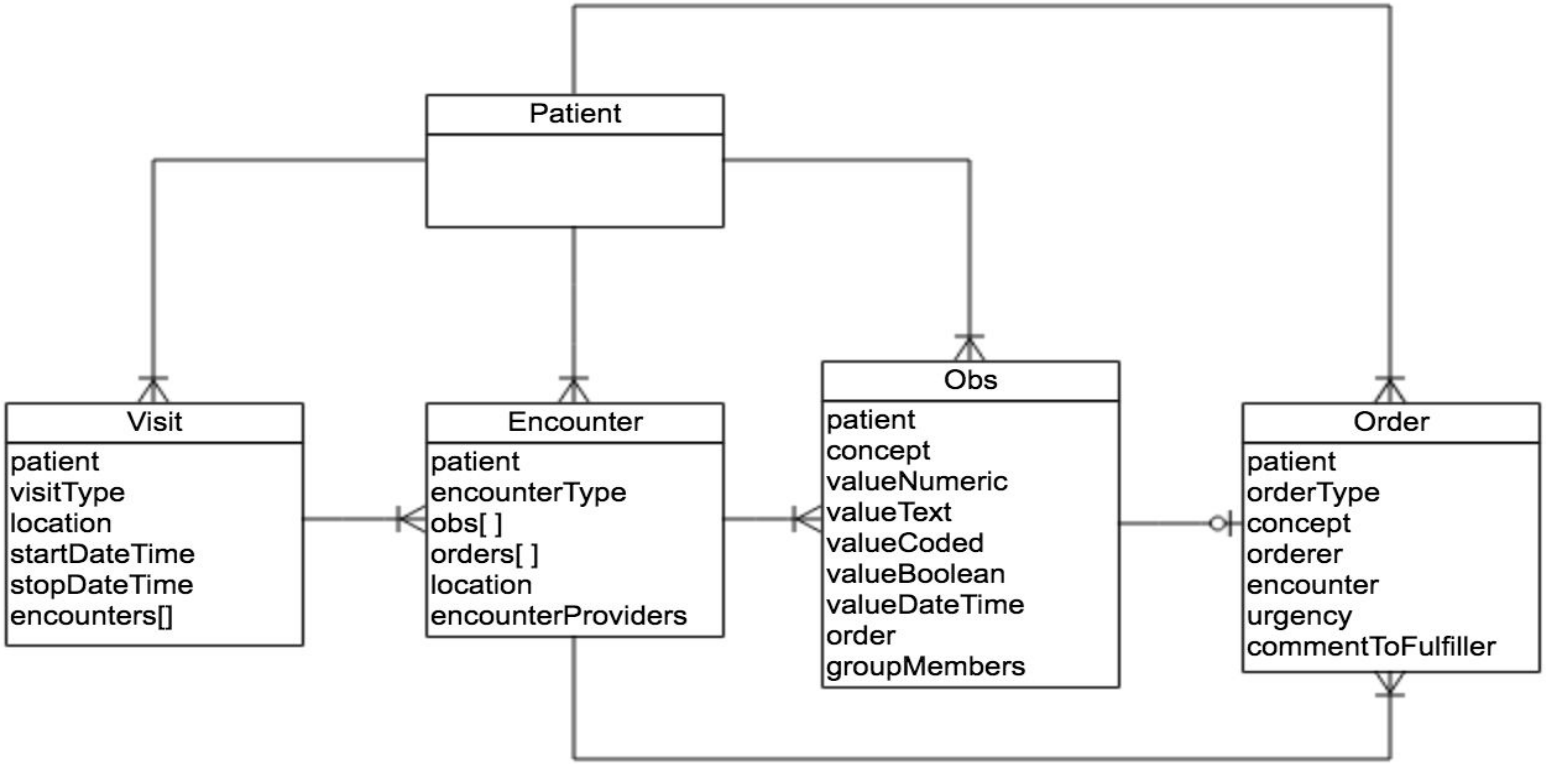
- Heart of every OpenMRS implementation
- Defines the medical concepts needed in forms, orders, reports, etc
- Open Dictionary - easy to expand and evolve
- Provides flexibility to implementations
- Helps in standardising the vocabulary within the facility

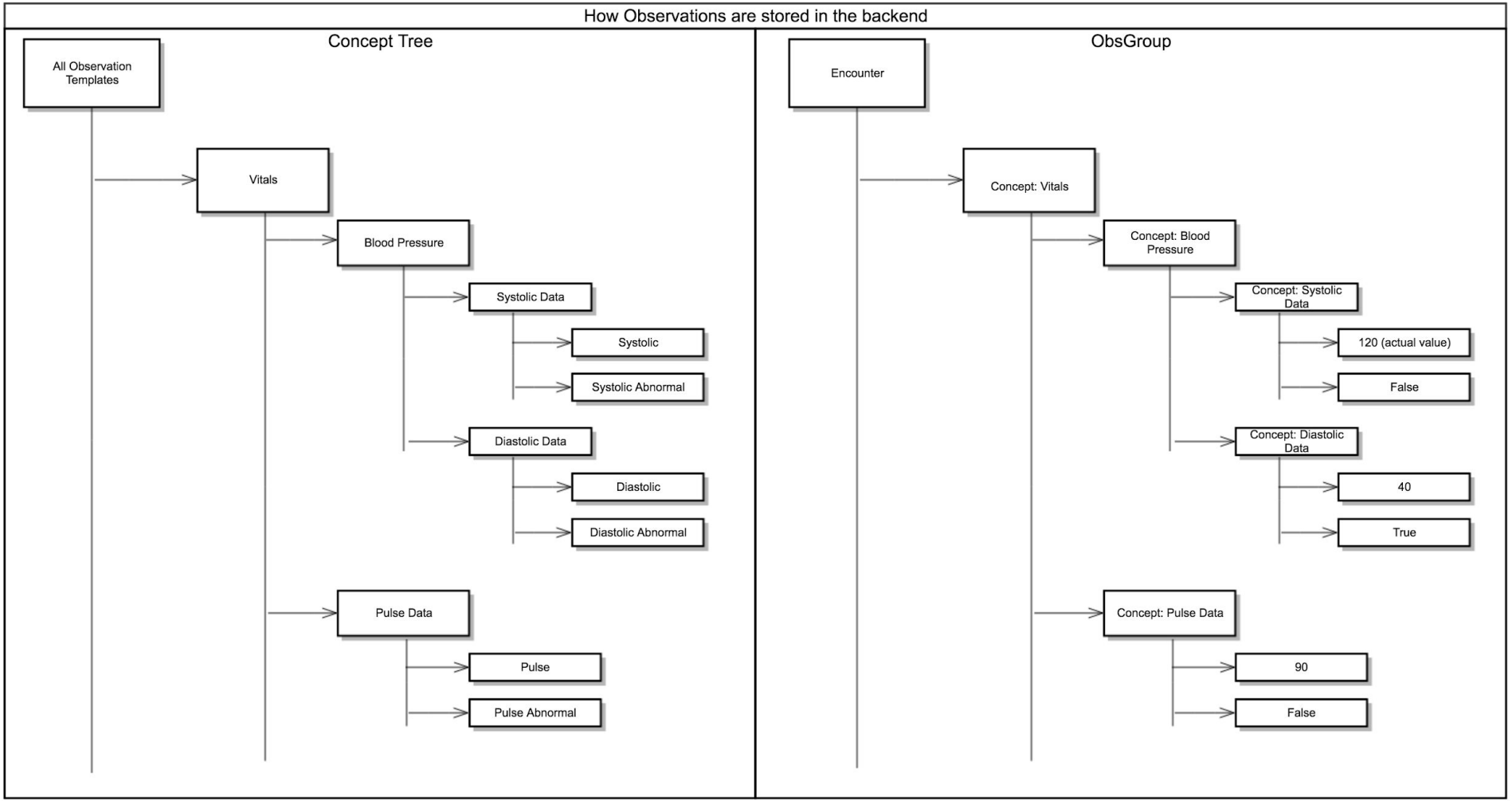
Orders

- Drug Orders
- Lab Orders
- Radiology Orders
- Procedure Orders
- Misc Orders



Bigger Picture - How this entities play together to store clinical transactional Data




How Observations are stored in the backend
Concept Tree
All Observation Templates
Vitals
Blood Pressure
Systolic Data
Systolic
Systolic Abnormal
Diastolic Data
Diastolic
Diastolic Abnormal
Pulse Data
Pulse
Pulse Abnormal
ObsGroup
Encounter
Concept: Vitals
Concept: Blood Pressure
Concept: Systolic Data
120 (actual value)
False
Concept: Diastolic Data
40
True
Concept: Pulse Data
90
False

Users, Roles & Privileges

- New users, roles and privileges can be defined in openMRS
- Users can be assigned one or more roles
- Roles
  - composed of privileges
  - Can inherit from other roles
  - E.g : Doctor, Nurse, RegistrationClerk, Registration, app:billing
- Privileges
  - E.g. : View Orders, Save Orders, View Dashboard, app:billing

https://bahmni.atlassian.net/wiki/spaces/BAH/pages/48889893/EMR+Security+and+Access+Control+OpenMRS

That’s it for now!