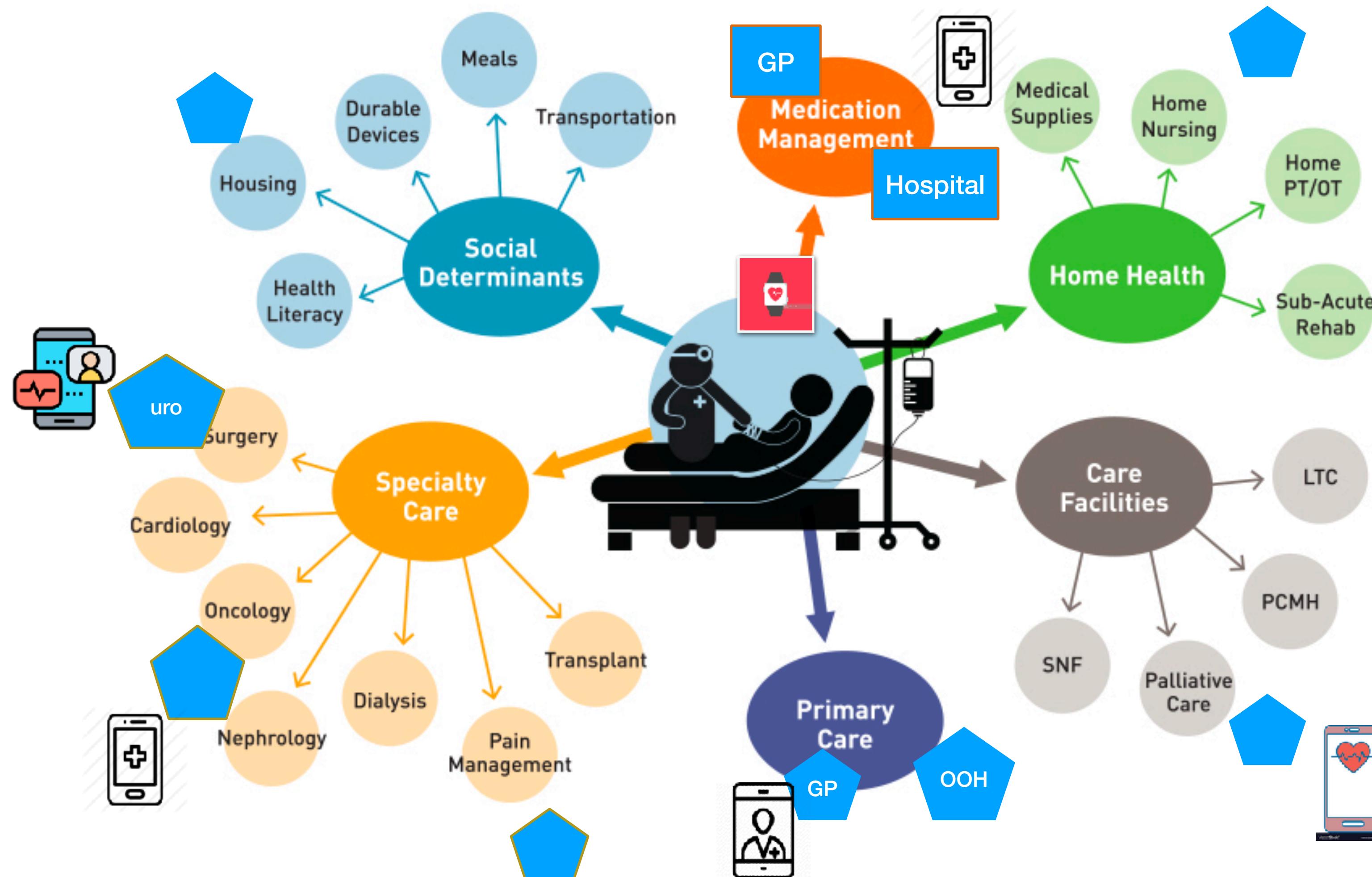


# openEHR Archetypes: Overview

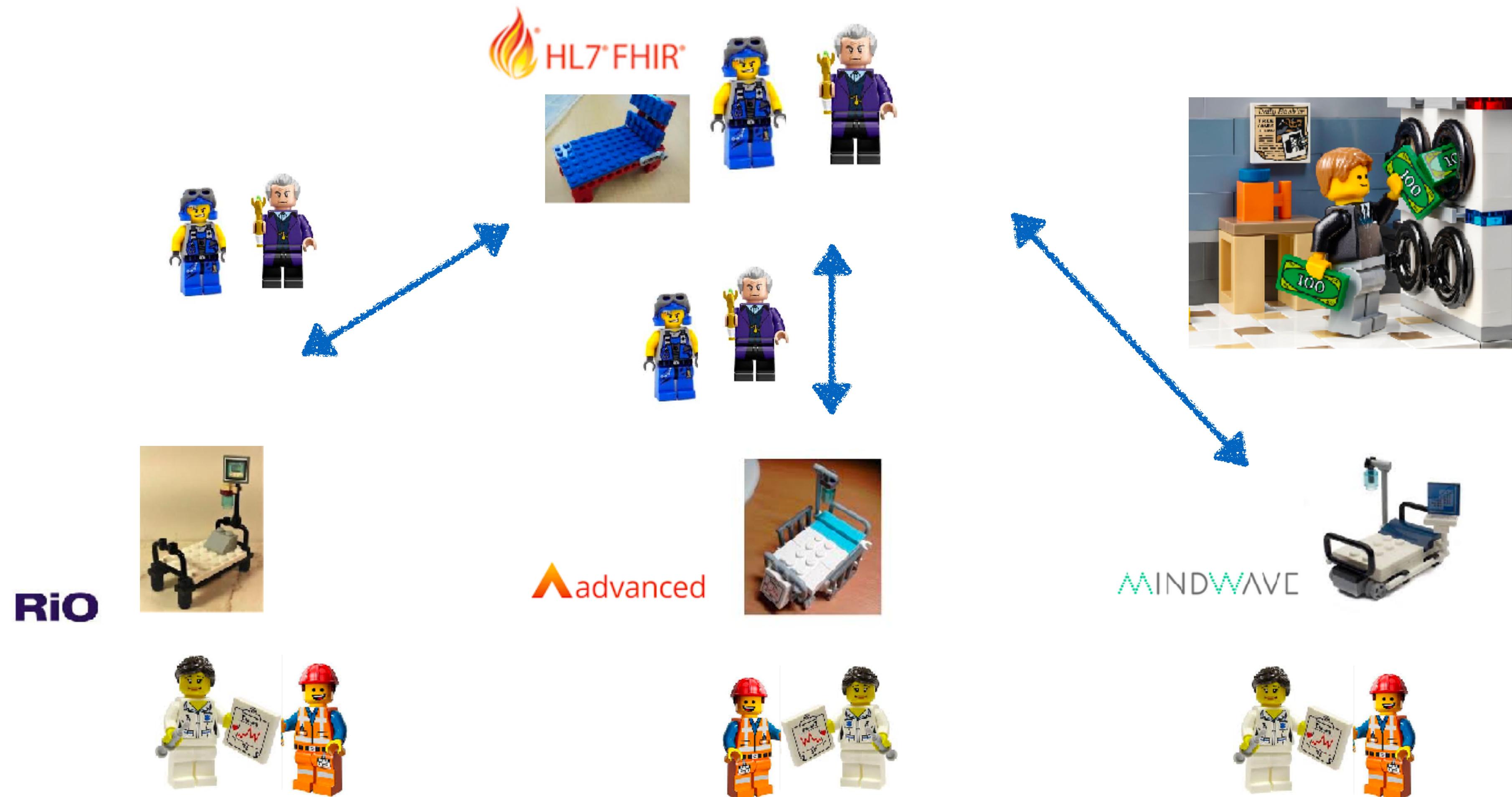
# What do we actually want ? A patient-centred coherent information system?

openEHR



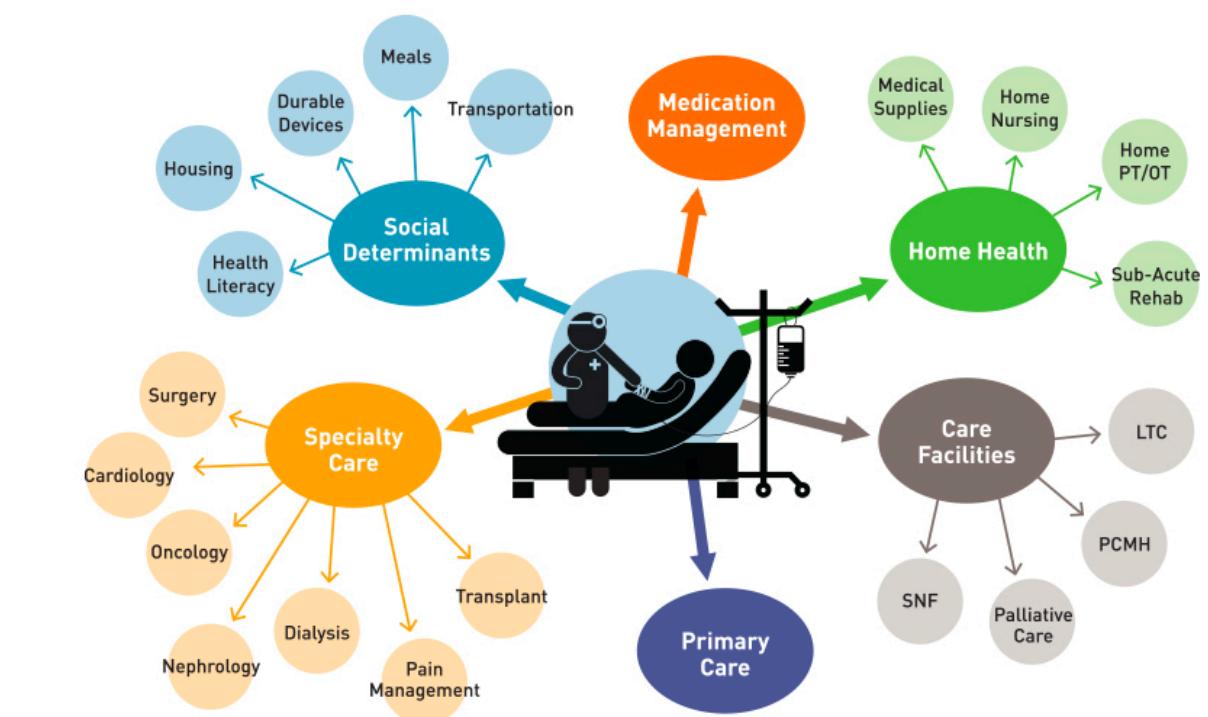
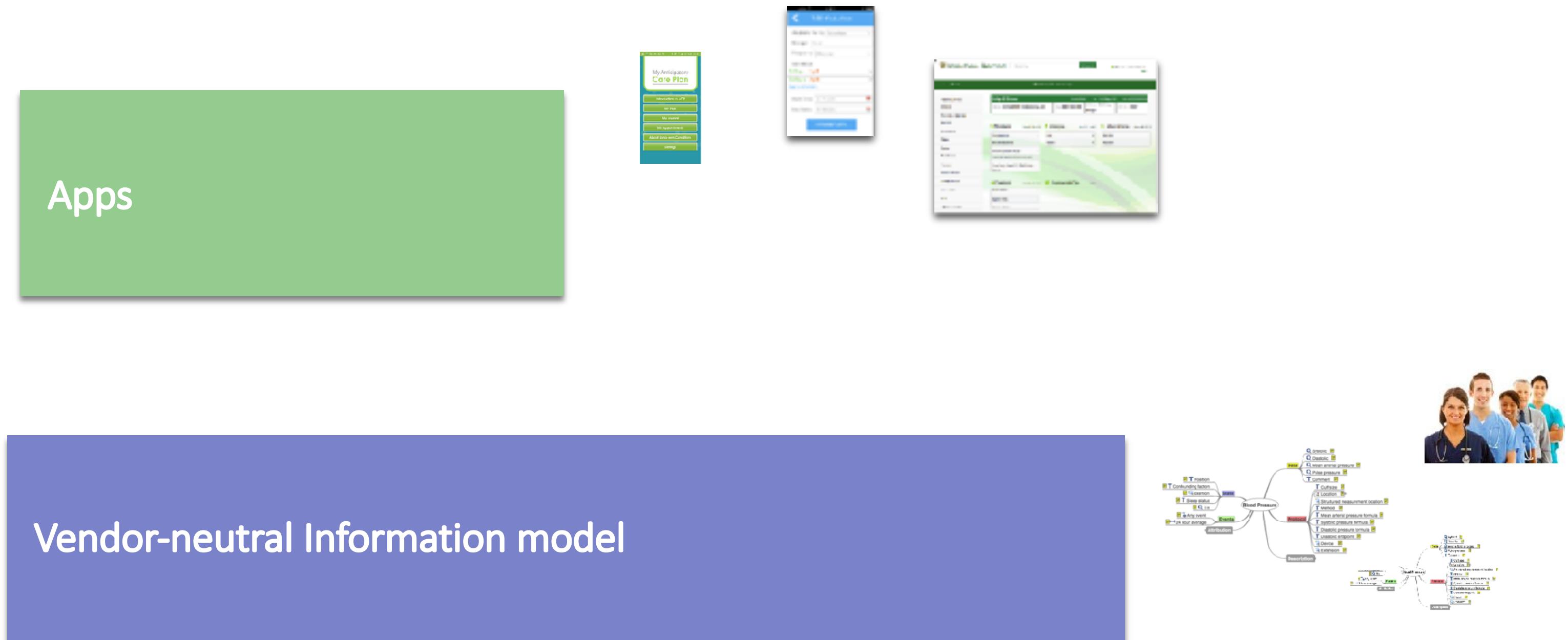
# B. Best of Breed - ‘interoperability’

*open*EHR



# C. open Platform - vendor-neutral

# *open*EHR



# *open*EHR

# Technology-neutral datastore (CDR)

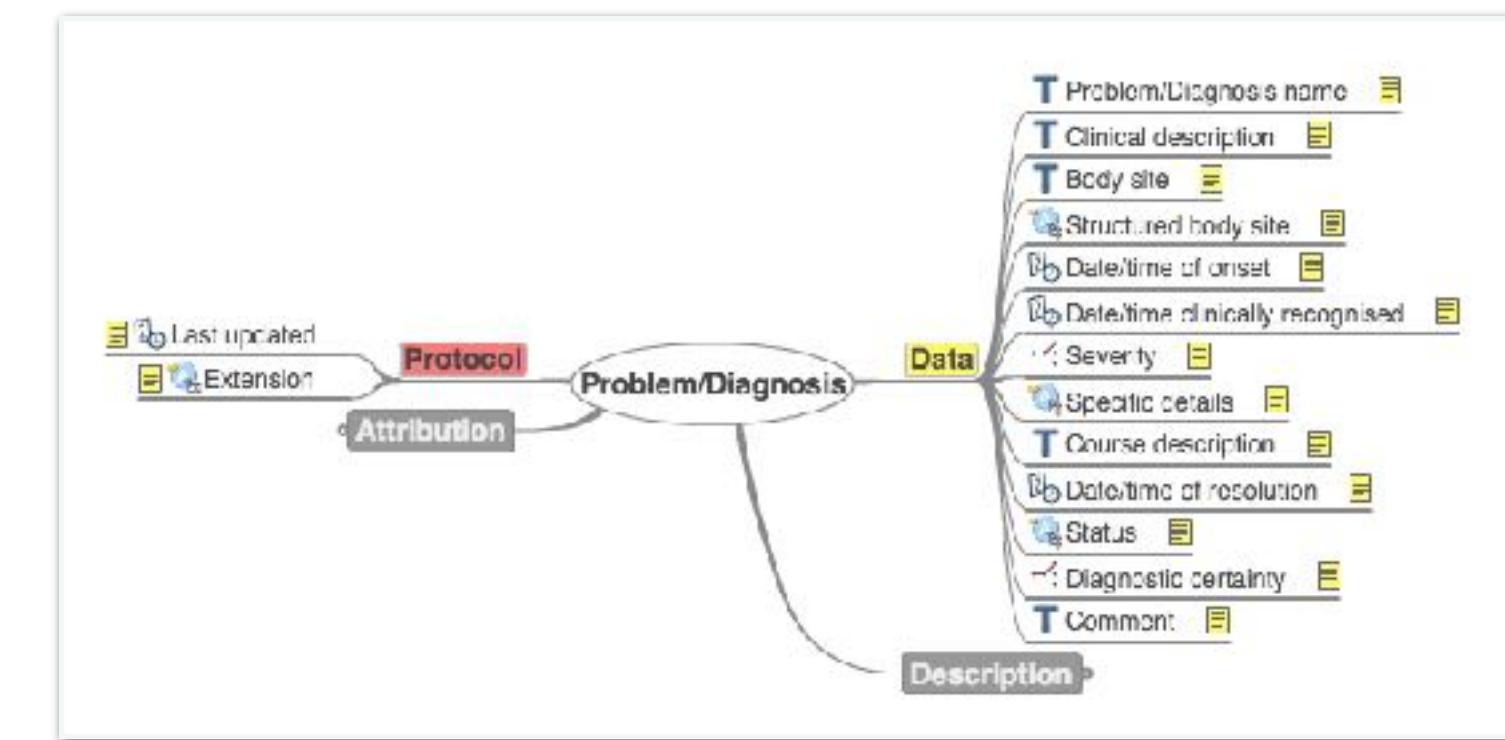


 CaboLabs



# openEHR Archetypes

- Computable models of discrete clinical concepts
  - Familiar components of a health record
    - Blood pressure, Body weight, Symptom
    - Medication order, Family history
  - ‘Maximal dataset’ philosophy
    - Capture as many clinical perspectives as possible



Problem/Diagnosis, Published Archetype [Internet]. openEHR Foundation, openEHR Clinical Knowledge Manager [cited: 2016-03-09]. Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.169](http://openehr.org/ckm/#showArchetype_1013.1.169)

# openEHR Templates

openEHR

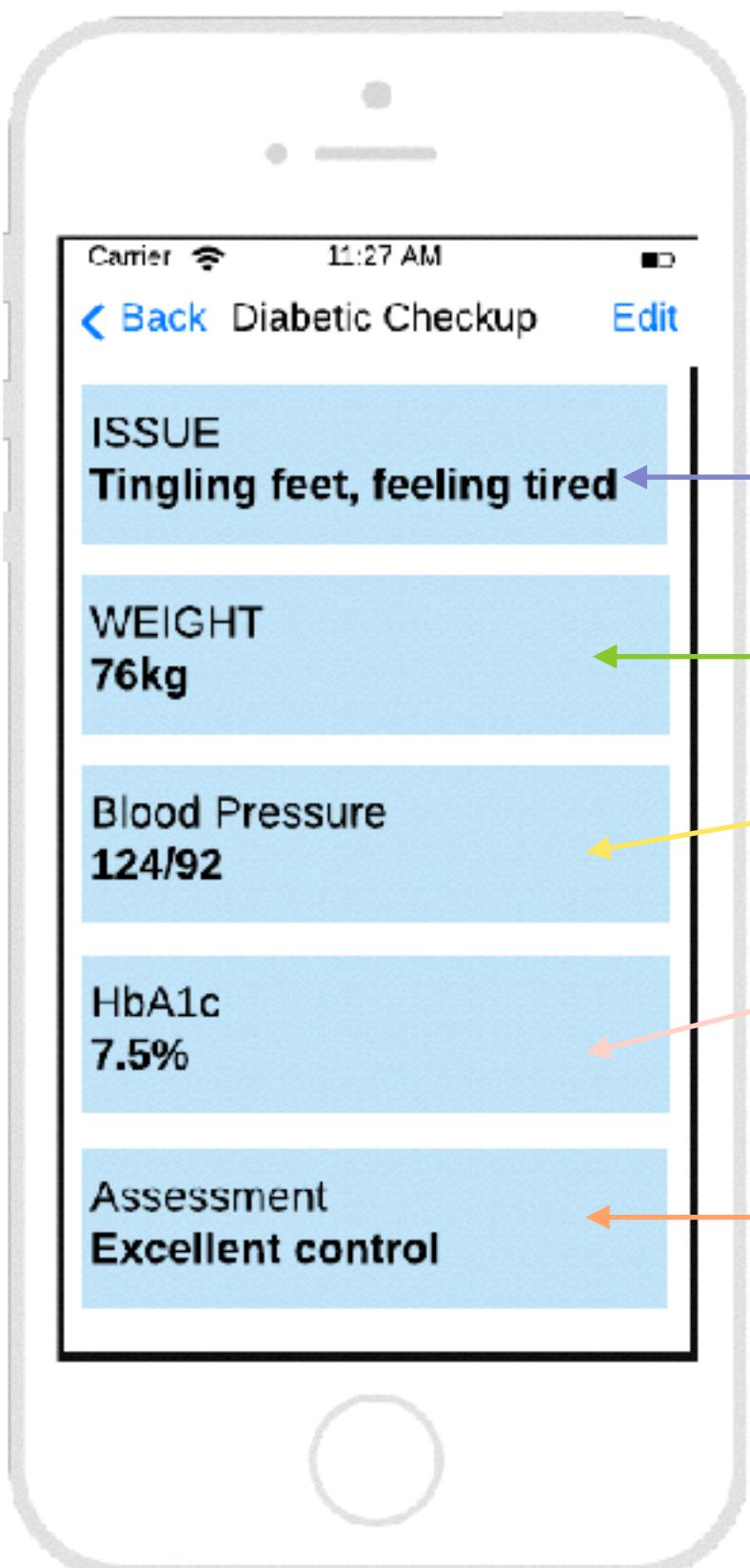
- Computable models bringing together component archetypes
  - create a dataset for a particular clinical context or purpose
  - adjust component archetypes to make them 'fit for purpose'
    - make items mandatory
    - remove unwanted items
    - set default values
    - create terminology mappings
  - In practice, creating a dataset to underpin
    - data entry / message / interface definitions

The screenshot shows the openEHR template editor interface. At the top, there's a header for 'The Princess Alexandra Hospital NHS Trust'. Below it is a 'Social Situation' form with various sections like 'Information from', 'Lives', 'Property Owner', 'Type of Property', 'Step/ Stairs', 'Layout', 'Equipment in situ', 'POC', 'Key safe', 'Safeguarding Concerns', and 'Baseline Mobility'. To the right of the form, there are tabs for 'Herts' and 'Essex'. Below the form, a detailed view of the 'Current COVID Status' archetype is shown, listing fields such as 'Report ID', 'Status', 'content', 'Current COVID Status', 'Problem/Diagnosis', 'Diagnostic certainty', 'Last updated', 'Isolation Status', 'Service request', 'activities', 'Current Activity', 'description', 'Service name', 'Reason for request', 'Reason for isolation', and 'Complex timing'. On the right side of the editor, there are panels for 'Details', 'Annotations', 'Rm Attributes', 'Terminology', 'Add valueset', 'Default value', and 'Code'.

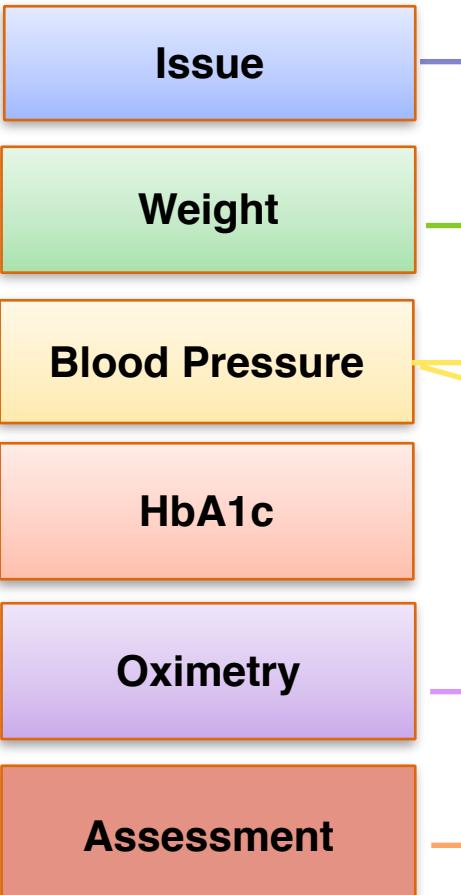
# Archetypes and templates

openEHR

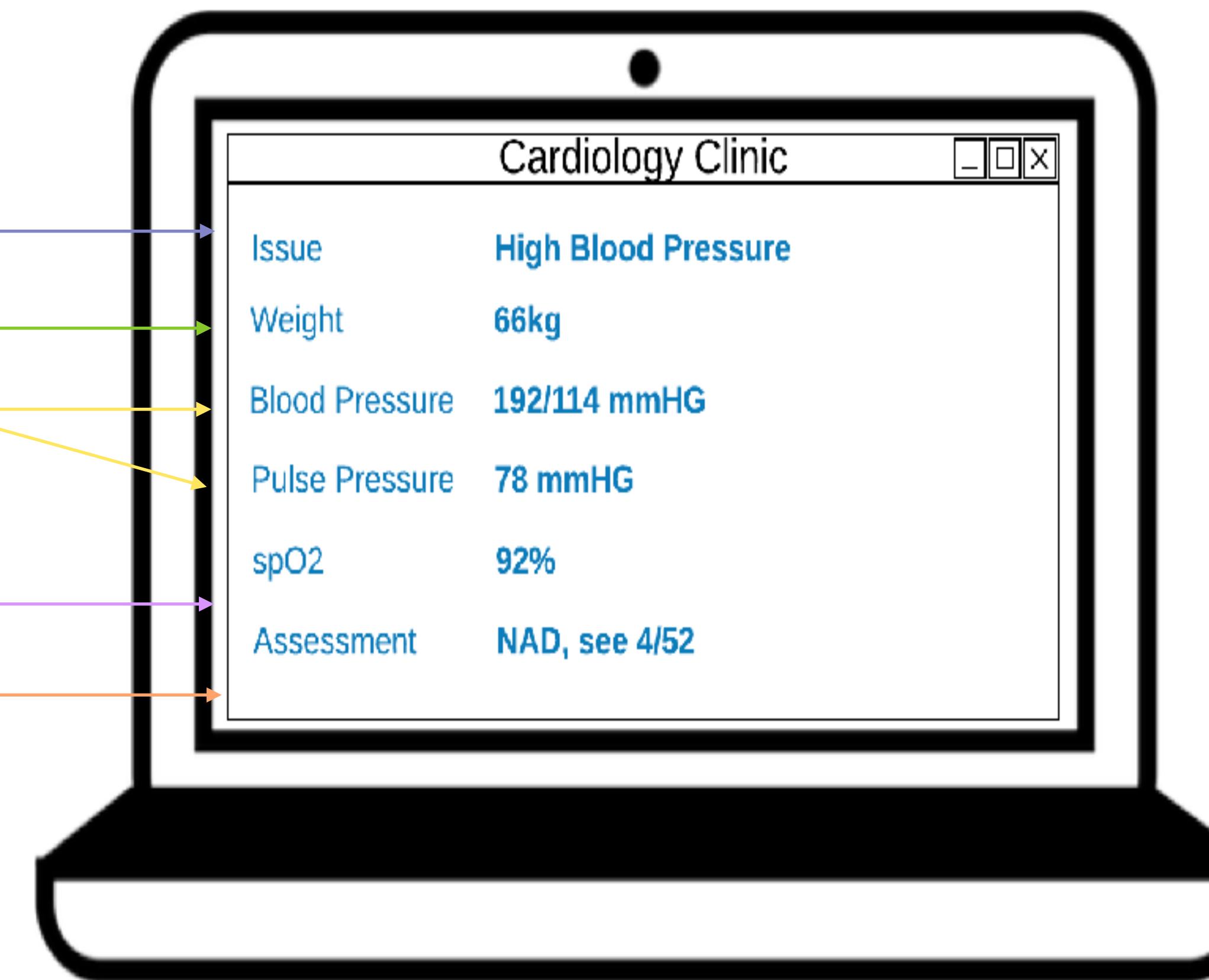
Template underpinning application



Archetypes used in template



Template underpinning application



# openEHR clinical modelling

*open*EHR

**Archetype Designer**   [Repositories](#)   [Save](#)   [Export](#)   [Import](#)

NWIS/DHI - Cancer Care   NWIS-Myeloma.v.0.0 x

NWIS-Myeloma.v.0.0 ([openEHR-EHR-COMPOSITION.encounter.v1](#))

Definition   Description   Analytics

Myeloma MDT

Myeloma MDT NAME (from: 'Encounter')

- ⊖ → context
- ⊖ → other\_context
- ⊖ Extension
  - ⊖ WCRS Metamodel Δ [0..\*] to [0..1] NAME (from: 'XDS Metadata')
- ⊖ → content
- ⊕ MDT Summary
- ⊖ Problems and diagnoses
  - ⊖ → items
  - ⊖ Primary diagnoses
    - ⊖ → items
    - ⊖ Problem/Diagnosis
      - ⊖ → data
      - T Primary cancer site NAME (from: 'Problem/Diagnosis name')
      - T Clinical description Δ [0..1] to [0..0]
      - T Body-site Δ [0..\*] to [0..0]
      - Structured body site
      - Date/time of onset Δ [0..1] to [0..0]

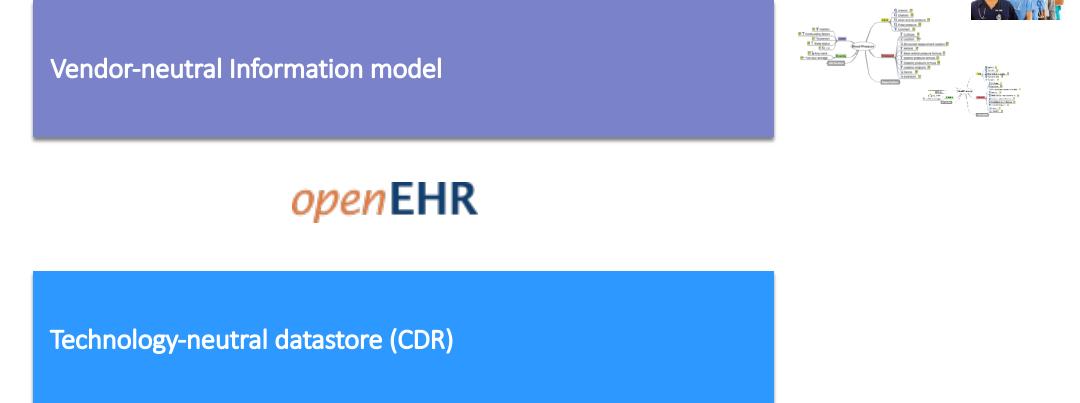
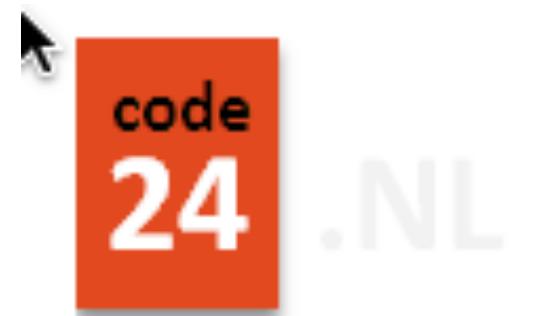
# CDR - Clinical data repository

*open*EHR

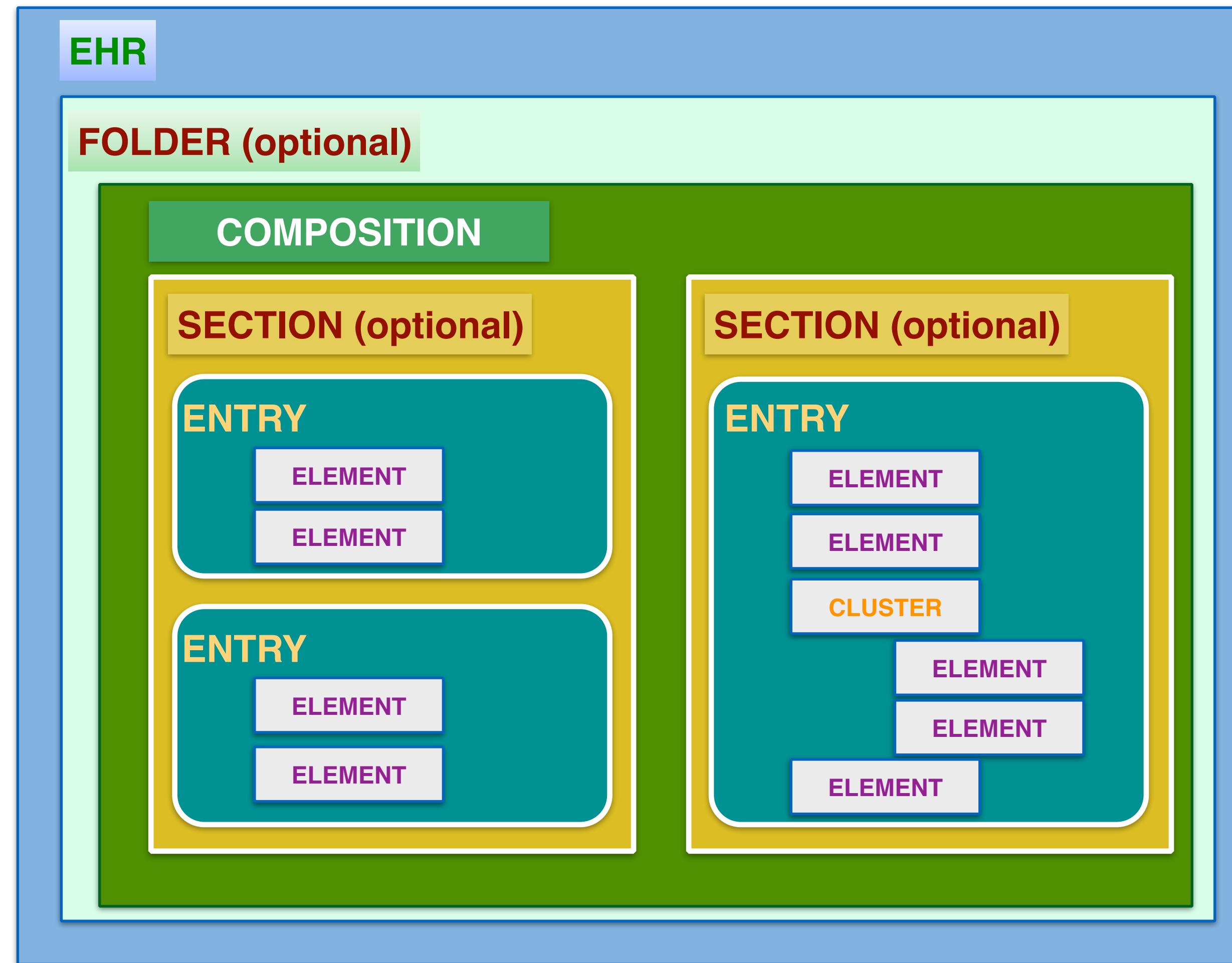
- Smart datastore which natively stores, retrieves, queries openEHR data via a standard API



- All data completely available
- AQL - Vendor-neutral querying
- **'No-code' deployment of new clinical content definitions**

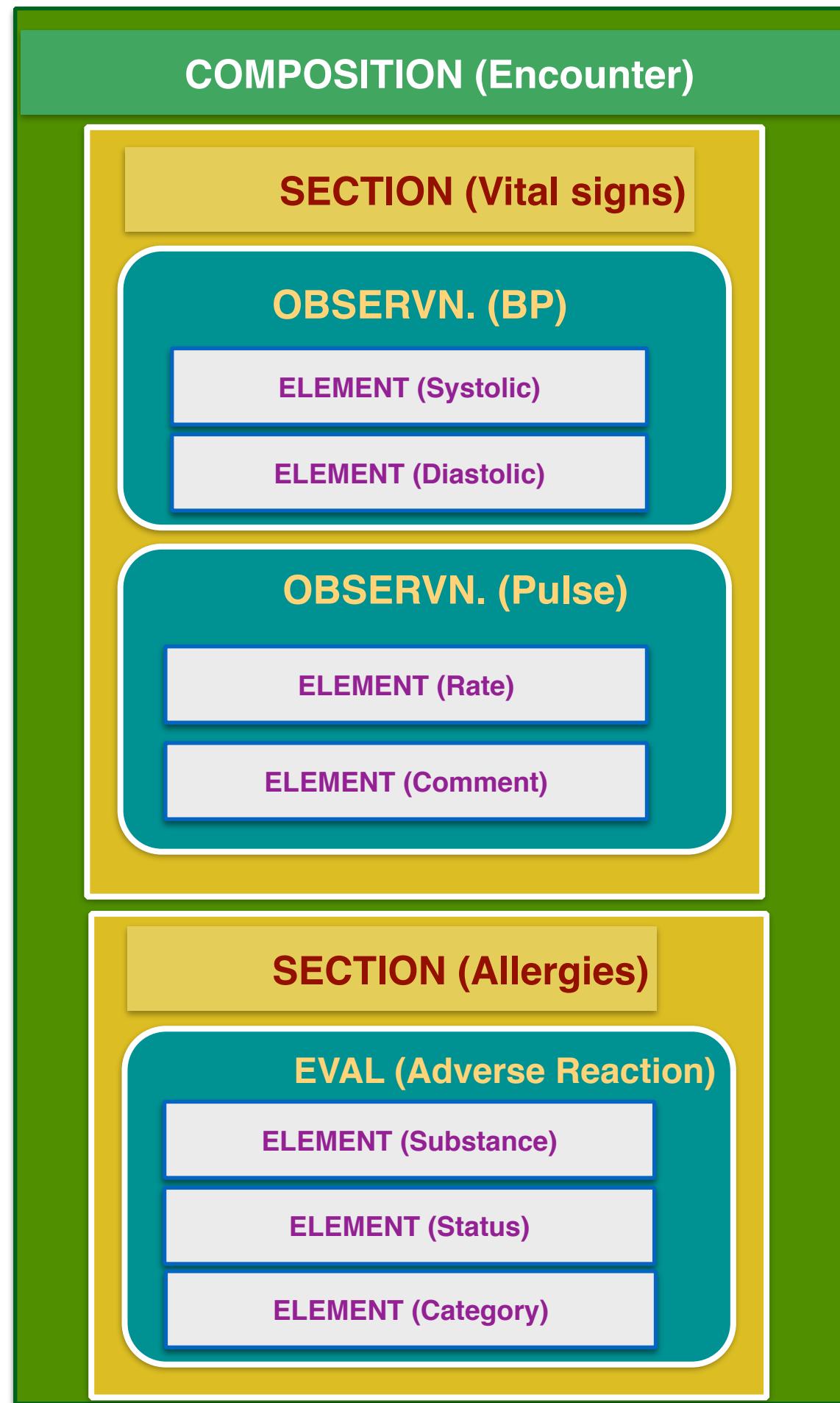


# Key openEHR Classes

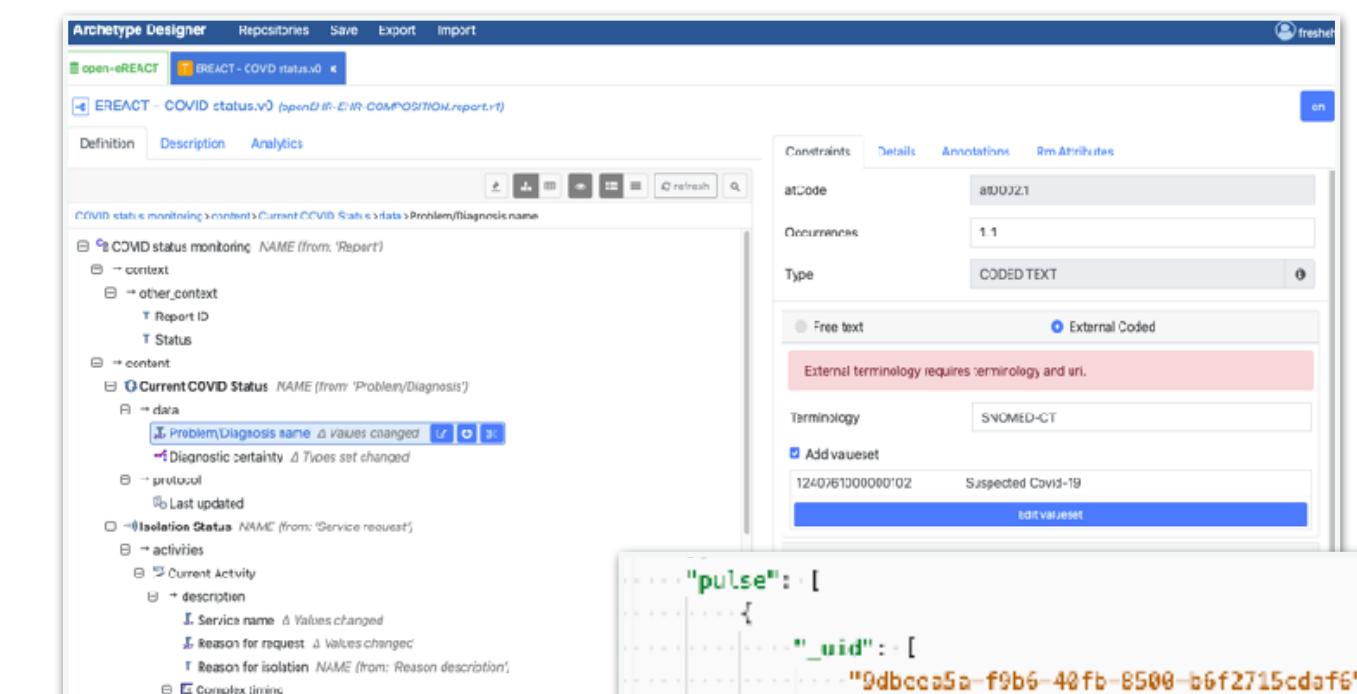
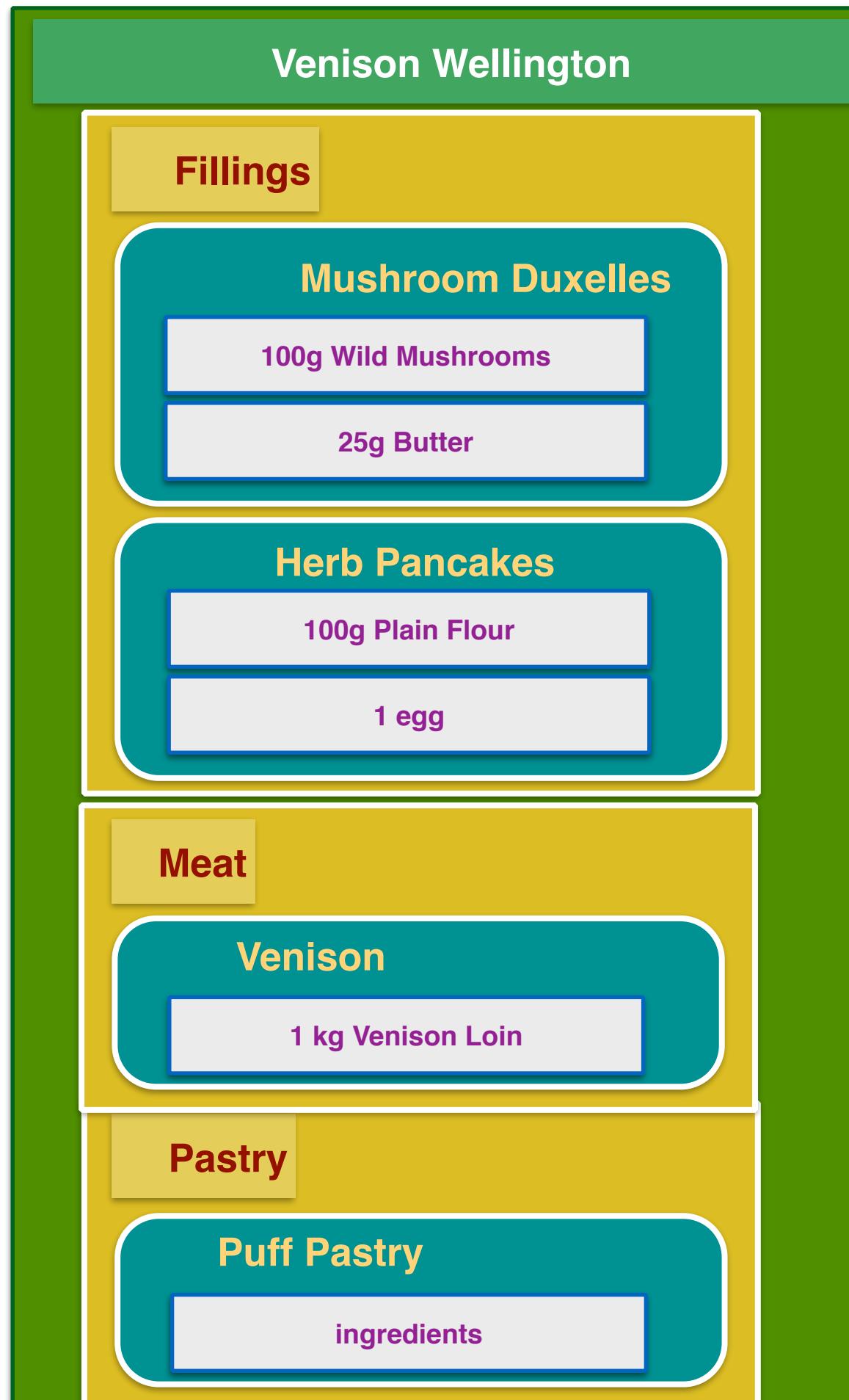


# Archetypes and Templates : Recipes for clinical content

**openEHR**

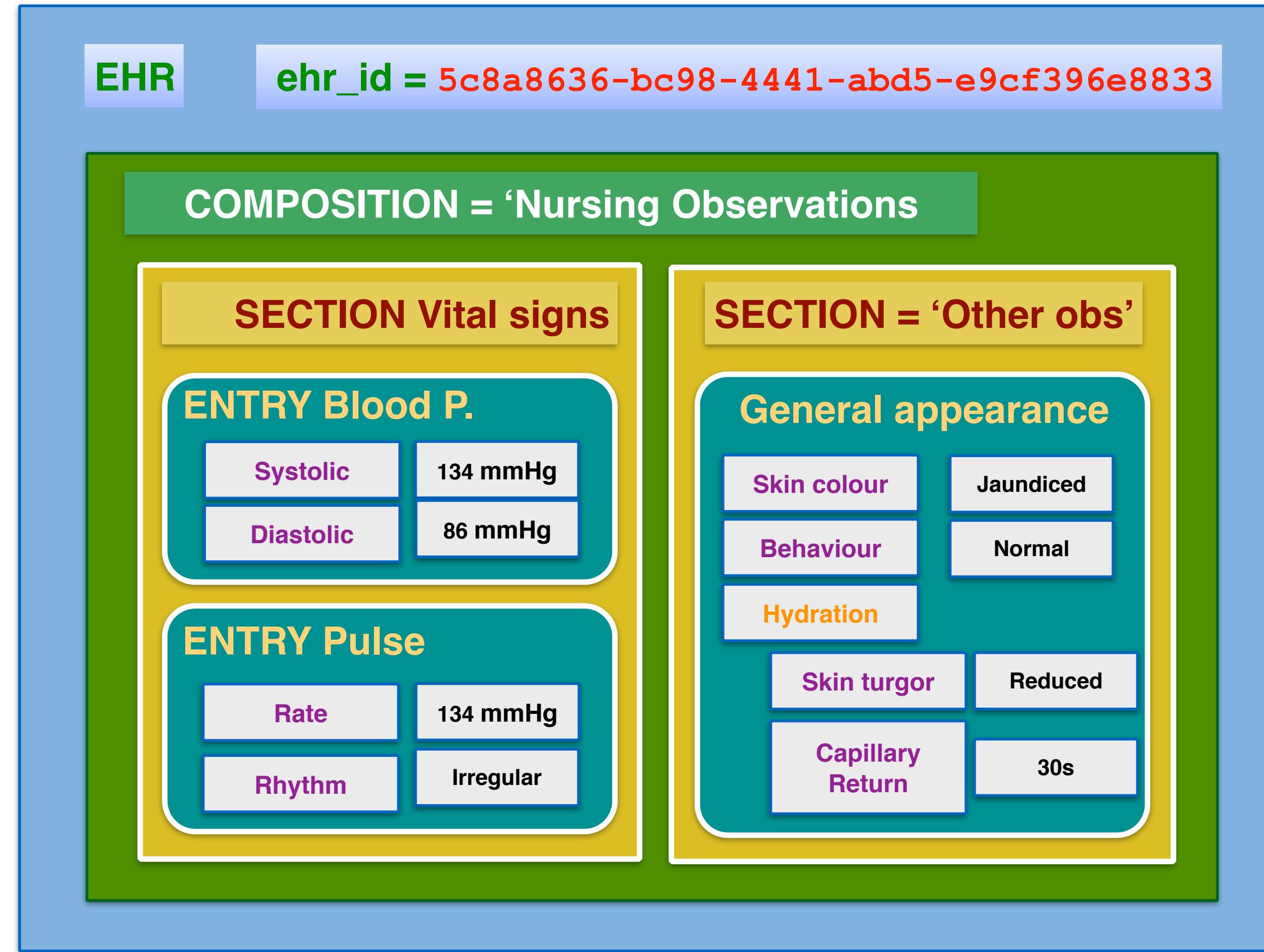


← Composition →  
 ← Section →  
 ← Entry →  
 ← Element →



```
"pulse": [
  {
    "_uid": [
      "0dbcca5a-f9b6-40fb-8500-b6f2715cdaf6"
    ],
    "pulse_rate": [
      {
        "|magnitude": 80.0,
        "|unit": "/min"
      }
    ],
    "time": [
      "2020-11-17T16:34:03.874Z"
    ],
    "language": [
      {
        "|code": "en",
        "|terminology": "ISO_639-1"
      }
    ],
    "encoding": [
      {
        "|code": "UTF-8",
        "|terminology": "IANA_character-sets"
      }
    ]
  }
]
```

# openEHR data objects

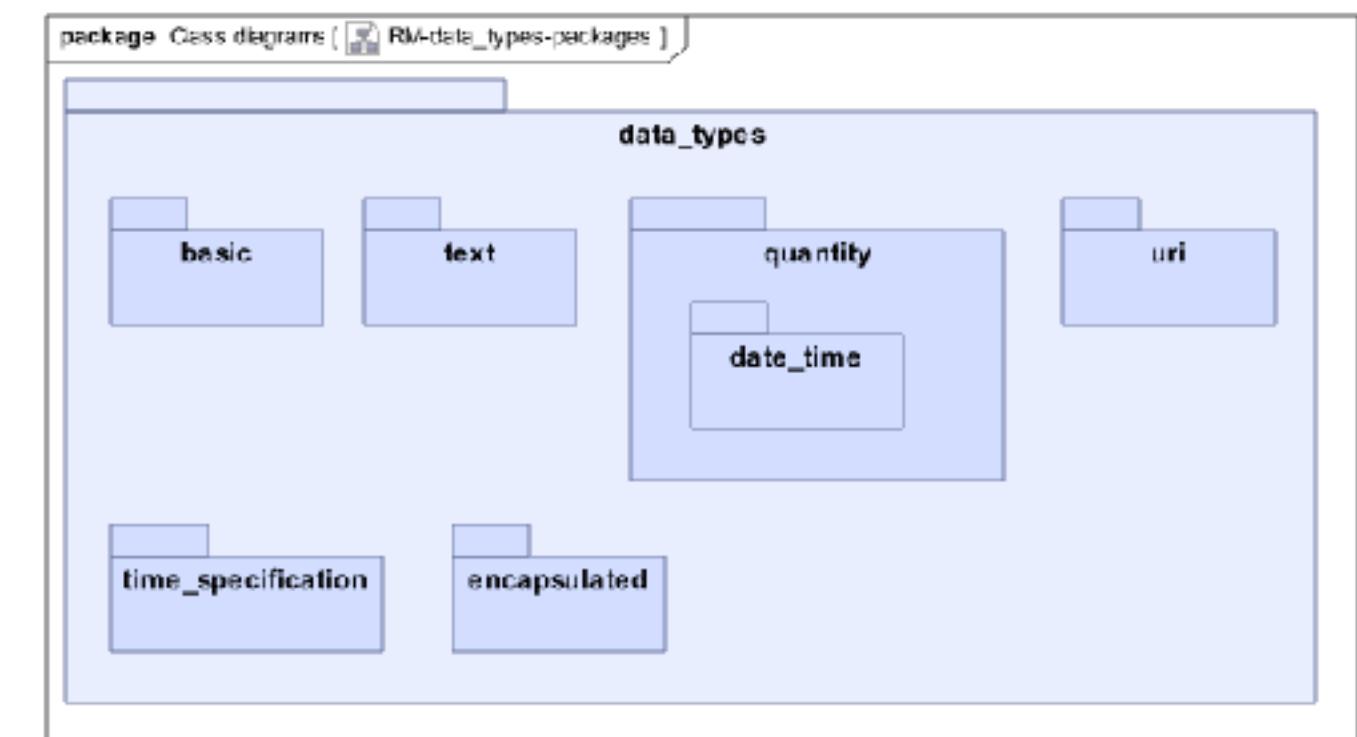


# openEHR RM datatypes

openEHR

- The modelling tools expose most aspects of the data types that are of interest to the clinical modeller
- Some RM attributes of datatypes are not clear or only apply to the actual data, not the models

T	Coded Text
T <sub>2 67</sub>	
Q	Quantity
1:2	Proportion
1 <sub>2</sub> 3	Count
⌚	Datetime
🕒	Time
📅	Date
☰	Ordinal
✓✗	Boolean
E•	Choice
🌐	Cluster (internal)
📝	Slot
⌚⌚	Duration
ID	Identifier

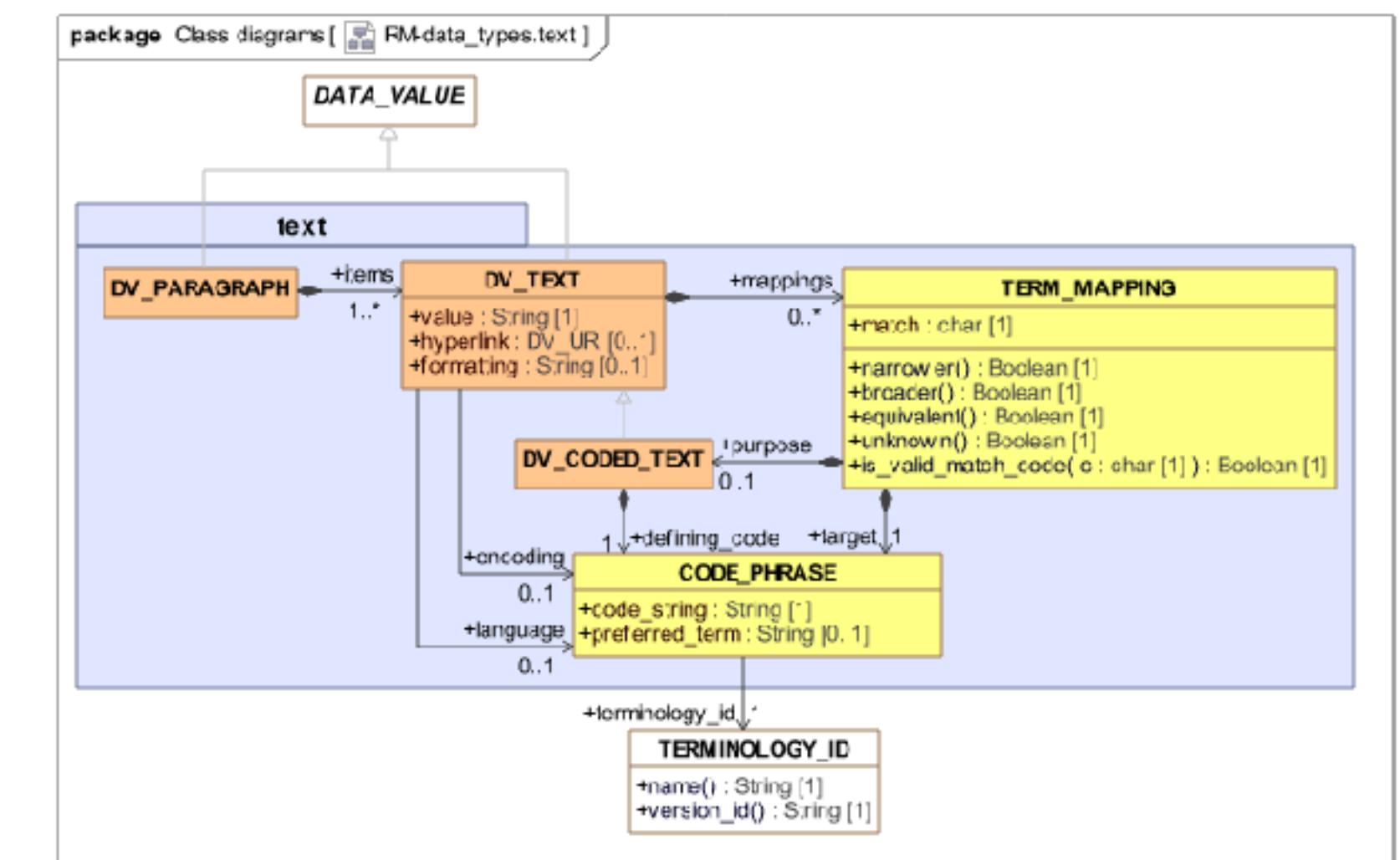


[https://specifications.openehr.org/releases/RM/latest/data\\_types.html](https://specifications.openehr.org/releases/RM/latest/data_types.html)

# Text/CodedText datatype

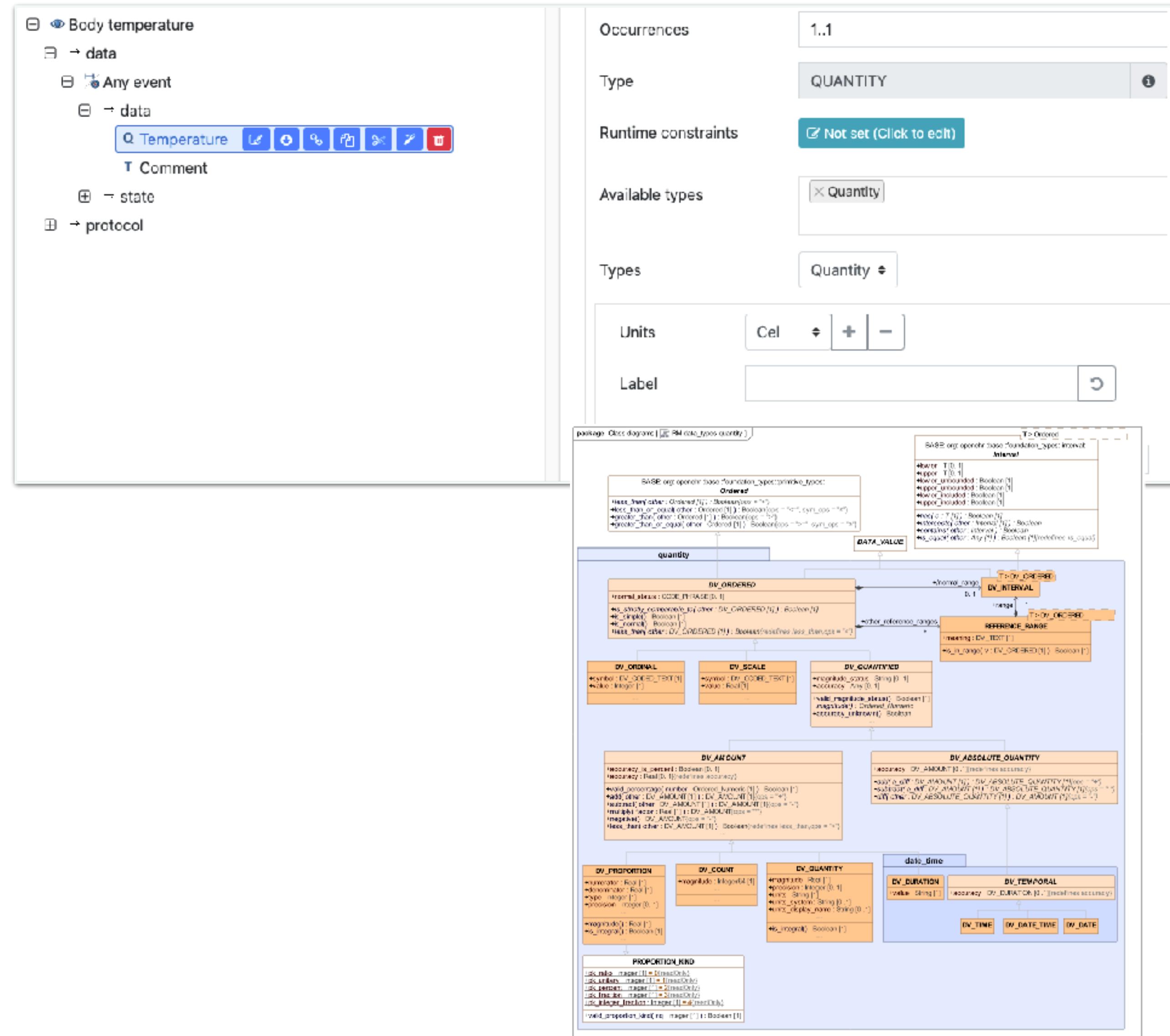
- Any Text datatype can also act as a CodedText datatype
  - if you have defined an element to be Text, it can still carry CodedText
- **Defining\_code**
  - The actual code of a CodedText e.g “123478-AS”
  - The terminology/version of the CodedText e.g. “ICD-10”
- **Mappings**
  - to external terminologies
    - e.g. The original code is an internal code “at007::Left” but is mapped to SNOMED code |123456|left|

Code	Text	Description
at0025	Rectum	Temperature measured with
at0024	Axilla	Temperature is measured from
at0023	Ear canal	Temperature is measured from
at0051	Forehead	Temperature is measured or
at0022	Mouth	Temperature is measured with
at0026	Nasopharynx	Temperature is measured with
at0027	Urinary bladder	Temperature is measured in



# Quantity datatype

- Units
  - e.g. mmHg, mmol/l, /min
- Normal\_range
  - For lab or device normal ranges e.g. 20-46 mmol/l
- Other reference ranges
  - For age or sex-specific reference ranges
  - Normal range for children : 18-28 mmol/l
- Magnitude\_status
  - To allow numeric to be qualified
    - $\leq 5$  (Less than or equal to 5)
    - $\sim 7.3$  (approximately 7.3)
- Normal\_status
  - High, normal, low e.g. HHH, HH,H, ,L,LL,LLL



# Other datatypes

- Duration : 1 day , 3 minute, including ages
- Boolean: True/ False
- Proportion: 83%
- Ordinal: 3: Moderate
- Multimedia: Image, Sound
- Identifier: NHSNumber
- Parsable Text: XML, JSON
- URI : Web-type links



# COMPOSITION archetypes

- ‘Top level document’ container for all clinical data
- All clinical data saved inside a Composition
- Represent generic document types in clinical system
  - Encounter, Report, Lab Report
  - Problem List, Discharge Summary, End of Life Care plan
- Simple
- Do not define detailed content.



[openEHR-EHR-COMPOSITION.report.v1](#)

Tree    Mindmap    Tabbed    ADL    Terminology    Analytics

Report

- **C Report**
- → context
- → other\_context
- T Report ID
- T Status
- E CLUSTER
- content

[openEHR-EHR-COMPOSITION.prescription.v0](#)

Tree    Mindmap    Tabbed    ADL    Terminology    Analytics

Prescription

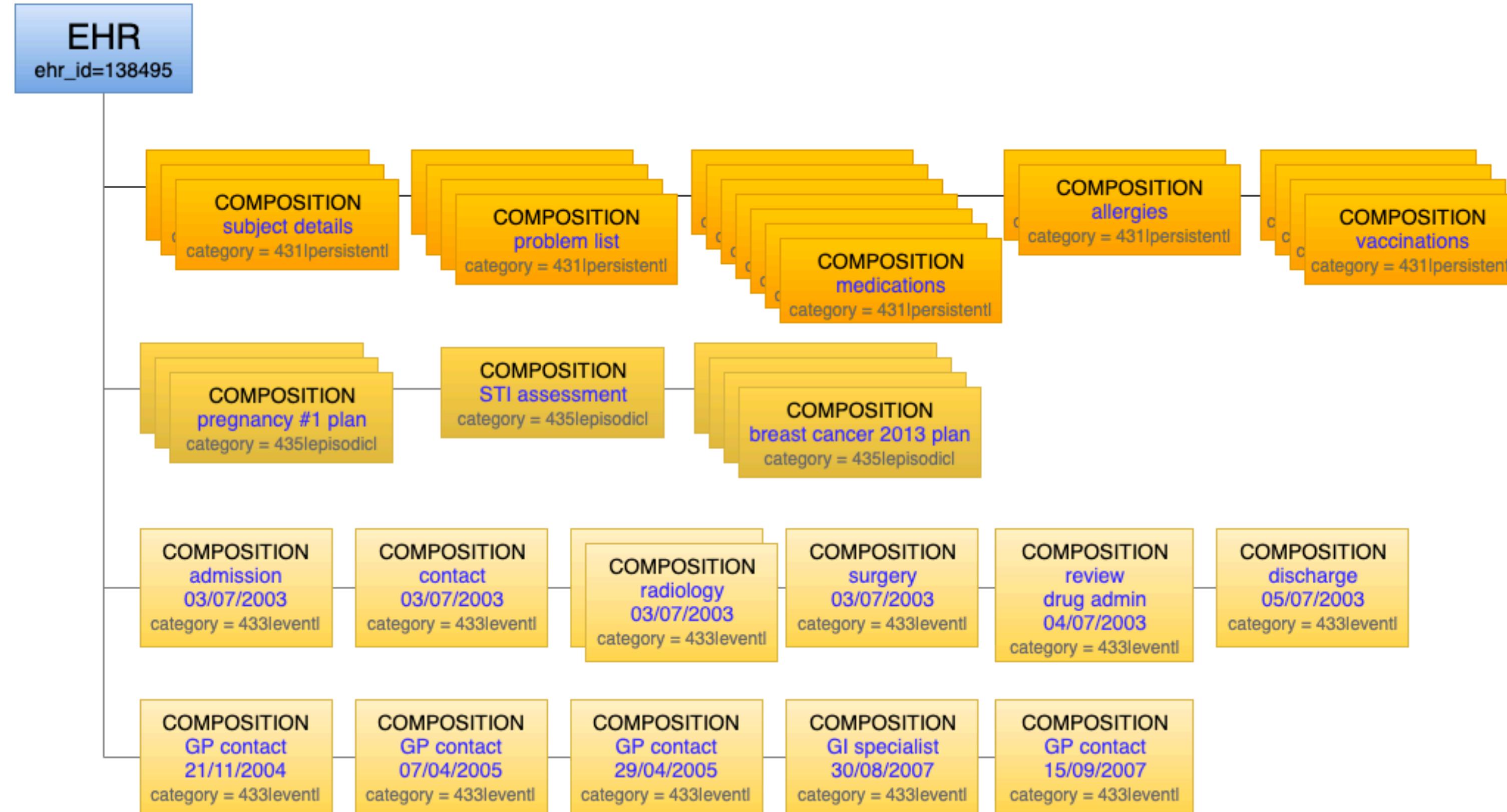
- **C Prescription**
- → context
- → other\_context
- E Extension
- ID Prescription identifier
- content

Report, Published Archetype [Internet]. openEHR Foundation,  
openEHR Clinical Knowledge Manager [cited: 2015-10-11].  
Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.677](http://openehr.org/ckm/#showArchetype_1013.1.677)

Prescription, Draft archetype [Internet]. openEHR Foundation,  
openEHR Clinical Knowledge Manager [cited: 2020-12-14].  
Available from: <https://ckm.openehr.org/ckm/archetypes/1013.1.121>

# Composition - Event vs. Persistent

*open*EHR



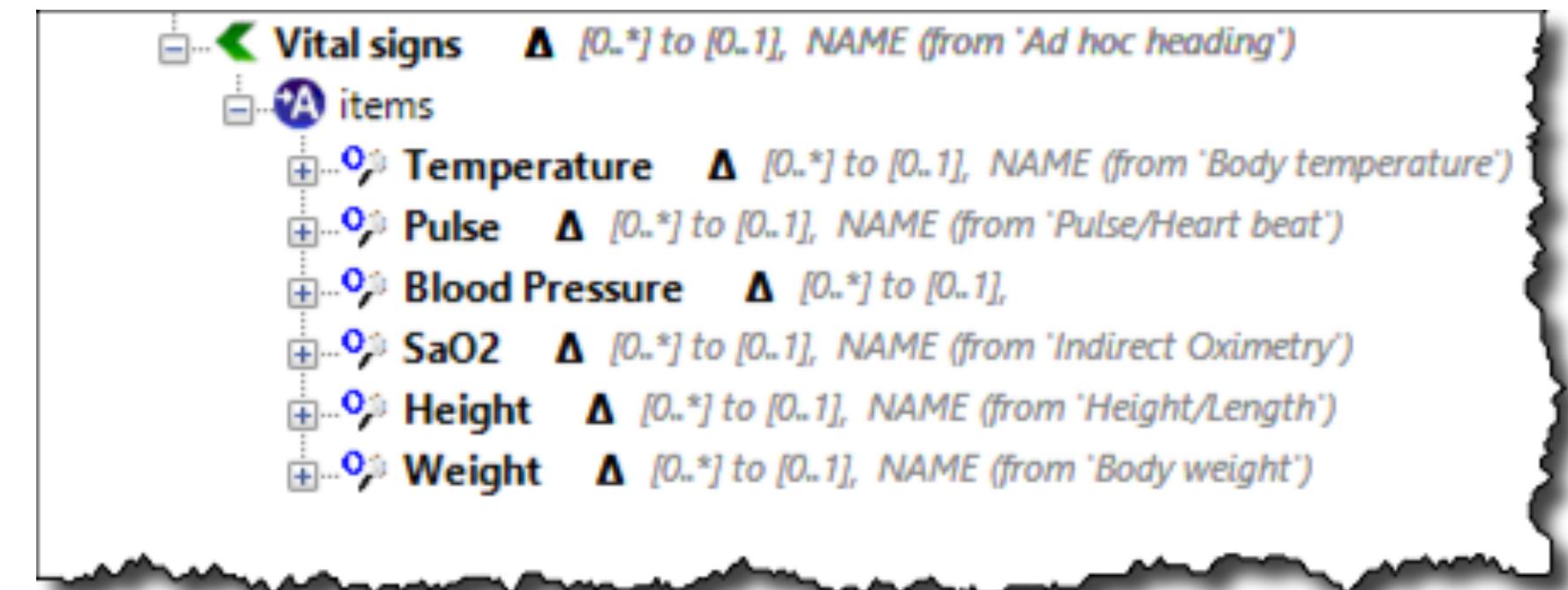
# Composition - Event vs. Persistent

**openEHR**

- **Event** composition
  - Each time new data is committed, a completely new composition instance is created
  - Technically a POST /composition
- **Persistent** composition
  - Each time new data is committed, the original instance is overwritten
  - Problem list, End of Life Summary
  - PUT /composition
    - [77a-bc98b345-4421-ba6d5-fc89f396e8855::ripple\\_osi.ehrscape.c4h::1](#)
    - [77a-bc98b345-4421-ba6d5-fc89f396e8855::ripple\\_osi.ehrscape.c4h::2](#)

# SECTION archetypes

- Sub-divide complex compositions
- No ‘semantic’ meaning
- Meaning carried in ENTRY archetypes inside SECTIONS
- Very few pre-defined SECTION archetypes



[openEHR-EHR-SECTION.adhoc.v1](#)

Tree Tabbed ADL Terminology Analytics

Adhoc heading

Adhoc heading

→ items

Ad hoc heading, Published Archetype [Internet]. openEHR Foundation, openEHR Clinical Knowledge Manager [cited: 2016-03-09]. Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.631](http://openehr.org/ckm/#showArchetype_1013.1.631)

[EREACT - Deterioration assessment.v0 \(openEHR-EHR-COMPOSITION.encounter\)](#)

Definition Description Analytics

Deterioration assessment

Deterioration assessment NAME (from: 'Encounter')

→ context  
→ other\_context  
 Extension

→ content

Situation NAME (from: 'Ad hoc heading')  
→ items  
 Story/History

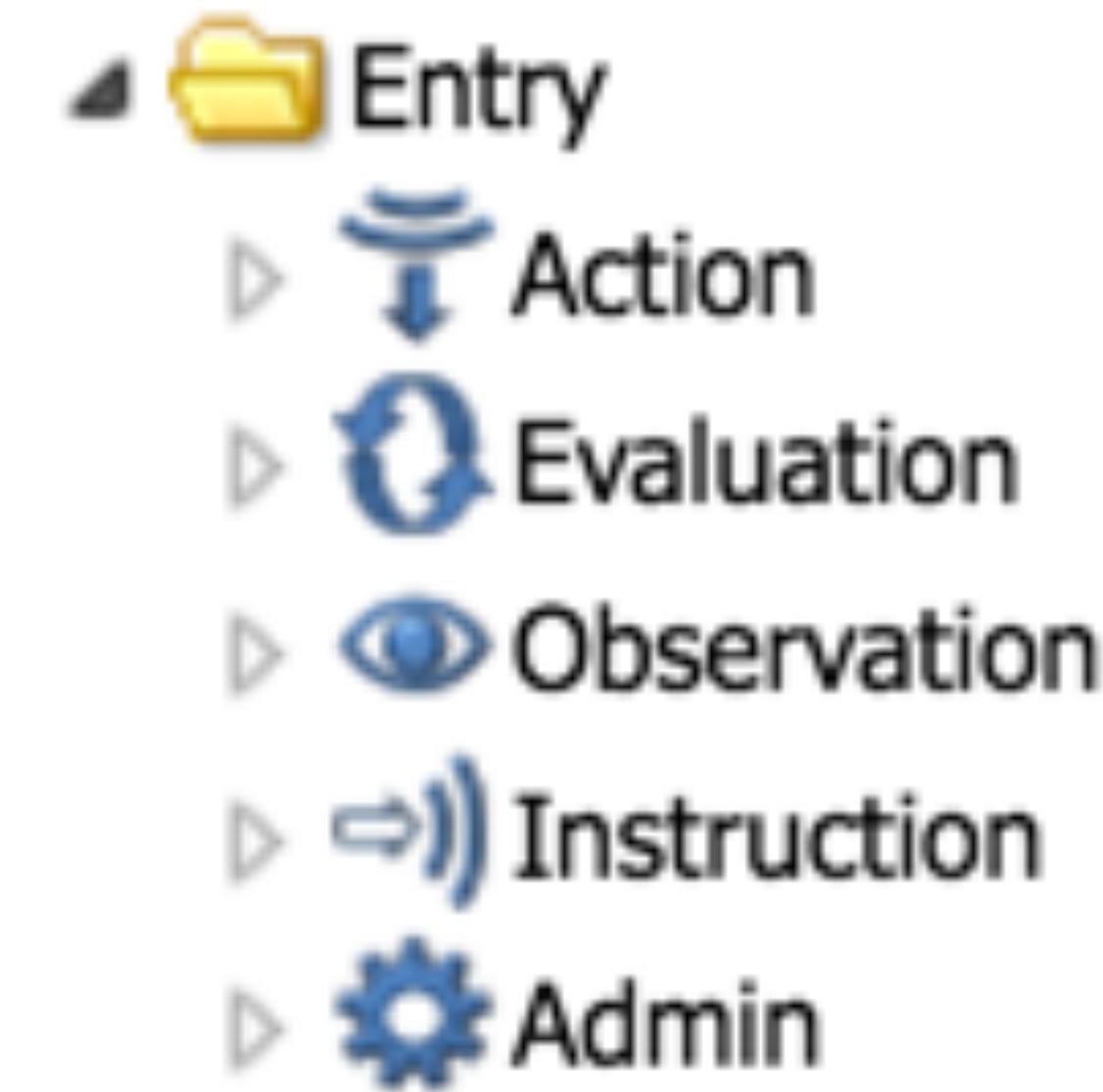
Background NAME (from: 'Ad hoc heading')  
→ items  
 Height NAME (from: 'Height/Length')  
 Weight NAME (from: 'Body weight')  
 Frailty NAME (from: 'Clinical Frailty Scale (CFS)')  
 Past history NAME (from: 'Clinical synopsis')  
 Medication NAME (from: 'Clinical synopsis')  
 Allergies NAME (from: 'Clinical synopsis')

Assessment NAME (from: 'Ad hoc heading')  
→ items

Response NAME (from: 'Ad hoc heading')  
→ items  
 Recommendation

# ENTRY archetypes

- Carry key clinical content payload
- Carry clinical meaning
- Carry sufficient clinical context
- ‘Clinical statement’
  - Blood pressure, Diagnosis
  - Lab test, ECG, Procedures
- Must use one of the ENTRY sub-types



# Clinical Investigator Cycle



# ENTRY reference model features

	Provider Subject	Data	History Event	Protocol	State	Activities	Pathway
OBSERVATIONS	Yes	Yes	Yes	Yes	Yes		
EVALUATIONS	Yes	Yes		Yes			
INSTRUCTIONS	Yes	Yes		Yes		Yes	
ACTIONS	Yes	Yes		Yes			Yes
ADMIN_ENTRY	Yes	Yes					

# ENTRY: Provider/Subject/Participation

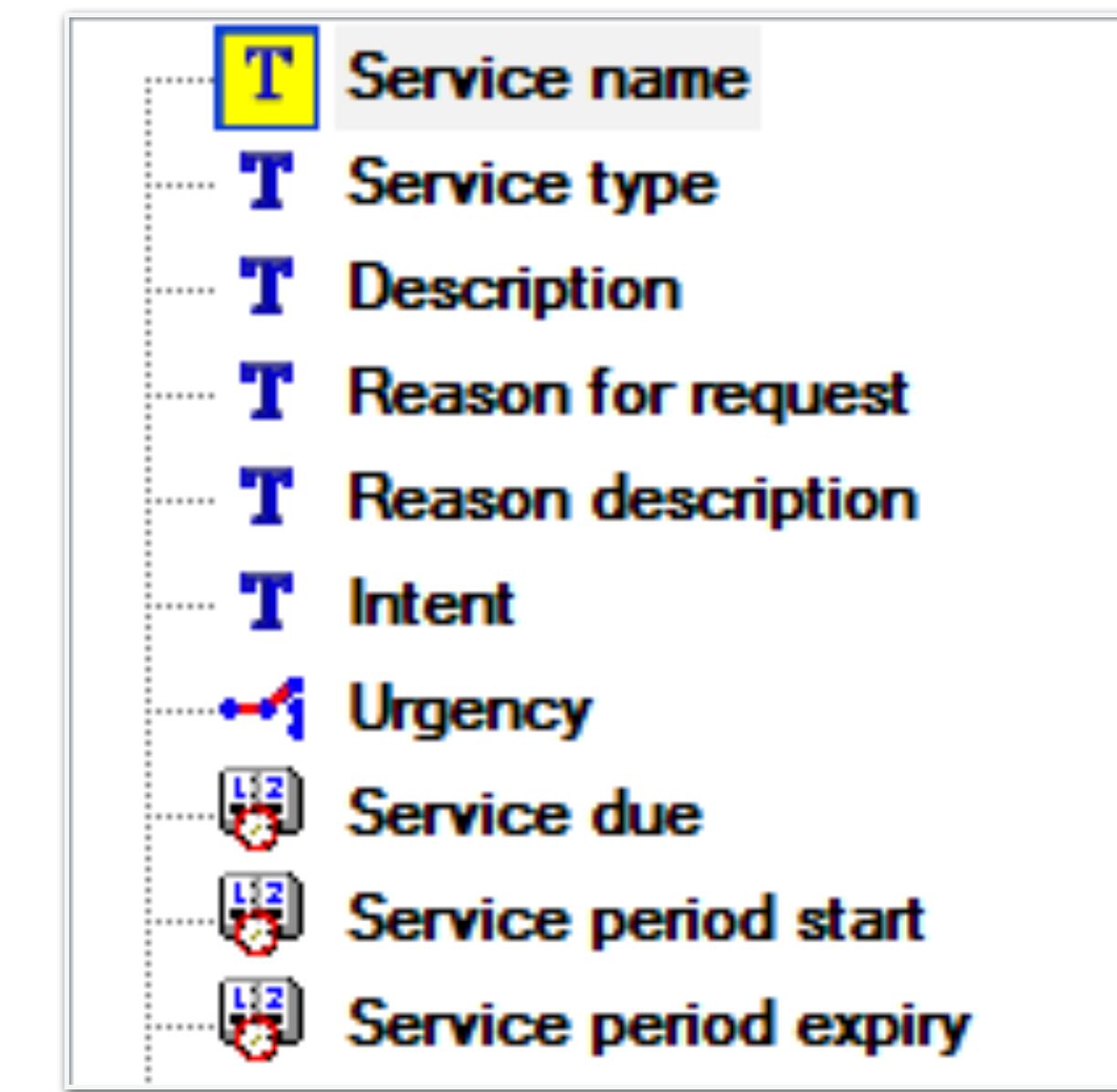
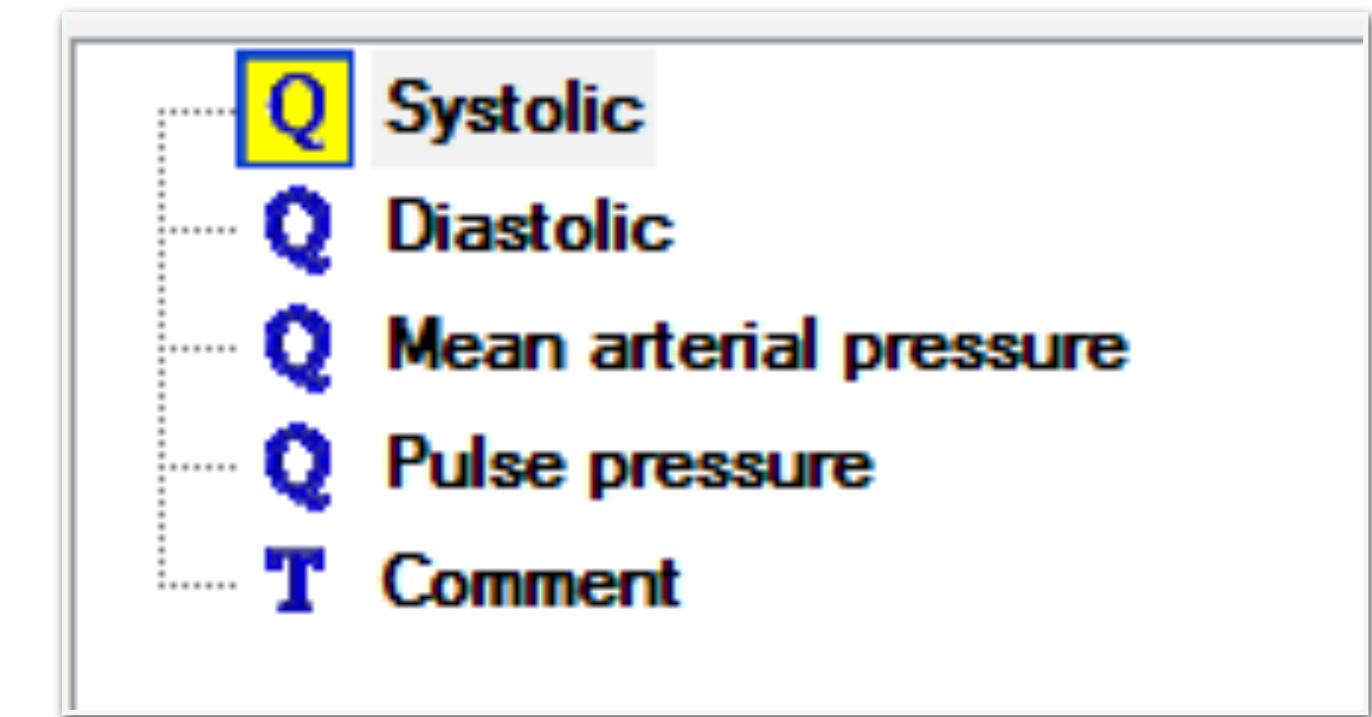
- Provider of care
  - Optional where provider <> composer
- Subject of care
  - Optional where subject <> patient
- Participation
  - Optional where other individuals involved, e.g. MDT



**Hidden in the tooling but can be exposed if required**

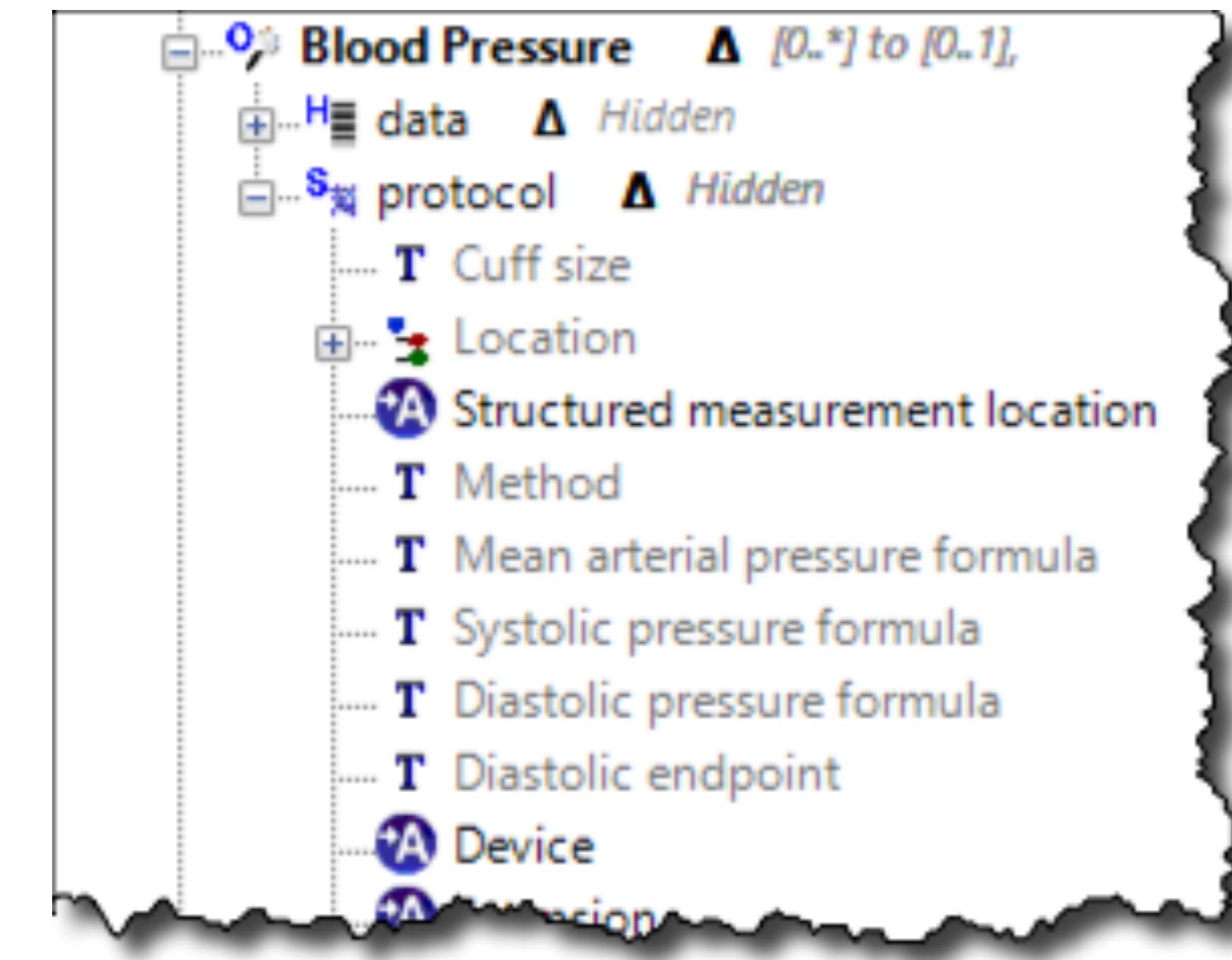
# ENTRY: Data

- The data of primary clinical interest
- Sometimes nested within another feature
  - inside INSTRUCTION ‘activities’
  - inside OBSERVATION ‘events’



# ENTRY: 'Protocol' feature

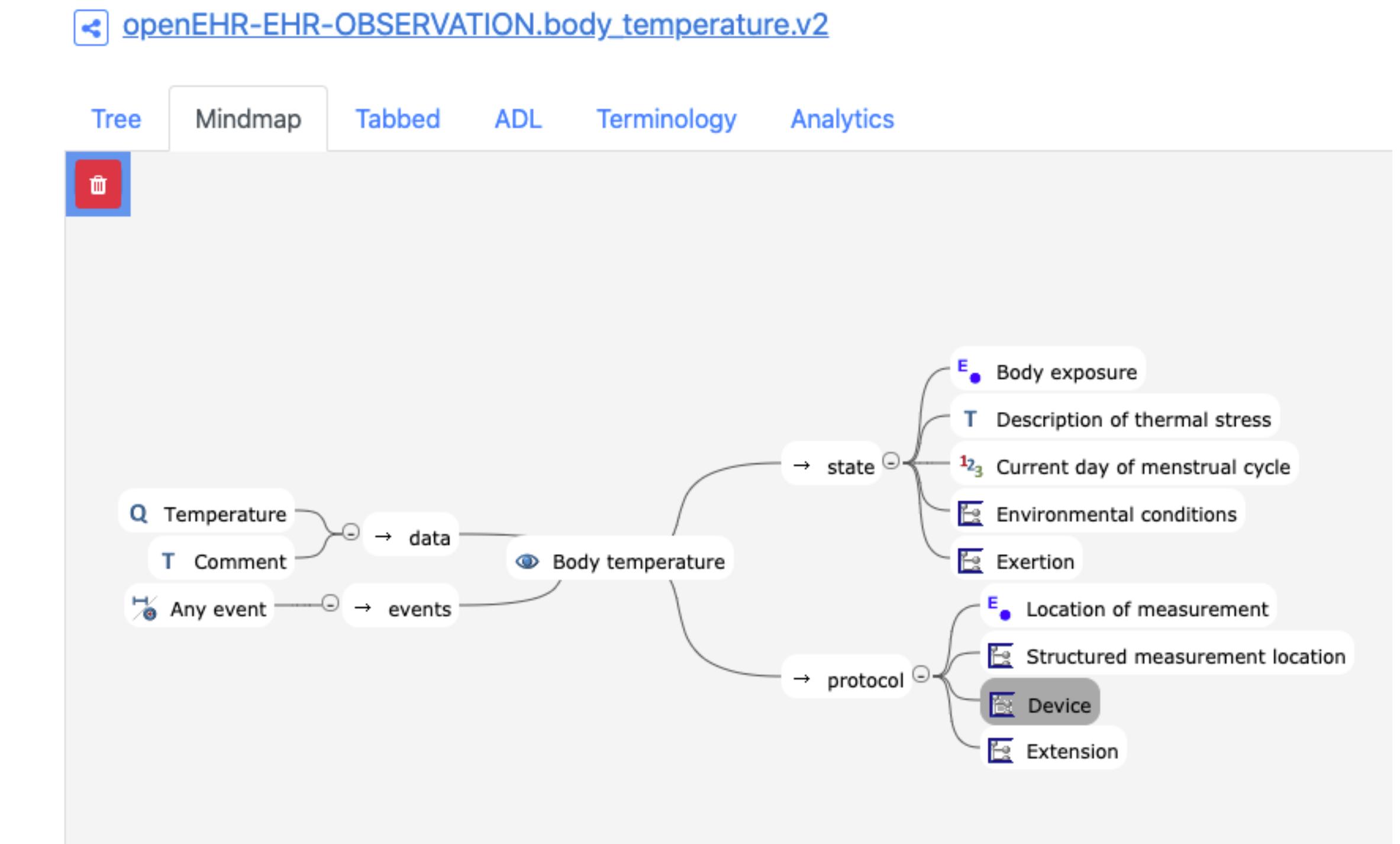
- Secondary information about the **method or circumstances of data collection**
  - Observations
    - Device/ methodology
      - e.g. Cuff size
    - Evaluations/Instructions
    - Links to guidance or criteria
    - Instructions / Actions
    - Workflow identifiers



# OBSERVATION archetypes



- Gathering of evidence
- Measurable / observable data
  - Patient history, physical examination
  - Lab tests, imaging
  - Scores and scales



[openEHR-EHR-OBSERVATION.laboratory\\_test\\_result.v0](#)

Tree Mindmap Tabbed ADL Terminology Analytics

Laboratory test result

- Laboratory test result
  - data
    - Any event
    - data
      - Test name
      - Specimen detail
      - Test status
      - Test status timestamp
      - Diagnostic service category
      - Clinical information provided
      - Test findings
      - Conclusion
      - Test diagnosis
      - Multimedia representation
      - Comment
    - state
      - Confounding factors
      - Confounding factors details
    - protocol
      - Receiving laboratory
      - Laboratory test identifier
      - Test request details
        - Point-of-care device
        - Test method/device details
      - Extension

**Laboratory test, Draft Archetype [Internet]. openEHR Foundation, openEHR Clinical Knowledge Manager [cited: 2016-03-09]. Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.21](http://openehr.org/ckm/#showArchetype_1013.1.21)**

91

NorthPROMs A openEHR-EHR-OBSERVATION.apgar.v1

[openEHR-EHR-OBSERVATION.apgar.v1](#)

Tree Mindmap Tabbed ADL Terminology Analytics

Apgar score > data > 1 minute > data

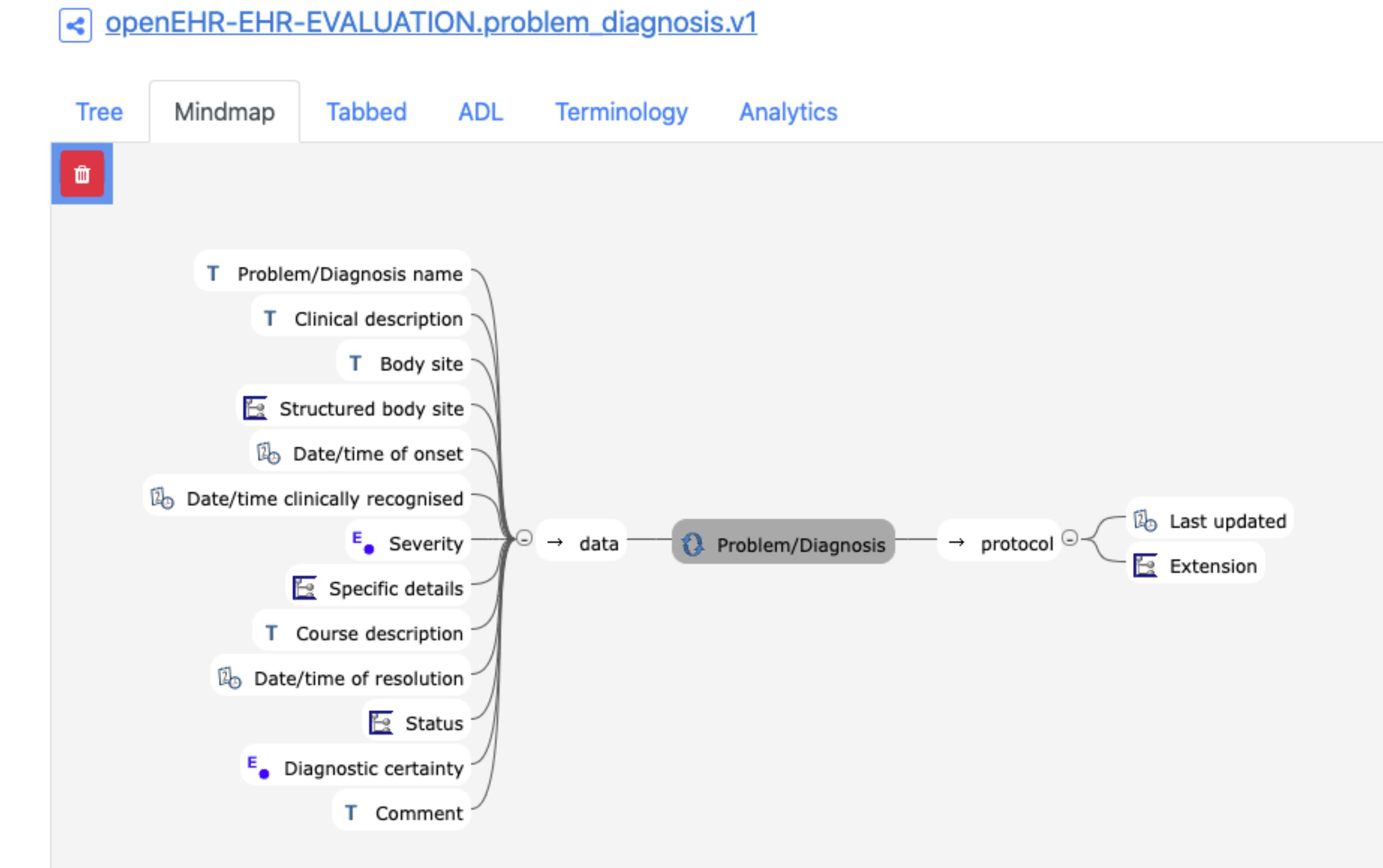
- Apgar score
  - data
    - 1 minute
      - data
        - structure
          - items
            - Respiratory effort
            - Heart Rate
            - Muscle tone
            - Reflex irritability
            - Skin colour
            - Total
        - 2 minute
        - 3 minute
        - 5 minute
        - 10 minute
        - Any event
    - protocol
      - Notes on measurement
      - Extension

**Apgar score, Published Archetype [Internet]. openEHR Foundation, openEHR Clinical Knowledge Manager [cited: 2016-03-09]. Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.172](http://openehr.org/ckm/#showArchetype_1013.1.172)**

# EVALUATION archetypes



- Outcomes of a clinical assessment or decision
- Clinically interpreted findings
  - “I think the problem is ...”
  - I think there is a risk of ...
  - The treatment goal is ...’
  - Diagnosis, synthesis
  - Genetic risk, Risk of Adverse reaction
  - CPR Decision



The image shows two side-by-side screenshots of the openEHR Clinical Knowledge Manager interface.

**Left Screenshot (Problem/Diagnosis Archetype):**

- Header: openEHR-EHR-EVALUATION.problem\_diagnosis.v1
- Toolbar: Tree, Mindmap, Tabbed, ADL, Terminology, Analytics
- Section: Problem/Diagnosis
- Structure:
  - Problem/Diagnosis (with icons for edit, add, copy, delete, search, and refresh)
  - data
    - Problem/Diagnosis name
    - Clinical description
    - Body site
    - Structured body site
    - Date/time of onset
    - Date/time clinically recognised
    - Severity
    - Specific details
    - Course description
    - Date/time of resolution
    - Status
    - Diagnostic certainty
    - Comment
  - protocol
    - Last updated
    - Extension

**Right Screenshot (CPR decision Archetype):**

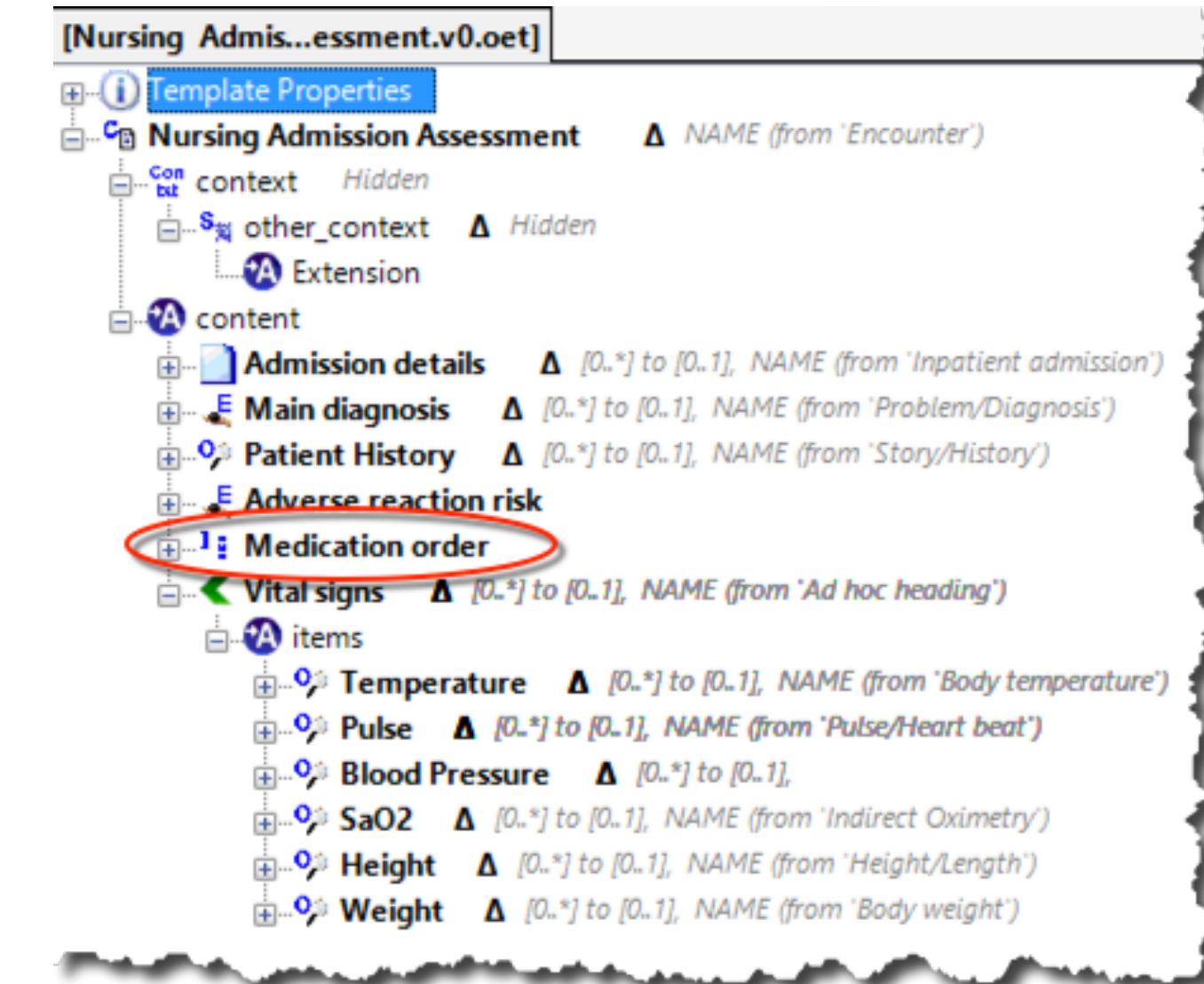
- Header: openEHR-EHR-EVALUATION.cpr\_decision\_uk.v0
- Toolbar: Tree, Mindmap, Tabbed, ADL, Terminology, Analytics
- Section: CPR decision
- Structure:
  - CPR decision (with icons for edit, add, copy, delete, search, and refresh)
  - data
    - CPR decision
    - Date of CPR decision
    - Details for Modified CPR child only
    - Patient awareness of decision
    - Informal carer awareness of decision
    - Comment
  - protocol
    - CPR form completed
    - Discussion with patient
    - Discussion with informal carer
    - Location of CPR documentation
    - Date for review of CPR decision

**Problem/Diagnosis, Published Archetype [Internet].  
openEHR Foundation, openEHR Clinical Knowledge  
Manager [cited: 2016-03-09]. Available from: [http://openehr.org/ckm/#showArchetype\\_1013.1.169](http://openehr.org/ckm/#showArchetype_1013.1.169)**

**CPR decision, Draft Archetype [Internet]. UK  
Clinical Models, UK Clinical Models Clinical  
Knowledge Manager [cited: 2016-03-09]. Available  
from: [http://clinicalmodels.org.uk/ckm/#showArchetype\\_1051.32.205](http://clinicalmodels.org.uk/ckm/#showArchetype_1051.32.205)**

# INSTRUCTION archetypes

- Orders that arise from clinical assessment
- Initiation of workflow process
  - “I will order some blood tests”
  - “I would like you to start this medication”
  - “I would like to refer you to a specialist”
- Lab test request, referral
- Medication order
- Nursing task



# Instruction: an order or request

openEHR

The screenshot shows the openEHR Clinical Knowledge Manager interface. The left sidebar displays a tree view of the 'Medication order' archetype, with various sections like Medication item, Preparation details, Route, Body site, Structured body site, Administration method, Adminstration device, Overall directions description, Parsable directions, Specific directions description, Dosage justification, Structured dose and timing cirections, Medication safety, Additional instruction, Patient information, Monitoring instruction, Clinical indication, Therapeutic intent, Order details, Authorisation directions, Dispense directions, Additional details, and Comment. The right panel shows the detailed structure of the 'INSTRUCTION' archetype, divided into several sections: INSTRUCTION, CARE\_ENTRY, ENTRY, and LOCATABLE. Each section contains a list of attributes with their corresponding data types.

Section	Attribute	Type
INSTRUCTION	narrative	DV_TEXT
	expiry_time	DV_DATE_TIME
	wf_definition	DV_PARSABLE
	activities	ACTIVITY
CARE_ENTRY	protocol	ITEM_STRUCTURE
	guideline_id	OBJECT_REF
ENTRY	language	CODE_PHRASE
	encoding	CODE_PHRASE
	subject	PARTY_PROXY
	provider	PARTY_PROXY
	other_participations	PARTICIPATION
	workflow_id	OBJECT_REF
LOCATABLE	uid	UID_BASED_ID
	archetype_node_id	STRING
	name	DV_TEXT
	archetype_details	ARCHETYPED
	feeder_audit	FEEDER_AUDIT
	links	LINK

**Medication order, Published archetype [Internet]. openEHR Foundation, openEHR Clinical Knowledge Manager [cited: 2020-12-14]. Available from: <https://ckm.openehr.org/ckm/archetypes/1013.1.3124>**

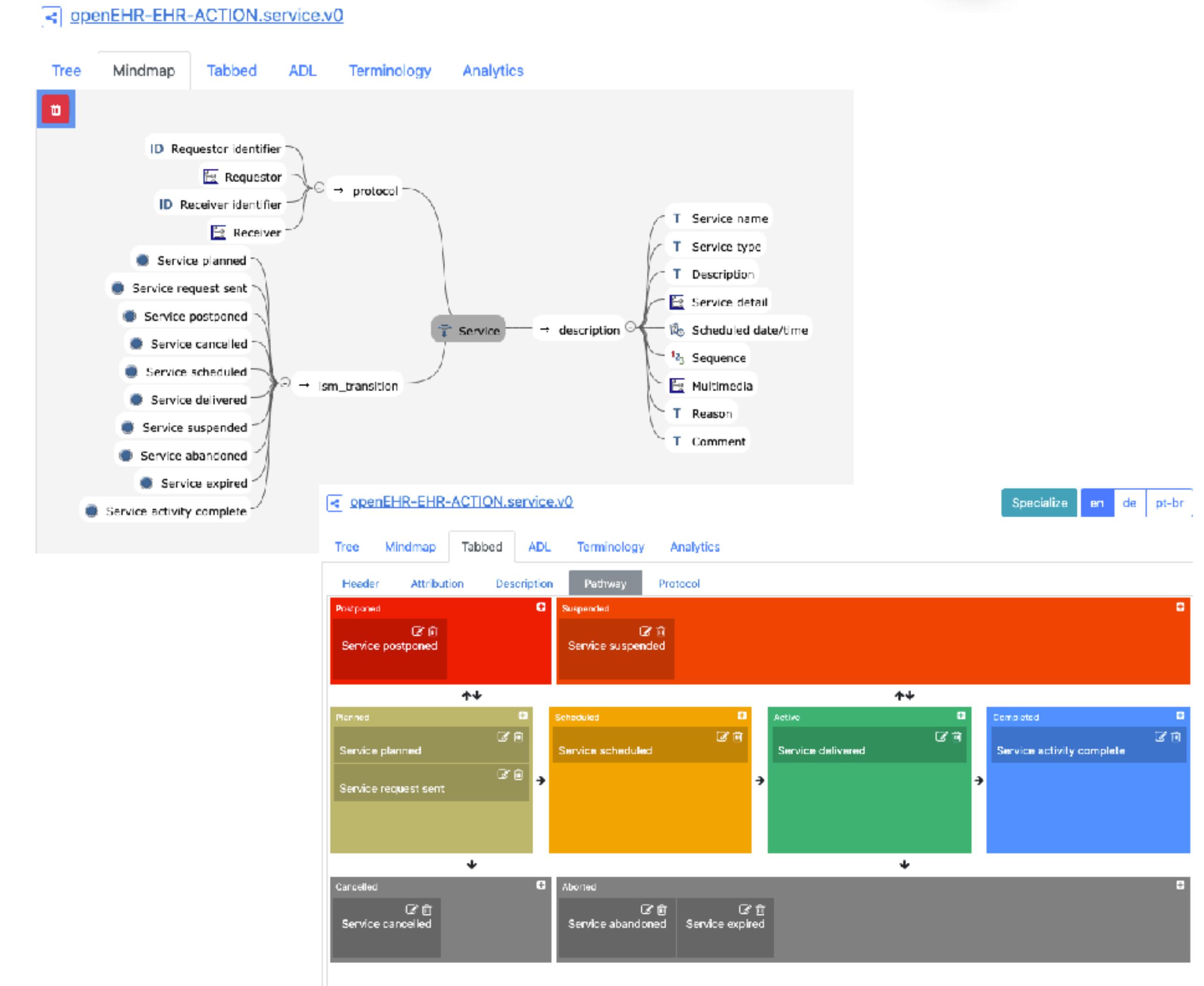
# ACTION archetypes



- Activities that result from an Instruction

- “Lab test performed”
- “Medication prescribed, administered”
- “Procedure performed”

- “Lab test tracking”
- “Medication supply”



Action : clinical procedure or workflow step

The screenshot displays the openEHR EHR ACTION medication.v1 interface, divided into two main sections: a left-hand navigation tree and a right-hand protocol editor.

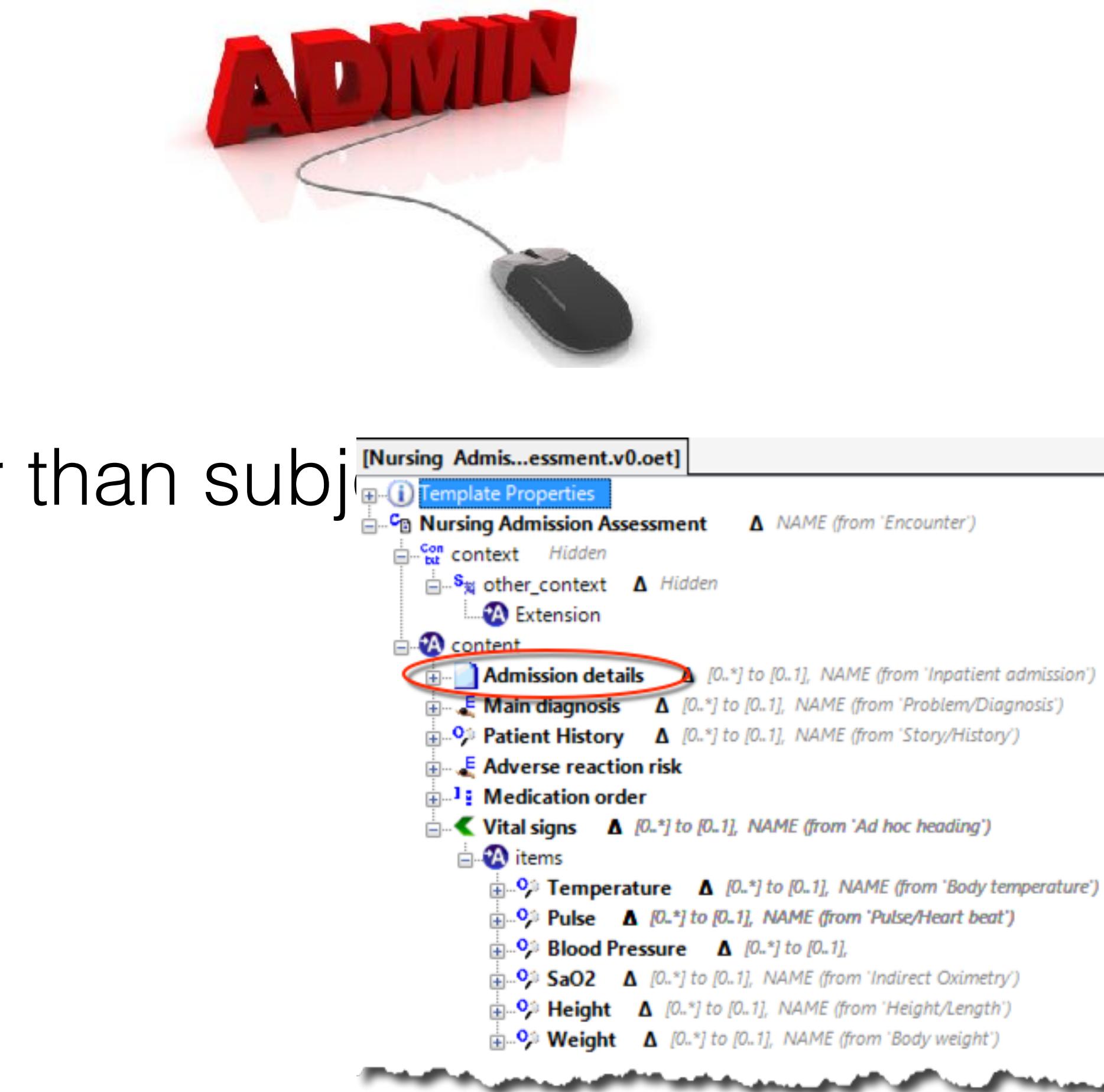
**Left Panel (Tree View):**

- The title bar shows "openEHR-EHR-ACTION.medication.v1".
- The navigation tabs include Tree, Mindmap, Tabbed, ADL, Terminology, and Analytics.
- The "Medication management" node is selected, revealing its sub-components:
  - Medication management (with icons for edit, add, copy, delete, and search).
  - ism\_transition
  - description
    - Medication item
    - Medication details
    - Amount
    - Substitution
      - Substitution reason
      - Original scheduled date/time
      - Restart date/time
      - Restart criterion
      - Reason
    - Administration details
      - Route
      - Body site
      - Structured body site
      - Administration method

**Right Panel (Protocol Editor):**

- The title bar shows "openEHR-EHR-ACTION.medication.v1".
- The navigation tabs include Tree, Mindmap, Tabbed, ADL, Terminology, and Analytics.
- The protocol editor displays a grid of states categorized by color:
  - Red Row (Top):** Postponed (Medication course postponed), Suspended (Prescription supply delayed, Administrations suspended, Prescription re-authorisation pending).
  - Green Row (Second from Top):** Planned (Medication recommended, Prescription awaiting authorisation), Scheduled (Medication start date/condition set, Medication authorised).
  - Green Row (Third from Top):** Active (Prescription issued, Prescription dispensed, Prescription re-authorised, Prescription re-issued, Medication prepared, Medication course commenced, Minor change to order, Medication reassessed, Dose administered, Dose administration omitted, Dose administration deferred).
  - Blue Row (Bottom):** Completed (Medication course completed, Prescription fulfilled).
  - Grey Row (Bottom):** Cancelled (Medication course cancelled, Prescription cancelled), Aborted (Medication course stopped, Major change to order, Prescription invalid or expired).

# Admin entry - for non-clinical data



- No special RM attributes other than subj
- No special features

**Inpatient admission**

Header Attribution **Data** Reference model

**Date of admission** Date patient admitted to hospital.  
Date/Time Optional

**Admission method** How the patient was admitted to hospital.  
Choice Optional

**Referrer details** Details of person making the request for admission.  
Slot (Cluster) Optional

**Source of admission** The location of the patient immediately prior to admission.  
*Comment: eg, usual place of residence, temporary place of residence, penal establishment.*  
Text Optional

**Choice of:**

- Coded Text
  - Elective [The admission was planned.]
  - Emergency [The admission was made as an emergency.]
  - Transfer [The patient was transferred from another inpatient unit.]
  - Maternity [The admission was maternity-related.]
- Text

**Include:**  
 All not explicitly excluded archetypes

**Inpatient admission, Draft Archetype [Internet]. UK Clinical Models, UK Clinical Models Clinical Knowledge Manager [cited: 2016-03-09]. Available from: [http://clinicalmodels.org.uk/ckm/#showArchetype\\_1051.32.291](http://clinicalmodels.org.uk/ckm/#showArchetype_1051.32.291)**

# Archetype naming

- **Concept name:** the human name of the clinical concept
  - ‘Blood pressure’, ‘Report’
- **ArchetypeID:** the technical name used by tooling and CDRs
  - ‘openEHR-EHR-OBSERVATION.blood\_pressure.v1’
  - ‘openEHR-EHR-COMPOSITION.report.v1’

# Archetype naming examples

**Archetype ID**

openEHR-EHR-EVALUATION.problem\_diagnosis.v1

Tree Mindmap Tabbed ADL Terminology Analytics

**Concept name**

Problem/Diagnosis

Problem/Diagnosis

→ data

T Problem/Diagnosis name  
T Clinical description  
T Body site  
Structured body site  
Date/time of onset  
Date/time clinically recognised  
E Severity  
Specific details  
T Course description

openEHR-EHR-EVALUATION.problem\_diagnosis.v1

Tree Mindmap Tabbed ADL Terminology Analytics

문제/진단 > data > 발병 날짜/시간

문제/진단  
→ data  
문제/진단명  
임상적 서술  
신체 위치  
구조화된 신체 위치  
발병 날짜/시간  
임상적으로 인지된 날짜/시간  
증증도  
특정 상세내용  
경과 서술  
완치 날짜/시간  
상태

Create new archetype

Archetype id: openEHR-EHR-ADMIN\_ENTRY.inpatient\_discharge.v0

Rm Type: ADMIN\_ENTRY

Concept: Inpatient discharge

Version: 0

Original Language: English (en)

**Close** **Create**

# Slots

- Where one archetype can be slotted into another
- Entry, Section into Composition
- Entry into Composition
- Cluster into Entry
- **But not Entry into Entry**

The screenshot shows the openEHR archetype browser interface. The title bar says "openEHR-EHR-OBSERVATION.body\_temperature.v2". The left pane displays a tree view of the archetype structure under "Body temperature > protocol > Device". The structure includes "Body temperature", "data" (with "Any event", "Temperature", "Comment"), "state", "protocol" (with "Location of measurement", "Structured measurement location", "Device", "Extension"), and "Extension". The right pane contains constraint settings: Path is "/protocol[<]", Occurrences is "0..1", Type is "SLOT", and Includes is "openEHR-EHR-CLUSTER\device\,v1".

The screenshot shows the openEHR archetype browser interface. The title bar says "openEHR-EHR-COMPOSITION.report.v1". The left pane displays a tree view of the archetype structure under "Analytics Report > content". The structure includes "Report", "context" (with "other\_context" containing "Report ID", "Status", and "Extension"), and "content". The right pane contains constraint settings: Path is "/content", Type is "ATTRIBUTE", Archetype id is "openEHR-EHR-COMPOSITION.report.v1", and Cardinality is "(0..\*)".