

# Interoperability and the EHR: The role of archetypes

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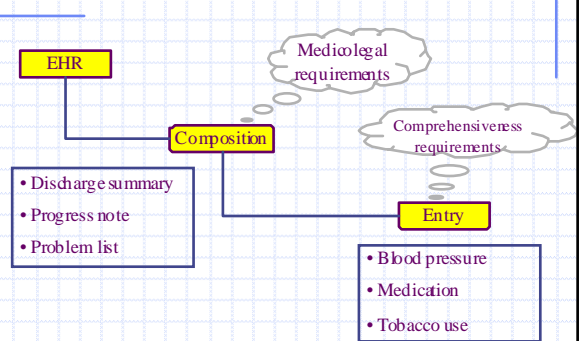
HL7



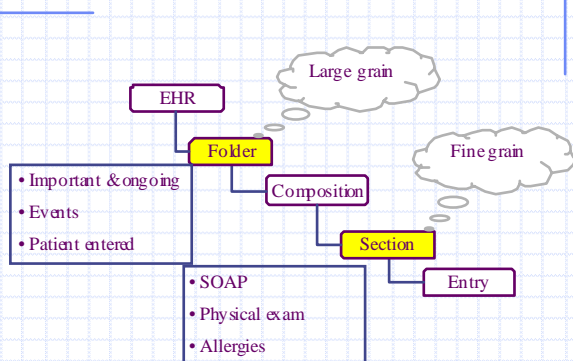
## Logical building blocks of the EHR

<b>EHR</b>	The electronic health record for one person
<b>Folders</b>	High-level organisation of the EHR eg. per episode, per clinical speciality
<b>Compositions</b>	Set of entries comprising a clinical care session or document eg. test result, letter
<b>Sections</b>	Clinical headings reflecting the workflow and consultation/reasoning process
<b>Entries</b>	Clinical "statements" about Observations, Evaluations, and Instructions
<b>Clusters</b>	Compound entries, test batteries eg. blood pressure, full blood count
<b>Elements</b>	Element entries: leaf nodes with values eg. reason for encounter, body weight
<b>Data values</b>	Datatypes for instance values eg. coded terms, measurements with units

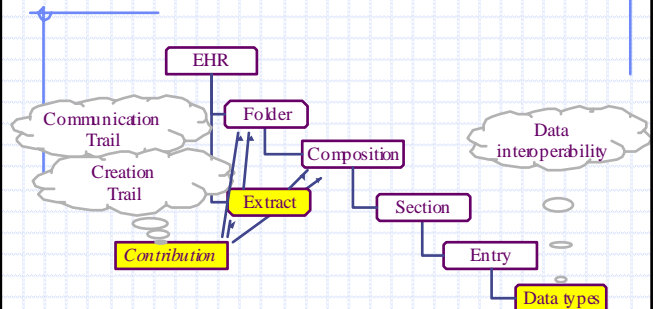
## Information Model



## Organisation



## Technical





## Logical building blocks of the EHR

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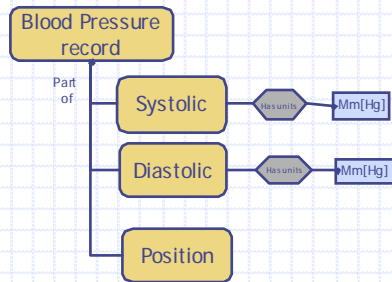


## Knowledge

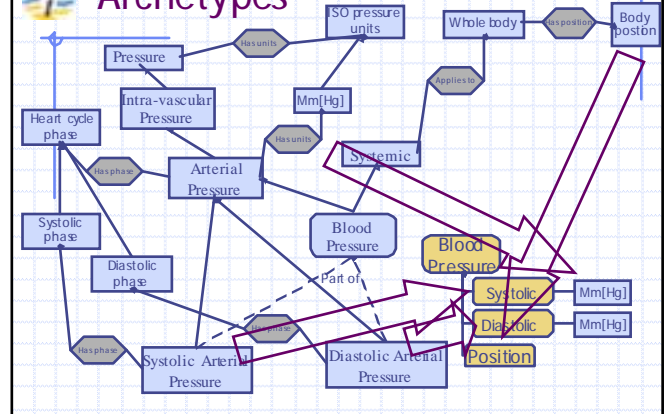
- Reference model
  - Information
  - Record management
  - Medico-legal accountability
- Archetypes
  - Context, the question
- Leaf values
  - The answer



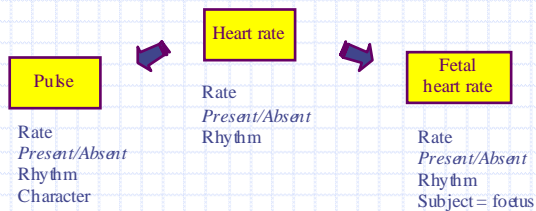
## Archetypes



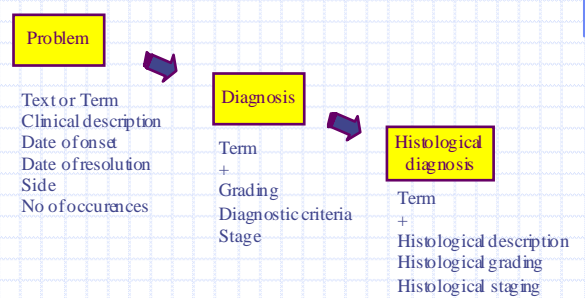
## Archetypes



## Specialisation of archetype

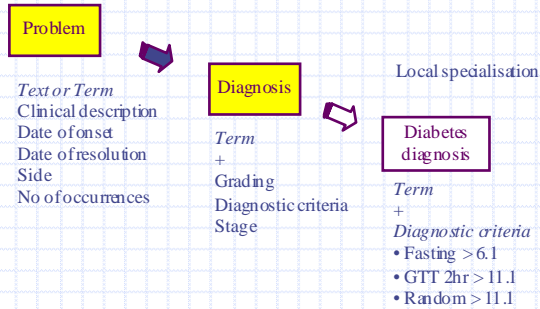


## Specialisation of archetype





## Specialisation of archetype



## Defining features

- They mean something to clinicians
- Clinicians want to share this information
  - in a manner that ensures it can be automatically processed



## Defining features

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  - Discrete concepts
  - Whole concepts
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## Defining features

- They mean something to clinicians
    - Discrete concepts
    - Whole concepts
  - Clinicians want to share this information in a manner that ensures it can be automatically processed
    - Decision support
      - Order entry
    - Reporting
- USEFUL
- RE-USE



## Defining features

- For each clinical model
    - Constraints on an information model
      - ♦ Structural constraints
        - List, table, tree
      - ♦ Compositional constraints
    - Content constraints
      - ♦ What labels can be used
      - ♦ What data types can be used
      - ♦ What values are allowed for these data types
- Terminology



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- Data dictionary

WARNING – GEEK SLIDE!



## Characteristics of an Archetype

- Defines valid data configurations
- Informed by terminology
- Authored by domain specialists using tools
- Saved as document
  - XML instance
  - Specific language
- Used by systems to control creation and validation of data, and to perform querying



## How to find them

- Maximise use
  - Create a small set that covers 80% of interoperability requirements
- Maximise re-use
  - Maintain knowledge around archetypes
    - Knowledge base of archetypes
- Minimise complexity
  - Specialisation
  - Templates



## How to find them

- Use sections when context unnecessary
  - E.g. Physical examination
- Recognise relationships
  - Kind of (is a)
    - ♦ BP in general, Pressure in catheter lab
    - ♦ Pulse and heart rate
  - Part of (in a)
    - ♦ Heart rate and ECG



## How to find them

- Look for important and useful concepts
  - Therapeutic precautions
    - ♦ Adverse reactions
    - ♦ Allergies
    - ♦ Preferences
    - ♦ Refusal
  - Problem list, Ongoing medication, ? Past Rx
  - Risks, Care plans, Targets...

WARNING – GEEK SLIDE!



## Distinct Domain Concept

- Each Archetype describes a distinct, whole clinical concept as represented in an ontology
- Archetypes may provide generic models that rely on terminologies in use
- Archetypes need to be individually identified and managed



## What archetypes can do!

- Dictate what elements are mandatory or optional within each building block
- Limit a transaction to specific contents
- Set the terms that may be used at a particular point in an entry
- Set the normal ranges for a particular content
- Dictate how the information is organised within a transaction
- Validate data entry
- Can be specialised locally



## How to build them

- Use tools...



## Physical examination

- Observe
- Palpate
- Percuss
- Move
  - Active
  - Passive
- Auscultate
- Test senses
  - Sensation
  - Vision
  - Hearing
  - Smell
  - Taste
- Test function
  - CNS -reflexes, power
  - Resp – peak flow



## Physical examination

- General – ‘Chest normal’, ‘Chest clear’
- Specific – ‘Slight tenderness over the medial joint space of the right knee when the knee is fully flexed’
- Organised differently
  - System e.g. CNS, Cardiovascular
  - Anatomically e.g. Chest, Abdomen
  - Functionally e.g. Vision, home assessment of aged
  - Situation e.g. Febrile child



## Specialisation of archetypes

- More specific constraints
- Obeys all rules of parent archetype
- International -> national -> regional -> local
- Generalist -> specialist -> subspecialist -> technician
- Untested at present



## How to approach the problem?

- Separation of Concerns
- Separation of Viewpoints
- Separation of Knowledge and Information
- Abstraction
- Re-use of models and software components



## Key components

- Knowledge representation
- Terminology
- Services
- Interface specification
- Generic information model



## Key archetypes

- Problem/Issue
  - Diagnosis
    - ◆ Histological
  - Genetic diagnosis
  - Accident or Injury
- Therapy
  - Medication order
  - Chemotherapy
  - Prescription
- Labs (generic pathology)
  - Battery
  - Non-battery
- Therapeutic precautions
  - Adverse reaction
    - ◆ Allergy
  - Personal factors
  - Personal preferences
- Pregnancy
  - Including breast feeding
- Procedures
- Family history



Thank you,

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