A sustainable European roadmap for semantic interoperability

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on behalf of the SHN Consortium

Drivers for trans-border information and knowledge sharing

- **Cross-border health care**
  - emergency care
  - elective care
  - consistent care pathways and standards of care
- **Population health**
  - public health measures: prevention, immunisations etc.
  - detecting and tracking critical events: antibiotic resistance, infectious outbreaks, bio-terrorism etc.
- **Comparisons**
  - treatment effectiveness
  - clinical outcomes
  - safety signals
- **Research**
  - epidemiology
  - multi-national clinical studies
- **Common products and services**
  - cross-border EHR systems and services
  - consistent implementation of clinical guidelines and decision support

Many incompatible standards and specifications

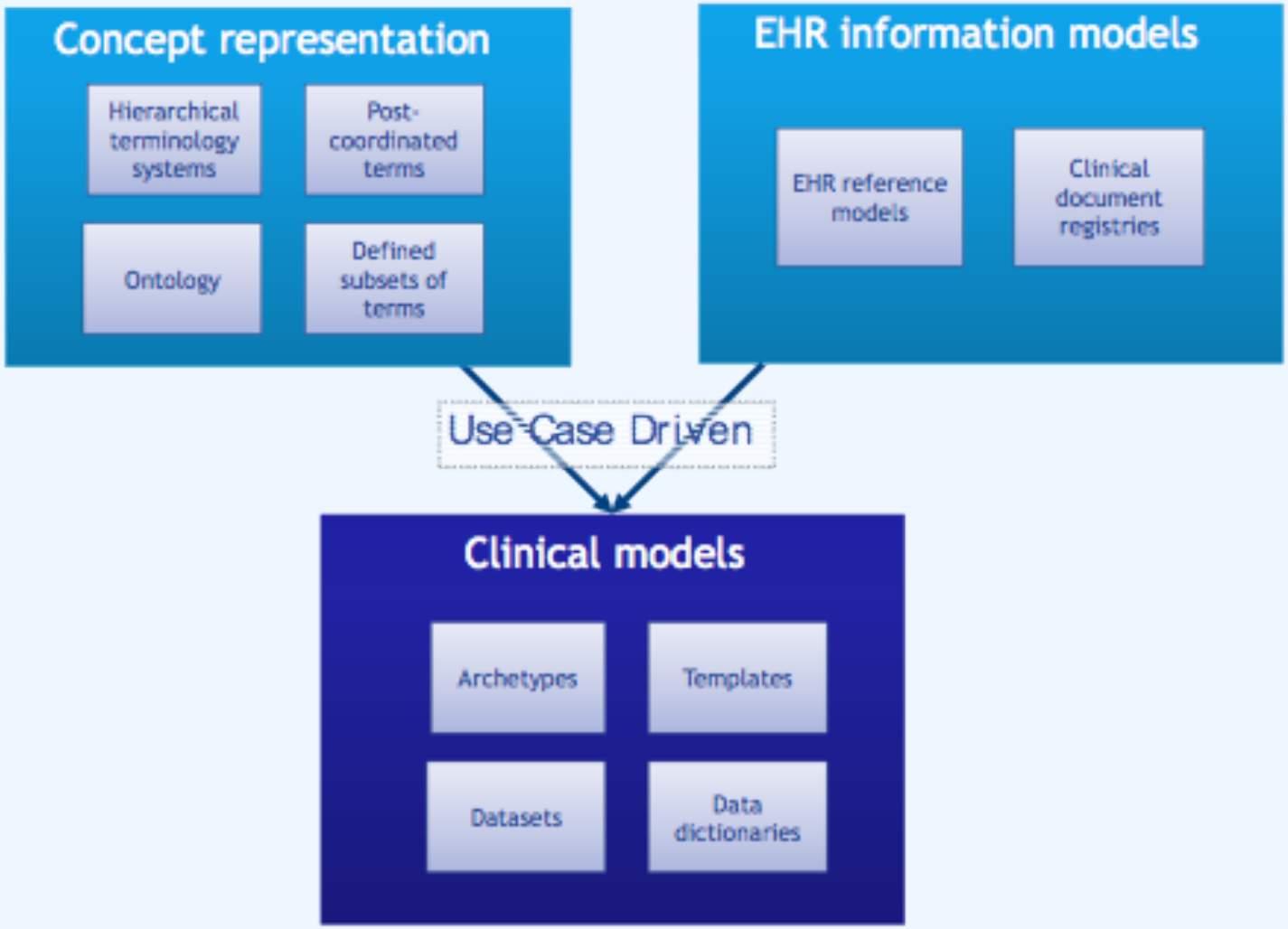


Figure 5 - Overview of artefacts used to represent clinical meaning

Source: The Vision of the eHealth European Interoperability Framework (2013), Deloitte and DG Connect

The challenge of semantic interoperability

- A global and singular representation for each distinct clinical expression is not realistic, and may not be desirable
  - different representations might be optimal for different use cases
  - different levels of detail, different levels of granularity, different kinds of data entry options might be suitable for different clinical settings
  - clinical practice is too diverse, and evolving, for such fine grained standards to be set or adopted
  - different cultures, and natural languages, may need to represent clinical meaning differently
  - patients and carers might need to enter and read a different level of jargon from health care professionals

SemanticHealthNet

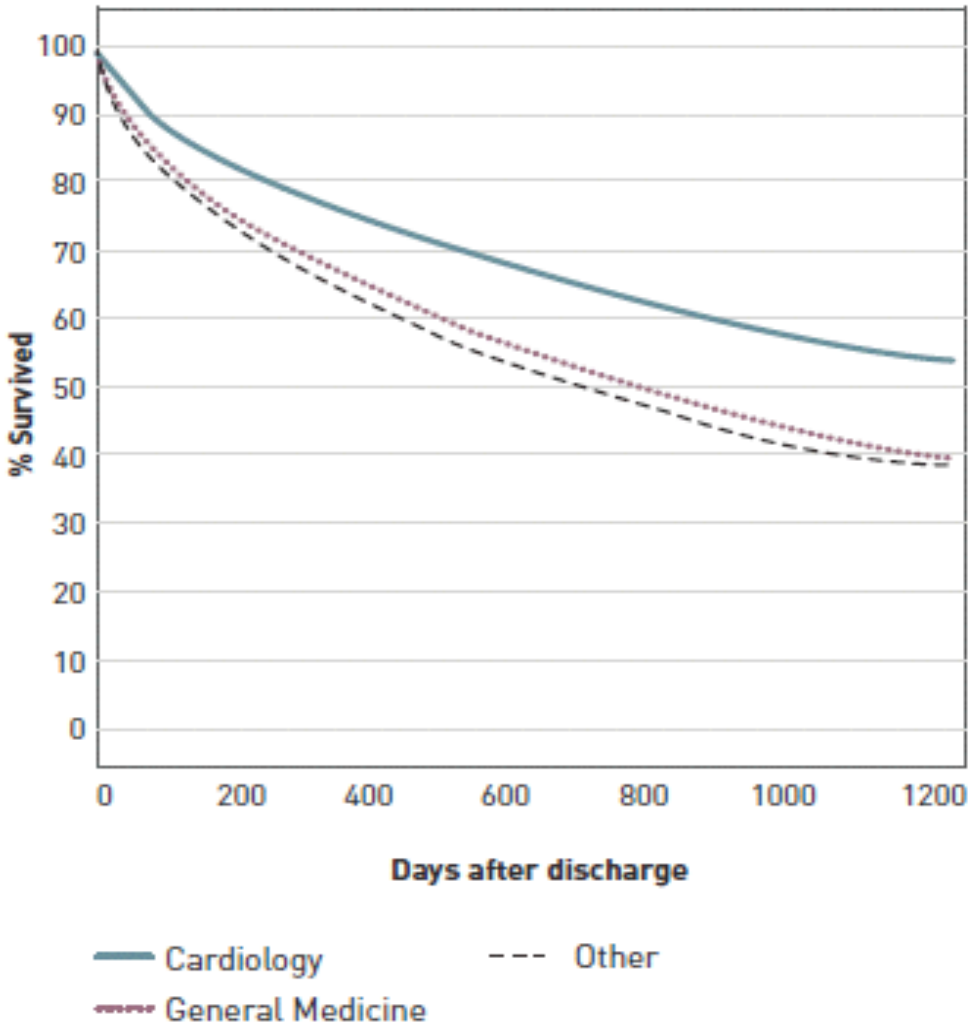
- European Commission sponsored
  Network of Excellence on Semantic Interoperability
  - 2011 to 2015
  - 3m Euro
  - 17 Partners
  - > 40 internationally recognised experts

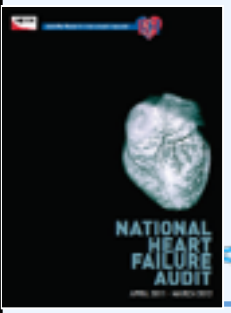
SemanticHealthNet concept and objectives

- Leverage a clinically-driven work-plan
  - heart failure, exemplifying chronic disease management, evidence based care and shared care: focus on individuals who are patients
  - cardiovascular prevention, exemplifying public health and national / global strategies: focus on populations who are citizens
- Bring together the globally best of breed semantic resource producers including commitment from the top SDOs
- Draw on a rich body of expertise including past EU projects in the EHR, semantics, semantic interoperability, wide-scale record sharing and eHealth governance + the new projects
- Maximise stakeholder engagement and resourced commitment to ensure we focus on usable and useful and affordable solutions
- Robust business approach: people, processes, products, platforms
- Develop a scalable, sustainable, well-governed European Virtual Organisation for semantic interoperability

Mortality for patients hospitalised with HF

- Inpatient Mortality 11.1%
  - Cardiology ward 7.8%
  - General medical 13.2%
  - Other ward 17.4%

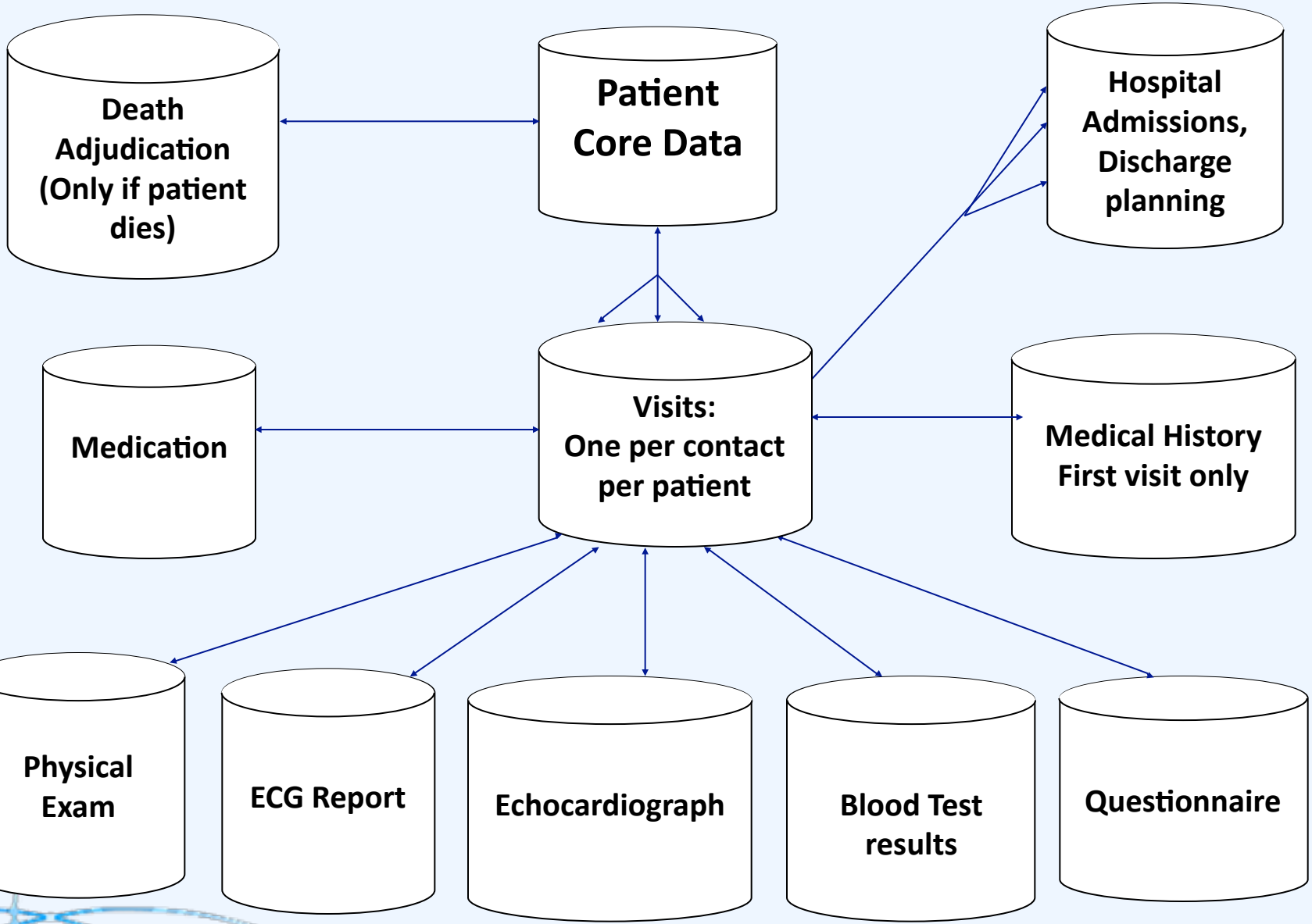




Source: John Cleland, Suzanna Hardman, SHN WP1

SemanticHealthNet

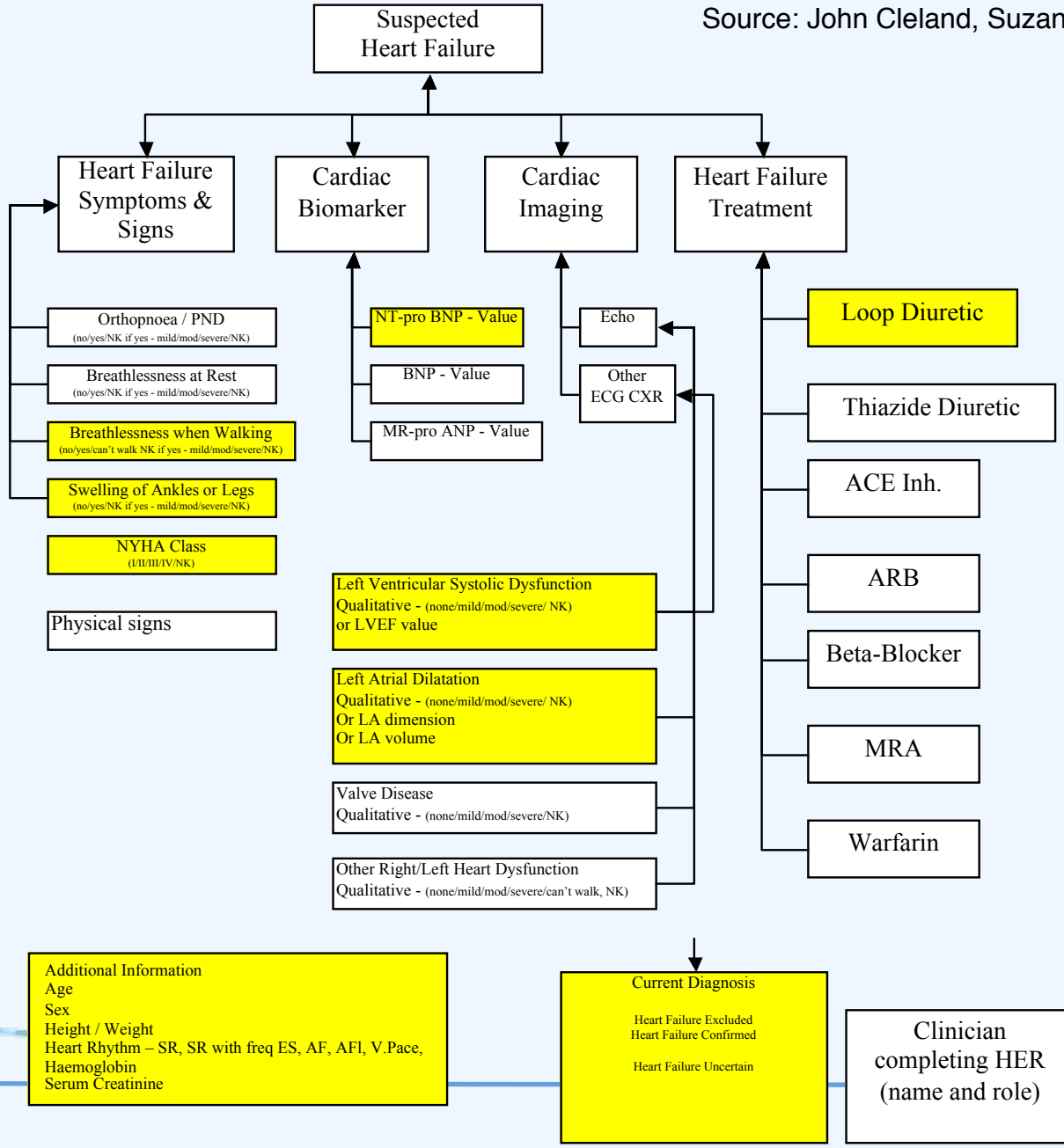
The HF Information Landscape



Source: John Cleland, Suzanna Hardman, SHN WP1

Is it heart failure? Key information for diagnosis

Source: John Cleland, Suzanna Hardman, SHN WP1

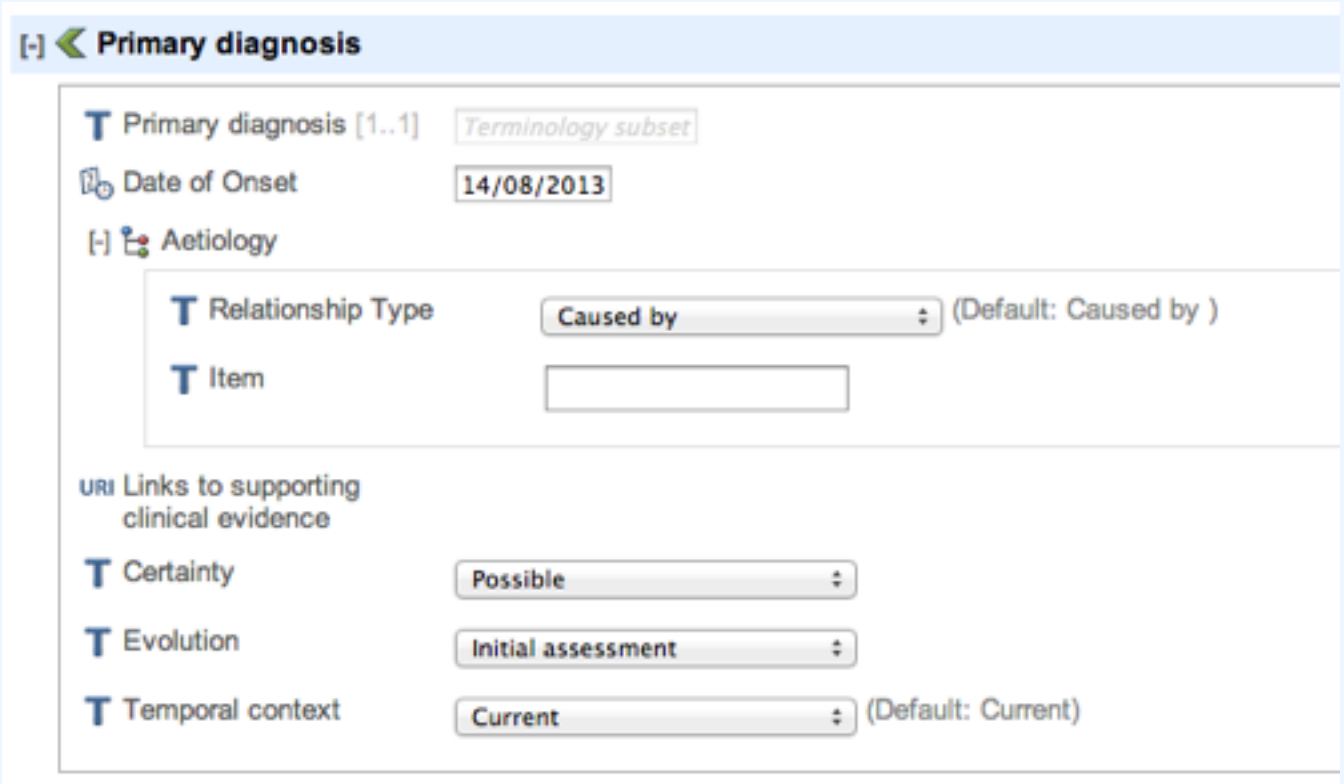


SHN standards, specification and profiling expertise

- Continua Health Alliance
- EN13606 Association
- HL7
- IHE
- IHTSDO
- openEHR Foundation
- WHO

- Academic expertise: ontology, guideline representation
- Industry expertise: EHR system vendors
- Adoption, quality labelling, dissemination: EuroRec, ESC, public health
- Sustainability: EuroRec, eHGI, Ministry experts, health insurers

Interoperable representations for diagnosis: archetype, OWL DL



shn:DiagnosisRecord **subClassOf** **(D1)**

shn:InformationItem and

and **shn:hasInformationObjectAttribute** some *shn:CertaintyAttributeC*

and **btl:outcomeOf** some *shn:DiagnosticProcedureD*

and **btl:outcomeOf** some (*shn:Interpreting* and **btl:hasparticipant** some *shn:EvidenceE*)

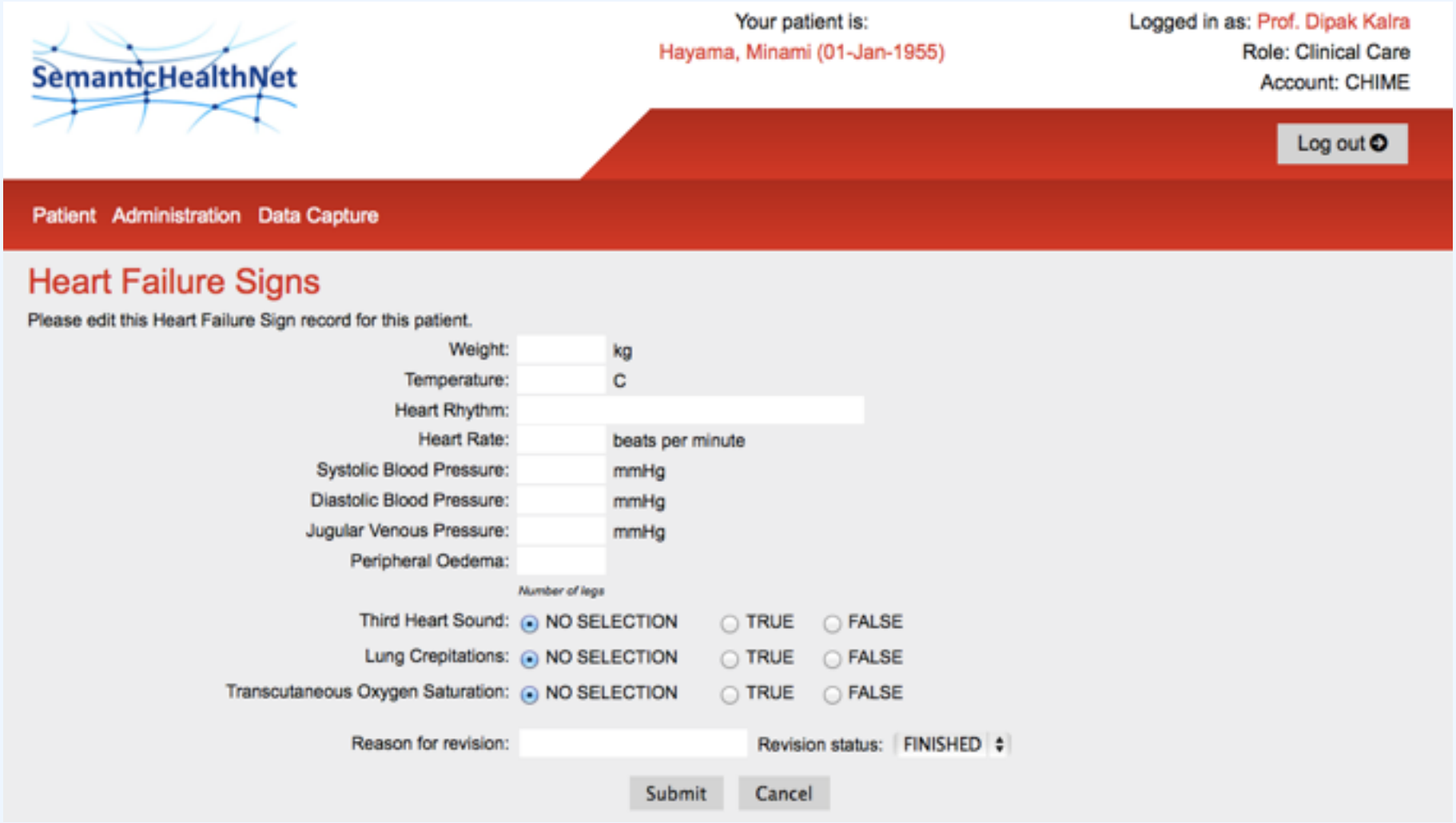
and **shn:isAboutSituation** only

(*shn:ClinicalSituationX* and

and **btl:temporallyRelatedTo** some *shn:TimeT*

and **btl:causedBy** some *shn:ClinicalSituationXY*)

Example clinical screen - to assist with clinician feedback



Source: Tony Austin, Shanghua Sun, WP1

Industry “soundbites”

- Slowly but steadily industry is realising the importance of semantic interoperability, although many don't understand fully what this involves.
- SI will ... increase the Business Intel capabilities and make our systems more competitive.
- Industry lacks a clear growth path and guidance on the implementation of semantic interoperability.
- As long as industry is not actively involved in engineering the solution, the whole effort is deemed to fail.
- SI will benefit the user much more than the vendor but in the long run it will increase competition and therefore improve the quality and competitiveness of the systems.

SHNet sustainability activities

- Work with the clinical, public health and patient stakeholders to define a formal process for the **governance** of semantic interoperability resources
- Design an overall **infostructure** (a virtual platform and services) that can **publish or reference** resource "bundles" and manage their maintenance
- Specify how EHR systems, public health systems, CRO systems etc. should ensure consistent and **verifiable adoption** of semantic interoperability resources
- Develop a **business plan for certifying** semantically interoperable systems
- Liaise with industry, professional bodies, ministries, insurers, SDOs on **business drivers and incentives** to foster rapid adoption of semantic interoperability resources and certification of such systems

Thank you

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