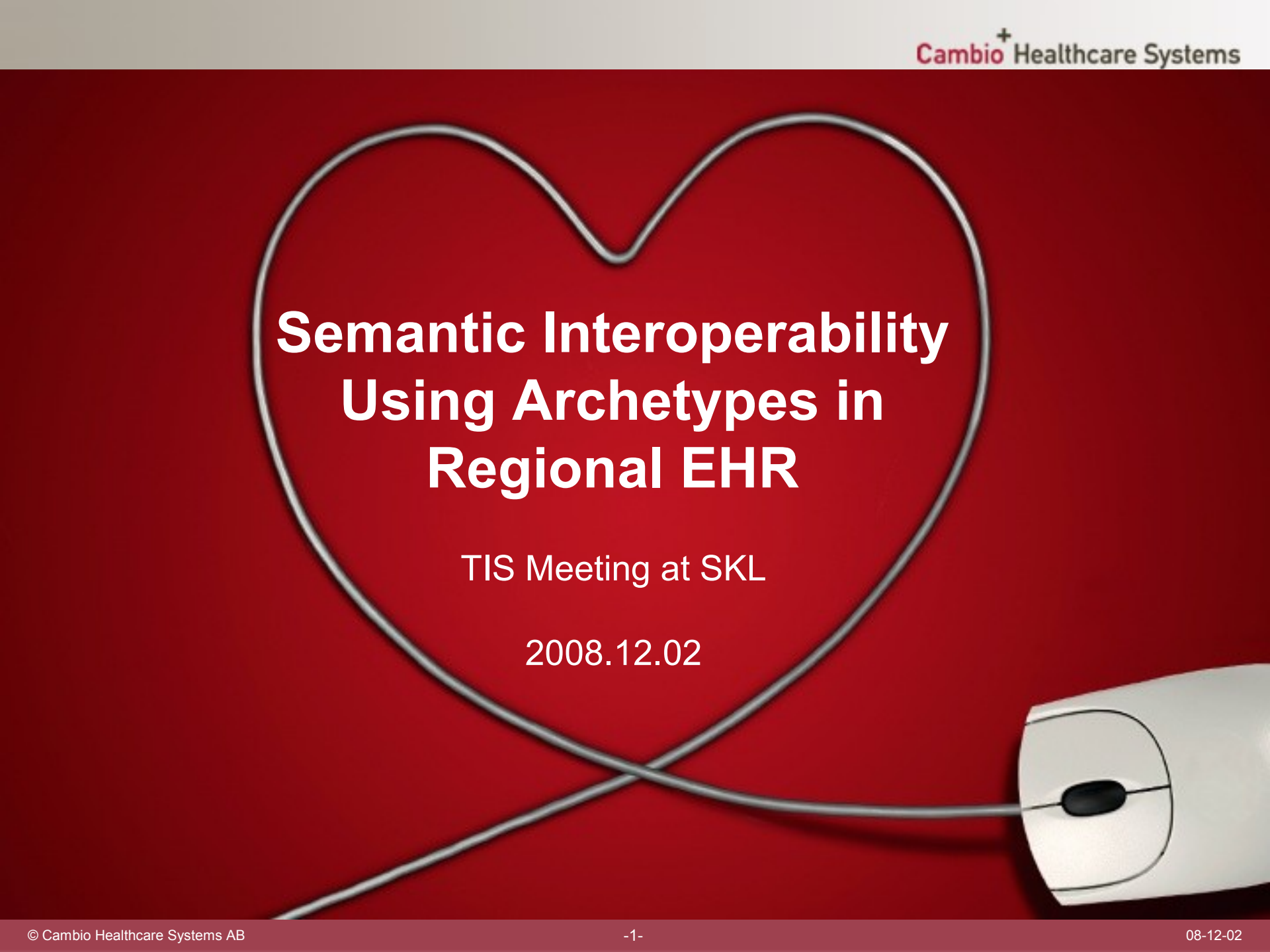
Semantic Interoperability Using Archetypes in Regional EHR

TIS Meeting at SKL

2008.12.02



Dr. Rong Chen

Chief Medical Information Officer

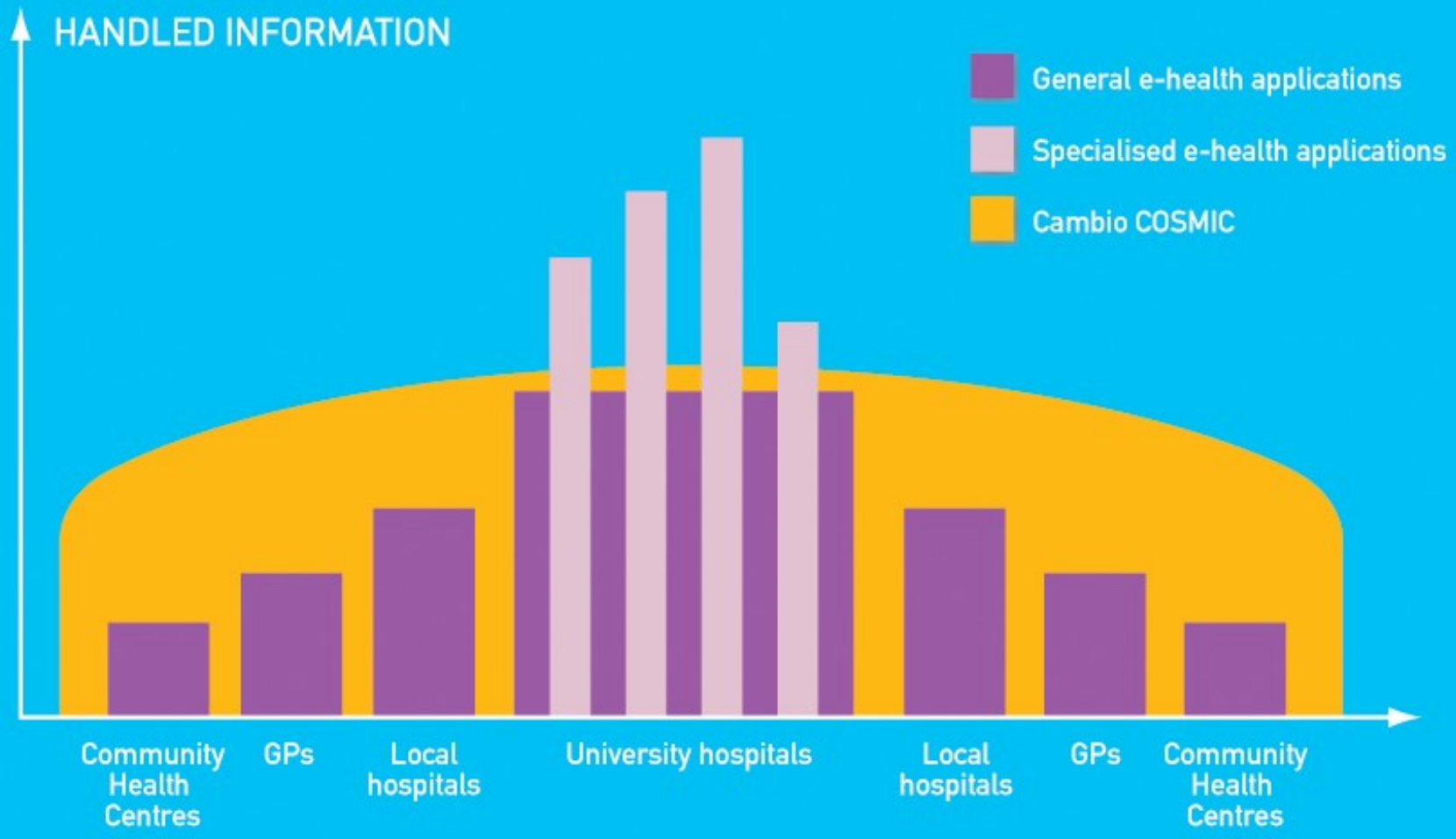
- Medical Doctor
- PhD Candidate (EHR semantic interoperability)
- Implementing *open*EHR since 2004
- Lead of the *open*EHR Java Implementation Project since 2005
- Member of the Architecture Review Board at the *open*EHR Foundation since 2008
- +10 years in e-Health

CAMBIO – the company

- In e-Health since 1993
- Turnover 14 M€ and 170 employees

- More than 70 000 licensed users
- Present in Sweden, Denmark and the U.K.
  - –Expanding into the Netherlands
- Leader in regional EHR
  - – 8 Proven Regional installations

COSMIC Reality and CAMBIO'S Vision of Regional EHR



Towards Next Level of Functionality

- Both human users and IT-systems have to understand the meaning of the shared data
- **Semantic Interoperability** is the real challenge
- We think this can be achieved through **archetypes**

Cambio's Archetypes Initiatives

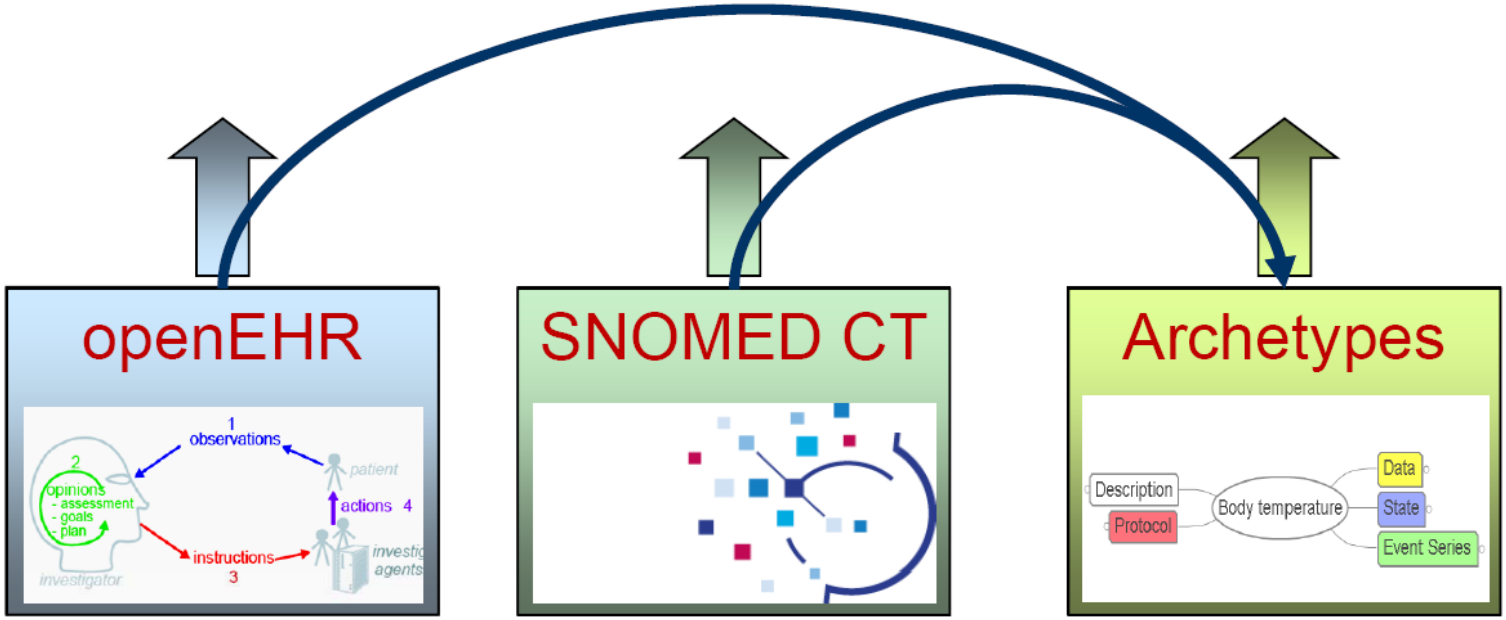
- **CEN** standardization: **EN13606** etc
- ***open*EHR**
  - Sponsor the ref. Java project
  - Member of **Architecture Review Board**
  - Participate in archetypes review process
- **OHT**, Open Health Tools
  - open source e-Health projects

Cambio's Archetypes Initiatives

- **Research Partnership with IMT (Linköping Univ.)**
  - Advanced EHR architecture & CDSS
  - Part of **NovaMedTech** consortium
- **Archetype-based Quality Registry**
  - Joint dev. by SKL & Uppsala in 2009
  - Archetypes based semantic layer
  - Advance analytic queries & knowledge discovery
- **Danish Archetype Trial-out project**
  - Digital Health Denmark (SDSD)

The three EHR pillars

EHR system
- exchanging and sharing data

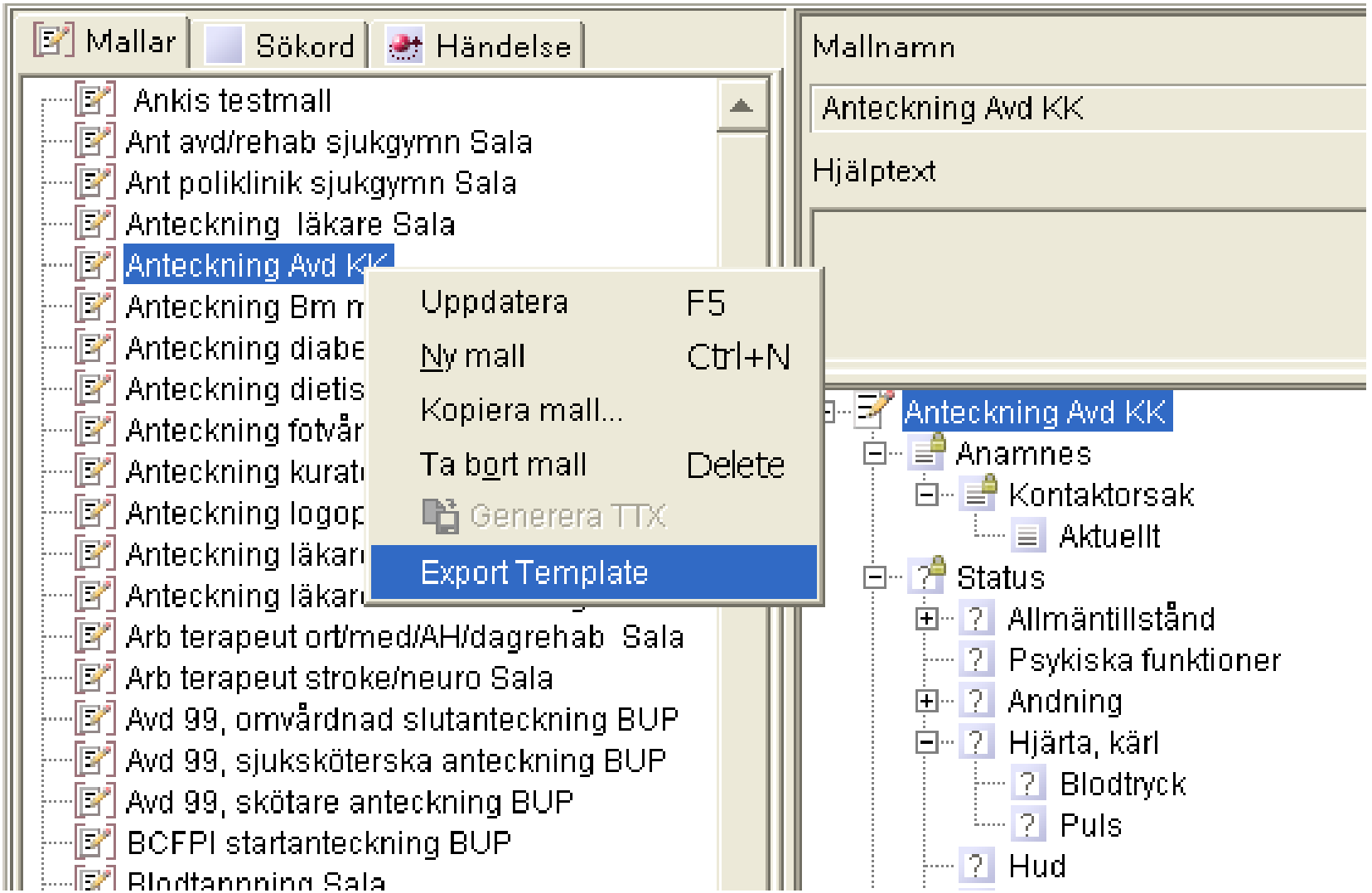


Background for the archetype project

- Clinical content documents and the lack of structure
  - A lot of descriptions produced for several years
- Need for a common format to ensure sharing and reuse of the clinical content
  - No agreement on a common format between the regions
- *openEHR* - archetypes
  - Many countries have shown interest (Sweden, UK, Netherlands….)
- Archetypes on the way to becoming a standard in ISO 13606 part 3

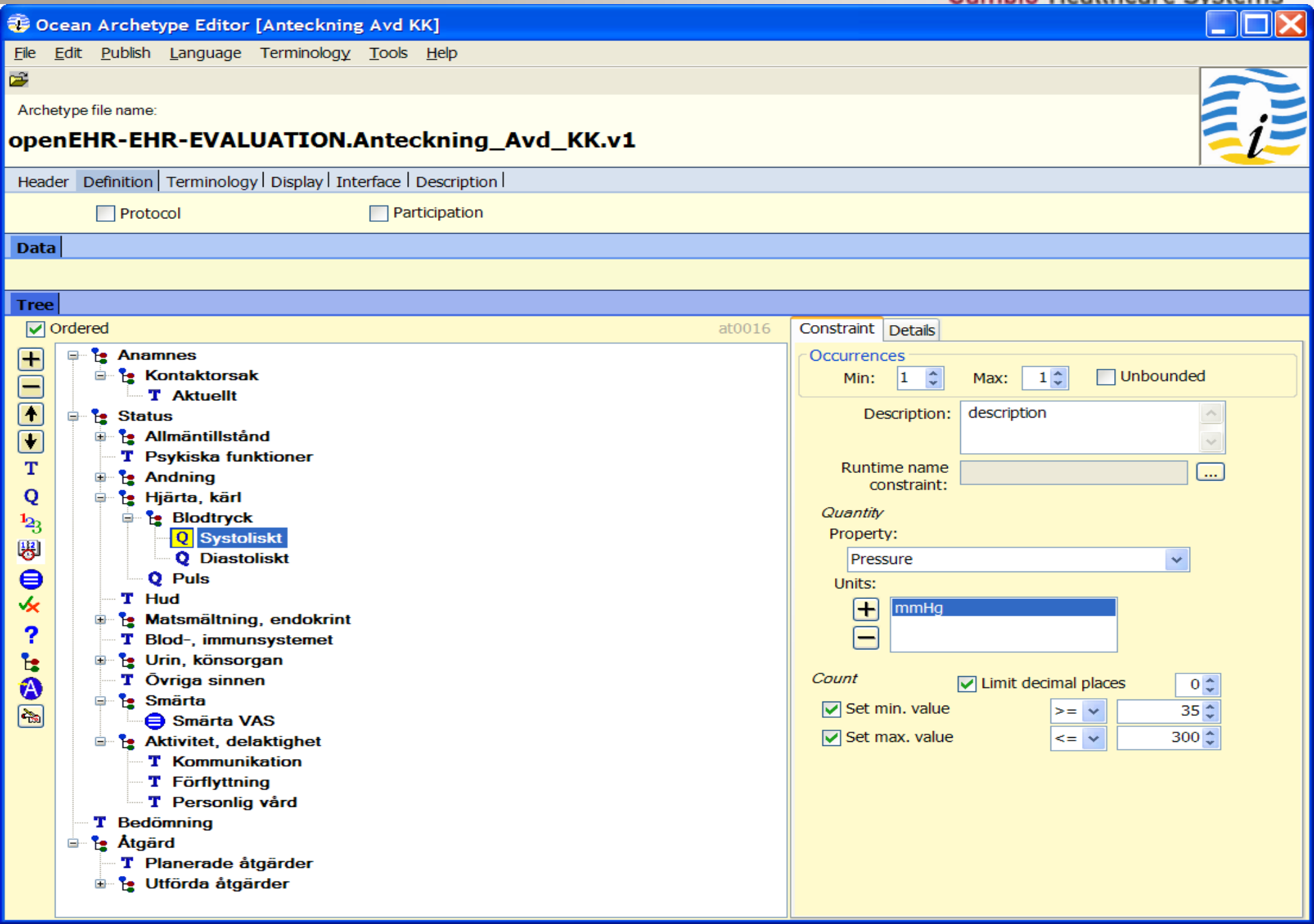
Standard aktivitet (SA)	Standard resultat (SR)	SR /værdi	SR /værdi	Kommentar
Planlægning	⇔ Booking kardiologisk amb.	Dato/klokkeslæt (tal-værdi)		
Undersøgelser	Blodprøver ⇔ LABKA*	Na	K	Tidsaspekt 3. mdr.
		Hgb	*INR	*Hvis AK behandling

Export COSMIC Template as Archetype



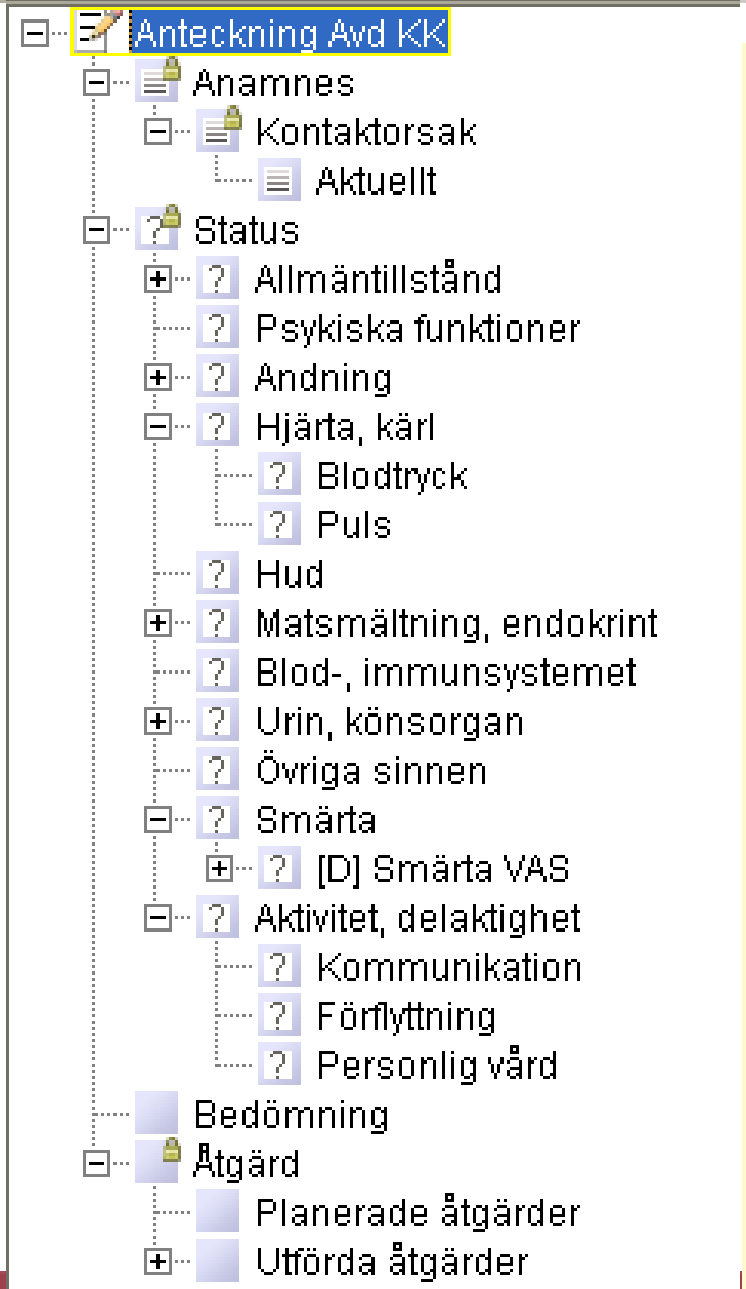
Exported COSMIC Template in Archetype Editor

Cambio Healthcare Systems



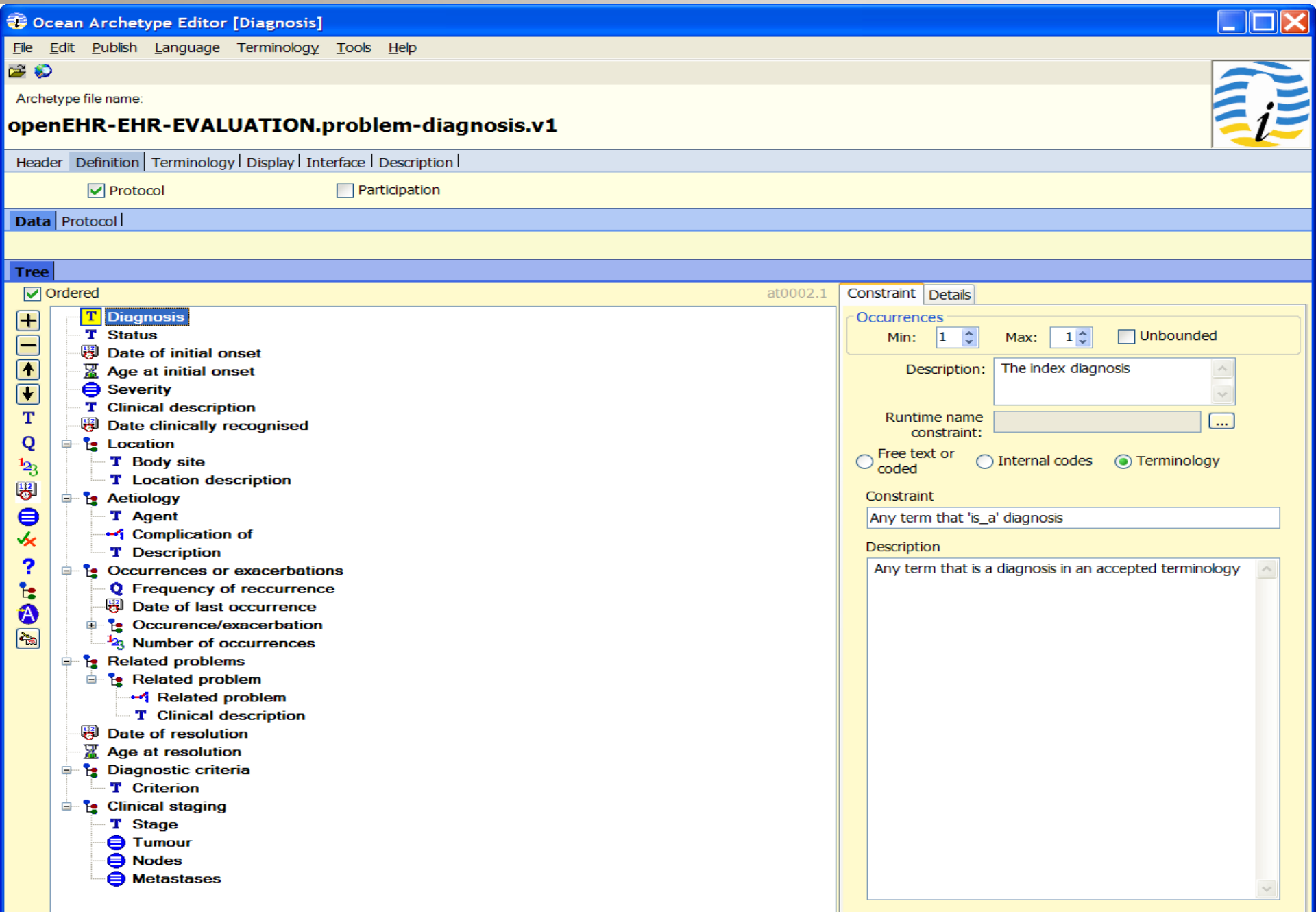
COSMIC Template & Archetype Side-by-side

Cambio Healthcare Systems



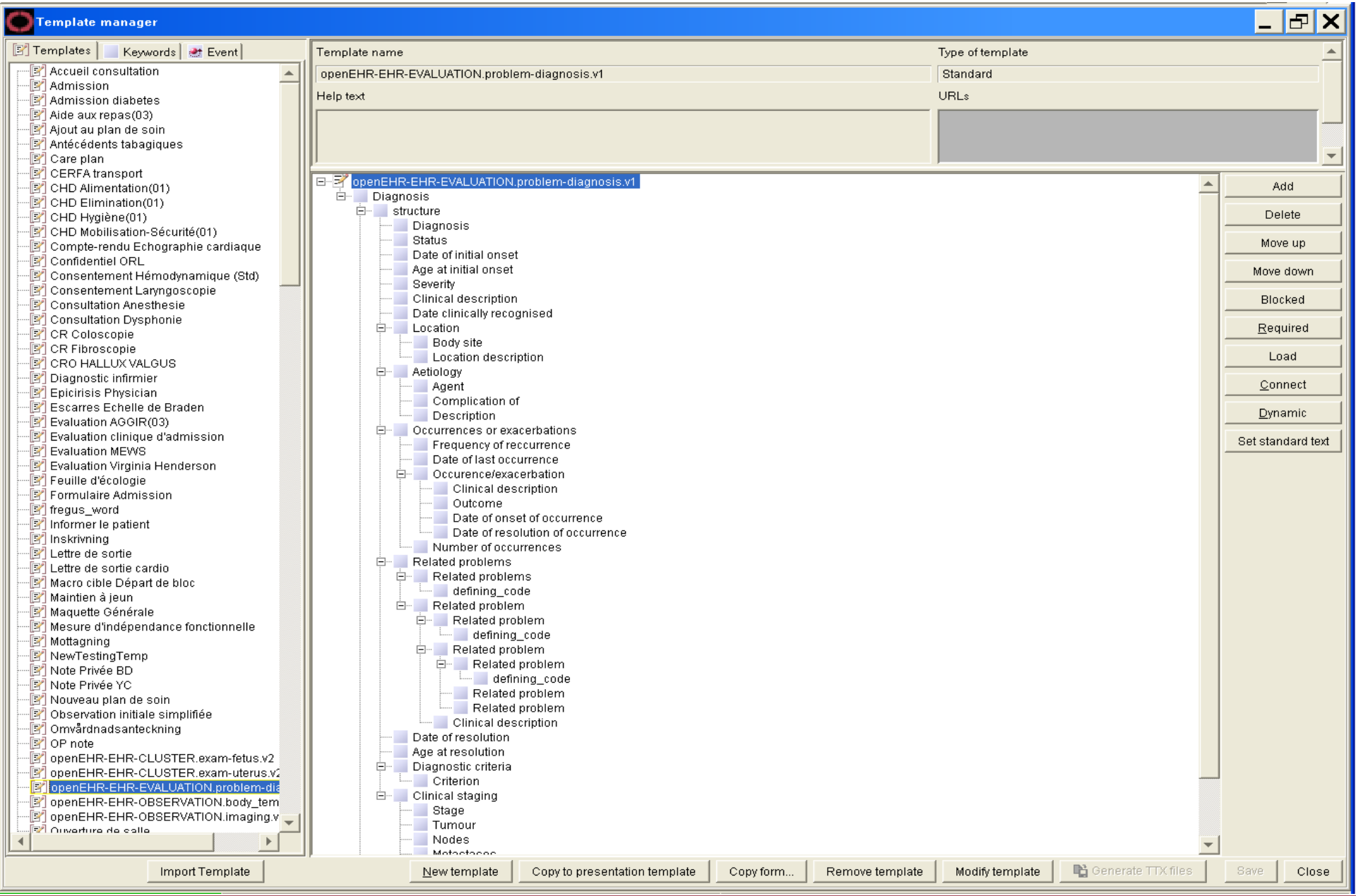
Archetype from Danish Archetype Project

Cambio Healthcare Systems

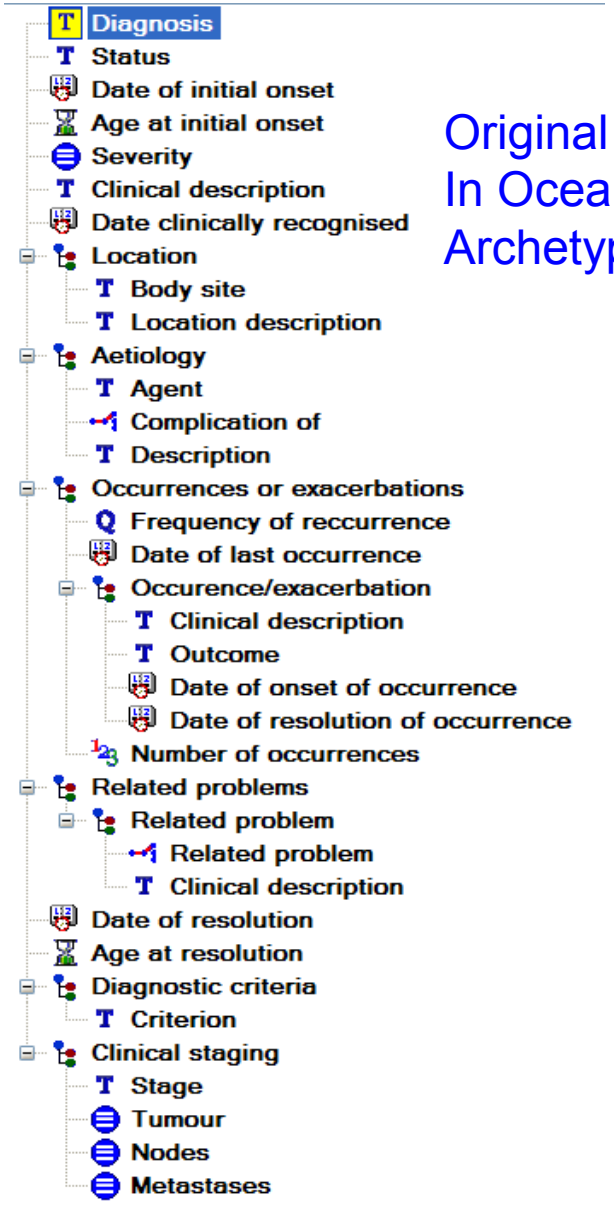


Imported Archetype as COSMIC Template

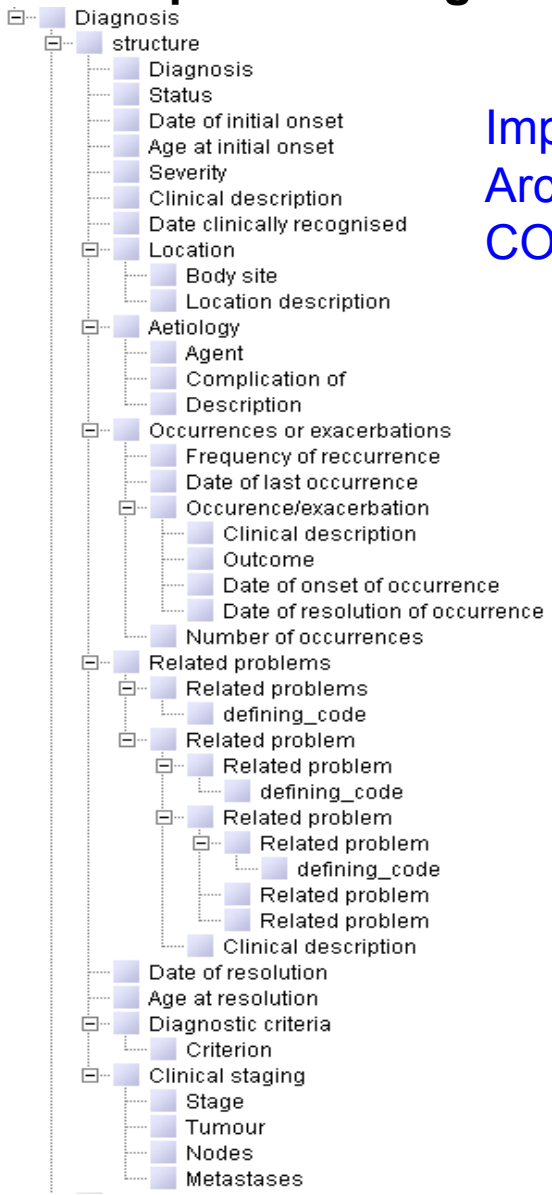
Cambio Healthcare Systems



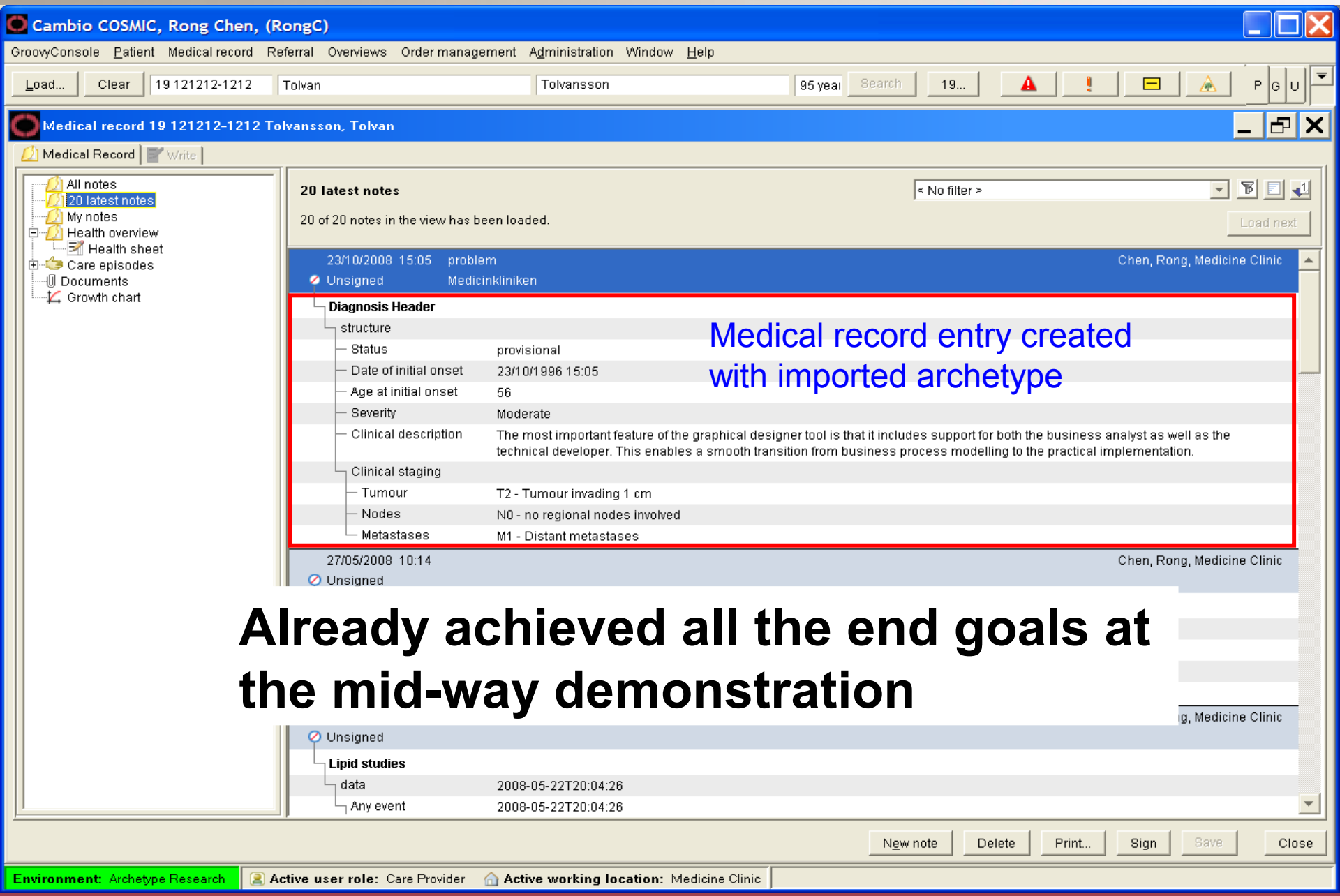
Archetype openEHR-EHR-EVALUATION.problem-diagnosis.v1



Original Archetype In Ocean Archetype Editor



Imported Archetype in COSMIC



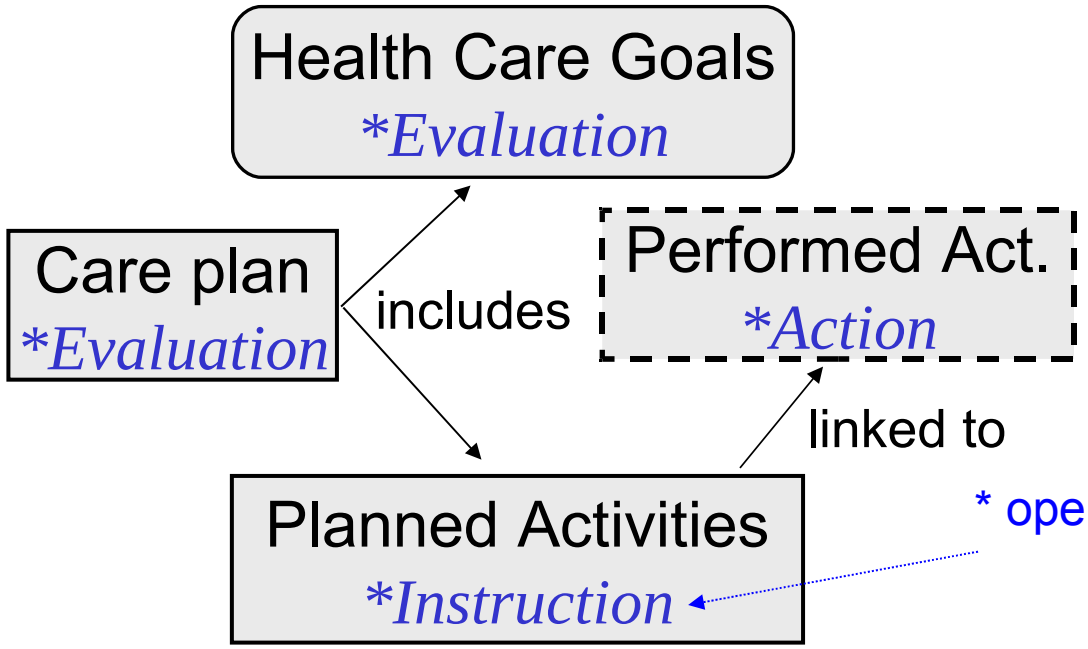
Already achieved all the end goals at the mid-way demonstration

Interoperable Care Plans

Rewarded Presentation at MI, Läkarstämman 2008.11.28

Concepts from **CONTsys** (EN13940, System of concepts to support continuity of care) the ***open*EHR** EHR Reference Model (RM) are used to represent care plans

- Goals (what)
- Planned activities (when & how)
- Performed activities (status)

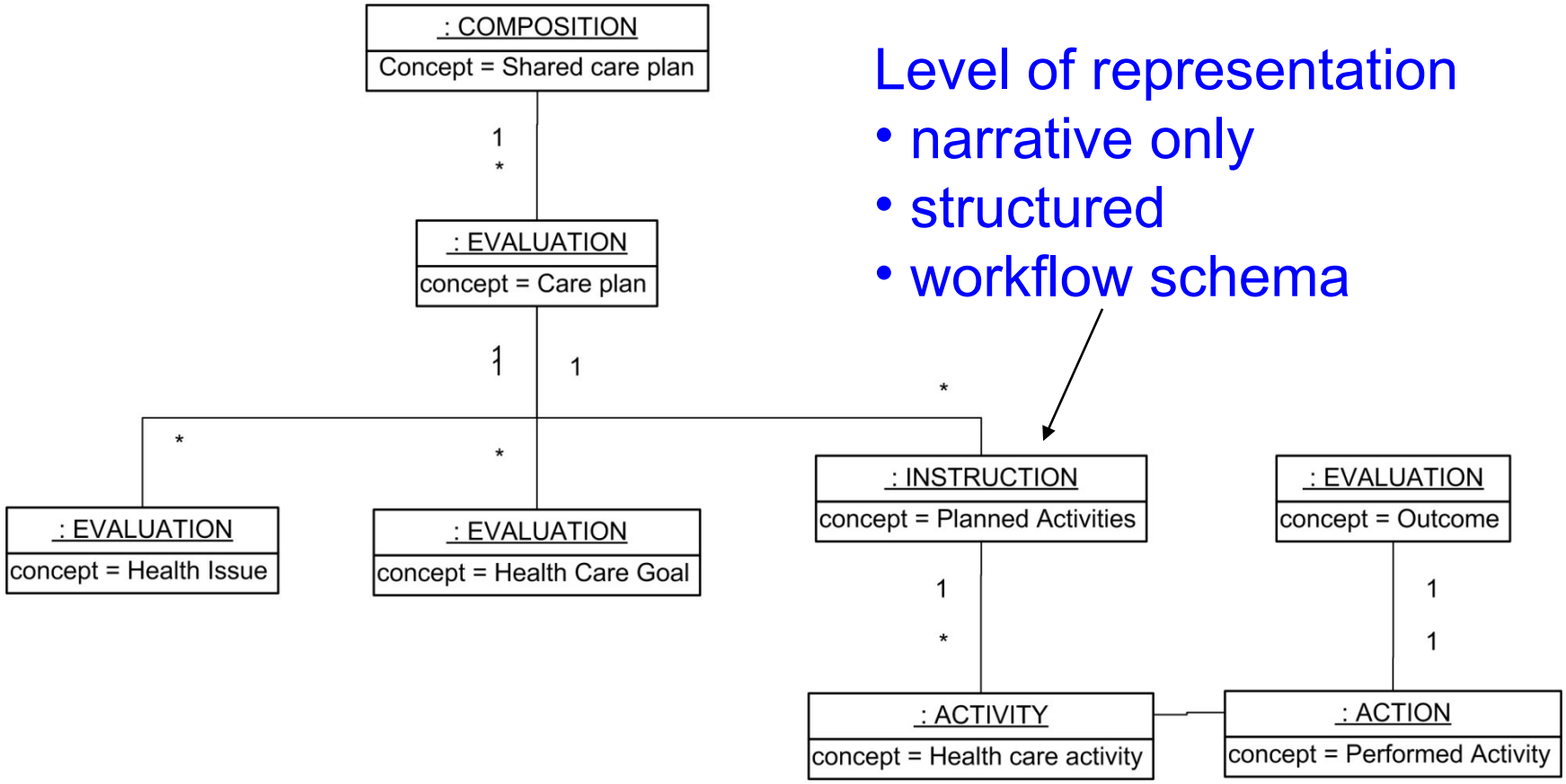


Advantages

- Improved Interoperability
- Enabling decision support
- Facilitating process support
- Reusable clinical models

* openEHR EHR model Entry types

Interoperable Care Plan in *open*EHR RM



Level of representation

- narrative only
- structured
- workflow schema

Clinical Decision Support

Elective

- links to literature that requires manual interpretation

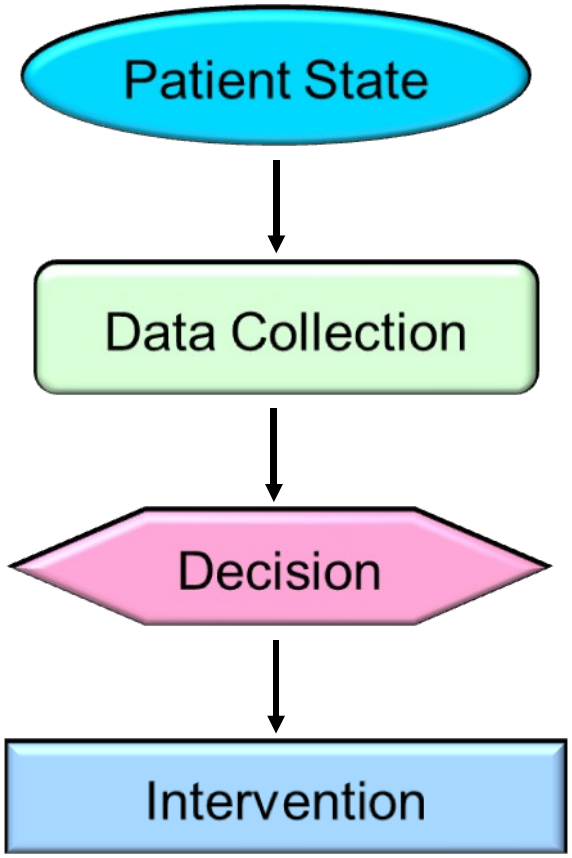
Passive

- templates for order sets, formularies & protocols
- simple rules for limited context based alerts

Active

- evidence-based clinical guidelines
- context sensitive alerts & reminders
- integrated with care process

Decision Support Benefited from Archetype Based Interoperability



EHR Queries

facilitated by

- Common EHR Model
- Archetype Based Queries
- Reusable Clinical Model

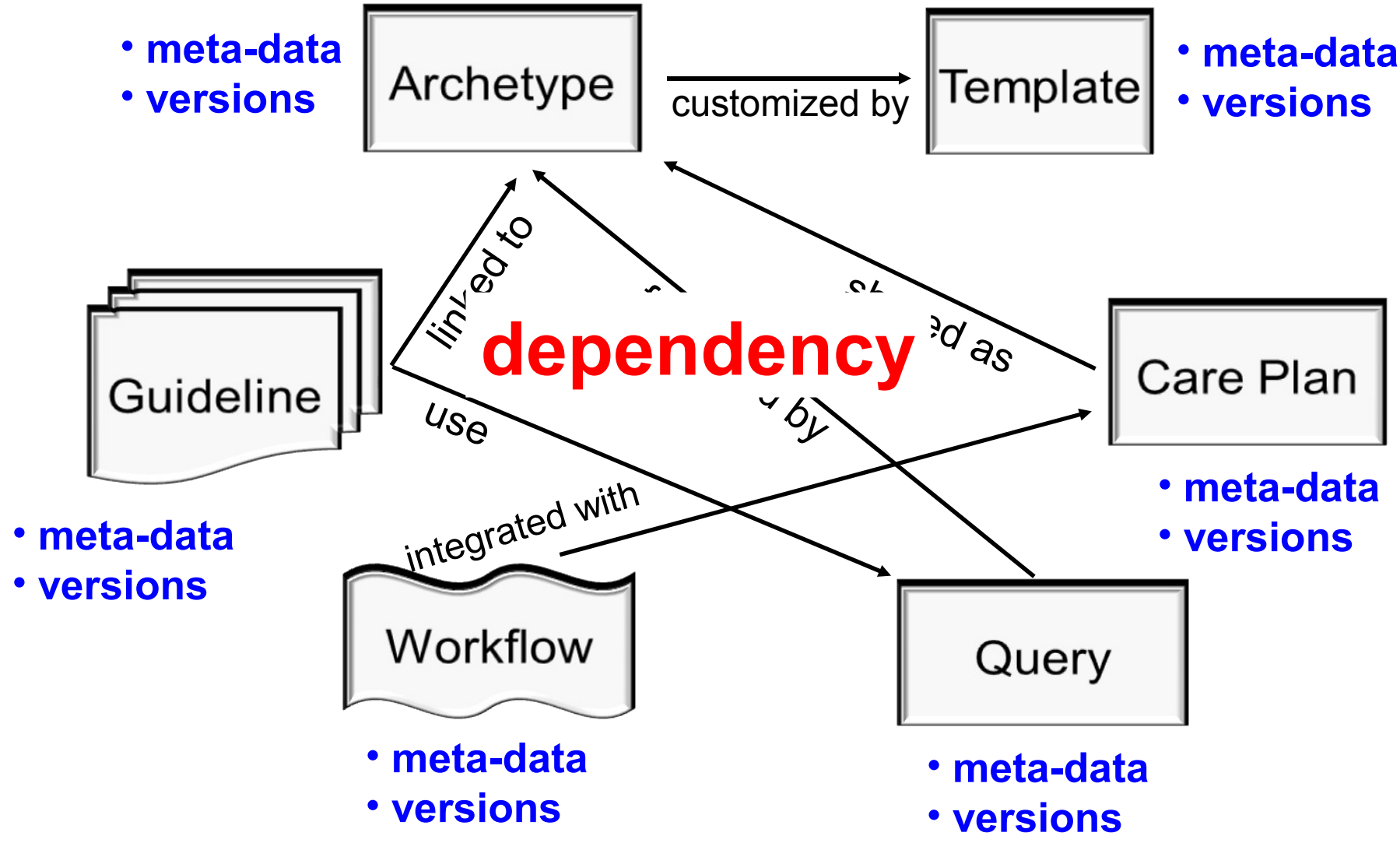
facilitated by

Instructions

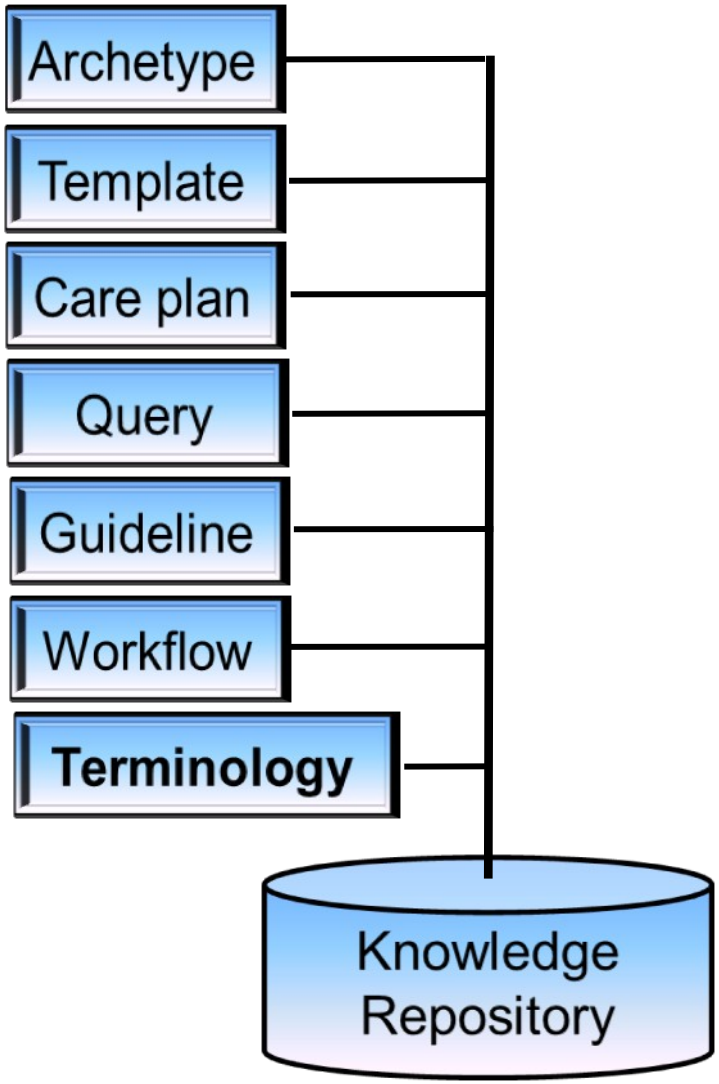
Guideline Representation Primitives

source: D. Wang et al. Int J Med Inform. 2002;68(1-3):59-70

Interrelated Knowledge Artefacts



Knowledge Management



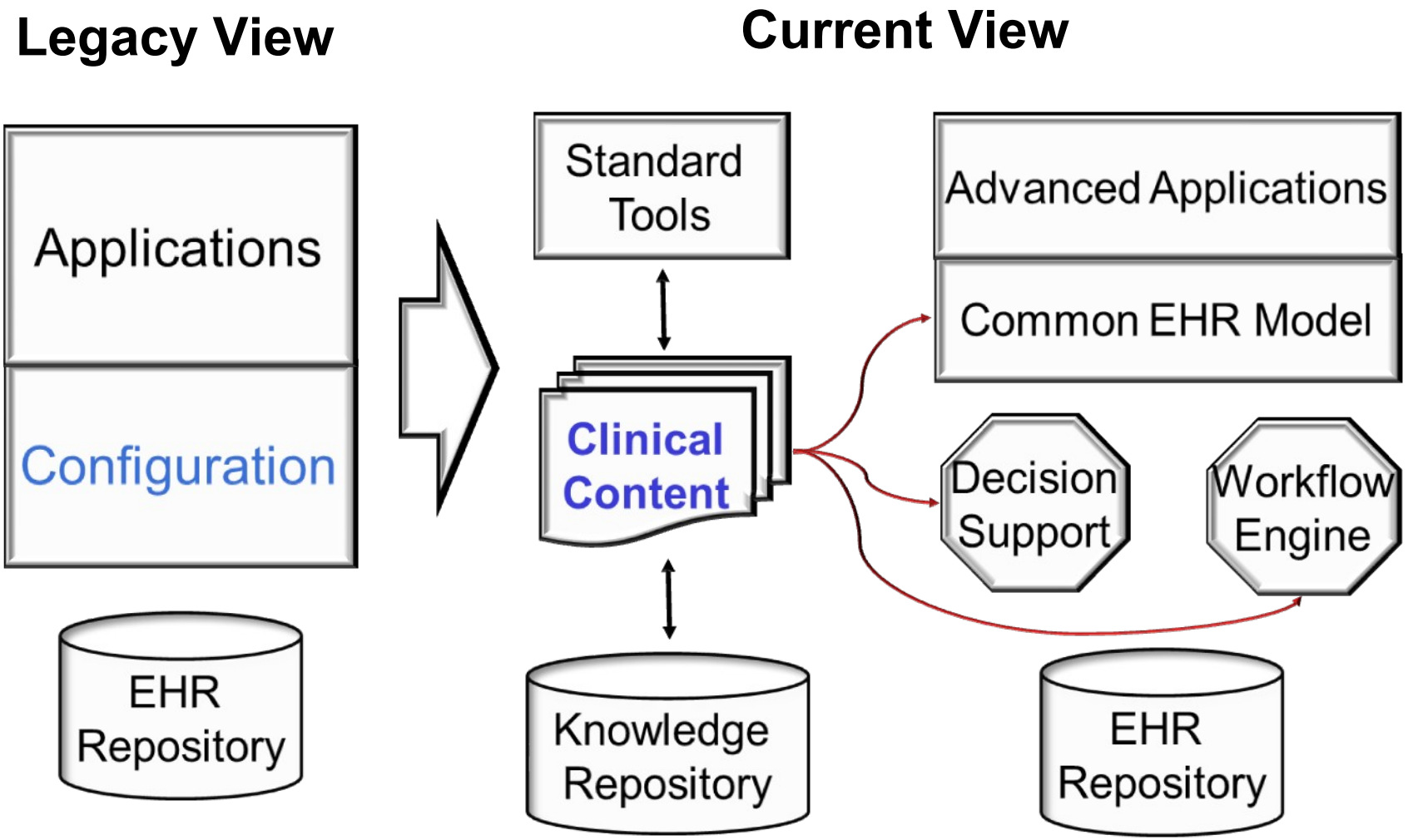
Features

- Indexing / searching
- Consistence checking
- Change management
- Release management
- Online authoring
- Exists at difference levels

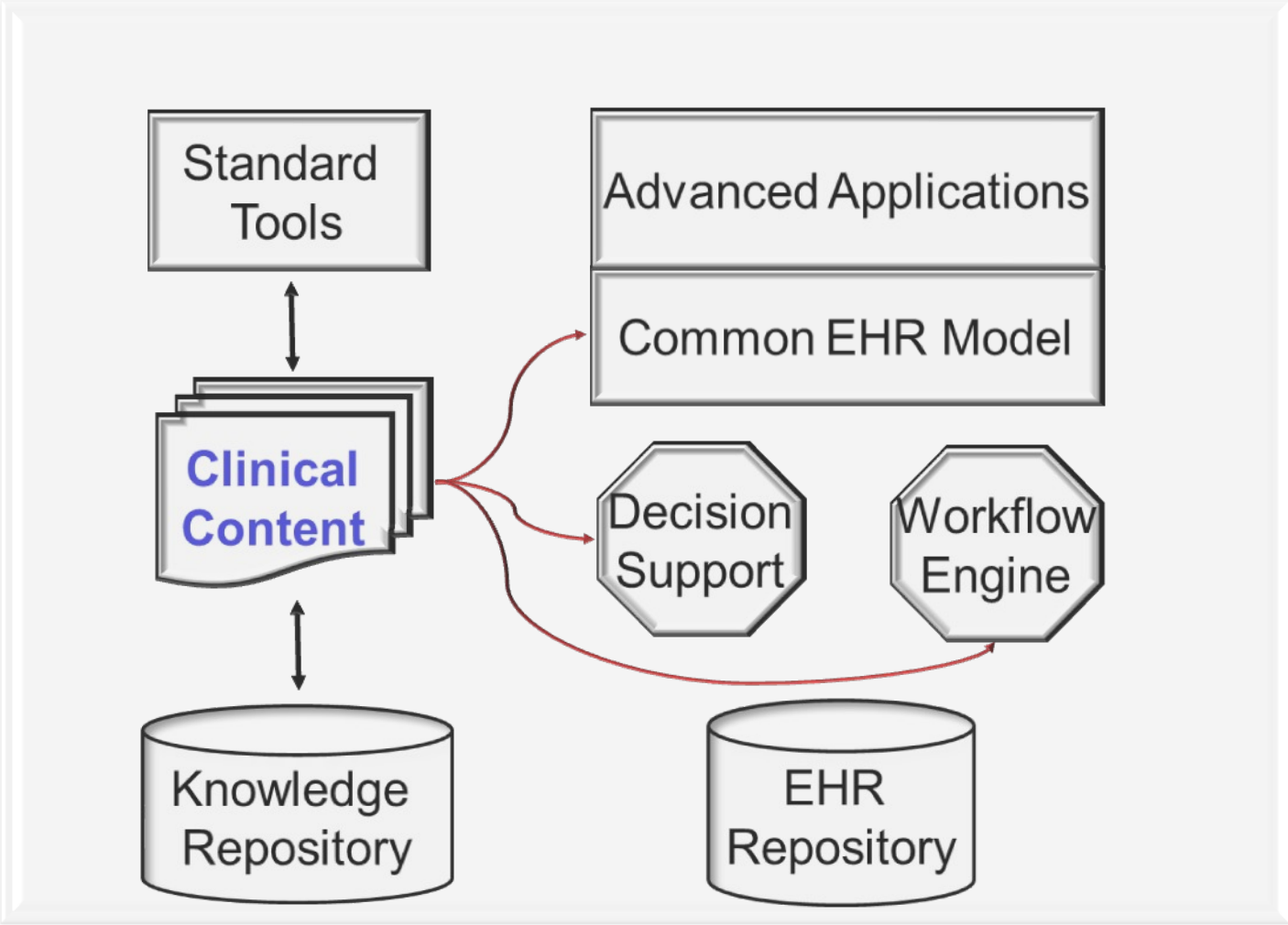
Benefits

- Encouraging reuse
- Quality assurance
- Proper maintenance
- Empower care professionals
- **Open-ended & sustainable**

Evolution of Regional EHR Architecture



The Next Generation COSMIC EHR



Built on Semantic Interoperability

Conclusions

Semantic interoperability is the major challenge of a regional EHR solution.

Archetypes based logical EHR architecture is the corner-stone of an interoperable regional EHR.

Integrated **guidelines**, **care plans** and **process support** provide the foundation for the next generation EHR functionality.

Clinical **knowledge management** must be in place to ensure sustainable development and quality of entire regional EHR solution.