Artificial intelligence, big data, clinical decision support, and knowledge design

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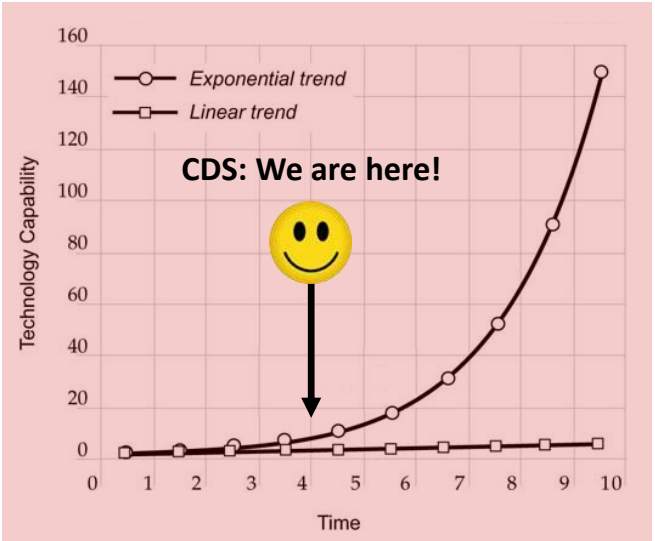
Kurzweil, R. The singularity is near. Viking, 2005.

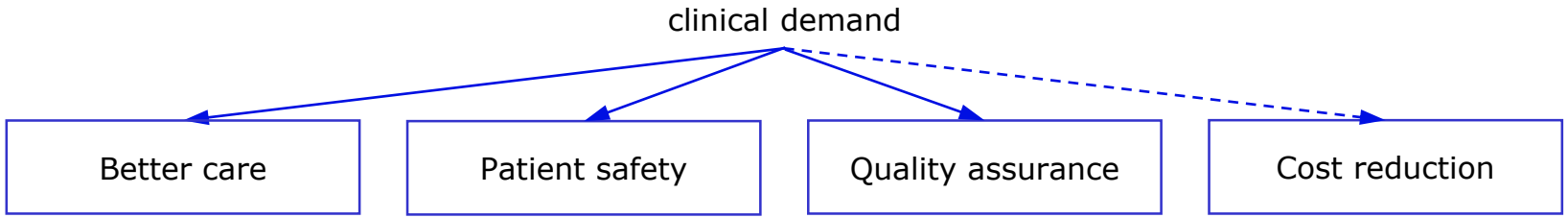


Clinical decision support in practice – HL7 standards, interoperability, and selected applications, Vienna, 23 May 2017

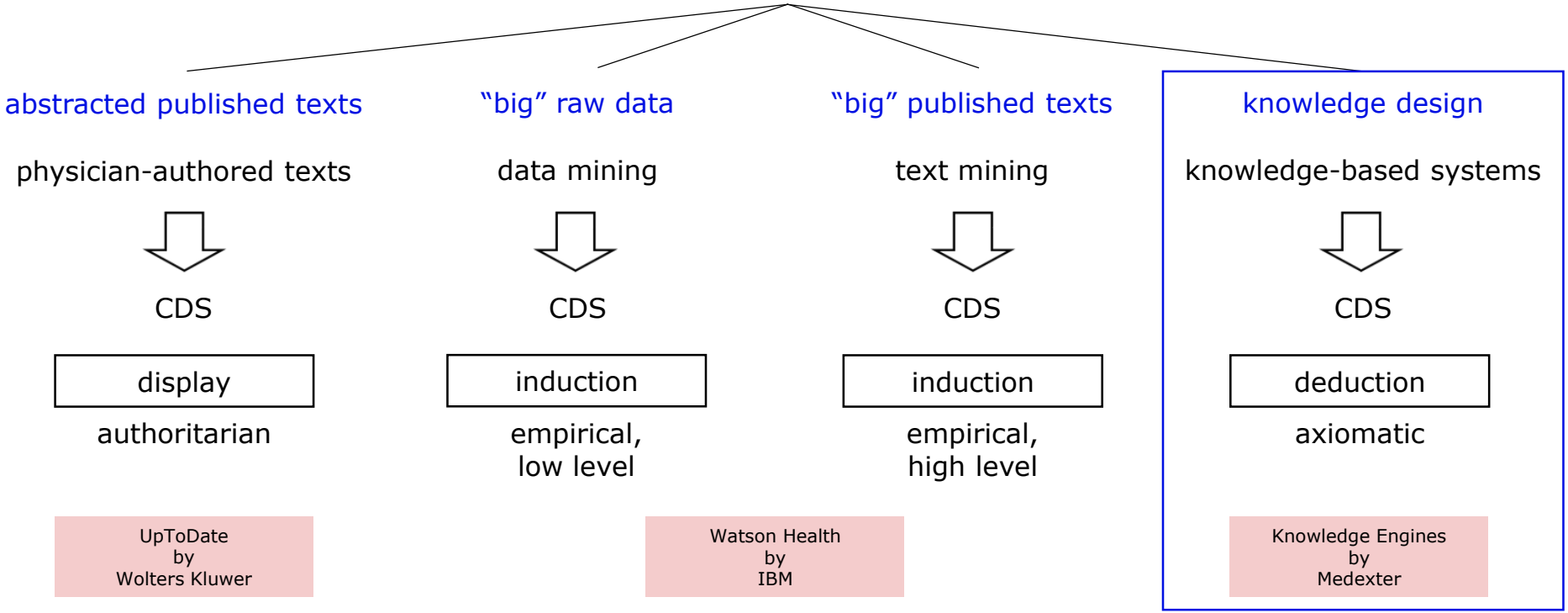
Digitalization in clinical medicine

- Stage I: Digitizing medical patient data
  - EHRs, EMRs, Health Apps, images, bio-signals, national, …
- Stage II: Digitizing clinical workflows
  - In-patient care, wards, departments, out-patient, home, chronic care, …
- Stage III: Digitizing medical knowledge
  - Anatomy, physiology, pathophysiology, nosology, pharmacology, pharmacogenomics, …

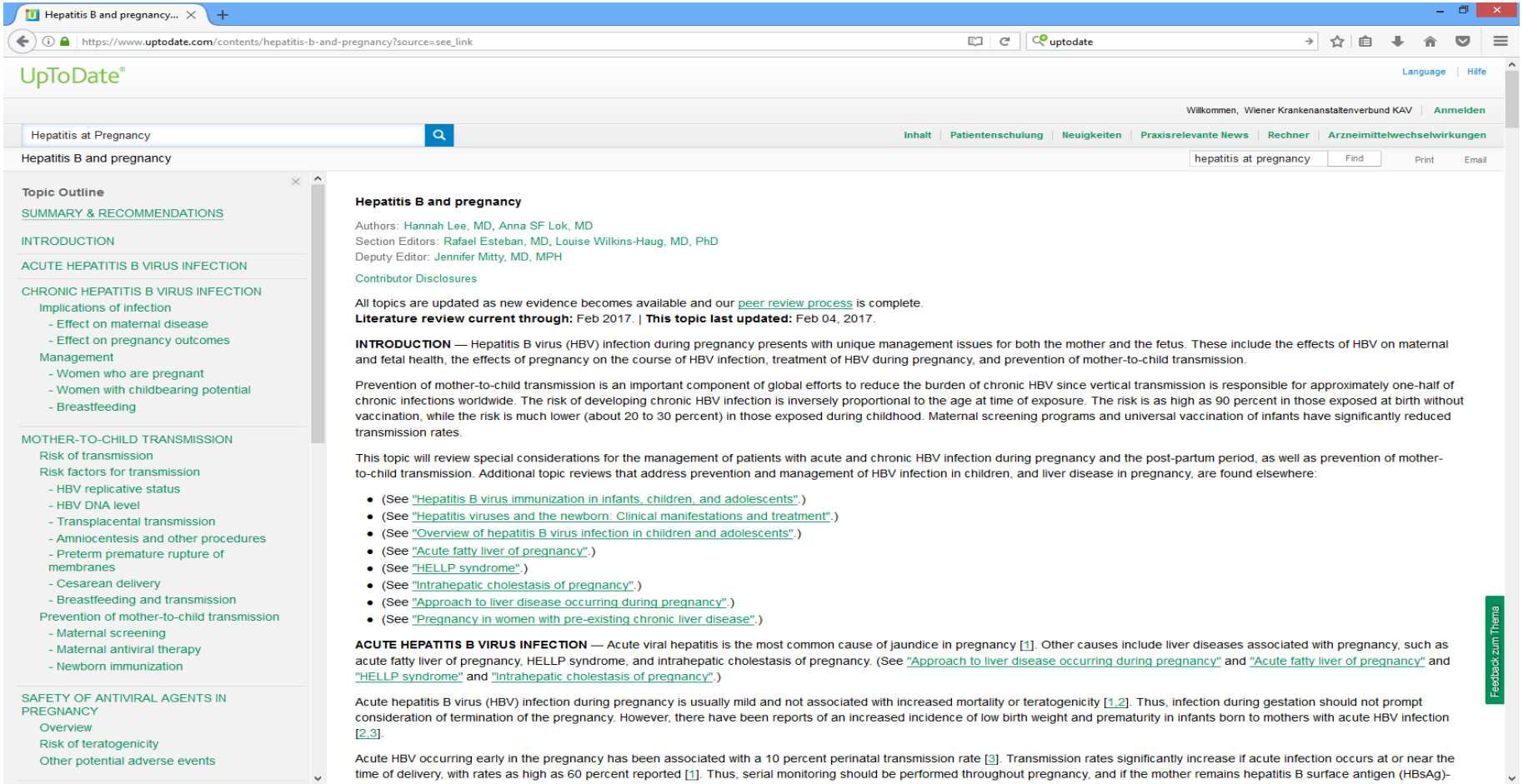
Clinical decision support—Applying knowledge to data



Approaches to CDS

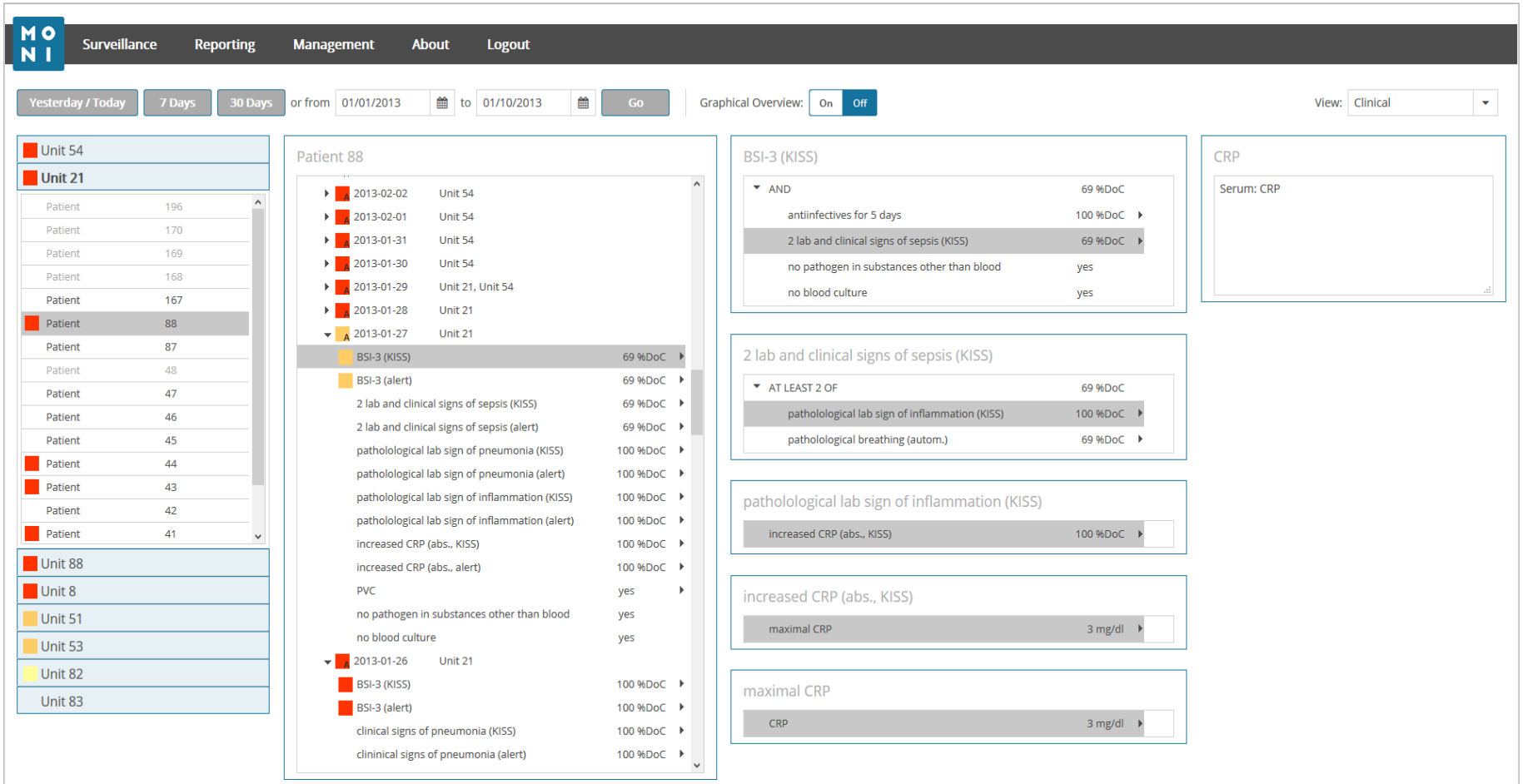


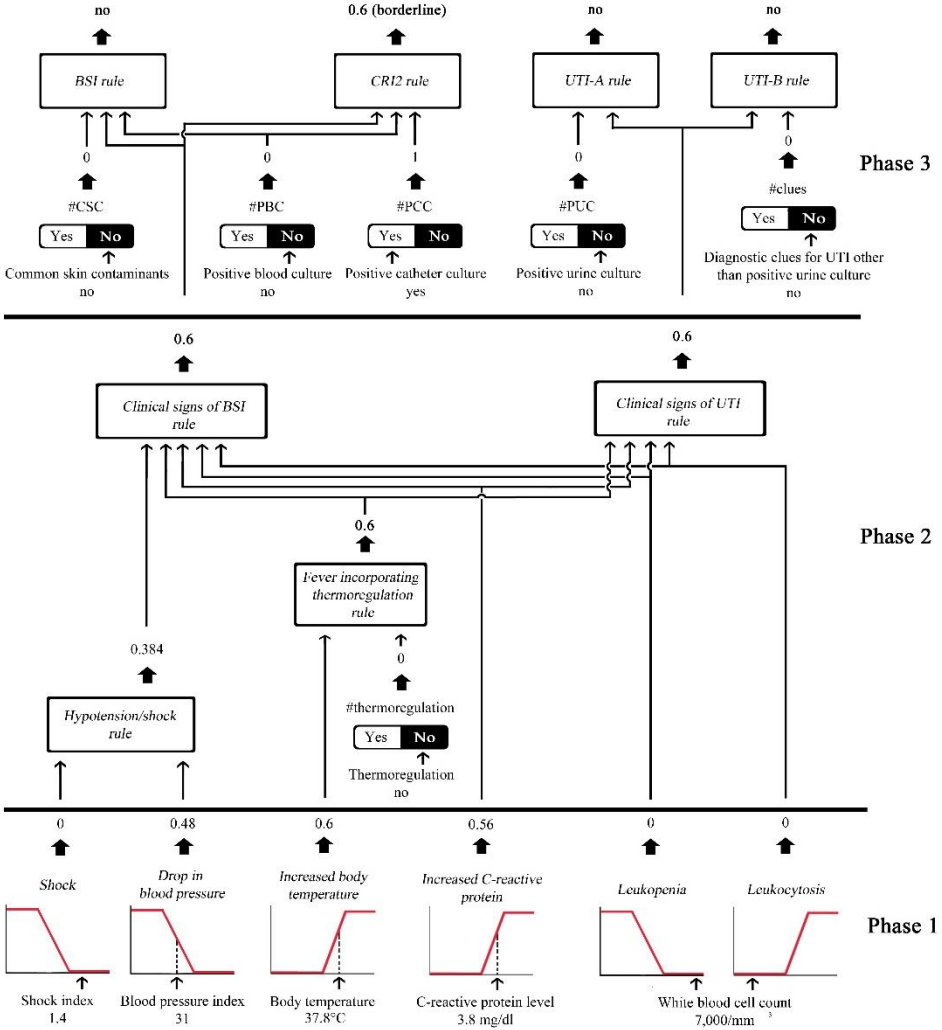
UpToDate by Wolters Kluwer: Abstracted published texts



Watson Health by IBM: "Big" raw data and "big" published texts

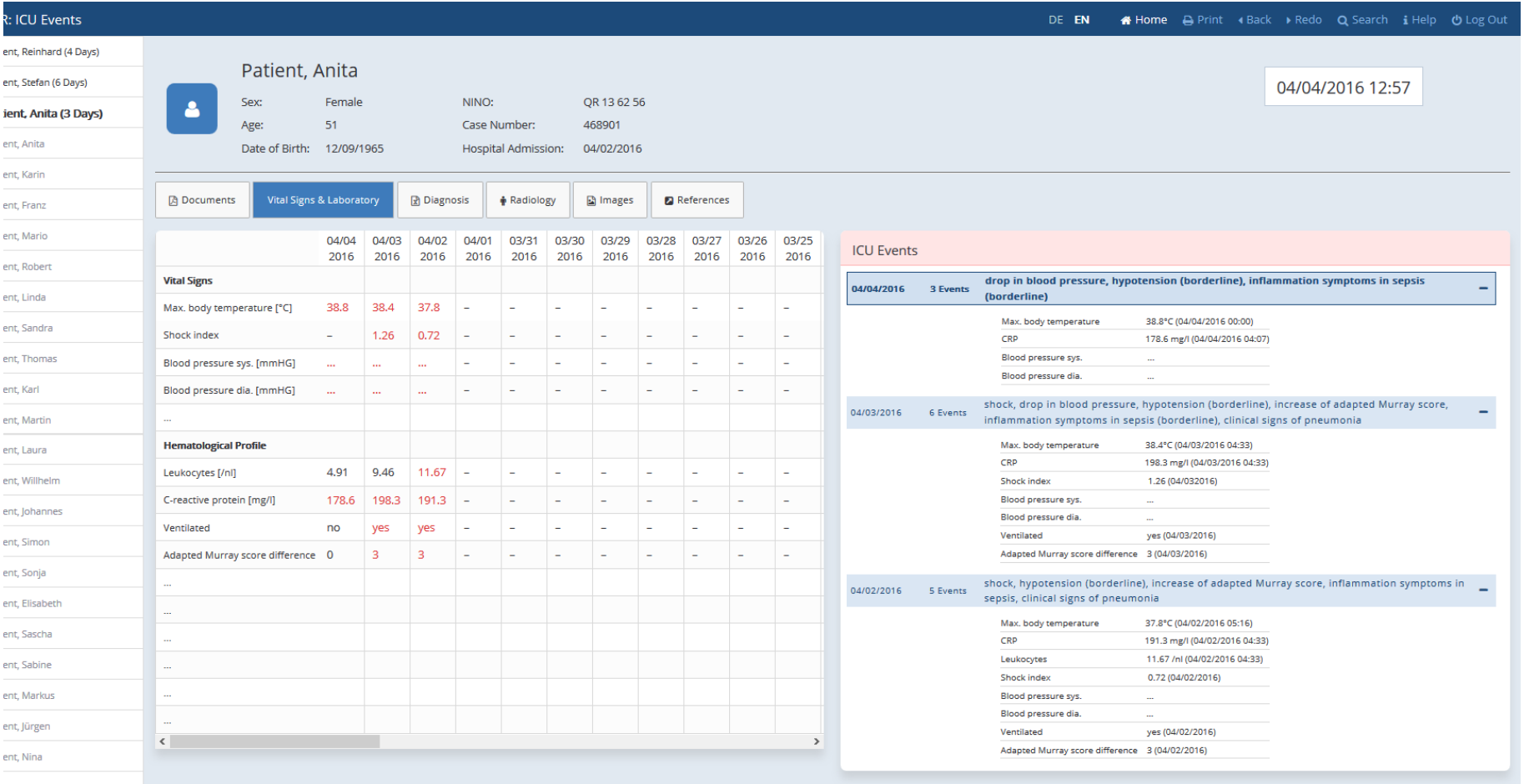
MONI by Medexter for HAI surveillance: Knowledge design



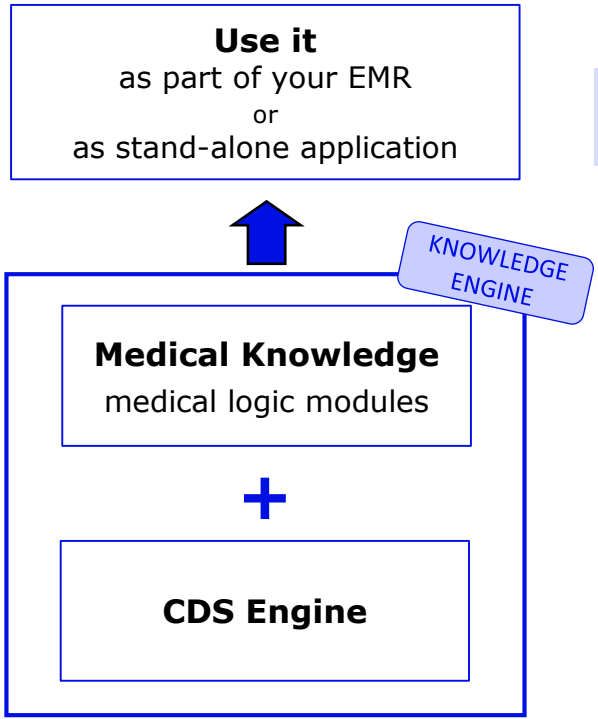


MONI:
Healthcare-associated infection monitoring and surveillance at ICUs

Clinical event monitoring at ICUs: Knowledge design



Medical Knowledge CDS Engines



The prediction:

In the future, any clinical activity will be either supported or substituted by Medical Knowledge Engines.

The medical knowledge

- clinically proven knowledge: rules, tables, decision trees, guidelines, scores, algorithms, …
- evidence-based, application-ready knowledge packages
- knowledge design or knowledge through machine learning

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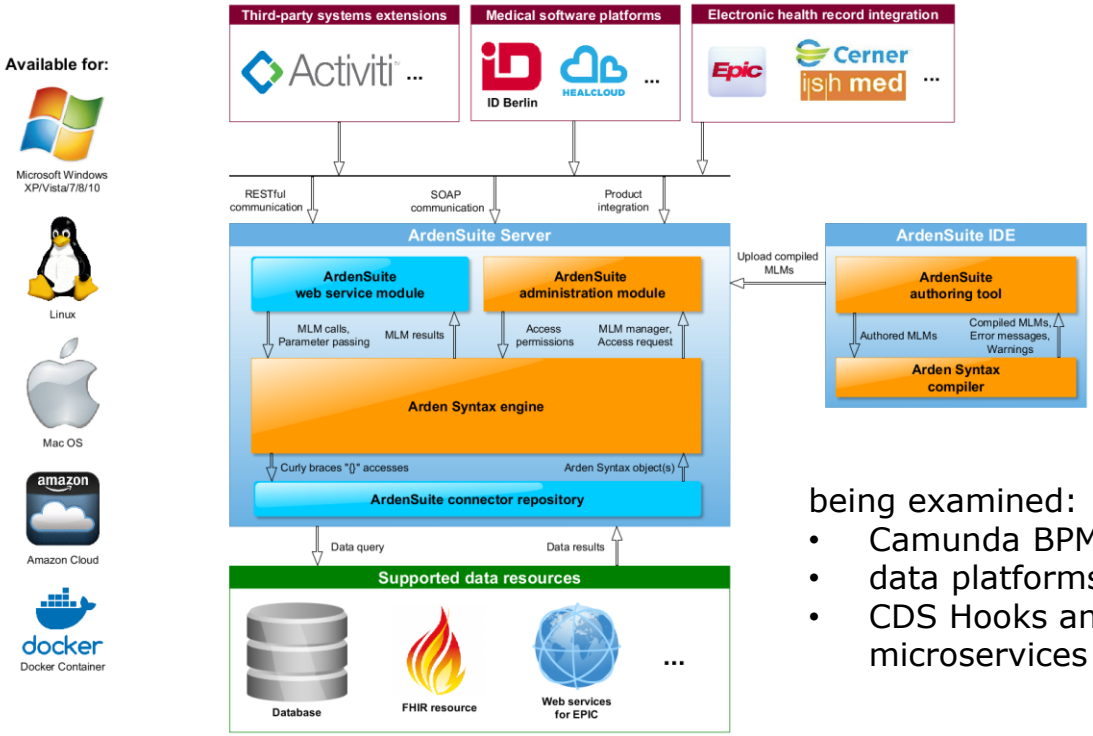
The CDS engine

- HL7's Arden Syntax medical knowledge representation and processing, with fuzzy methodologies
- scalable from cloud-based services to mobile apps

Arden-Syntax-based CDS authoring tool and engine



being examined:

- Camunda BPMN
- data platforms and warehouses
- CDS Hooks and clinical microservices