



Production-contextual clinical information - why is it so hard?

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From the domain of health informatics

Can you develop an IT system that makes it easy for me to find the relevant information?

Sure!
What information is relevant to you?



From the domain of health informatics

Ehhh?

Ohh.
Another day at the office...

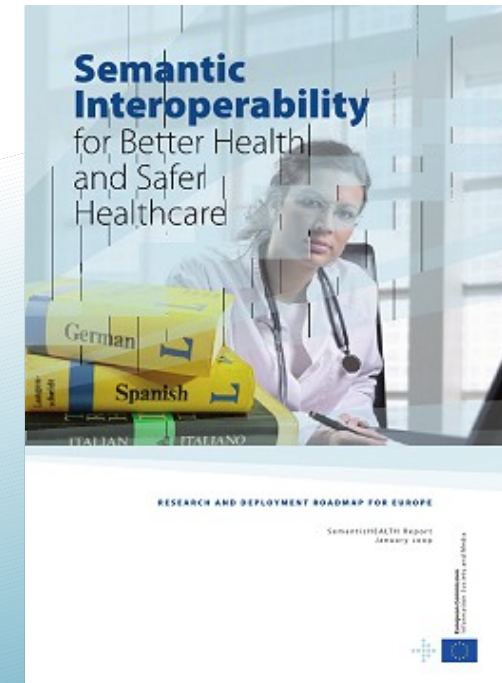


A beautiful vision of unlimited, pragmatic interoperability

Stroetmann, Kalra, Lewalle, Rector, et al. Semantic Interoperability for Better Health and Safer Healthcare. Luxembourg: European Commission; 2009

Health System Interoperability is the ability, facilitated by ICT applications and systems,

- to exchange, understand and act on citizens/patients and other health-related information and knowledge
- among linguistically and culturally disparate health professionals, patients and other actors and organisations
- within and across health system jurisdictions in a collaborative manner.



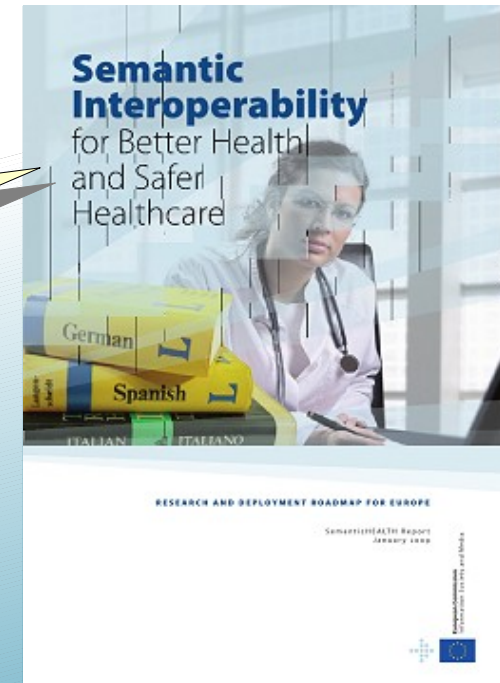
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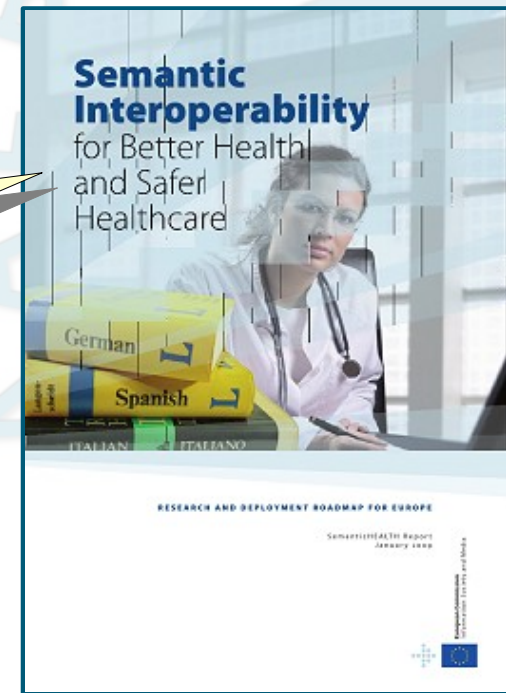
"... to seamlessly integrate the received information into the local record and provide a complete picture of the patient's health as if it was collected locally."



A beautiful vision of unlimited, pragmatic interoperability

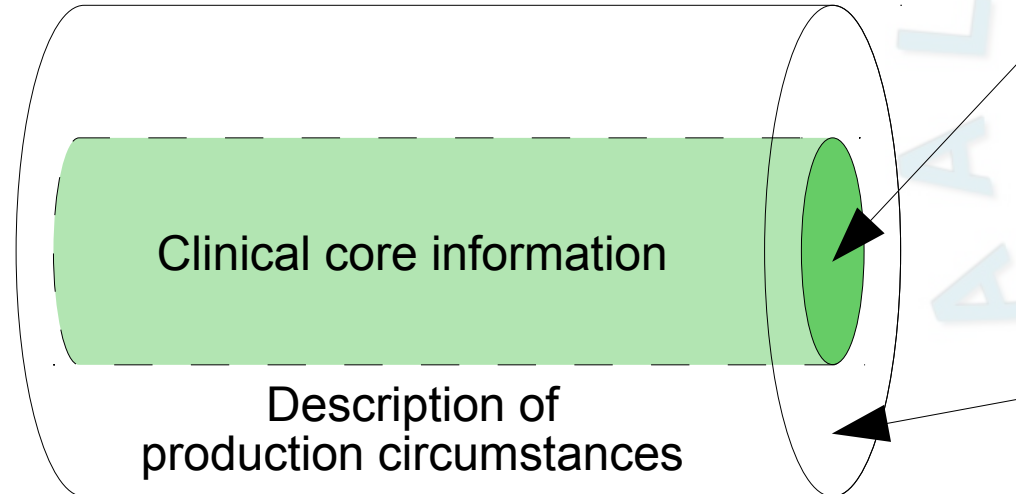
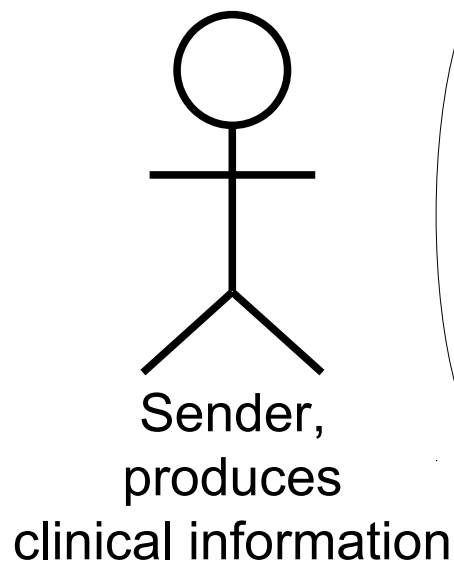
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Production-contextual clinical information

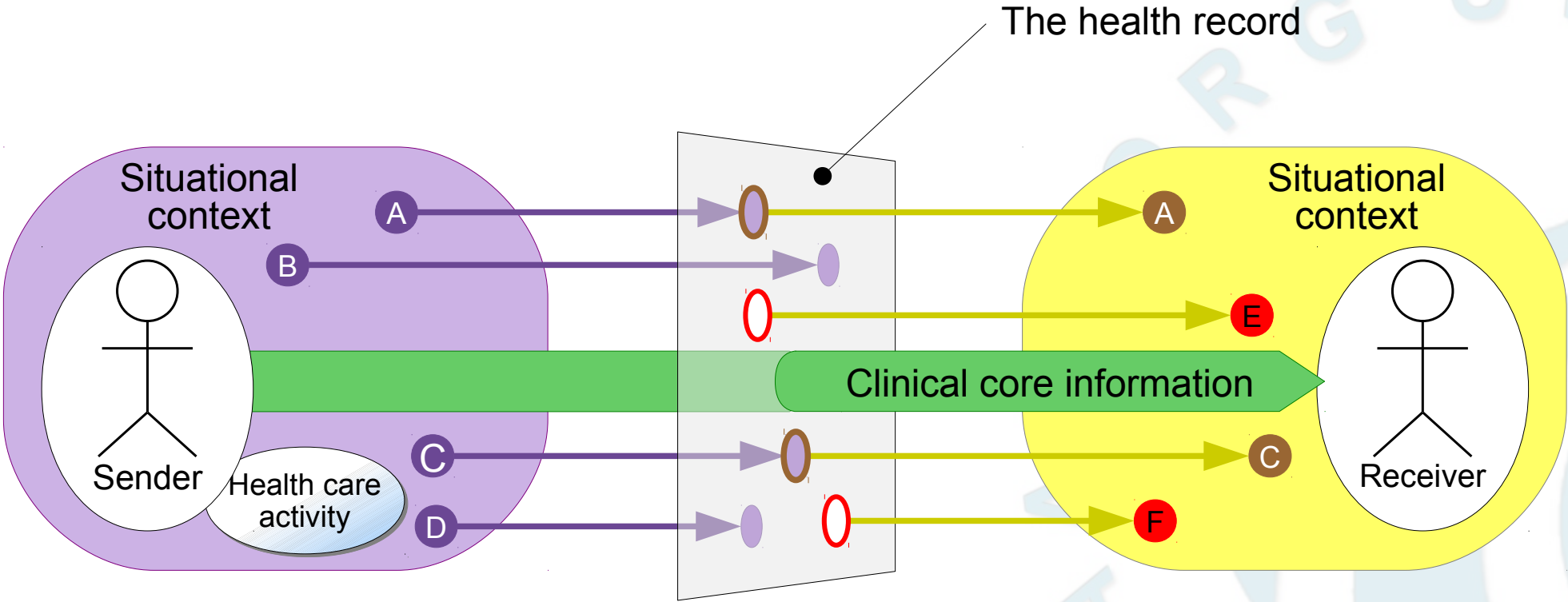
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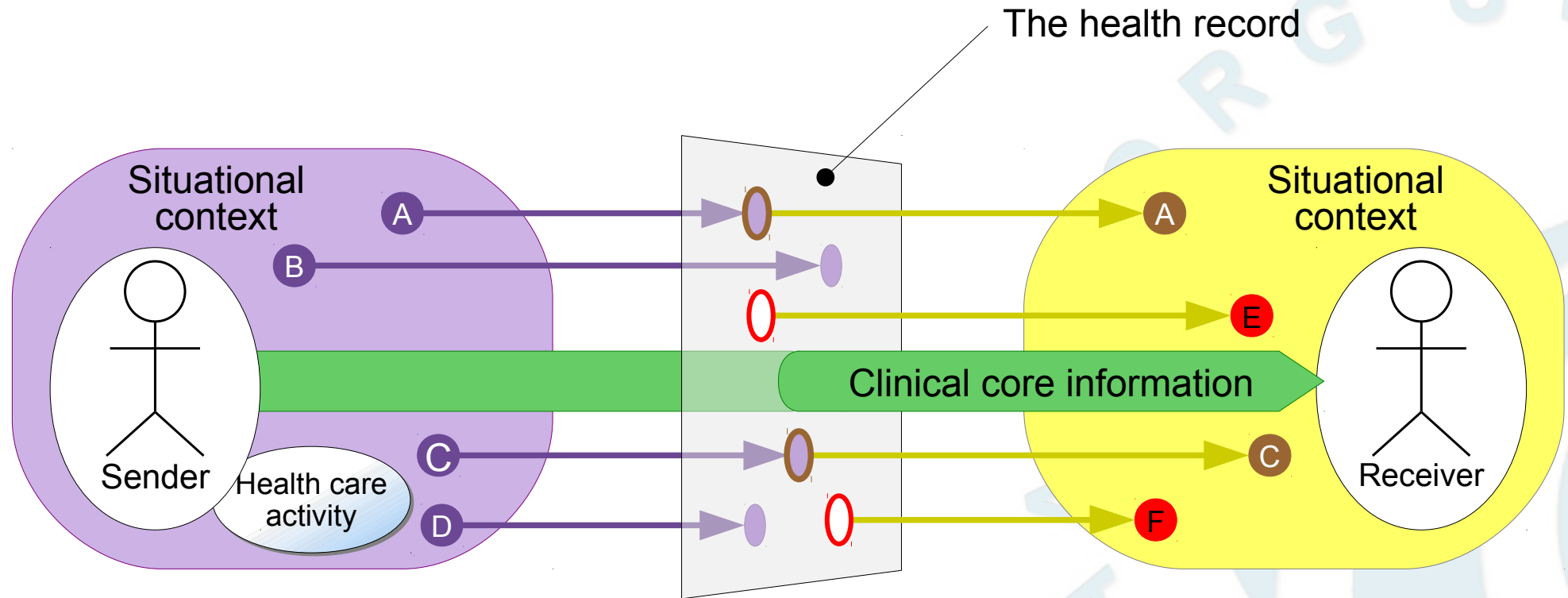
E.g. chest x-ray with
consolidation of the
right inferior lobe.

E.g. patient in the
supine position.
Poor image quality
due to massive
overweight.

Production-contextual clinical information

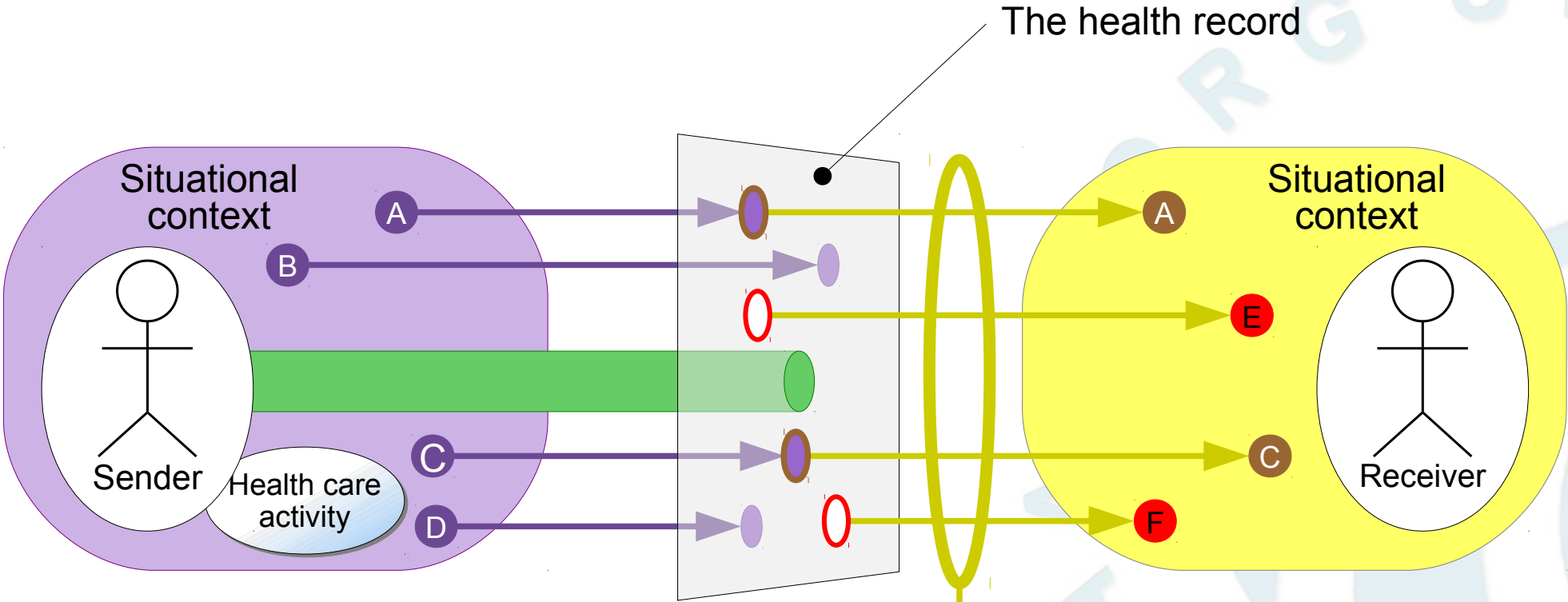


Production-contextual clinical information



What is production-contextual clinical information?

Production-contextual clinical information



Production-contextual clinical information?

Production-contextual clinical information

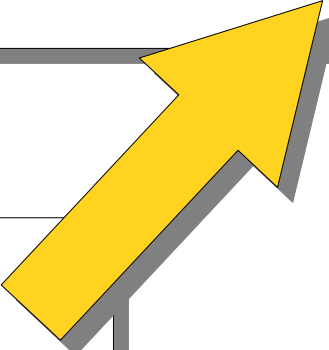
Qualitative study based on observations and interviews in the Cardiology Department of a mid-size hospital in the capital region of Denmark.

Questions:

What is production-contextual clinical information?

Do doctors use/need it?

Can it be operationalized?



What is production-contextual clinical information?

Methods and materials

Observation of doctors at five morning conferences

- 20-25 participating doctors
- Two types of scenario:
 - the reporting of yesterday's patients
 - the collective analysis of selected case stories.
- My focus of observation was the recurring requests for additional information

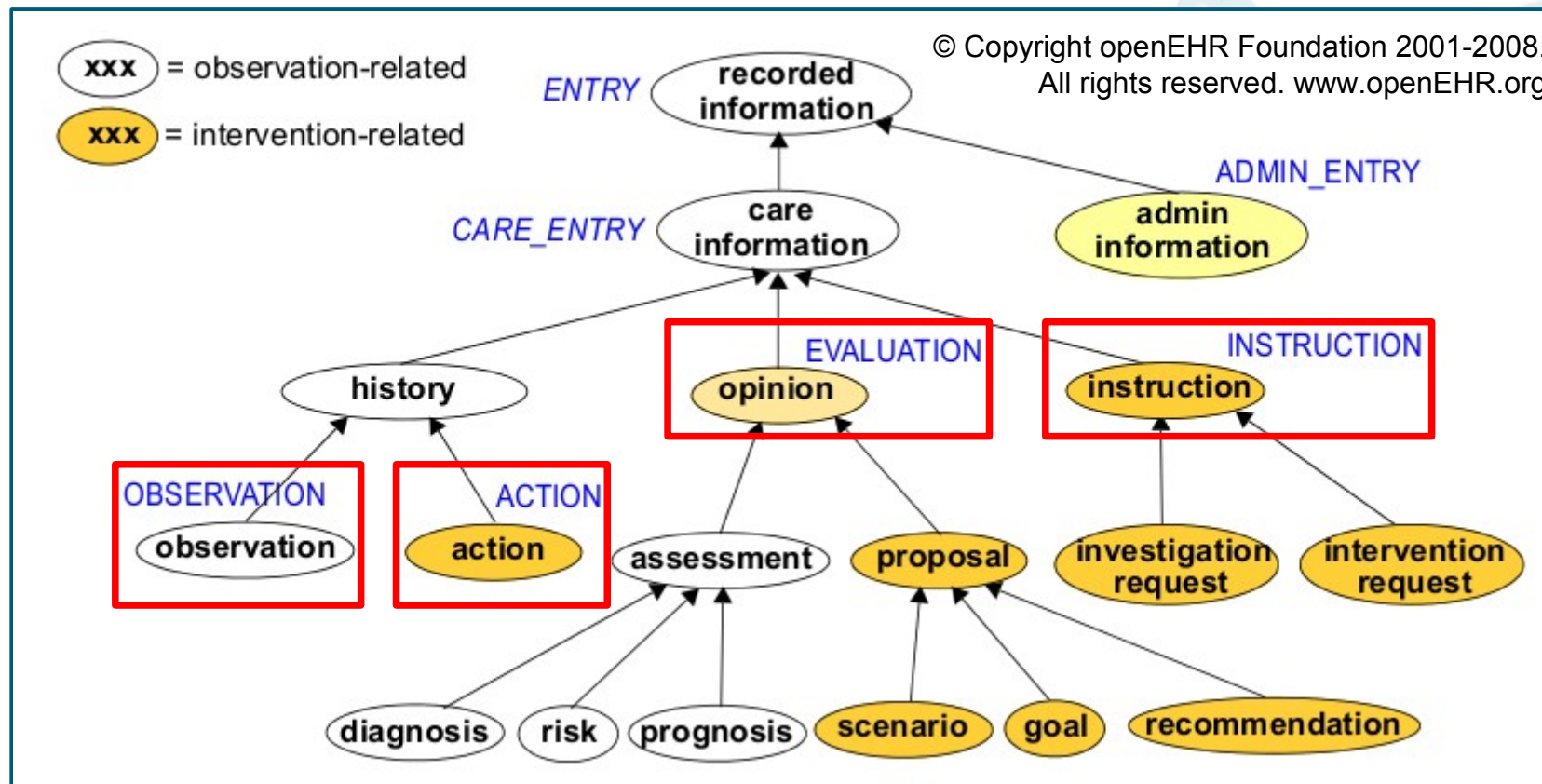
Focus group interview of doctors

- Five sessions with 3-6 participating doctors
- The focus of interview was the doctors' information needs
- Interview performed on the basis of predefined pieces of clinical information selected from cardiology health records
- My focus was on the need for production-contextual clinical information

Frame of reference

Ontology of clinical information

- by Ocean Informatics, Beale, Heard et al.
- describes four basic types of health information and four corresponding health care activities



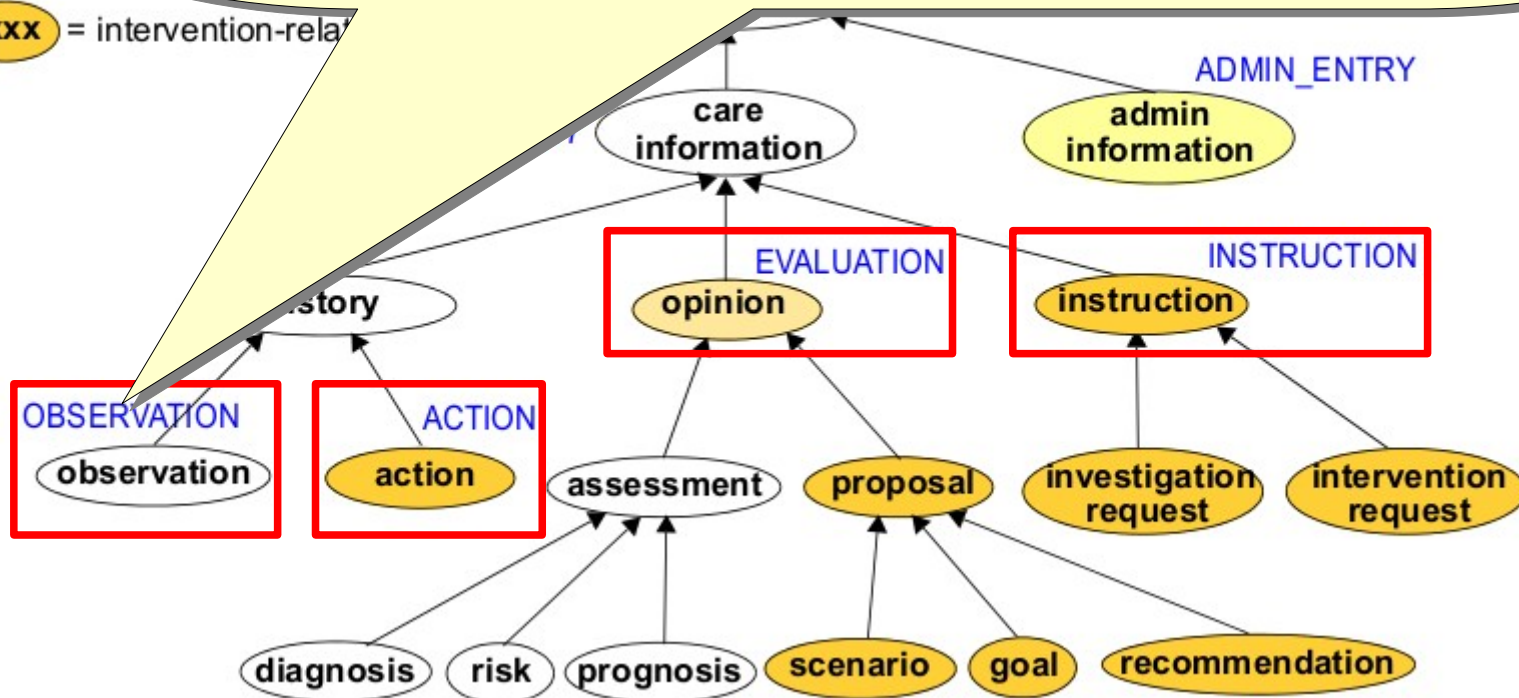
Frame of reference

Observation

information created by an act of observation, measurement, questioning, or testing of the patient or related substance, in short, the entire stream of information captured by the investigator, used to characterise the patient system.

xxx =

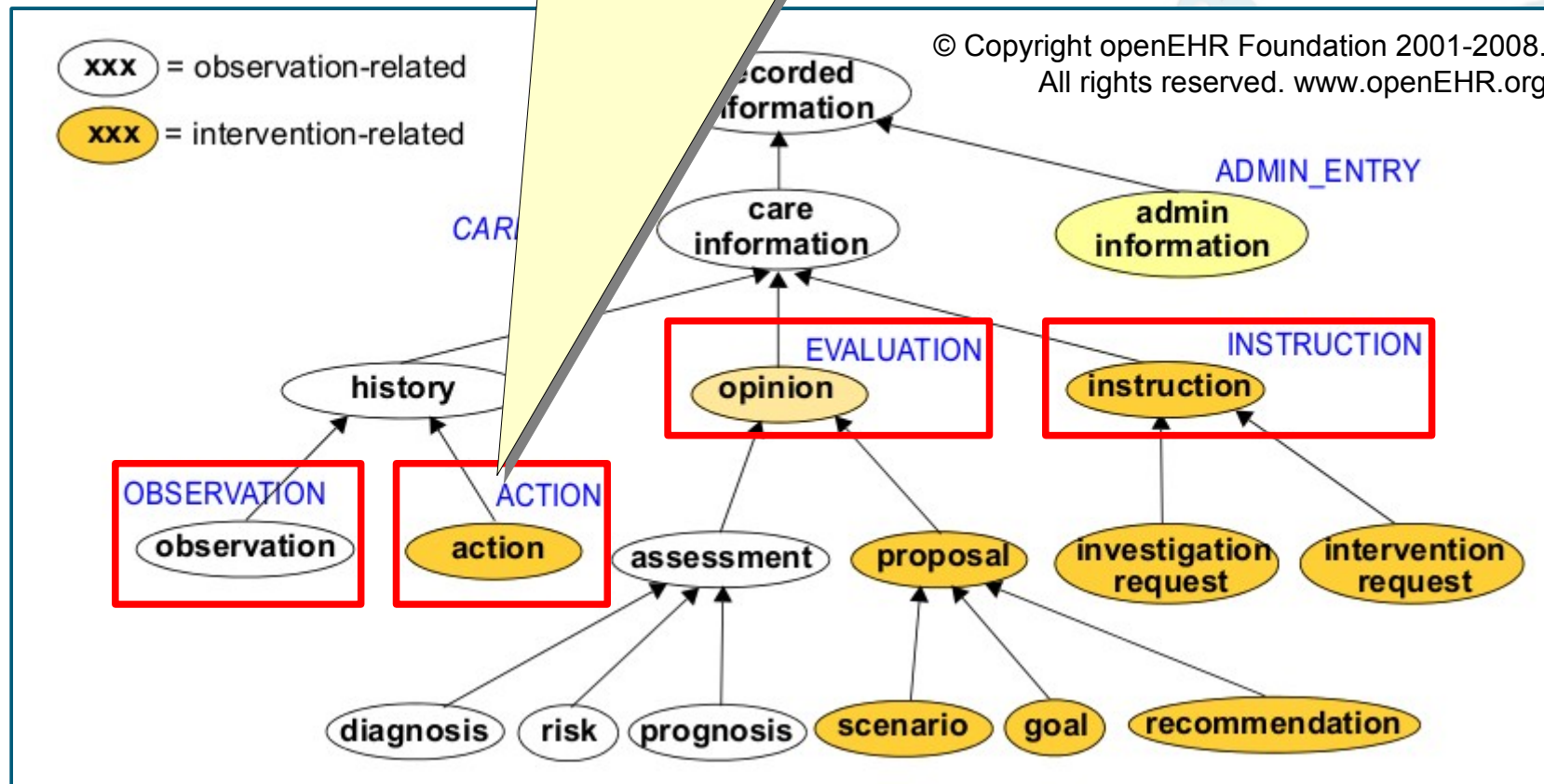
xxx = intervention-rela



Frame of reference

Action

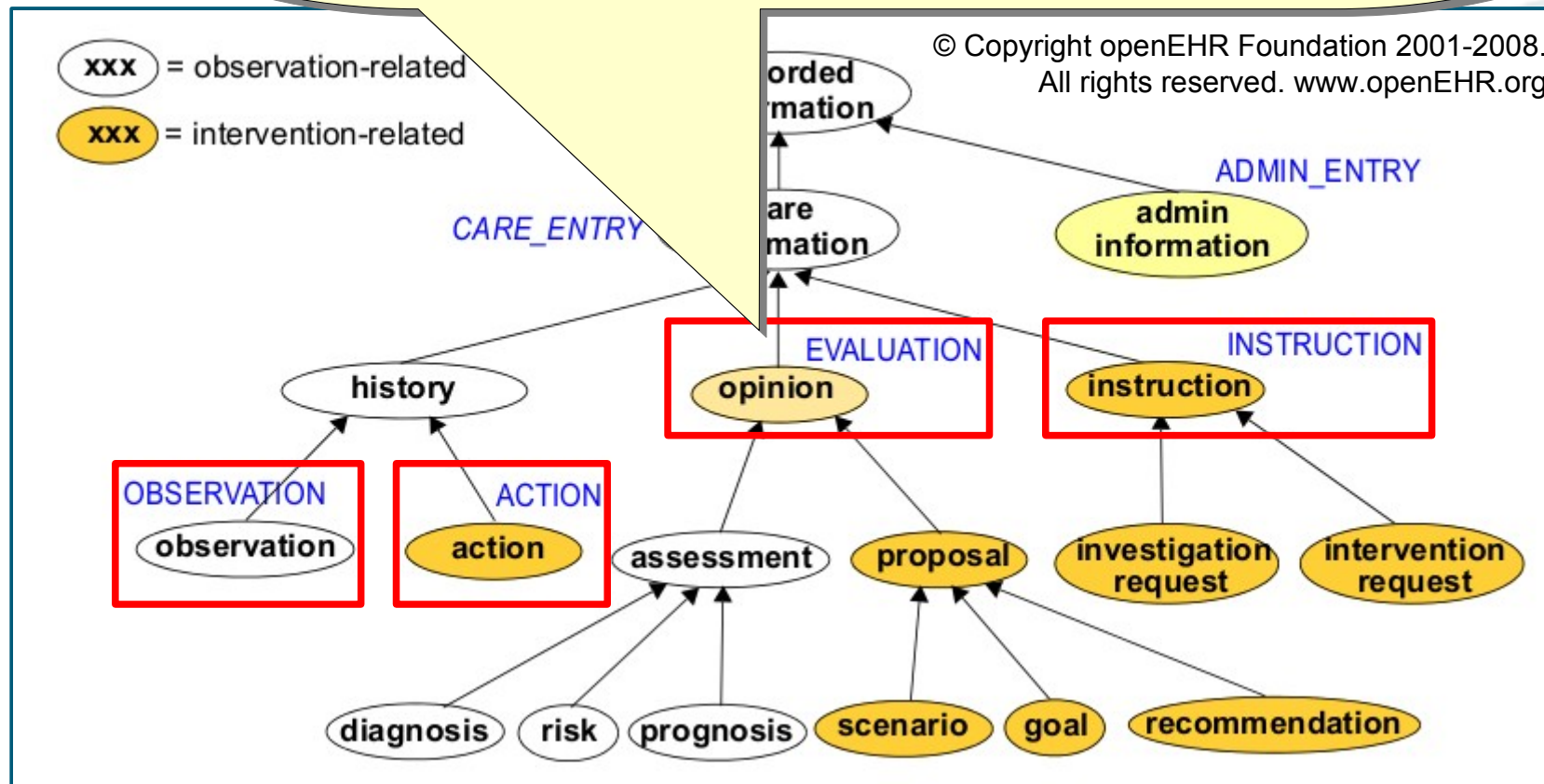
a record of intervention actions that have occurred, due to instructions or otherwise.



Frame of reference

Opinion

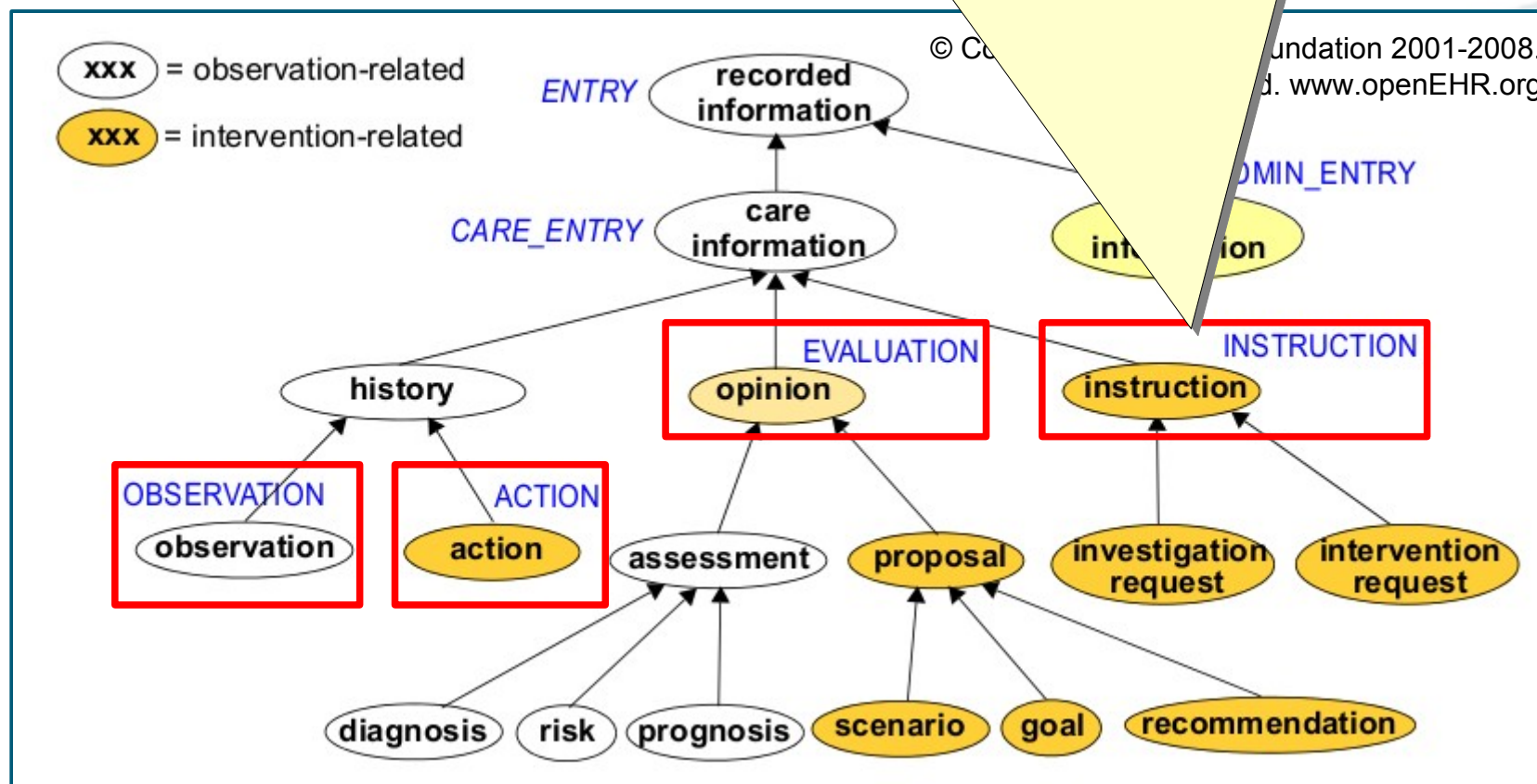
inferences of the investigator using the personal and published knowledge base about what the observations mean, and what to do about them; includes all diagnoses, assessments, plans, goals.



Frame of reference

Instruction

opinion-based instructions sufficiently detailed so as to be directly executable by investigator agents, in order to effect a desired intervention.



Data collection

At doctors conferences and in focus groups there were dialogue:

A doctor focuses on some piece of clinical information

- eg. A: the message: "We did a DC-cardioversion"
- eg. B: the message: "The blood pressure was high, but declined over time"

Message is interpreted according to the frame of reference

- eg. A: the message is an Action-entry
- eg. B: the message is an Observation-entry

Does this piece of information elicit requests for further information?

If so, what information is requested?

- eg. A: "What was the blood pressure prior to the cardioversion?"
- eg. B: "Can we discontinue the beta-blocker treatment?"

Is the requested information production-contextual?

- eg. A: yes
- eg. B: no

The raw data

Observations

- Presentation of patients or cases gave rise to dialogue between doctors
- Registered 206 requests for additional clinical information
54 (26%) requests for production-contextual information
- Answers to questions asked led to further questions with the obvious purpose to perform source criticism, and assess the credibility of information.
- Former decisions were reconsidered due to production-contextual information

Focus group interviews

- Presentation of a single piece of clinical information
Group discussion concerning the need for additional information
- Presentation of 47 pieces of clinical information
- Registered 67 requests for additional clinical information
40 (60%) requests for production-contextual information

What is production-contextual clinical information?

Description of the circumstances associated with the production of clinical information.

- eg. blood pressure was measured under exercise
- eg. patient was treated by Dr. NN
- eg. the examination wasn't done here

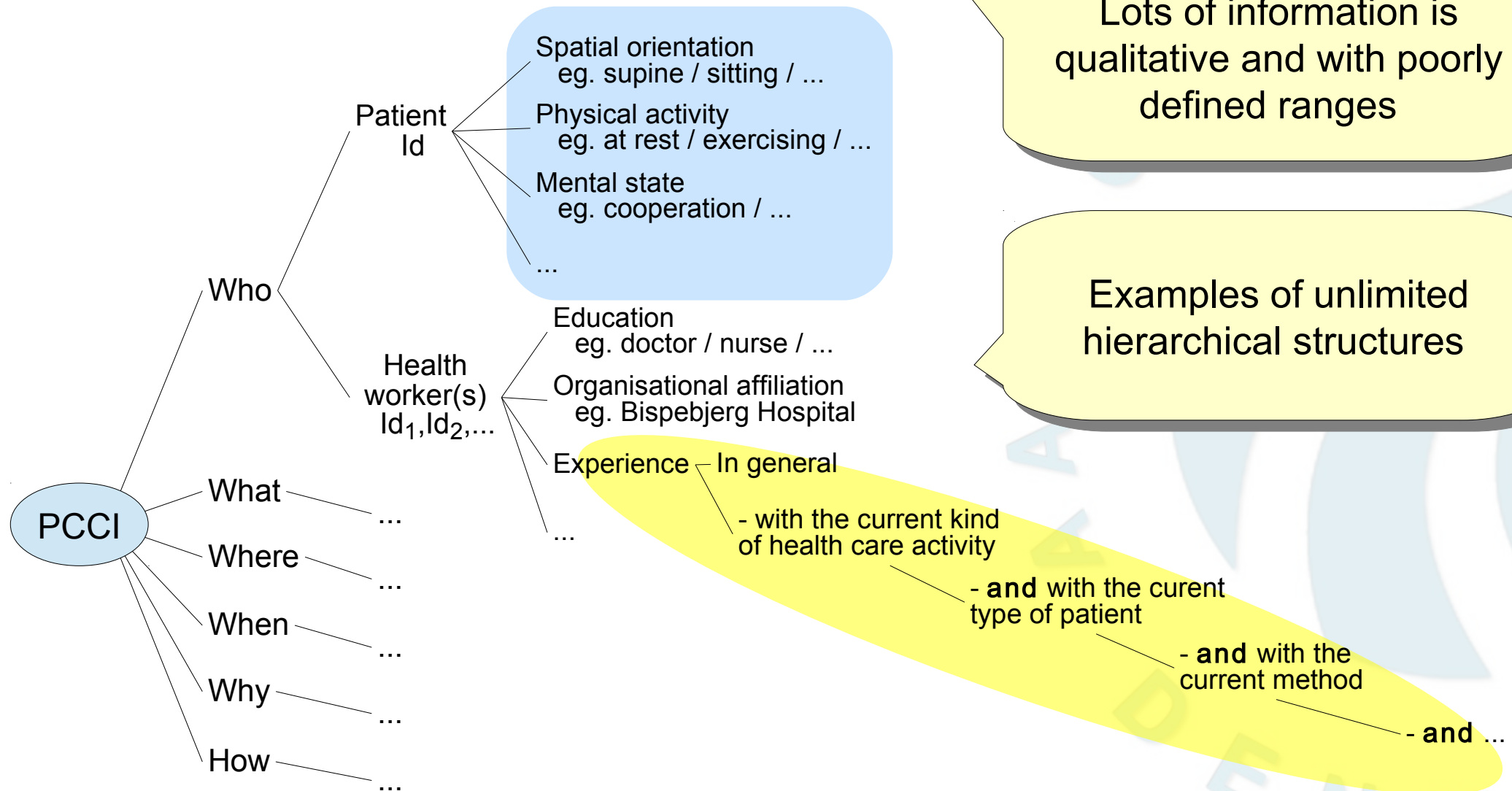
Very high volume - even compared to clinical "core-information".

Used for source criticism, ie. for balancing of likelihood, credibility, and overall weight of information concerning the patient.

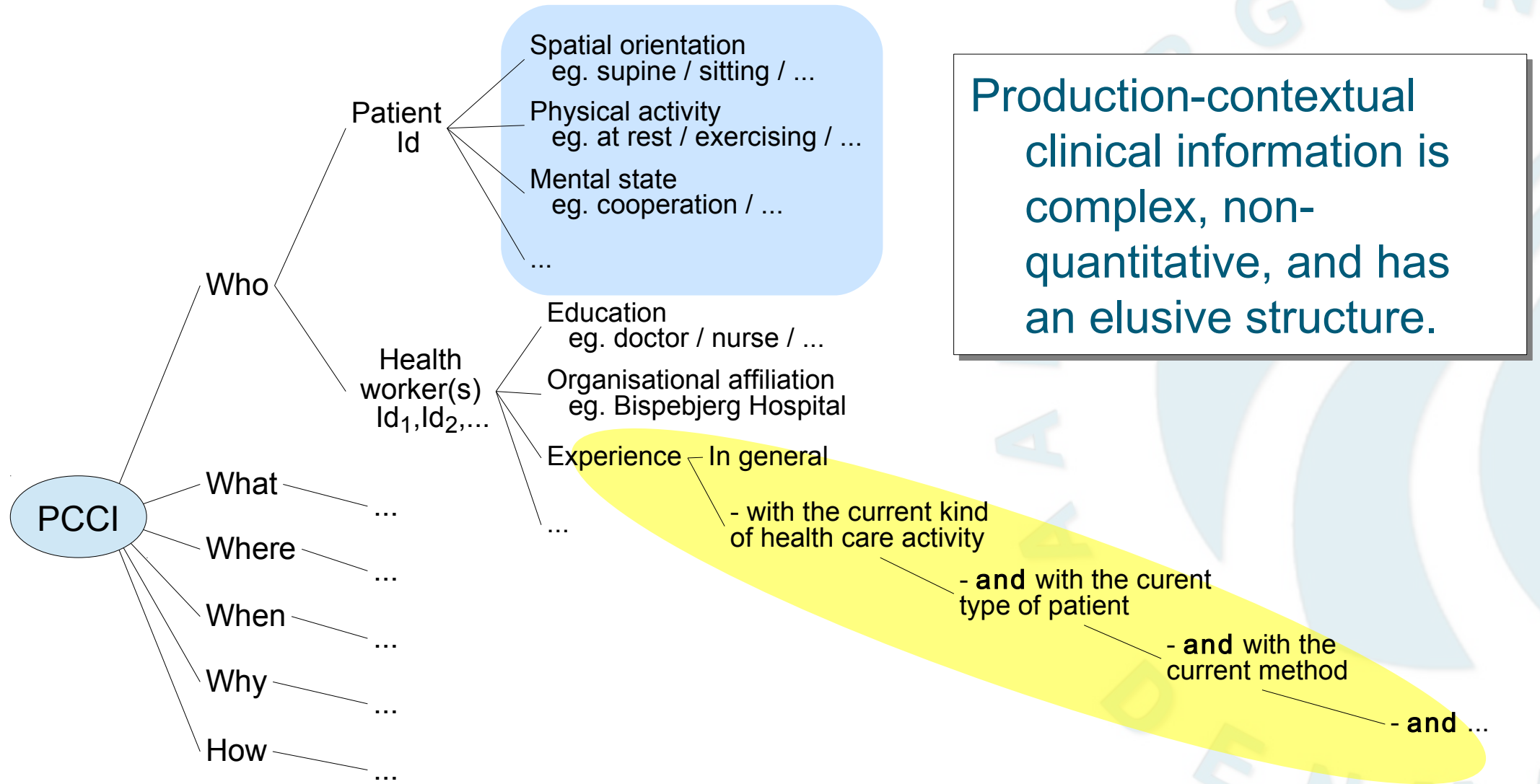
Structurally challenging.

- No obvious relation to the type of health care activity
- No obvious relation between different pieces of production-contextual information
- Nightmare-modelling:

Structuring production-contextual clinical information



Structuring production-contextual clinical information



Do doctors need production-contextual clinical information?

In short: They can't do without it!

In my observation of doctor's in-vivo dialogue, 26% of the requested clinical information was production-contextual.

Furthermore, there is a major dark figure: Circumstances concerning local guidelines, local staff, and local resources are not explicated at conference, but are common knowledge to the doctors.

It was repeatedly observed how decisions were reconsidered due to production-contextual information.

Production-contextual clinical information is considered essential to doctors' daily work.

Operationalizing production-contextual clinical information?

Problem #1: Production-contextual clinical information is complex, non-quantitative, and has an elusive structure.

- It seems unlikely to develop a model that permits a comprehensive expression.

Problem #2: The amount of production-contextual clinical information needed to meet every health actor's needs is enormous, even compared to the huge amounts of clinical core information.

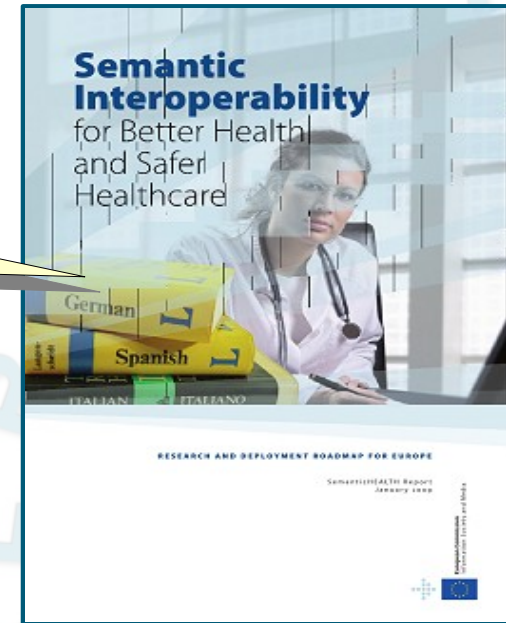
- The volume poses several problems - most of all how the complex and non-quantitative information should be obtained.

Problem #3: The need for production-contextual information is determined by the receiver.

- So unless the sender is told what contextual information to register, there is no guarantee that the existing production-contextual information will suffice.

Operationalizing production-contextual clinical information?

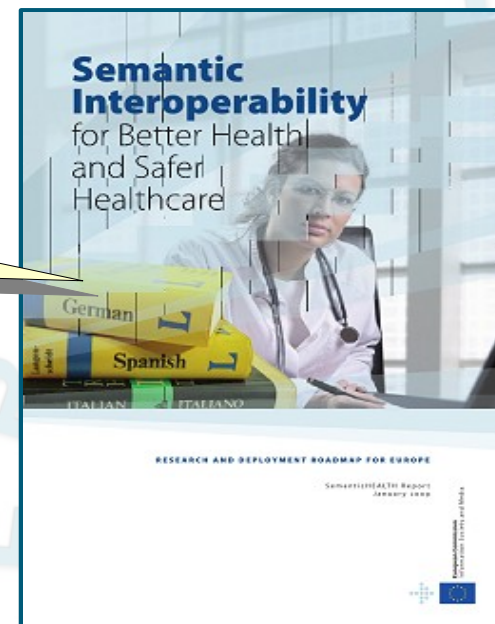
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Operationalizing production-contextual clinical information?

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What will it take to perceive clinical information "as if it was collected locally"?

Seriously?
Local information!
All of it!
Nothing else will do.



Production-contextual clinical information

It is essential to doctors' daily work.

It is difficult - probably even impossible - to express fully in a structured way, but it can be partially exchanged if

- sender and receiver have an agreement on type, amount and protocol
- sender has the necessary resources for documentation

Structured exchange of production-contextual clinical information in an amount needed to implement the vision of unlimited, pragmatic interoperability is simply not going to happen.

Thank you
for your attention!



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