The Swedish eHealth approach

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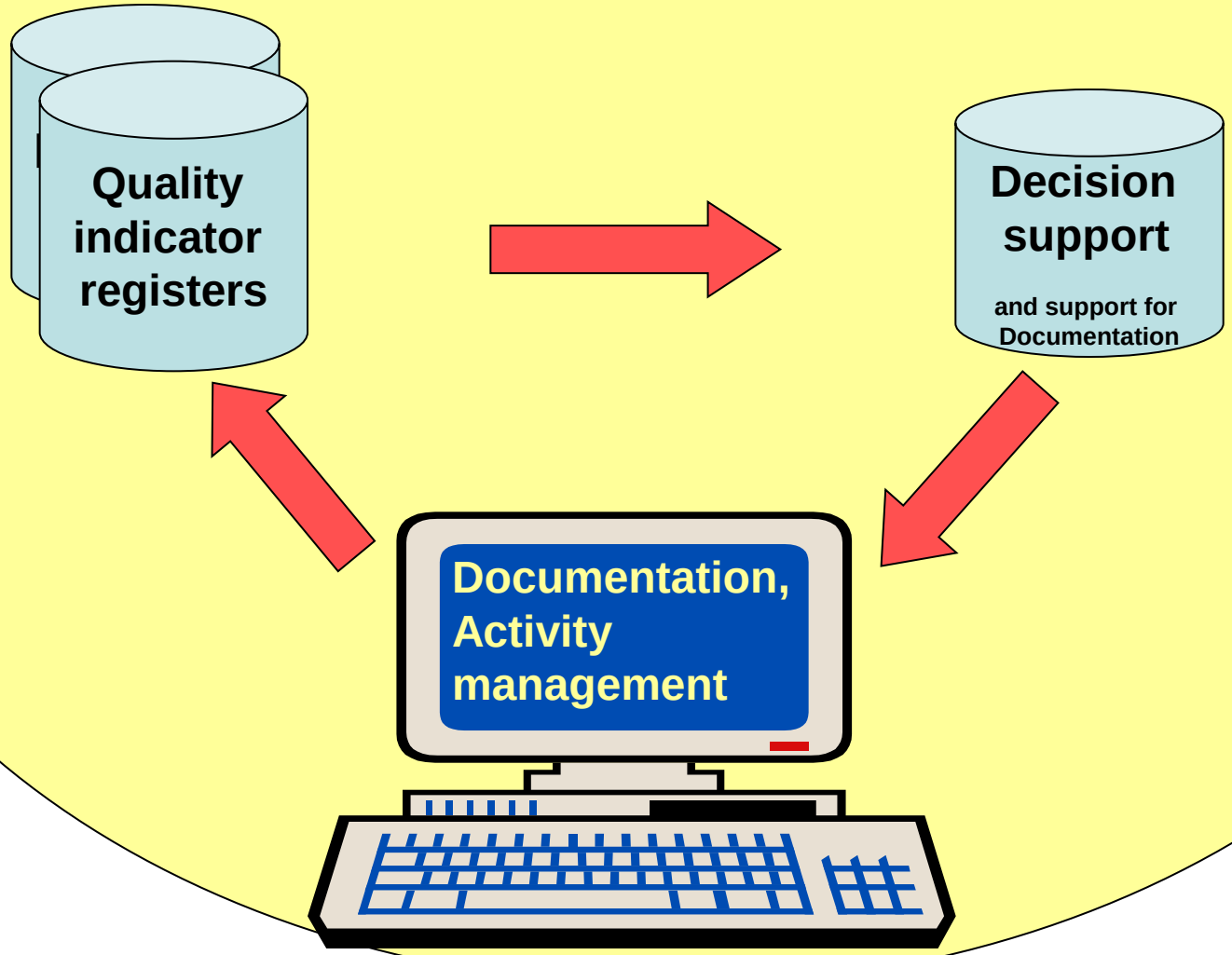
Agenda Tuesday

- The background and foundation of the Swedish national information structure
  - Aims
  - Business analysis
  - Business models
  - Generic process model
  - Some core concepts
  - Information model and area overview
- The specified information model V-TIM
- The national terminology approach – SNOMED CT and statistical classifications
- Aims and goals for the Swedish national approach
- The 3-layer approach for comprehensiveness
- AND A LOT OF DISCUSSIONS

IT in health care today in Sweden

- IT-systems in Sweden today not designed to support the intrinsic/core clinical work and lack support for;
  - knowledge management
  - standardized care plans
  - semantic interoperability
  - follow up of quality indicators
- IT-systems so far support more administrative than clinical aspects
  - contacts, episodes of care, referrals
  - units and responisbilities
  - economy, payment …..

Goal: Comprehensive clinical IT-support with interoperability



E-health with multiple purposes

- Provision of care to an individual patien
- Follow up, comparisons for developmen
- Research
- Quality management
- Resource management

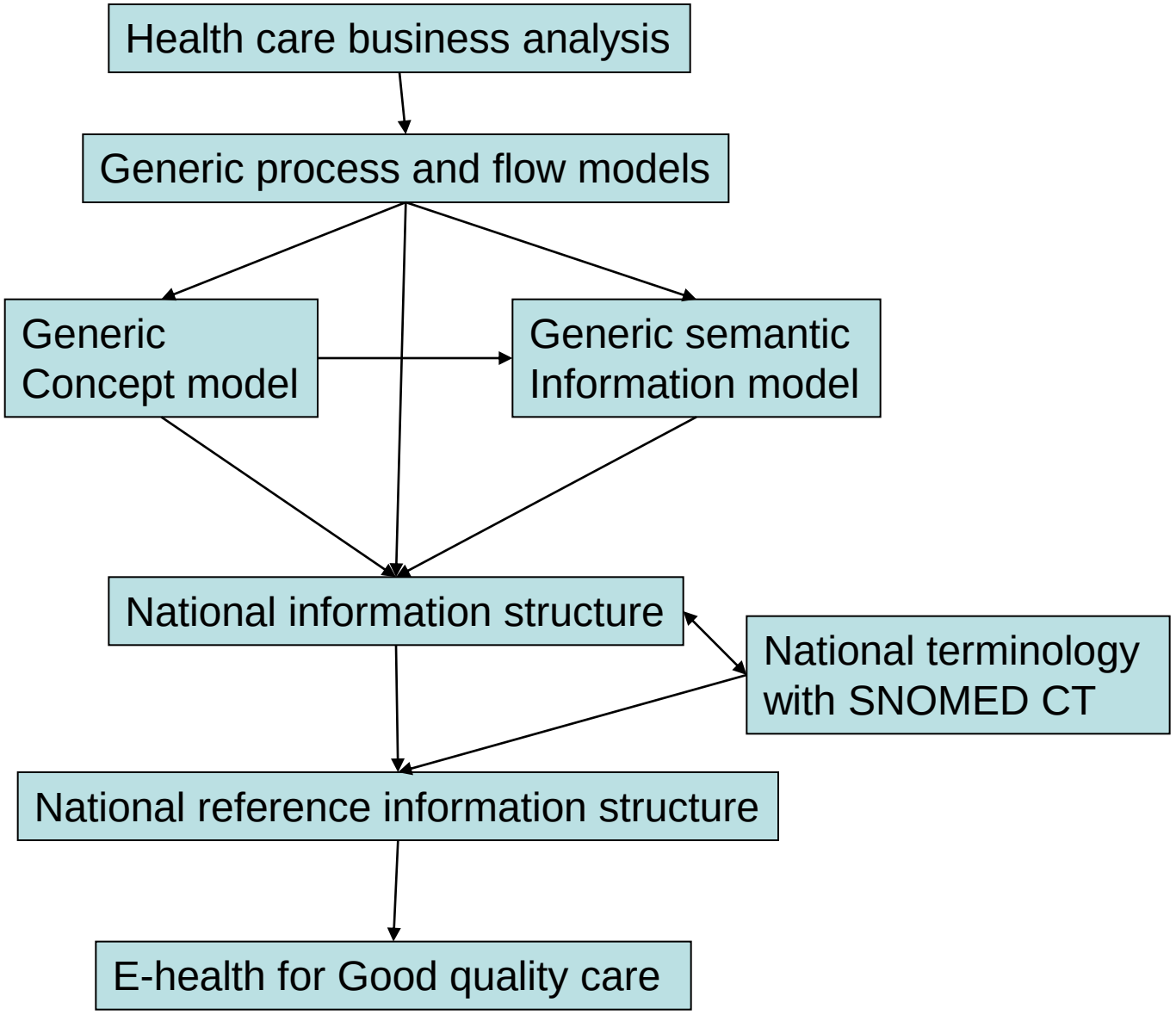
- *Requires complex strategies and well structured approaches*

Sweden

National strategy for e-health 2006

- National information structure project (NI)
- National terminology project including SNOMED CT
- National Center for e-health

The national information structure and national terminology projects projects 2006-2011



Clinical oriented business analysis?

- Clinical – “the interaction between a subject of care and health care professionals”
- The “business” in the national information project is clinical oriented and focus the clinical processes
- The business analysis comprise all clinical perspectives and purposes

Clinical oriented Business analysis in the National information structure project

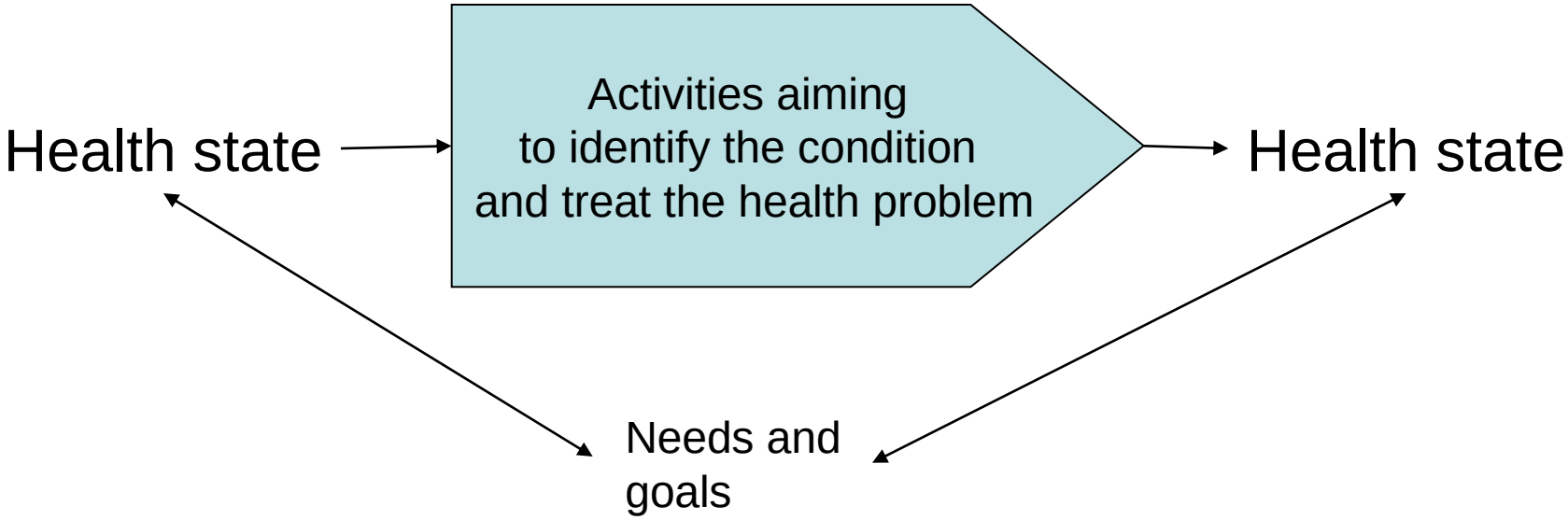
- Definition of health
- Definition of the core clinical process in health care
- Clarifying the value adding in the clinical process
- Clarifying the types of activities in the clinical process
- The results of the business analysis are mainly presented as;
  - Generic clinical process model
  - Generic concept models

Why business models?

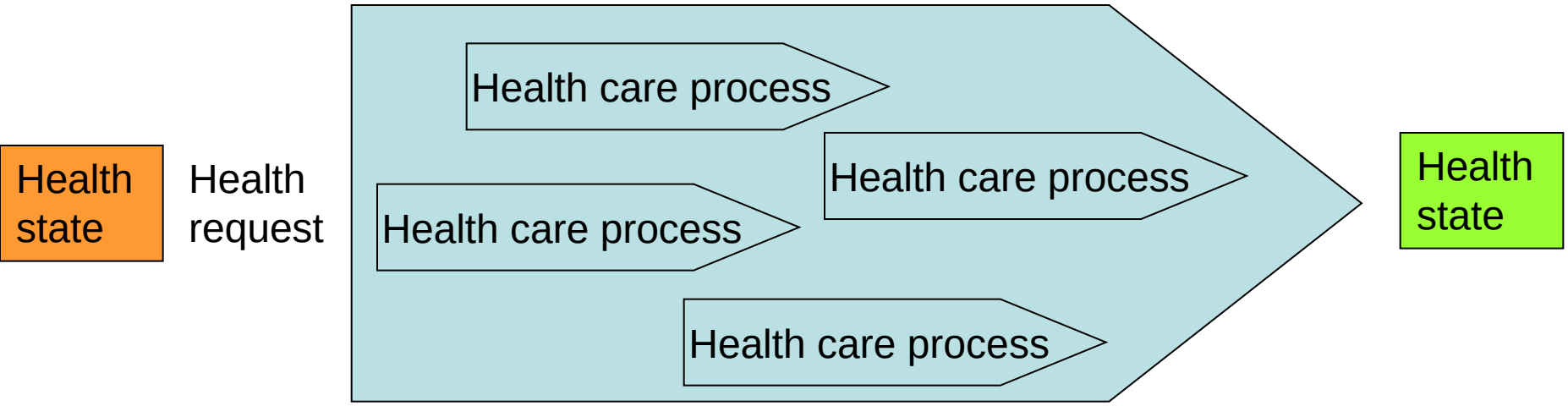
- The core processes are the clinical processes
- Information systems should support the provision and the management the of the clinical processes
- Any clinical support require explicit knowledge about the clinical processes
- Quality management systems should focus the clinical processes
- “Clinical oriented” is not enough in e-health – should be “clinical process oriented”

Clinical processes

health care process encompassing all health care activities **related to one or more health problems**



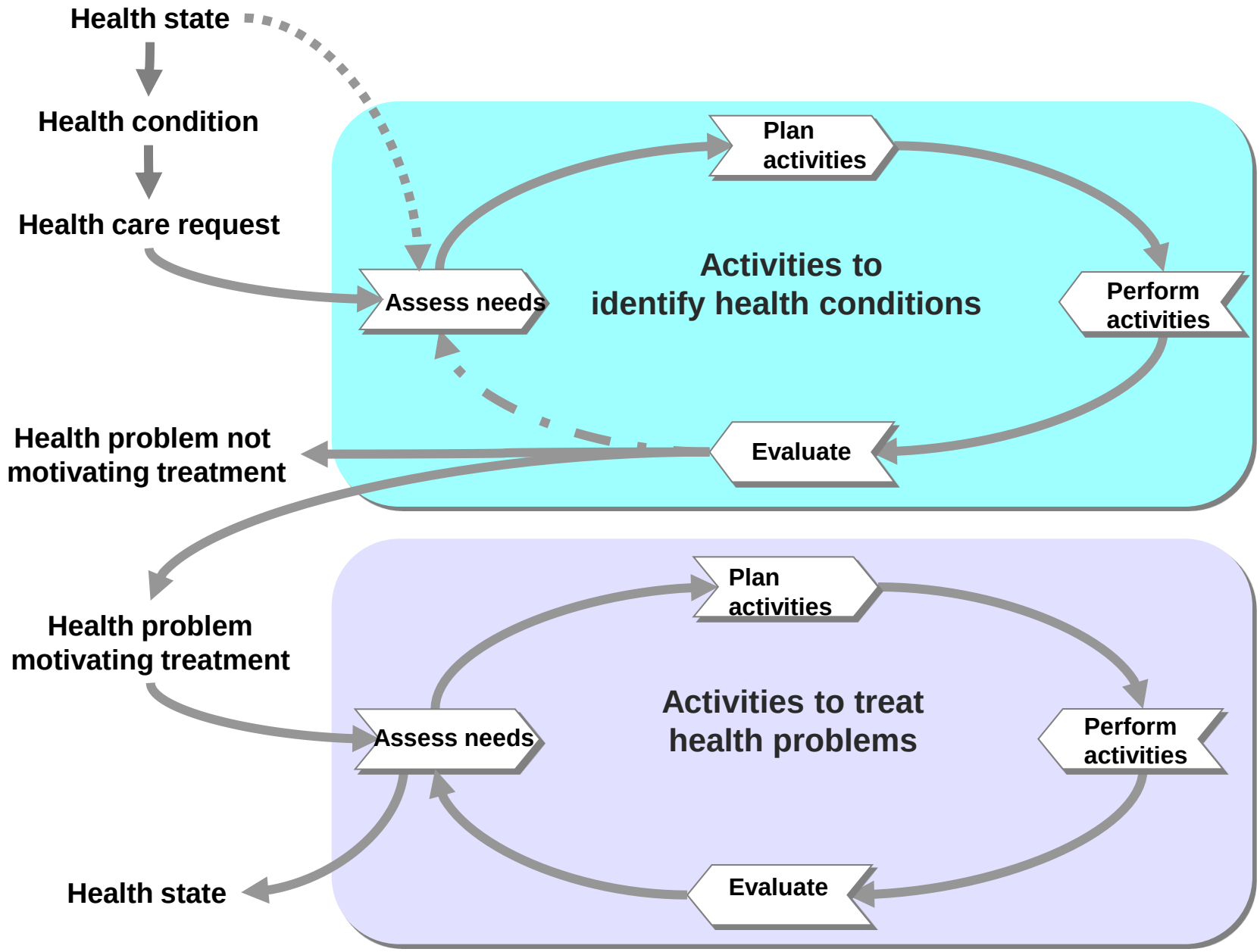
A clinical process

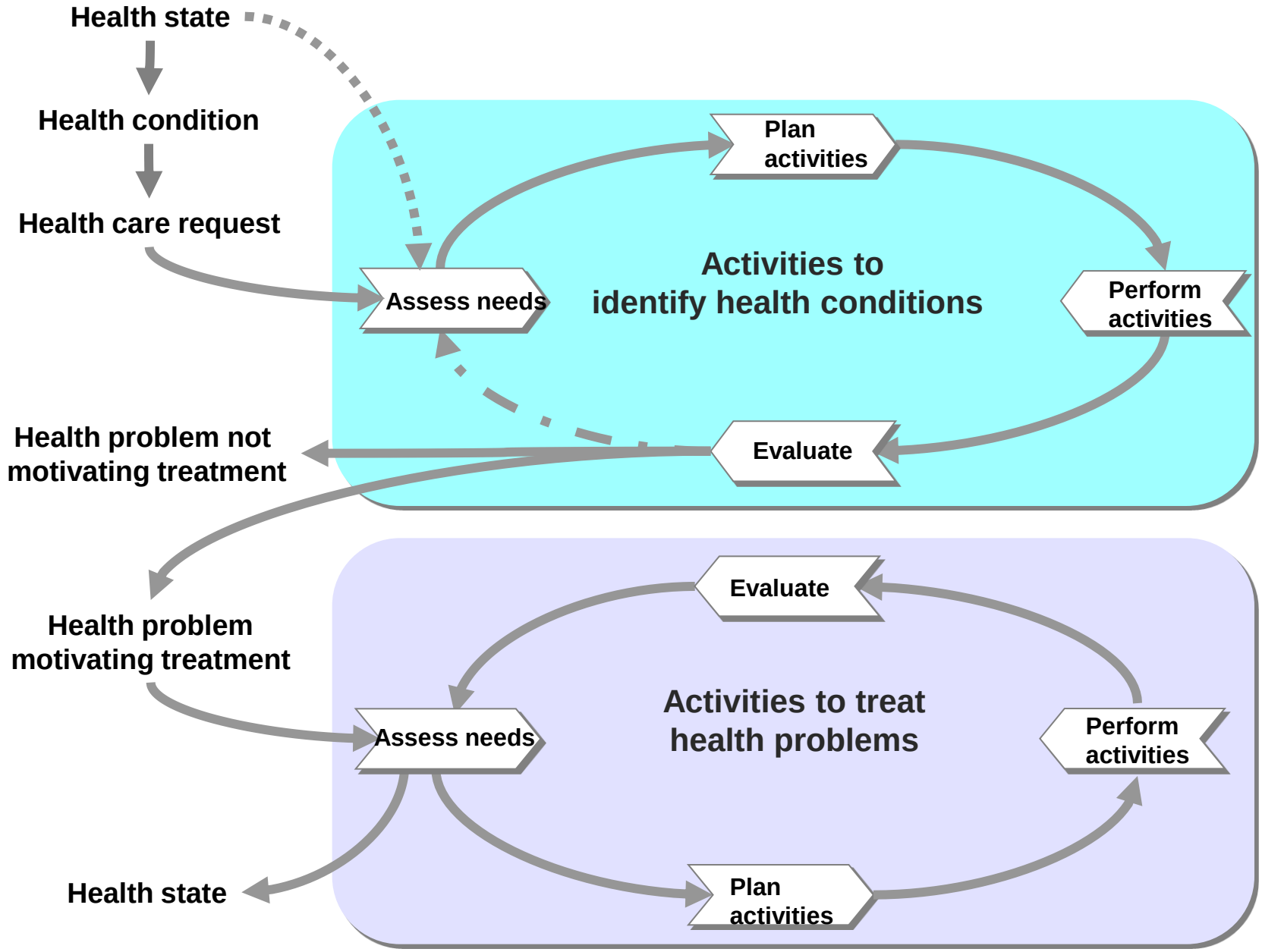


A comprehensive clinical process encompass one or several health care processes – a health care process could i.e. be defined as one contact or one episode of care

Scope of; process-, flow-, concept- and information models

- Process – input, activities, values added and output
- Flow – activity sequences, actors and cooperation
- Concept – definitions of and relations between concepts in process and flow models
- Information – classes and characteristics (attributes) for information regarding the concepts in the concept models


Health state
Health condition
Health care request
Plan activities
Assess needs
Activities to identify health conditions
Perform activities
Evaluate
Health problem not motivating treatment
Health problem motivating treatment
Plan activities
Assess needs
Activities to treat health problems
Perform activities
Evaluate
Health state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Plan activities
Health state

Process characteristics

- Customer
- Input
- Refinement object
- Value adding activities
- Output
- Which in clinical processes means
  - The **Patient** is the customer
  - A persons **Health state** expressed as **health conditions** is the input, refinement object and output
  - **Health care activities** are the value adding activities

To notice in the generic process model

- Defined start – a professionals perception of a health request
- Comprehensive coverage across organisational borders - health concern with specific id
- Needs assessment focussed
- Comprehensive Activity plan (Process overview) for process management
- All professions – teamwork possible

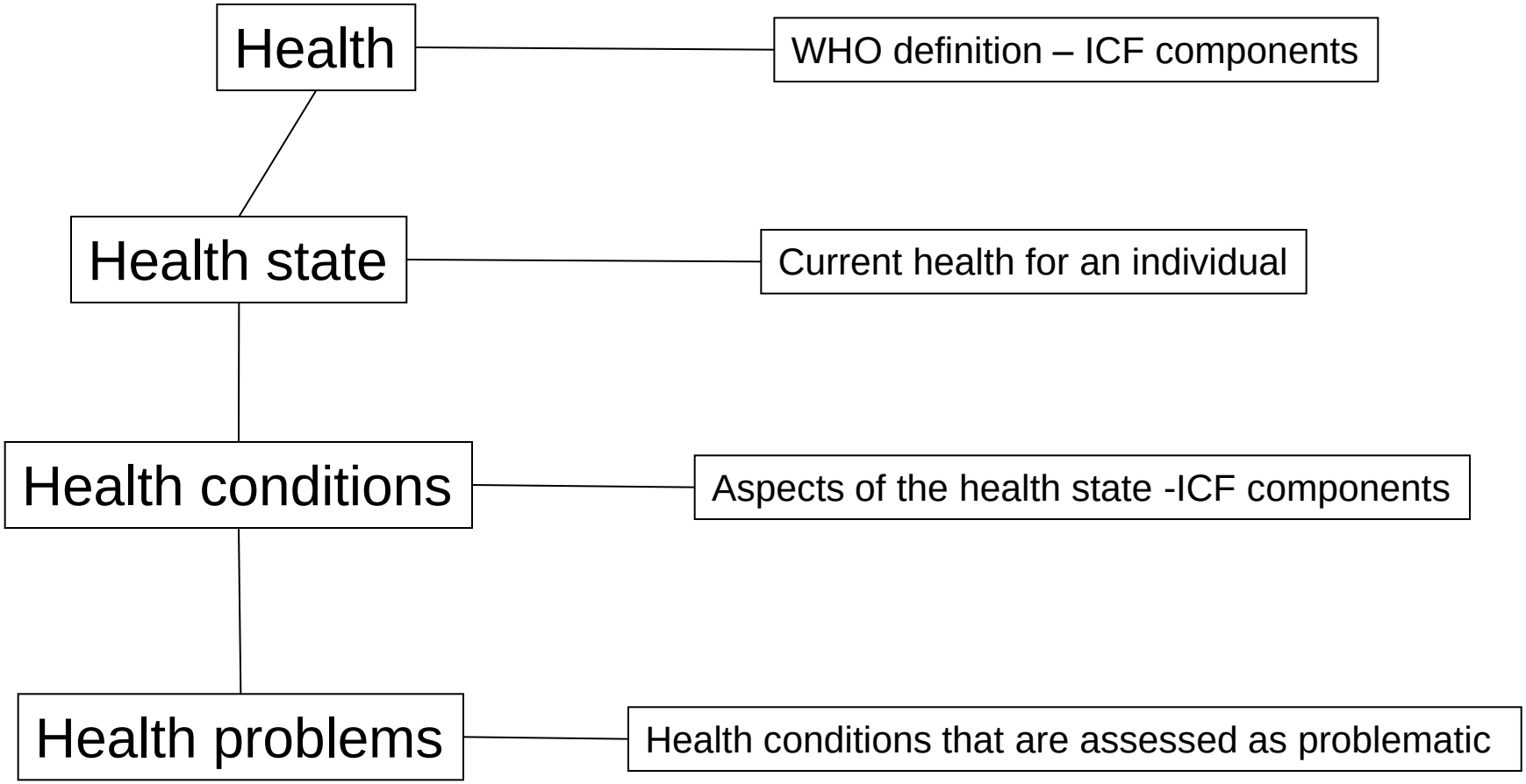
Health conditions in NI

- Noticed/registered health condition – aspect of health state ***noticed*** but not yet perceived by a human being
- Perceived health condition – aspect of health noticed and ***perceived*** by a human being – descriptive
- Assessed health condition – aspect of health noticed, perceived and ***assessed relevance of*** by a professional actor - defining
- Health problem – perceived or assessed health condition that i considered to be problematic for the health state of an individual

Activities in the generic process model

- Two main aims
  - To identify health conditions
  - To treat for health problems Två grundtyper
- Two main types
  - Direct interaction with the patient
  - Indirect interaction with the patient
    - Plan
    - Perceive
    - Assess
    - Evaluate

Health related basic concepts



”Health concern” (Hälsoärende)

- Identity carrier for a clinical process
- Keeps track on everything
  - Activities
  - Health conditions
  - Actors
  - Other resources
  - …
    - Related to a specific clinical process
- Gives the information needed in a patient summary for those health problems included in a clinical process
- Necessary for continuity of care and clinical process management

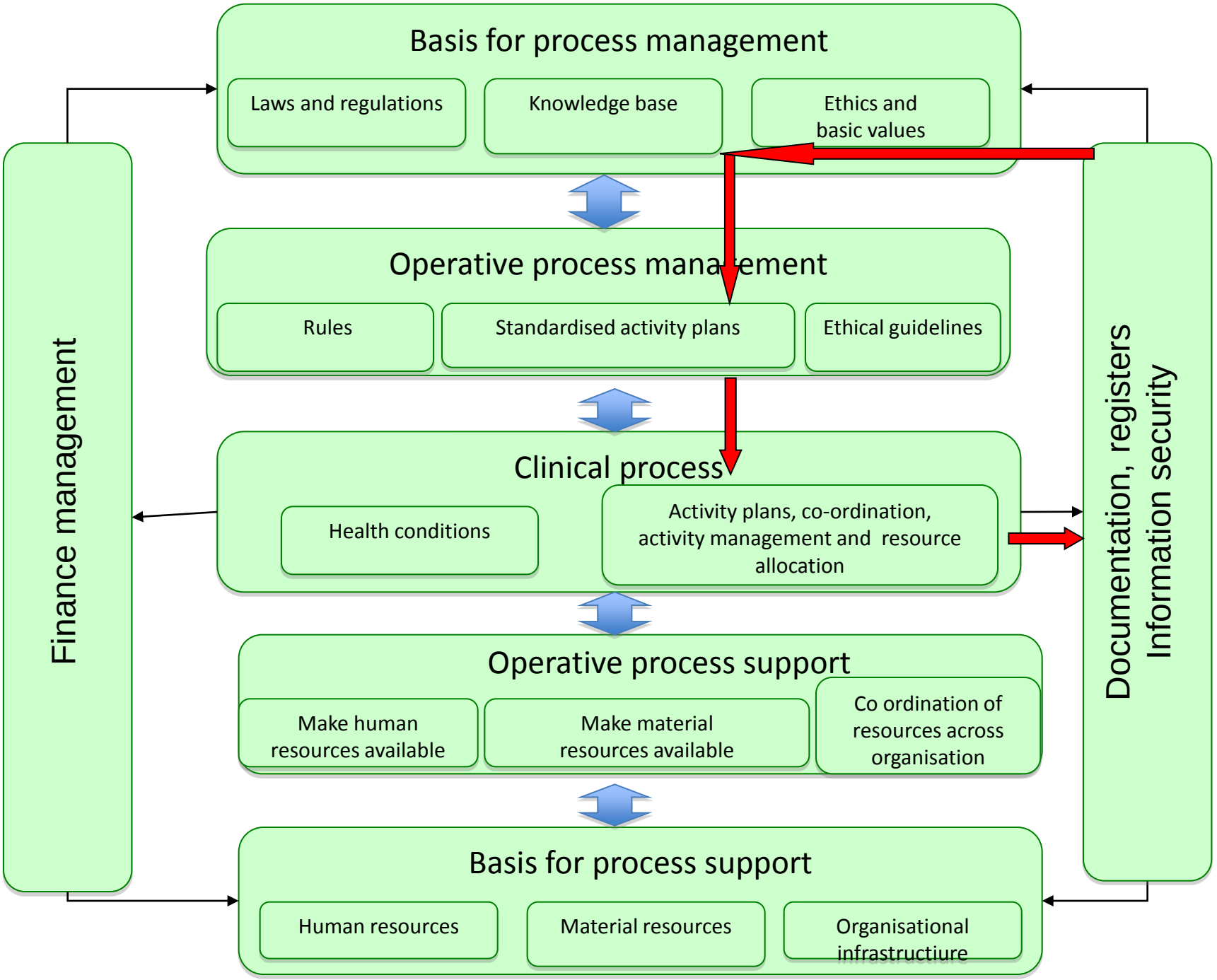
Concepts related to needs in NI

Risk and Prevention in NI

- Risk for a health problem is considered to be a health problem
- Risk for deteriorated health condition is considered to be a health problem
- Risk for health problems that motivates preventive actions are considered to be a treatment motivating health problem
- All preventive activities are considered to be treatment health care activities

NI Information model

- Focus on the clinical process
- Include all information needed to manage, support and perform the clinical process
- Information needs identified through analysis of a work flow model (showing also roles and responsibilities)
- 9 ”information areas” (which also represents areas for functionality)

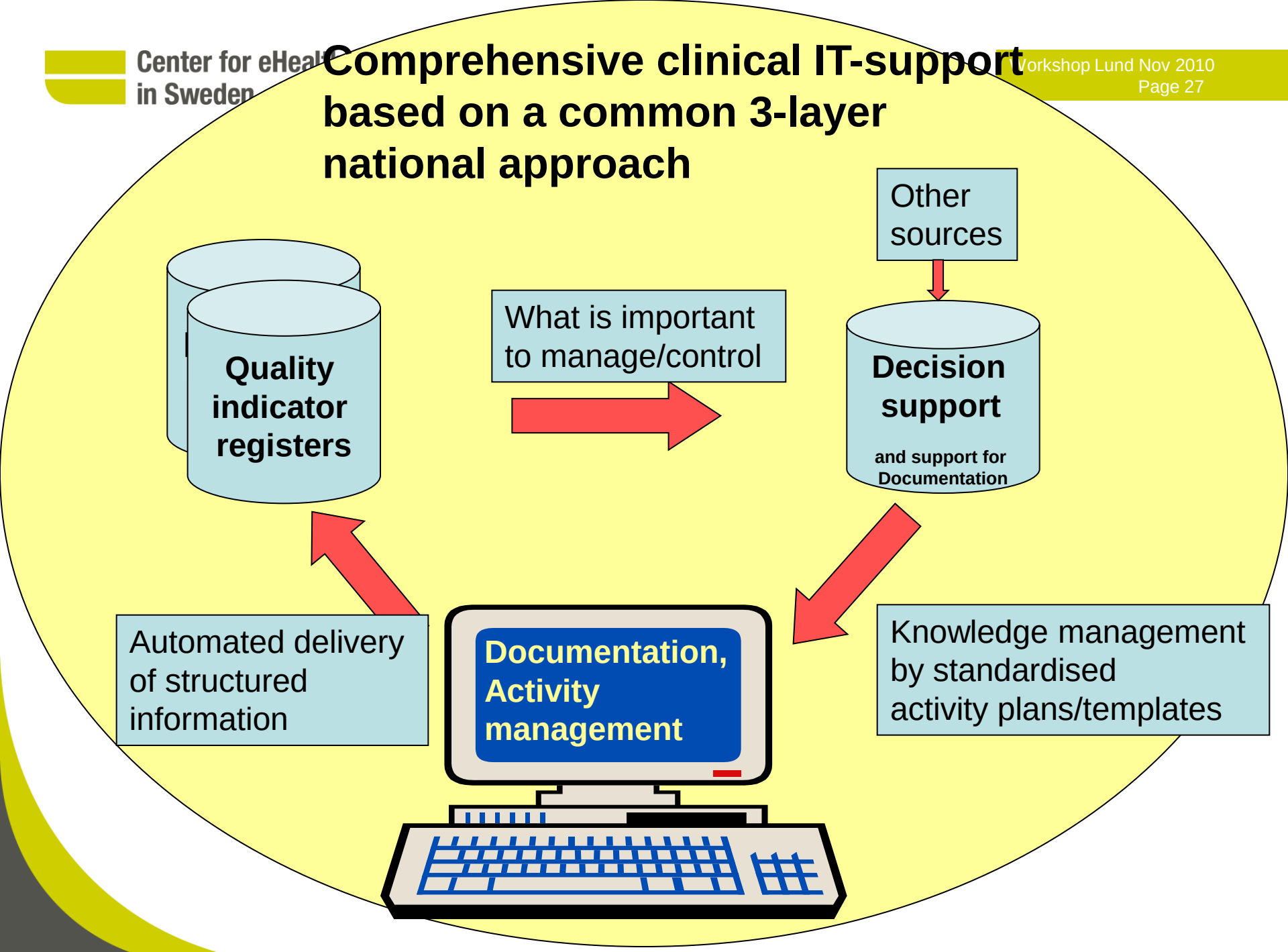

Basis for process management
Laws and regulations
Knowledge base
Ethics and basic values
Operative process management
Rules
Standardised activity plans
Ethical guidelines
Clinical process
Health conditions
Activity plans, co-ordination, activity management and resource allocation
Operative process support
Make human resources available
Make material resources available
Co ordination of resources across organisation
Basis for process support
Human resources
Material resources
Organisational infrastructiure
Finance management
Documentation, registers
Information security

To discuss

- The role of business analysis and business descriptions in e-health development?

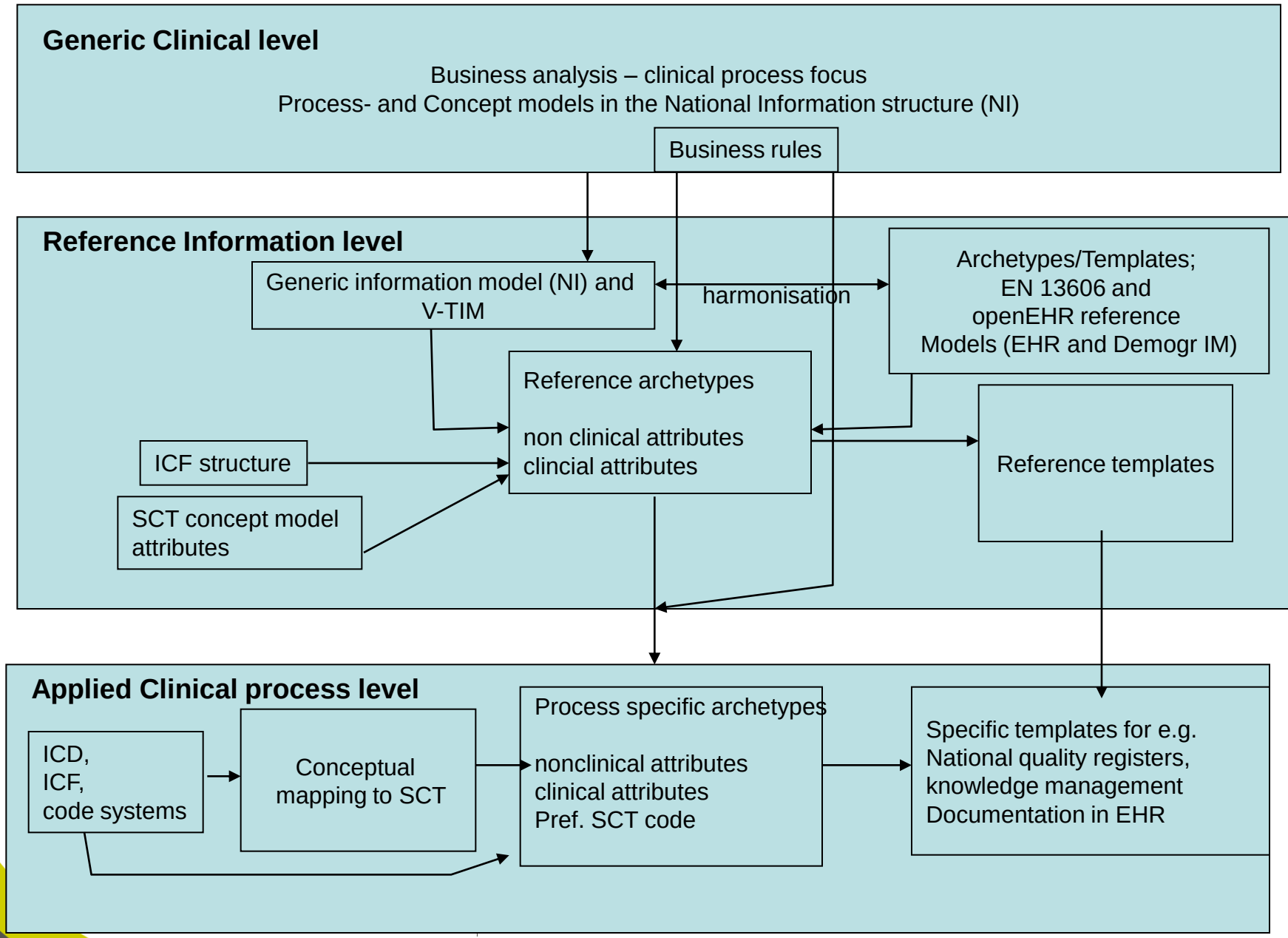
- Process- and concept models – are they needed to achieve semantic interoperability or are information models enough?

Comprehensive clinical IT-support based on a common 3-layer national approach



Strategy for comprehensiveness and clinical interoperability

- 3 perspectives all based on explicit business models – traceability and consistency to the ***clinical context***
- Reference information models with the clinical process concepts in focus – health conditions, health care activities and the interaction between the patient and the professional – traceability and consistency to the ***clinical content***
- **Interoperability in the specific individual clinical process**
- **Interoperability at the system level; Documentation** of care provision, **follow up** and **knowledge process management** with one and the same information structure


Generic Clinical level
Business analysis – clinical process focus
Process- and Concept models in the National Information structure (NI)
Business rules
Reference Information level
Generic information model (NI) and V-TIM
harmonisation
Archetypes/Templates; EN 13606 and openEHR reference Models (EHR and Demogr IM)
Reference archetypes
non clinical attributes
clincial attributes
ICF structure
SCT concept model attributes
Reference templates
Applied Clinical process level
ICD,
ICF,
code systems
Conceptual mapping to SCT
Process specific archetypes
nonclinical attributes
clinical attributes
Pref. SCT code
Specific templates for e.g. National quality registers, knowledge management Documentation in EHR

The Swedish 3-layer approach

1. Generic Clinical layer
   - Analysis of the core processes
   - Analysis of the information needs
   - Generic Process model
   - Generic Concept model; prEN 13940-2 harmonised

2. Reference Information layer
   - Generic information model and Applied information model (V-TIM); EN13606 and openEHR harmonised)
   - SNOMED CT concept model attributes
   - Reference archetypes (structure based on ICF and SNOMED CT)
   - Reference templates

3. Applied Clinical process layer
   - Clinical process specific archetypes
   - Clinical process specific templates
   - Archetype specific terminology binding (SNOMED CT, ICD, ICF …)

Generic Clinical level

- **EN 12967 (HISA part 1 enterprise viewpoint)**
- **prEN 13940-2 (Contsys part 2 health care process and workflow)**
- **ISO/FDIS 21667 (Health indicators conceptual framework)**
- **ISO 9001 and CEN/TS 15224 (Quality management systems)**

Reference Information level

- **EN 12967-2 (HISA part 2 information viewpoint)**
- **EN 13606-2 (Electronic health record communication part 2: Archetype interchange specification)**
- **Open EHR RIM and specifications**
- **SNOMED CT concept model attributes**
- **prEN 13940-2 (Contsys part 2: health care process and workflow)**
- **ICF (WHO classification for disabilities and functions)**

Applied Clinical process level

- **EN 13606-1 (Reference model for communication)**
- **EN 13606-4 (Electronic health record communication Part 4: Security)**
- **EN 13606-5 (Electronic health record communication Part 5: Interface specification)**
- **prEN 13940-2 (Contsys part 2: health care process and workflow)**
- **SNOMED CT, ICD,ICF ….**

Agenda Wednesday

- Reference archetypes – why and how
- Clinical process specific archetypes – how
- 13606 perspective
- Open EHR perspective
- Reference archetypes – which and comprising what
- Conclusions and closing remarks

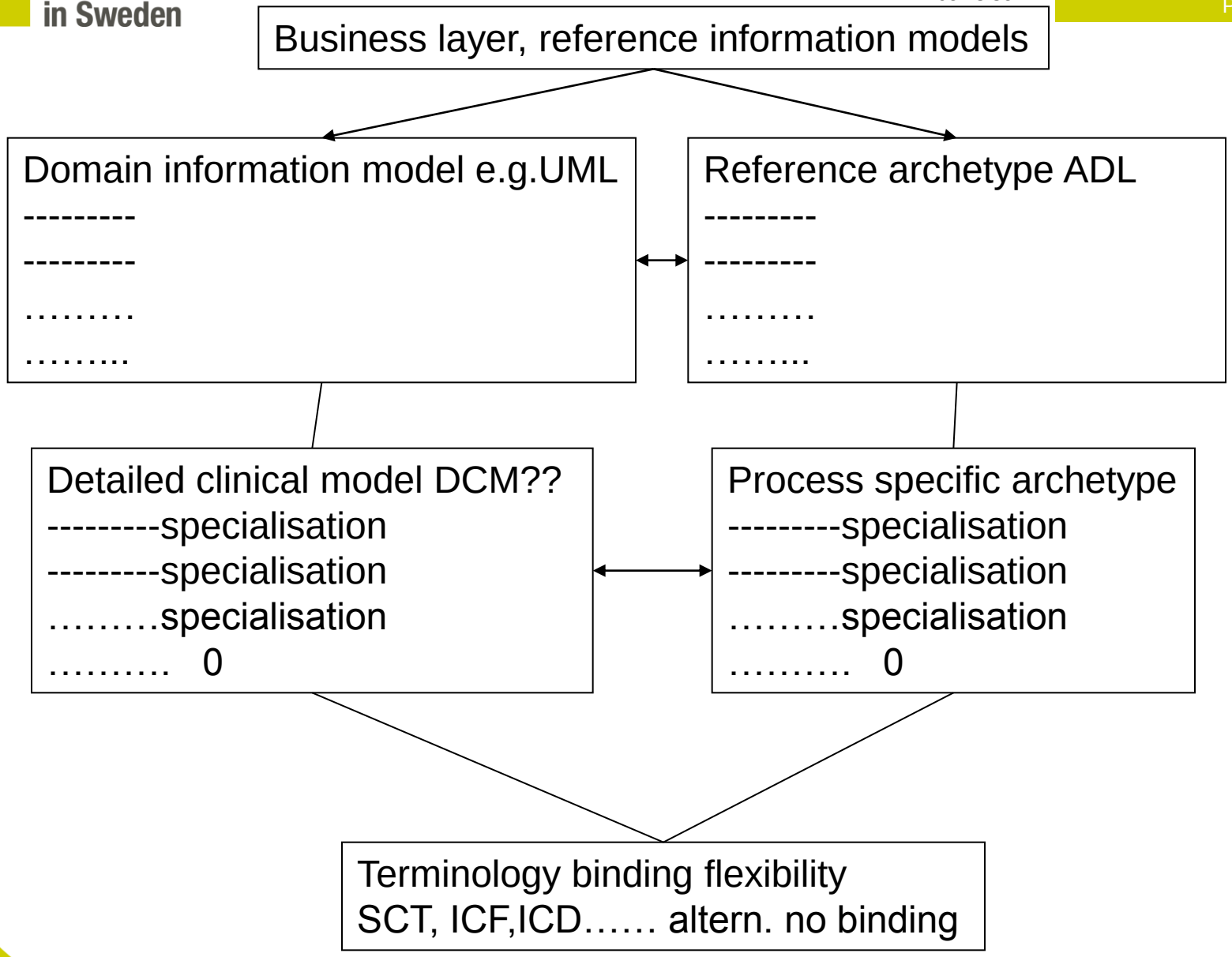
- AND A LOT OF DISCUSSIONS

Domain information model/reference archetype

- The clinical information in the reference layer can be presented with different notations/techniques, e.g.
  - UML
  - Archetype language
  - …….
- The information structure in the reference model shall be preserved in the process specific and applied archetype
- Binding to different terminologies must be possible.

Reference archetypes – which and why

- Cover all core concepts in the generic clinical process
- Cover all perspectives of clinical business
  - Documentation and communication in provision of care to an individual
  - Follow up
  - Management
- Achieve traceability and consistency of all clinical data to the core concepts in the process- and concept models
- Achieve traceability and consistency for all specific clinical process archetypes – through the reference archetypes to all reference information and the business models


Business layer, reference information models
Domain information model e.g.UML

……
……..
Reference archetype ADL

……
……..
Detailed clinical model DCM??
---specialisation
---specialisation
……specialisation
……. 0
Process specific archetype
---specialisation
---specialisation
……specialisation
……. 0
Terminology binding flexibility
SCT, ICF,ICD…… altern. no binding

Archetypes and codes

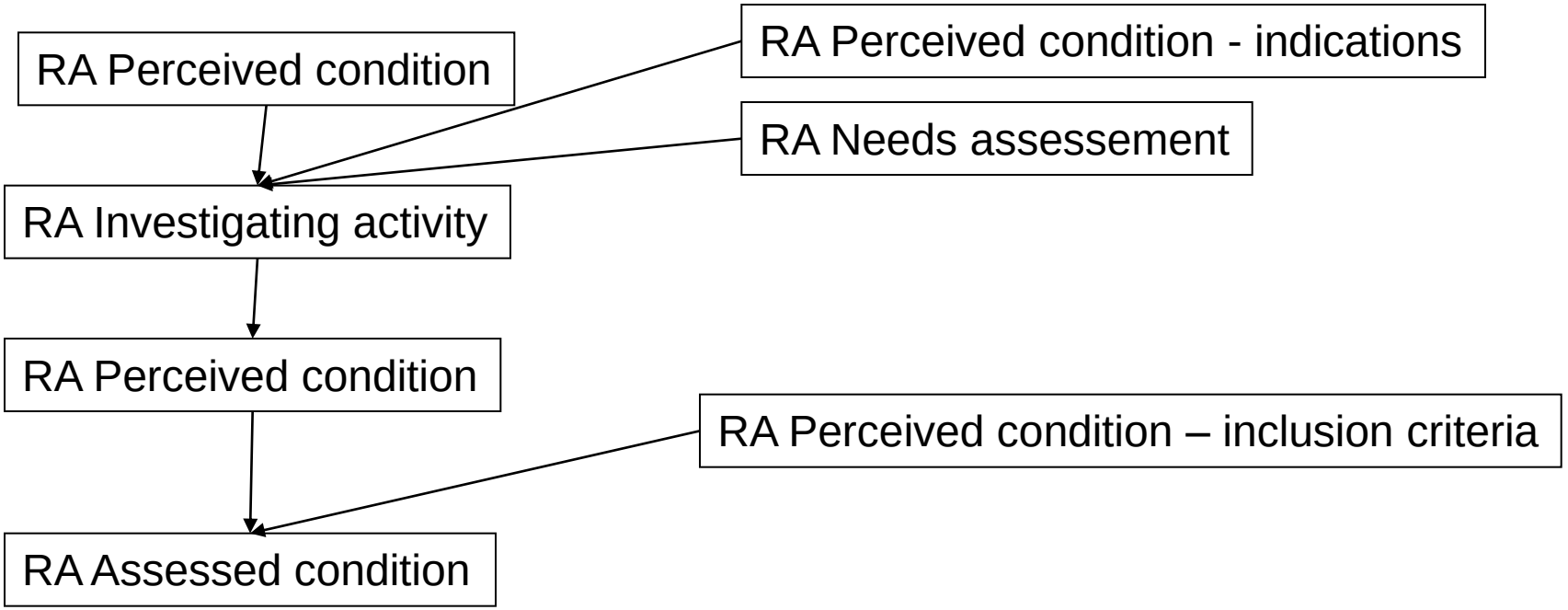
- Archetypes are carriers of specific defined information – and are the structure for storage in data bases
- Codes are the way we choose to communicate and show the stored information

Reference archetypes

- The link between business- and reference information models on one side and clinical process specific archetypes on the other side
- Structure for systematic archetype building
- The hub for traceability and consistency of archetypes (and terminology codes)
- The basis for reference templates and through them for documentation, follow up and knowledge management

Reference templates

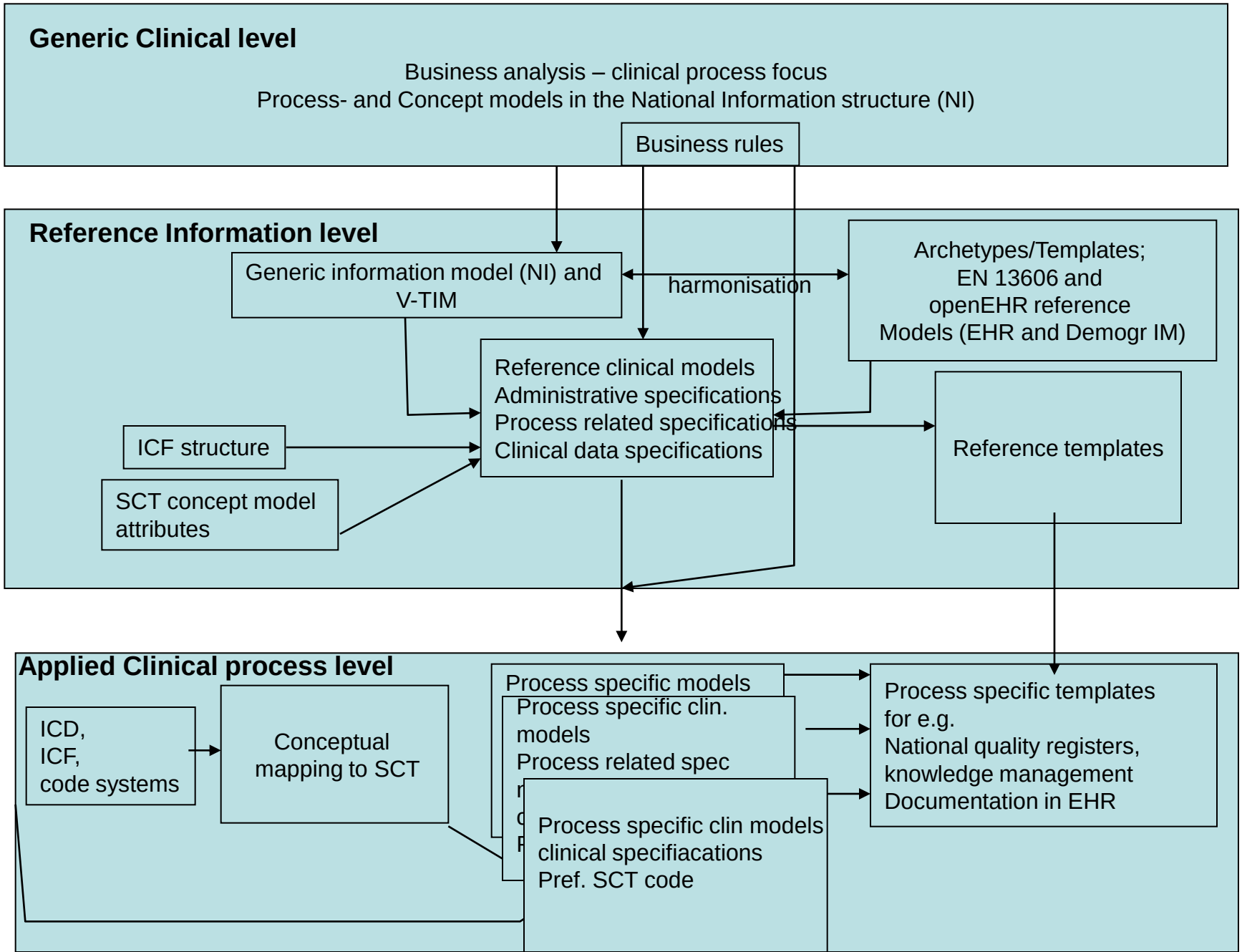
- Built up by several reference archetypes (RA) e.g. for identifying and assessment of a health condition



To discuss – the values/benefits of ……

- Reference archetypes (clinical part) – for what purposes are they needed
  - Traceability to the clinical process (clinical context)?
  - Structure for development of specific archetypes?

- National vs international
  - Common business models – process- and concepts models?
  - Common information reference clinical models?
  - Common reference archetypes ?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Administrative specifications
Process related specifications
Clinical data specifications
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Process specific templates for e.g.
National quality registers, knowledge management
Documentation in EHR

Guidance for mapping of clinical processes – aims

- Support for core process development
- Support for implementation of quality management systems
- Guidance for identification of information needs in specific clinical processes
- Basis for national business rules related to
  - –Information structure for record documentation
  - –Information structure for follow up and quality registers
  - –Informationsstructure for knowledge management by standardised activity plans
- Support for developing reference and clinical process specific archetypes

- Support for terminology binding

Guidance for mapping of clinical processes – structure

- Follows the process steps in the generic process model
- Gives the general information structure for activities and health conditions for every each process step and for four perspectives
  - Documentation
  - Follow up
  - Knowledge management
  - Resources

Reference archetypes development

- Basic strategy RA for health conditions (perceived and assessed)
  - Information needs for the three main perspectives are considered
  - ICF basic structure – health components is the first level of attributes
  - SCT concept model attributes are the second level attributes
  - Further attributes if all needs are not met (from NI/V-TIM)

Reference archetypes for activities

- Separate archetypes for
  - Types of activity
    - Direct
      - Identifying conditions
      - Treatment
    - Indirect
      - Perceive
      - Assess
      - Plan
      - Evaluate

Reference archetypes for activities - structure

- Investigating activities
  - ICF health component, Observerd aspect
  - SCT concept model attributes
  - Further from NI/V-TIM if needed

- Treatment activities
  - ICF health component
  - Activity object
  - SCT concept model attributes
  - Further from NI/V-TIM if needed

Reference archetypes

- Flexibility for possibilities to use archetypes in diffierent templates can be achieved by;
  - The health components from ICF constitute a cluster
  - As few clinical attributes as possible are mandatory
  - Which attributes that shall be mandatory in clinical process specific attributes is decided in the clinical process analysis made by clinical experts