Information infrastructures from a practice view

05.09.2013

Agenda

- Information Infrastructures
- Hospital IIs
- Practice view

- Case: heart transplant process

- Conclusions

Information Infrastructures

- In contrast to information systems IIs are larger and more heterogeneous networks

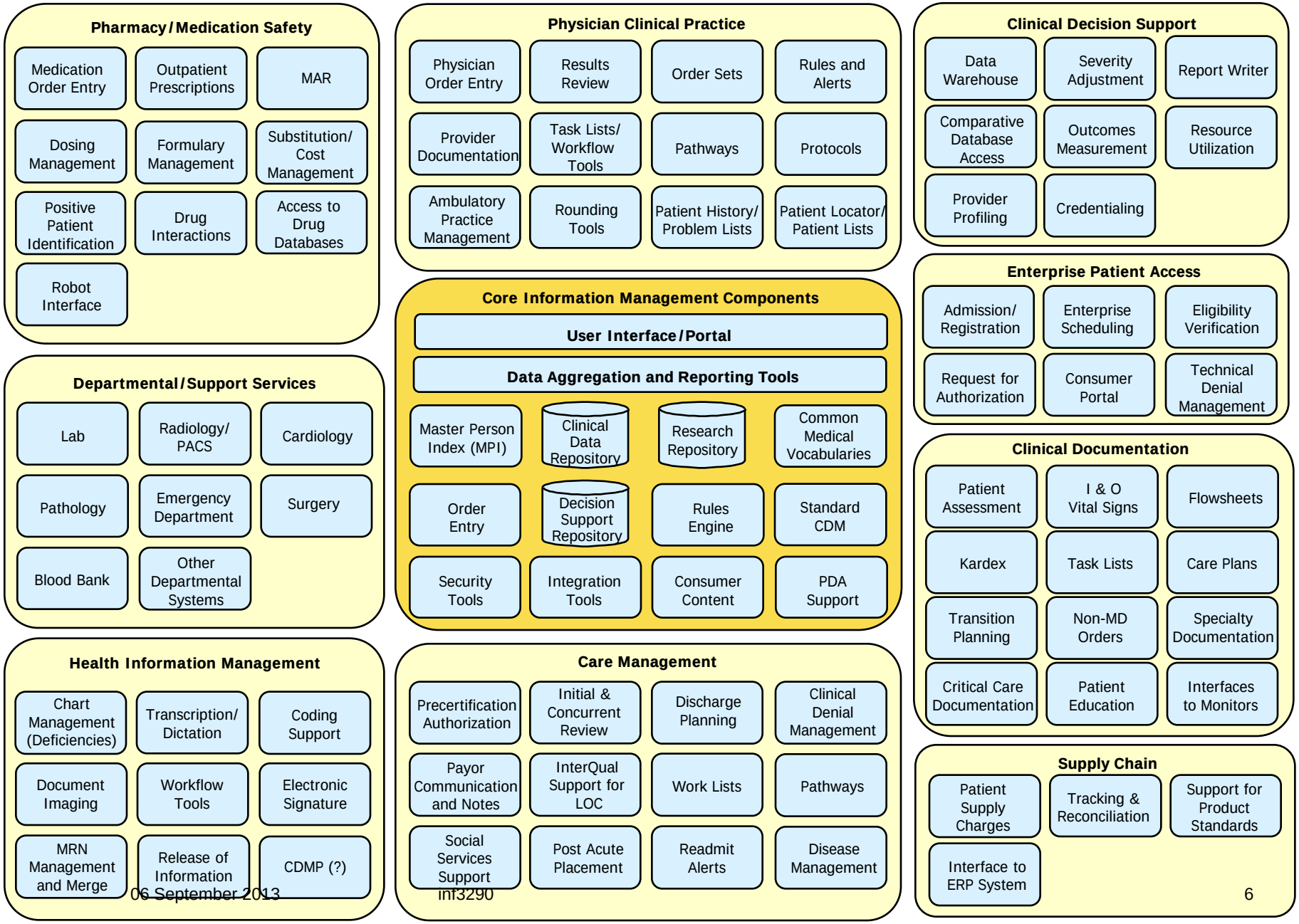
- Systems not self-standing - but interrelated,
- User-area not defined - but open
- Not used in one place – but many
- ”collective” evolution over time

- Sociotechnical view

Hospital information infrastructure

- network of all information systems in a hospital
- + work practices
- + information routines, conventiones of use…
- Hospital II today:
  - Large centralised systems
    - EPR Electronic Patient Record
    - PAS Patient Administrative System
    - PACS/RIS Picture archive + radiology system
  - Variety of specialised systems
    - Labs (clinical chemistry, microbiology, immunology, …)

Or to be more precise…



Solution Sets Solution Components

Kilde: John Quinn, Ernst & Young, 2002

Growth of hospital II

- Not ‘from scratch’
- Design starts from local needs
  - Veriety of small specialised systems addressing local information management needs
  - Local: departments, unit, laboratories,
  - Specialised: category of disease, diagnosis
- Often user initiated – with ‘no control’
  - 1995 Rikshospitalet: 160 systems

User needs

- Information and communication practices
- Examples:
  - Paper forms to structure information gathering
  - Archives to organize storing of information
- From paper to digital form
  - Efficiency, easy to retrieve data, access, sharing with other etc.

Example: ‘Berte’

Berte: system for paediatric cardiology at RH (children with congenital heart diseases, national centre)

From the initiative of the head of the section

installed in 1990

“in Berte there is a diagnosis system where there are more than *400 cardiac diagnoses*, and it is possible to diagnosis every single physical part of the heart. This details are very important for this section and for the surgeons, but of very little interest for paediatricians”

Berte (cont.)

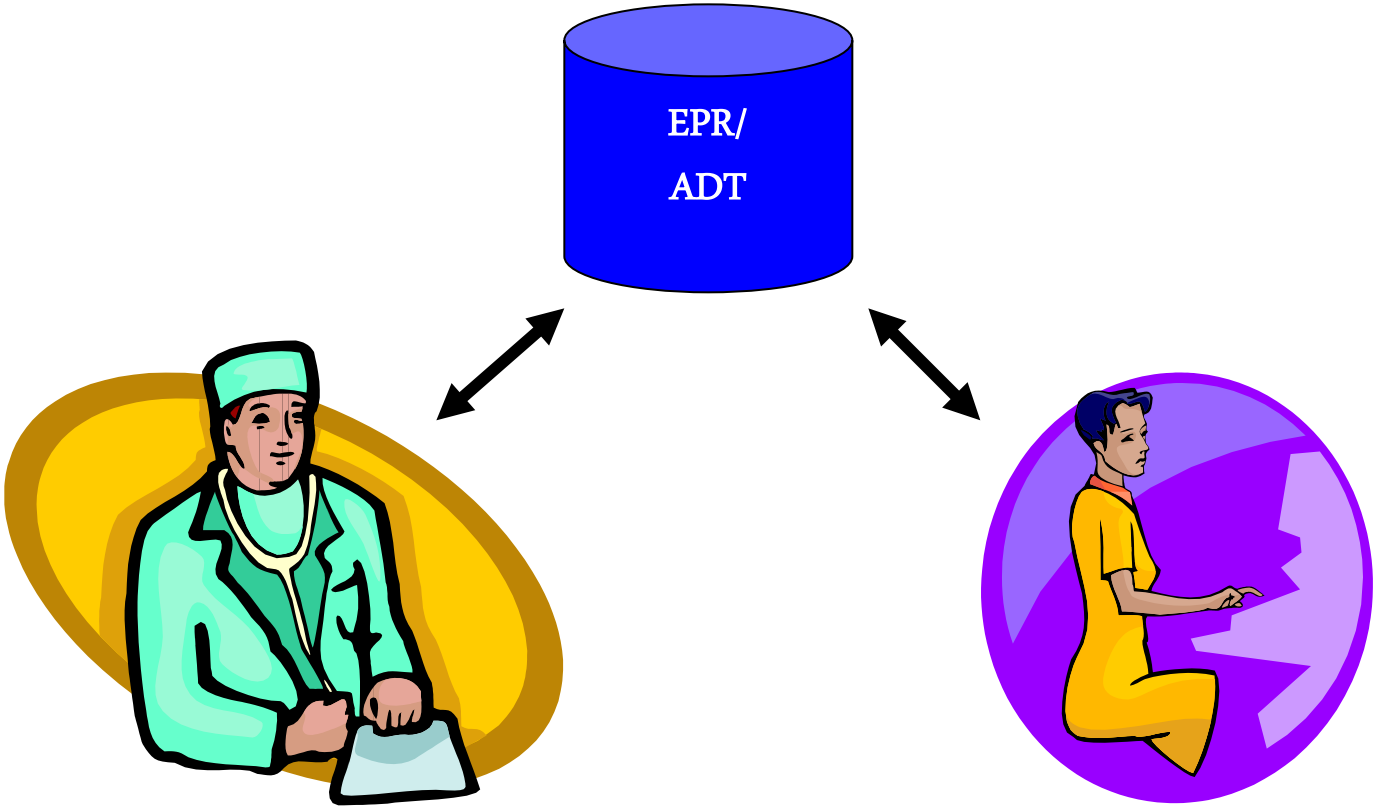
"in our department we are very specialized. What we need to provide, we need to have, and need to convey to the surgeons and in between us is *very specific* for our field and we *talk a different language* from the rest of the doctors in the paediatric department. Many of them don't understand what we say. That means that the system integrating the whole hospital or the regional hospitals in Norway will be too general for our purposes".

Medical work is collaborative

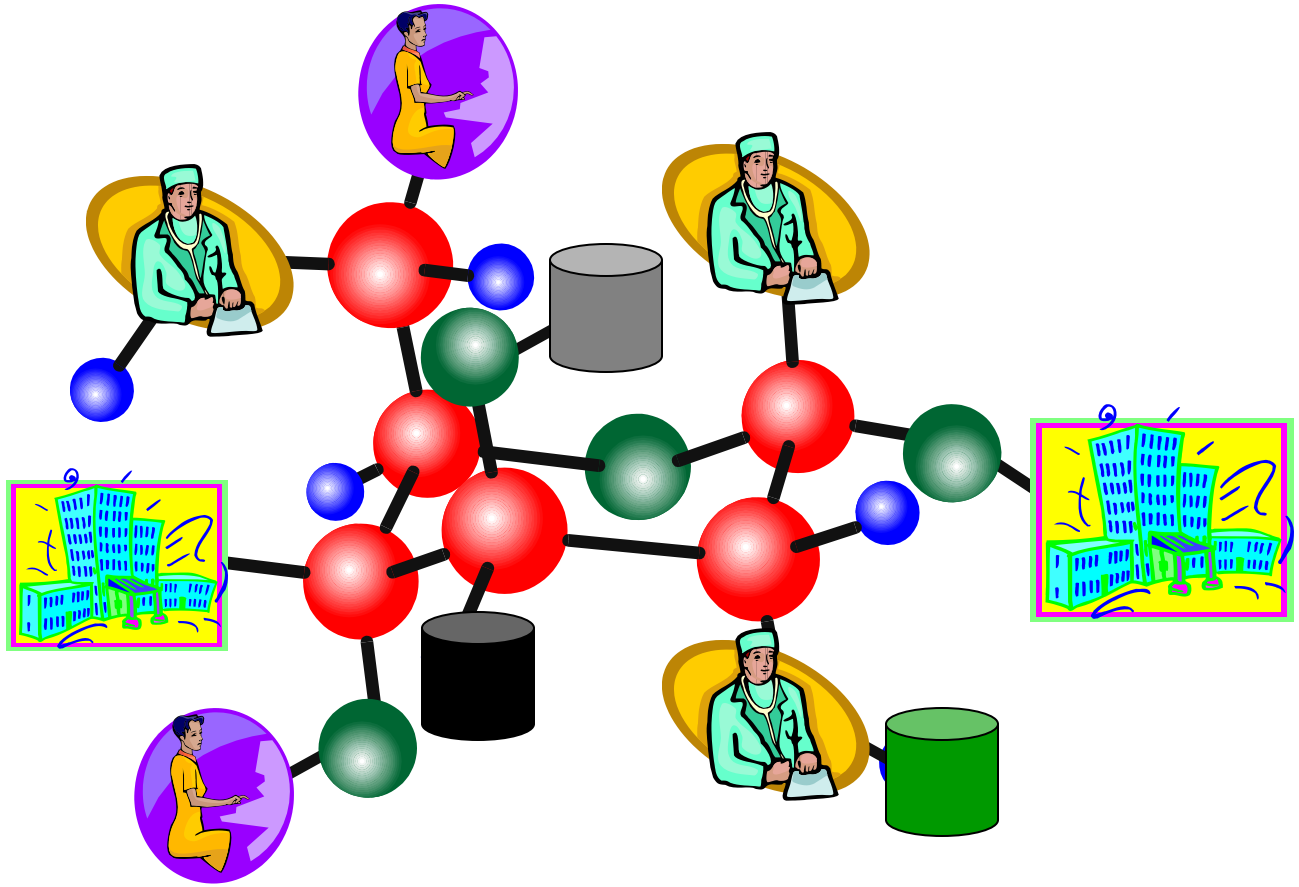
- Social and collective process
- Interdisciplinary
- Across locations
- Across time
- Berg: ‘managing patient trajectories’

- Critical need for sharing information and easy access

Collaborative practice...



Reality looks more like this:



II as a shared resource for work

- Shared:
  - Many users
  - Multiple users
- Enabling
  - not narrowly specified but open to new uses and possibilities
  - Multiple usages

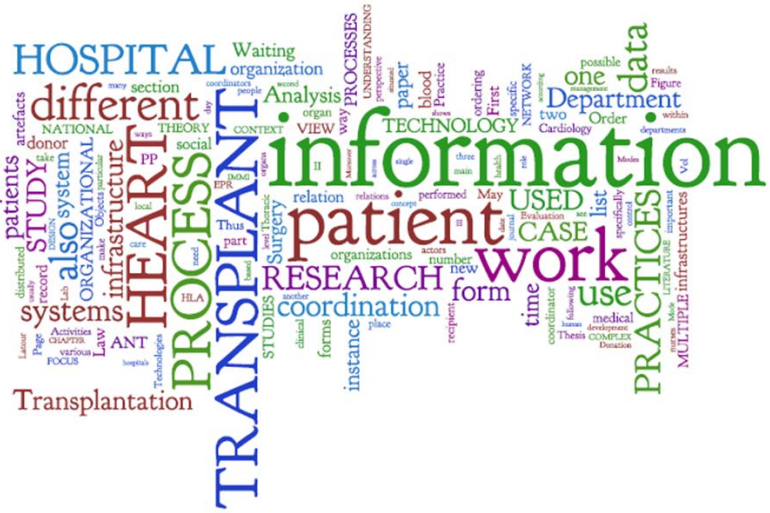
A practice view

- Work practices: networks of people, tools, organizational routines, documents etc. **"*in the doing*"**
- Actual practices – not formal descriptions
- Not in a vacuum: context + history

- A specific practice
- Constellation of practices
- **Information and communication practices**
- **Practices of making information flow**

Methodological note on how to study IIs from a practice view

- Star: «boring things»
- Bowker: «infrastructural inversion»
  - foregrounding the truly backstage elements of work practice
- II is «transparent to use»
- Becomes visible when it breaks
  - E.g.the server is down
- Articulation work vs primary work
  - E.g. how doctors document their practices while they are doing

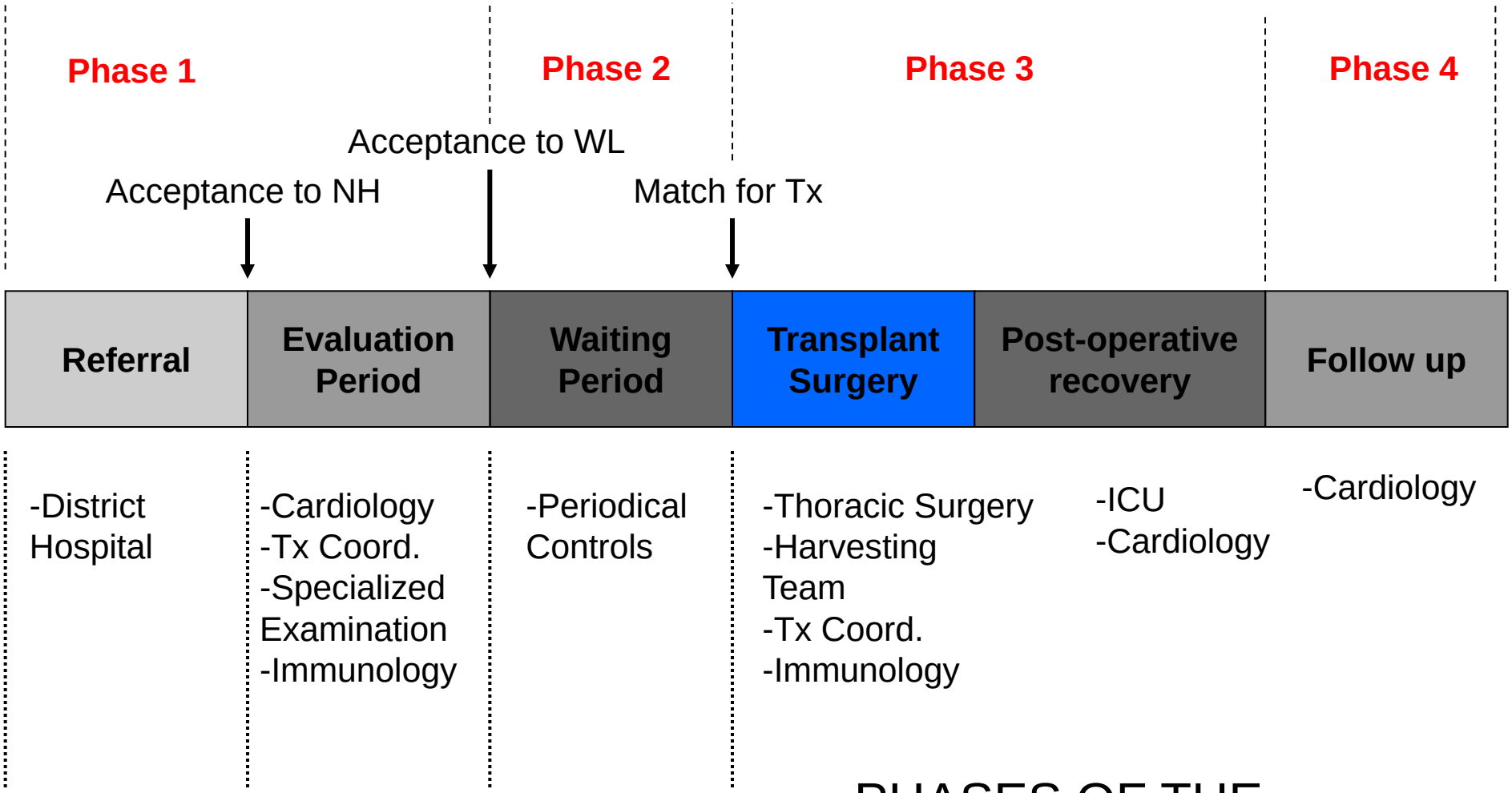


The case

- Heart transplants - process
- Background
- Patient process
- Information flow + information systems
- Information needs
- Multiple usages of information: logics

Heart transplant process

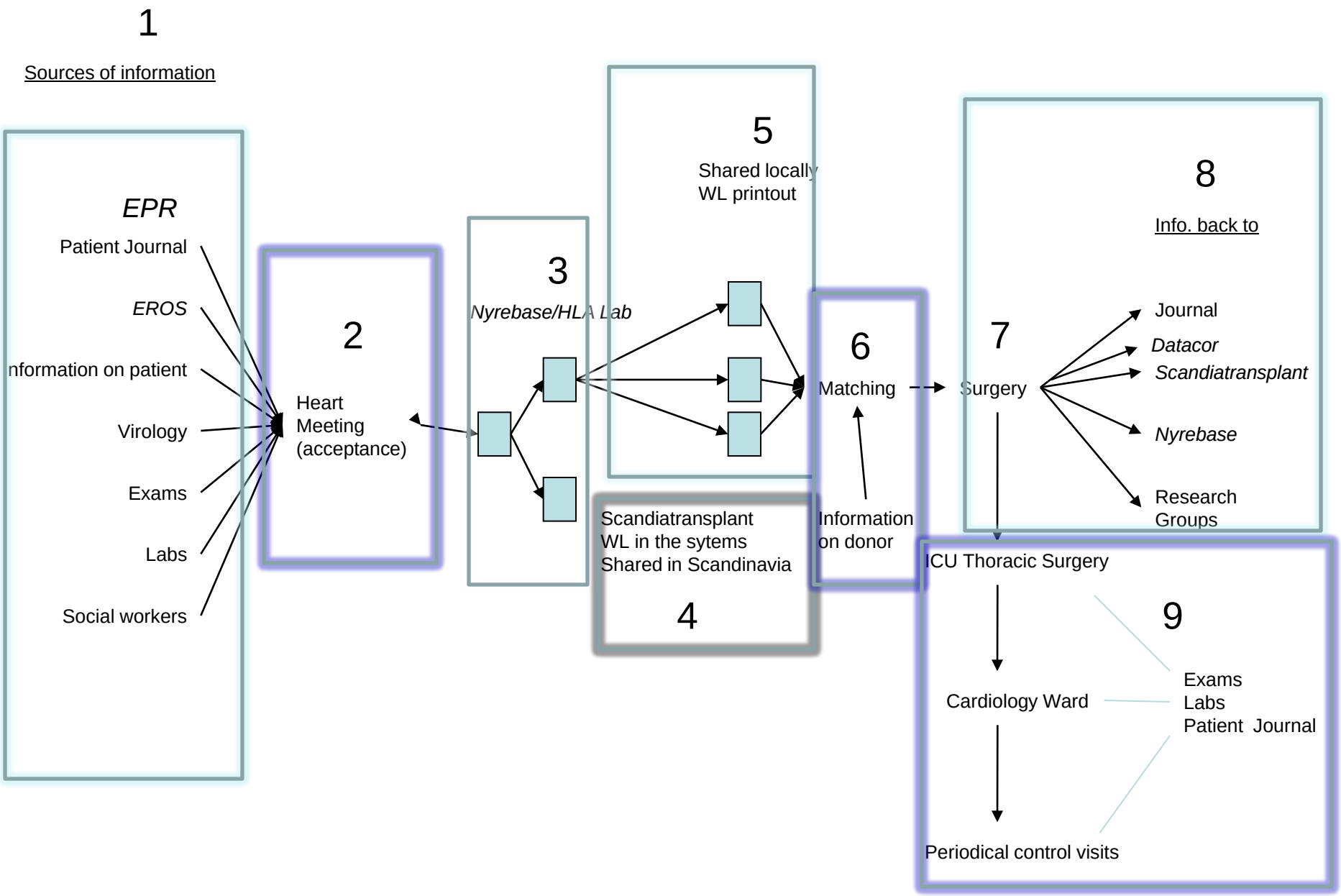
- Distributed work process
  - Within hospital
  - Across hospitals
  - Across levels of care
- Interdisicplinary (cardiology, thoracic surgery, immunology)
- Focus: coordination of work practices and the use of information artefacts
- Before/after surgery: complex process of information production, collection, selection – to reduce uncertainty



PHASES OF THE TRANSPLANT PROCESS

UiO : Department of Informatics
University of Oslo

Information flow in the process



	Paper based	Computer based
Centralized Artefacts	• Paper based centralized patient record (the patient journal). • Containing: • F1 form • G form: Checklist (Information for heart transplant and after transplantation)	• Electronic patient record (including the Administrative patient system)
Infra-departmental Artefacts	• Waiting list paper printout • Order form for Clinical Chemistry Lab • Order form for IMMI Lab • Order form for Microbiology Lab • Order form for other service departments • Form for acceptance for transplant	• Nyrebase system and HLA Lab system at IMMI • Datacor system in Thoracic Surgery
Infra-institutional Artefacts	• Transport plan for the incoming of heart-, heart/lung and lung recipients to transplantation	• ScandiaTransplant database
Local Artefacts	*Cardiology* • The cardiology ward daily patient list • Recipient form for evaluation for heart-transplant in the cardiology department • Binder *Surgery* • Donation plan paper form • Necro Organ paper Form *Immunology* • Local paper based patient record at IMMI	• Local database (cardiology)

Differences in the practice

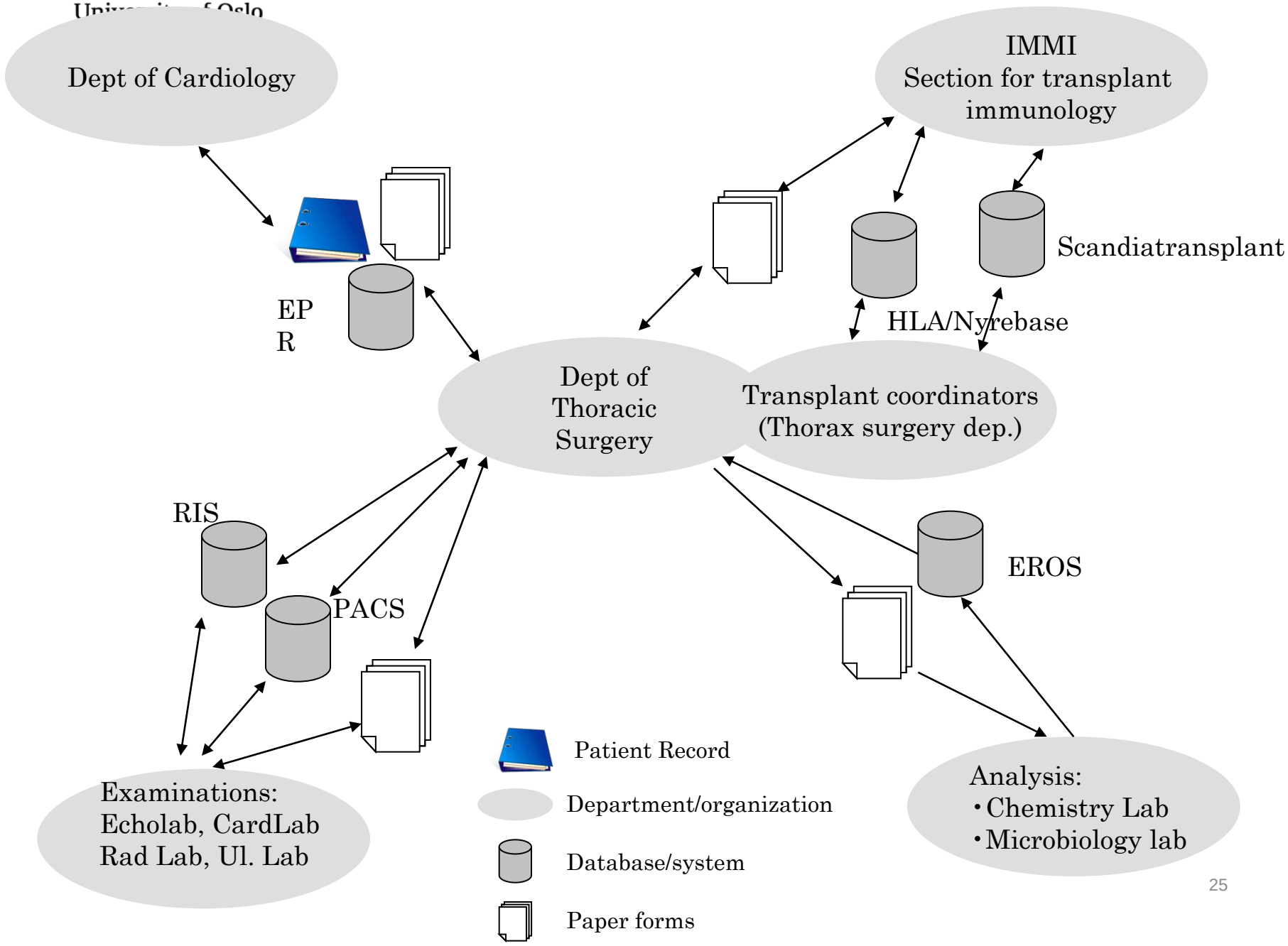
- Proximity:
  - Centrality of patient trajectory varies
- Specificities of roles to heart transpl. varies
- Different ‘objects’
  - Card: healthy enough/sick enough
  - Surgery: recipient/donor
  - Immunology: immunosuppr. treatment
- Boundaries between information area
  - Donor/recipient

Dept. of Thoracic Surgery (I)

- PACS/RIS - morning meetings
- Reports in EPR
- Datacor
  - Daily patients list for heart operations
  - Monthly/annual reports (e.g total number of interventions)
  - Quality report: risk factors
  - Operative interventions report: n operation per surgeon
  - VAD report: use of the Ventricular Assistance Device
  - Charts
- Donation
  - Donation Plan
  - Necro Organ Form

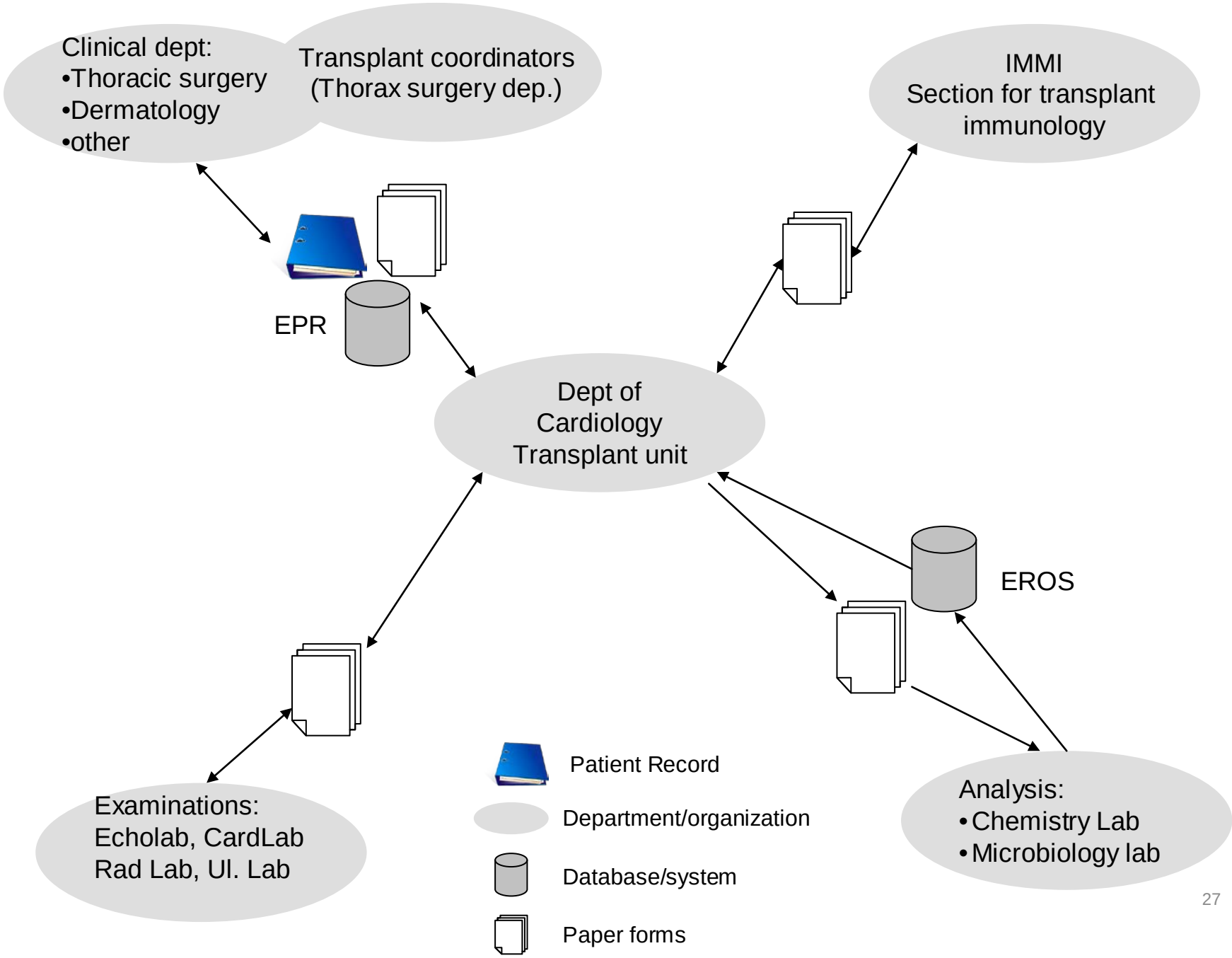
Dept. of Thoracic Surgery (II)

- ICU and Ward (one form per day)
  - Intensive form
  - Heart-Lung transplant form
  - Monitoring form
  - Respiration and circulation form
  - Oscillator-NO-gas form
- Transplant Registers
  - NTTD Pre-transplant form
  - NTTD Transplant form
  - NTTD Follow up form


Dept of Cardiology
IMMI
Section for transplant immunology
Scandiatransplant
EP
R
HLA/Nyrebase
Dept of Thoracic Surgery
Transplant coordinators (Thorax surgery dep.)
RIS
PACS
EROS
Examinations:
Echolab, CardLab
Rad Lab, Ul. Lab
Analysis:
• Chemistry Lab
• Microbiology lab
Patient Record
Department/organization
Database/system
Paper forms

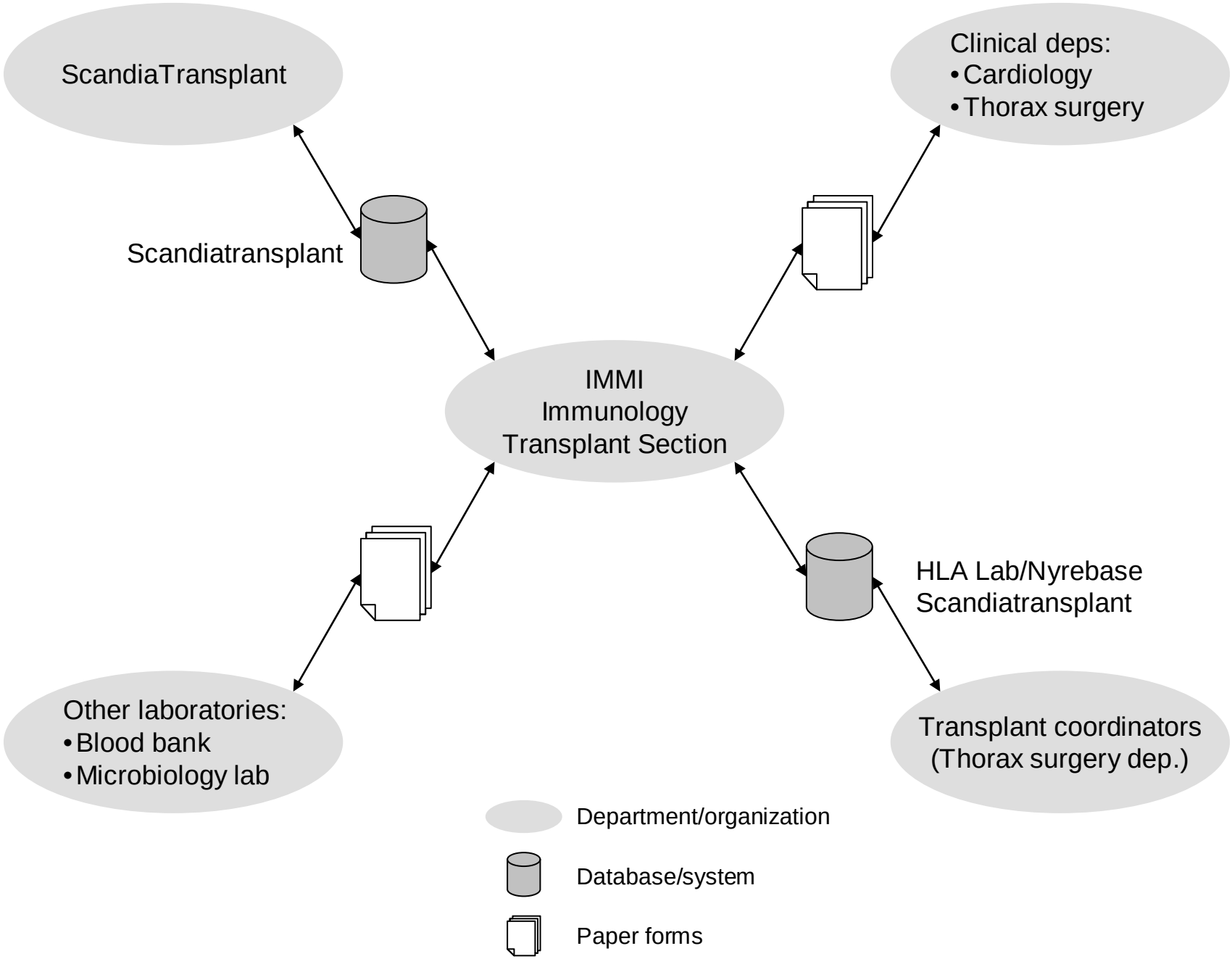
Dept of Cardiology

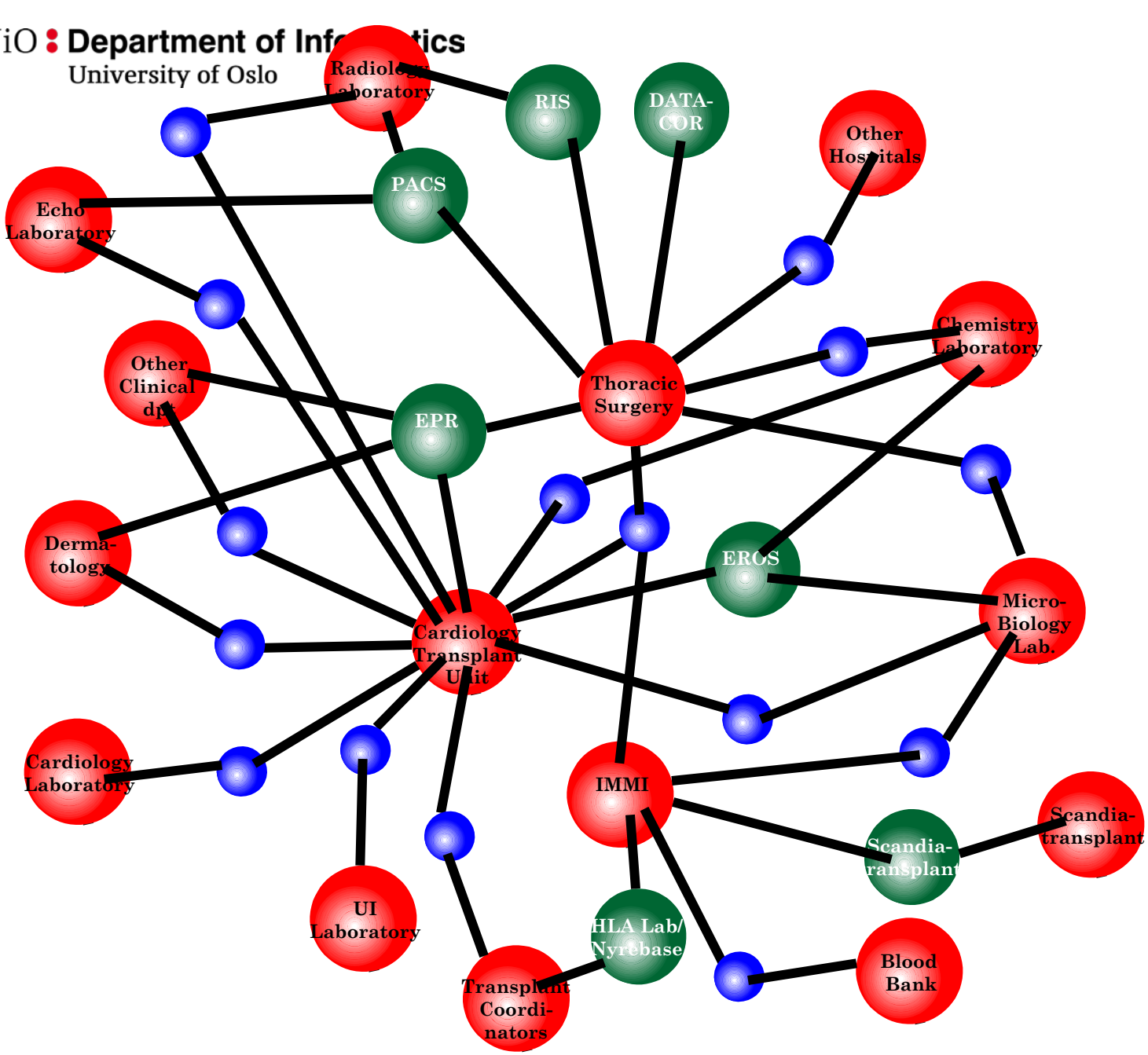
- Ward and visits
  - Forms and patient record (paper and EPR)
  - Checklists
  - Schedules
  - Patients lists
- Laboratories
  - Order forms/EROS
  - Phone calls
- Heart Meeting
  - Form for acceptance on the WL


Clinical dept:
•Thoracic surgery
•Dermatology
•other
Transplant coordinators
(Thorax surgery dep.)
IMMI
Section for transplant
immunology
EPR
Dept of
Cardiology
Transplant unit
EROS
Examinations:
Echolab, CardLab
Rad Lab, Ul. Lab
Analysis:
• Chemistry Lab
• Microbiology lab
Patient Record
Department/organization
Database/system
Paper forms

Immunology Institute

- Nyrebase/HLA system
  - For lab work procedures
  - Originally for renal transplantations
  - HLA typing
  - Shows previous typing
  - Prints WL
- Scandiatransplant
  - Shared WL maintenance
  - Registration of transplants
  - Follow-up data
  - Different transplant procedures:
    - donor once/more
    - donor one organ/many


ScandiaTransplant
Clinical deps:
• Cardiology
• Thorax surgery
Scandiatransplant
IMMI
Immunology
Transplant Section
HLA Lab/Nyrebase
Scandiatransplant
Other laboratories:
• Blood bank
• Microbiology lab
Transplant coordinators
(Thorax surgery dep.)
Department/organization
Database/system
Paper forms


Radiology Laboratory
RIS
DATA-COR
Other Hospitals
PACS
Echo Laboratory
Other Clinical dpt
Chemistry Laboratory
Thoracic Surgery
EPR
Derma-tology
ERCS
Micro-Biology Lab.
Cardiology Transplant Unit
Cardiology Laboratory
IMMI
Scandia-transplant
Scandia-transplant
UI Laboratory
HLA Lab/ Nyrebase
Blood Bank
Transplant Coordi-nators
Organi-zation
System/ database
Paper form

Logics of information use

1. Patient-centered logic
2. Treatment-centered logic
3. Activities-centered logic
4. Event-centered logic

- Multiple logics of *Information ordering*
- Multiple effects

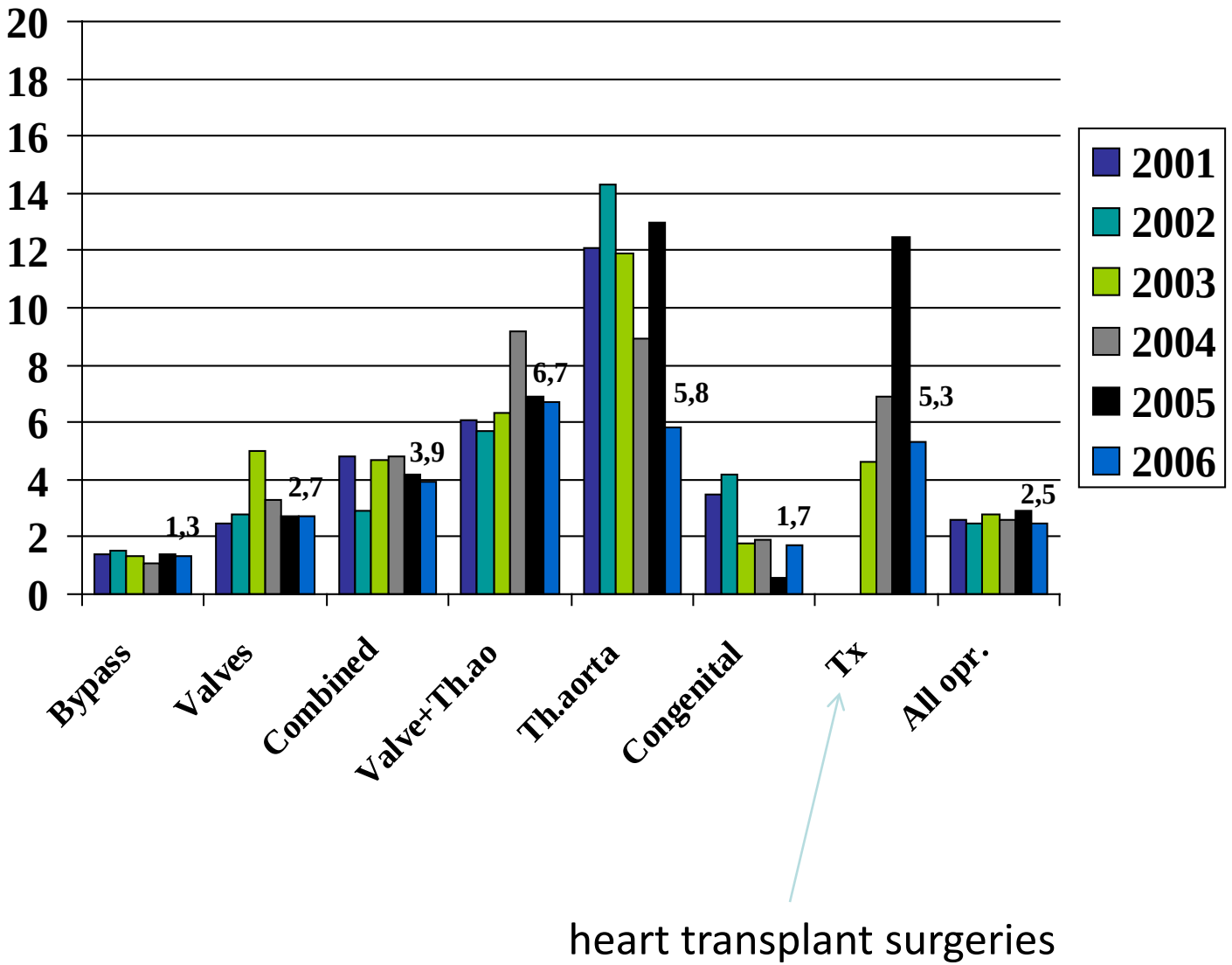
Patient-centred logic

- Medical history of each singular patient
- Chronological order
- What has been done, what results, what are the next steps
- Checklists across shifts, EPR, referral
- Connecting recipient and donor
- Not integrating disciplines and professions

Treatment-centred logic

- HTx as specific treatment
- Category of patient
- Quality of the process
- Research oriented
- Located in meetings, conferences, research articles
- Not identities of patients, aggregated data
- EPR as source of info, Datacor, personal databases, Scandiatransplant

Heart operations in Norway 2006 - 30-day mortality (%)



heart transplant surgeries

Activities-centered logic

- Concurrent tasks and patient trajectories
- Articulation work for managing many patients:
  - Different schedules for the same day,
  - Same stage, different places (WL)

- Organize movements in time and space of many patients
- Daily patient list in departments, weekly plans

Event-centered logic

- Heart transplantation as surgical procedure
- Specific event
- Minimize uncertainties
- Two directions:
  - Define as much as possible temporal and spatial boundaries of the transplant surgery
  - Rely on flexibility of schedules and plans
- Donation plan, waiting list

Co-ordering

- logics are not separated and isolated
- Interesting to look at their co-existance in practice
  - Co-existance takes different forms in the practices
  - Harmonious co-existance
  - Contradictions
  - Tensions
- Strenght, and other more silent modes?
- Multiple coherences
- No single order can do on its own
  - Different multiple complexly related orders

Conclusion I

- Multiplicity
  - II means different things to different groups
  - of systems
  - Of work practices
  - Of users + users' needs
  - logics

Conclusion

- Information Infrastructures
  - Shared
  - Enabling
  - Invisible (taken for granted)
  - Historically created
    - Information infrastructures are built on already existing "installations" (installed base), rarely from the "zero".