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Contextual Requirements on Computerization of Clinical Guidelines

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IT-University of Copenhagen and
Danish Institute of Medical Simulation

Agenda

1. Background
2. Study methods
3. The two cases
4. Working context - implications for computerization
5. Prototypes of computerized guidelines
6. Preliminary conclusions

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Clinical Practice Guidelines (CPG'S)

Clinical practice guidelines are systematically developed statements to assist practitioner decisions about appropriate health actions for specific clinical circumstances

Field and Lohr, 1992: Guidelines for Clinical Practice: from development to use

Existing problems with CPG's

CPG's are not applied in practice - as they often are:

- Not known by clinicians
- Very voluminous
- Not matching local practice
- Not agreed with

Why Computerize CPG's?

- Introduction of EPR/EMR
  - Moving records from documentation tools to proactive clinical support tools
- Improving professional standards
  - Quick translation from science to practice
  - Just in time guidance
- Efficient use of resources
- Enable standardization of
  - Care
  - Documentation
- Support seamless care path
  - Across organizations
- Enable transparency of care
  - Benchmarking

Translation from paper CPG to IT

- A variety of methods
  - Textual mark up
  - Mapping to models
- Most applications based on theoretic models of work
  - Workflow algorithms (BPEL,YAWL,Petri net...)
- Little focus on how work is practiced

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Study methods

- Observations of work practice in hospitals
- Interviews
- Analyzing CPG's
- Workshops with clinicians
- Prototyping

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3. The two cases:
   - Advanced Life support in case of cardiac arrest
   - Chemo therapy treatment
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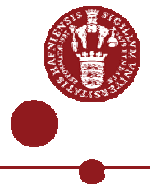
Advanced Life Support

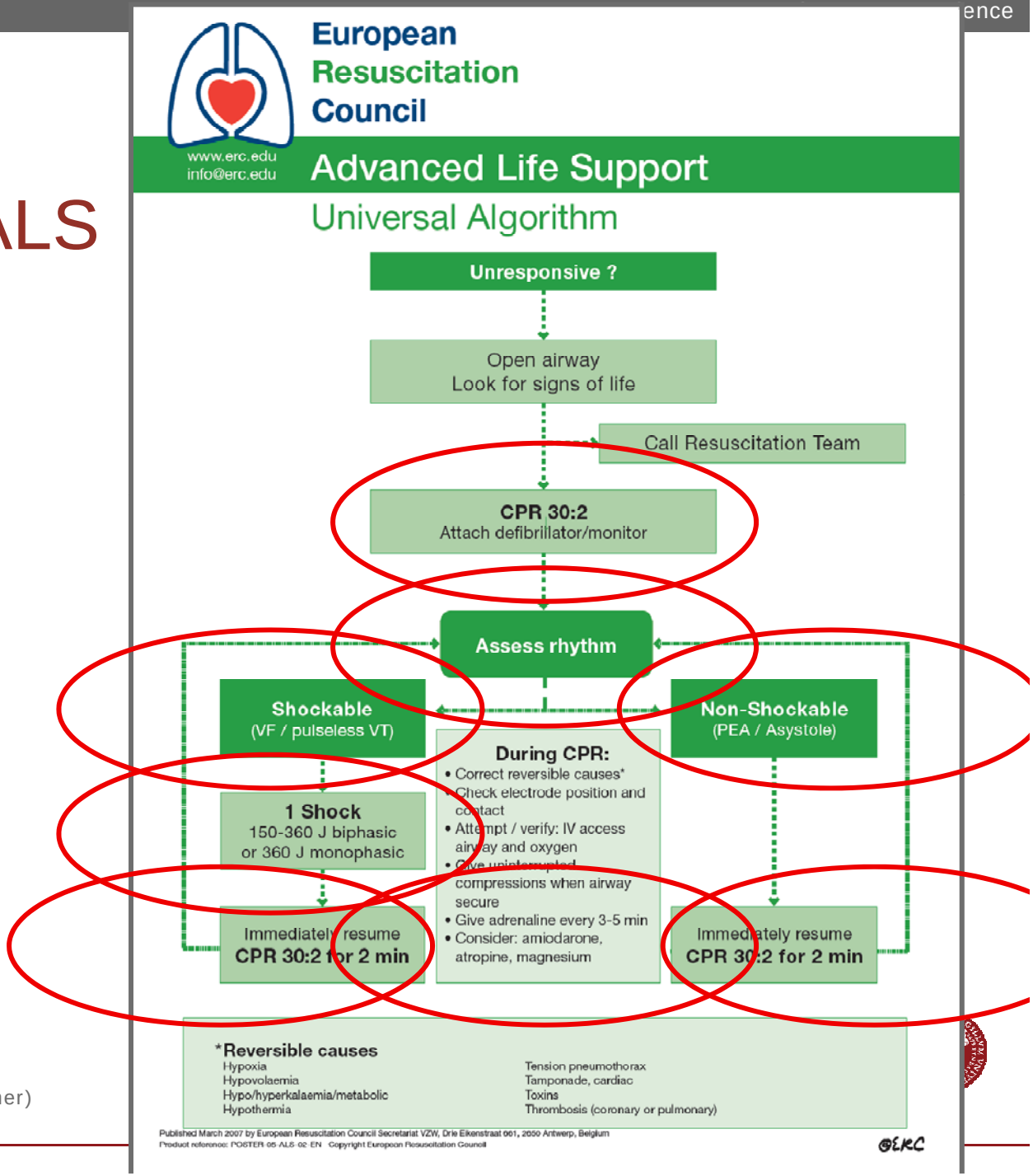
Characteristics:

- Random occurrence
  - Time
  - Place
- Random team
  - 1 anaesthesiologist + anaesthesia nurse
  - 1 cardiologist - resident
  - 1 nurse from ward
  - 2 hospital porters
- Urgency
- Poor prospects



2 porters
Anaesthesia nurse
Anaesthesiologist
Cardiologist
Nurse
Patient

Algorithm for ALS



Challenges in ALS

- Time keeping
  - Heart compression rhythm 30:2
  - Rhythm assessment every 2 minutes
- Ordering of right medication
  - Calculations for children
- Documentation
  - What
  - When

  } providing data for QI and research

Chemotherapy in oncology

Characteristics:

- Frequently occurring
  - scheduled
- Office-like working conditions
- Stable teams
  - 1 physician
  - 1+1 nurse
  - Pharmacist/pharmacy
- Ordering is dependent on record information
- High risk treatment
  - Many check points

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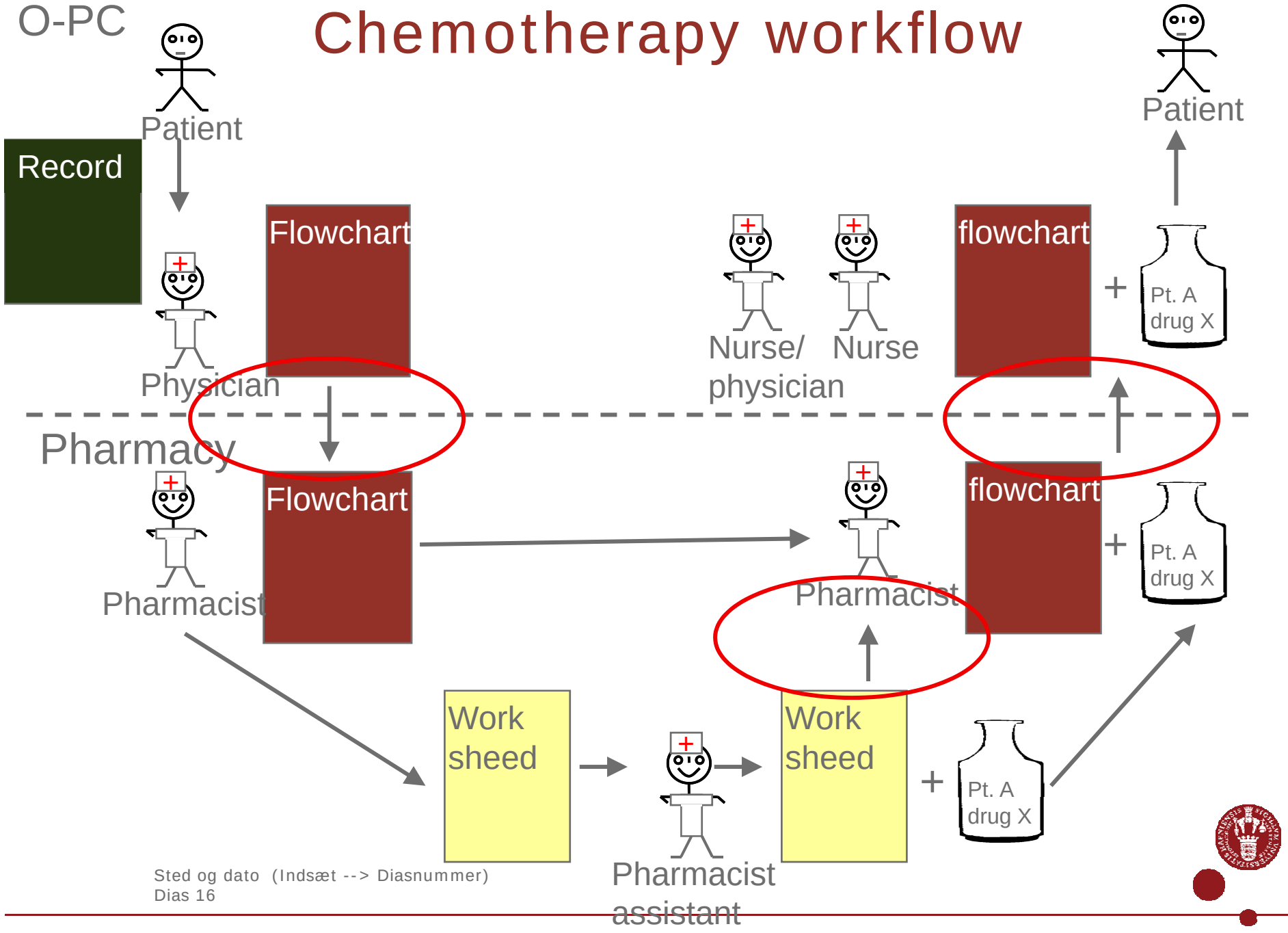
Nurse

Physician

Patient

O-PC

Chemotherapy workflow



Challenges in chemotherapy ordering

- The process is included in App. 100 disease specific treatment protocols
  - Standard protocols
  - Research protocols
- Reliant on different information sources
  - Patient history - side effects
  - Laboratory results
  - Other examinations
- Dosage calculation
- Checkpoints
  - Signatures
  - Re-do
- Overview
  - Of chemotherapy process progression
  - Of patient trajectory

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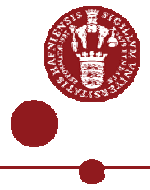
Differences in observed working situations

	Advanced Life Support (ALS)	Chemotherapy
Urgency	Very urgent	Can be planned
Place	Any where	Out patient clinic
Tasks	Internal in the team	Internal as well as external
Relation to existing data	Independent	Dependent on existing data
New data	Few and simple	Comprehensive



Differences based on interviews and workshops

	Advanced Life Support (ALS)	Chemotherapy
User interface	Very simple	Big and loaded with information
User interaction	Simple - tactile	Keyboard
Documentation	Simple documentation demands	Extensive documentation and signing demands
CPG adaptations	Minimal patient specific adaptations	Frequent patient specific adaptions

Implications for design

Advanced Life Support

Application

- Simple functionality
- Simple user interface
- Not integrated to record

Artifact

- Device have to be mobile
- Device have to be robust
- Device have to be small
- Simple interaction

Chemotherapy ordering

Application

- Advanced functionality
- Loaded user interface
- Deeply integrated to record

Artifact

- Can apply a stationary PC with screen and keyboard interaction

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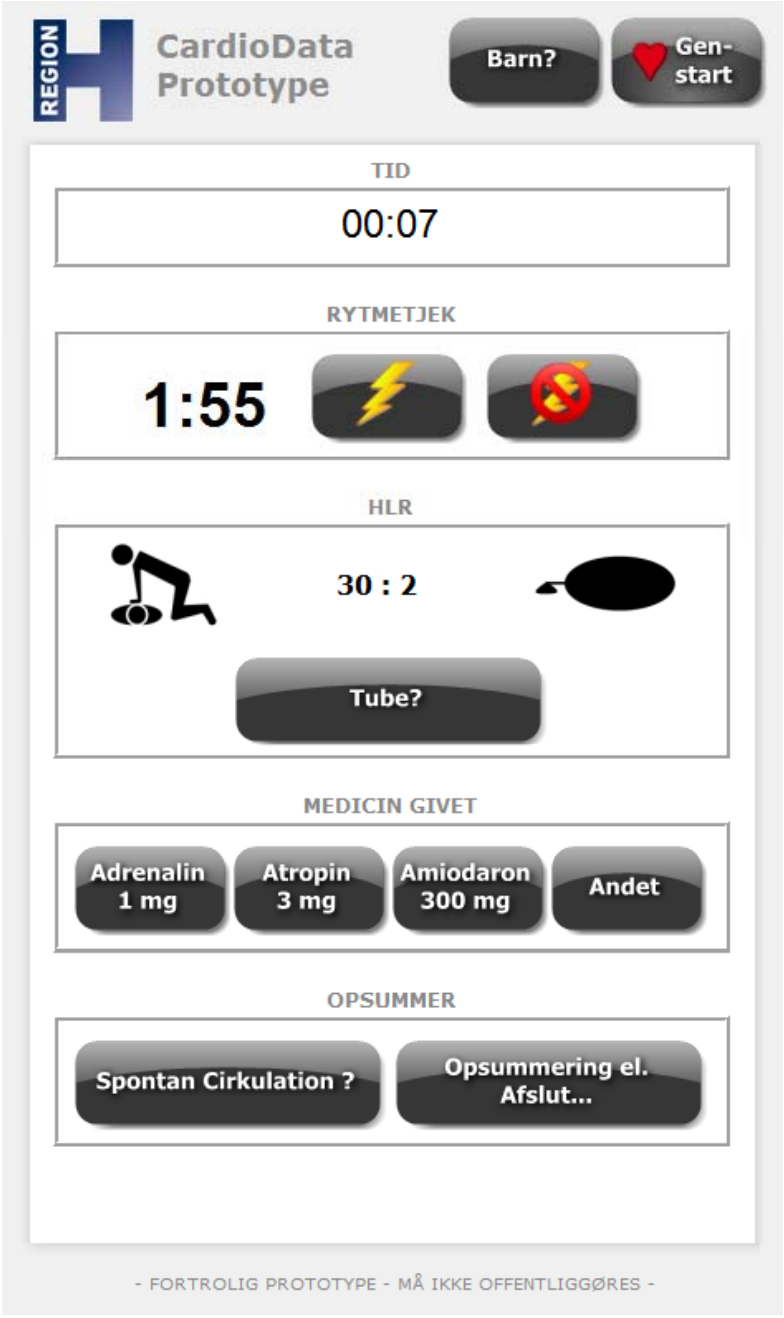
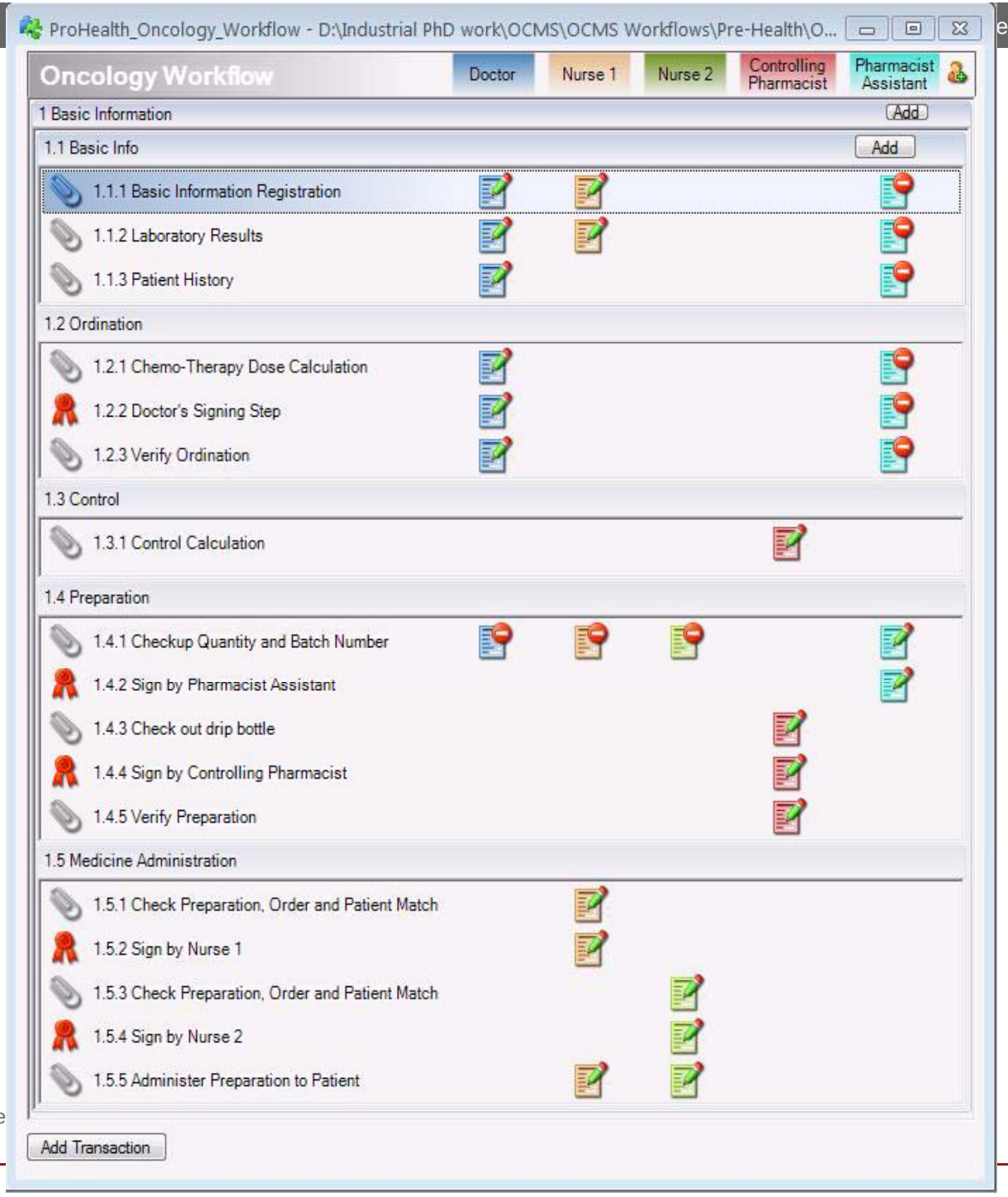
CardioData prototype in use (simulation)

CardioData prototype interface



Chemotherapy workflow - prototype



Oncology Workflow

You are here: Basic Information Registration

Basic Information

Date 8/27/2008 1:59:09 F

Patient Information

Name of the Patient: Stephen *

Patient Identifier: PI456MIS *

Diagnosis

Diagnosis 1: Neoplasma malignum bronchi (DC340) *

Diagnosis 2: Neoplasma malignum pulmonis lobi superioris (DC34

Diagnosis 3: Neoplasma malignum pulmonis lobi inferioris (DC343

Reason for Contact: Chemo Therapy 2 *

Surface Area Calculation

Patient Weight (in Kg): 75 *

Patient Height (in CM): 179.5 *

Patient Surface Area (in sq m): 2.244 *

< Back | Continue >

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These are the steps to complete:

- **Basic Information Registration**
- Laboratory Results
- Patient History
- Chemo-Therapy Dose Calculation
- Doctor's Signing Step
- Control Calculation
- Sign by Pharmacist Assistant
- Check out drip bottle
- Sign by Controlling Pharmacist
- Check Preparation, Order and Patient Match
- Sign by Nurse 1
- Check Preparation, Order and Patient Match
- Sign by Nurse 2
- Administer Preparation to Patient

Status for the prototypes

Advanced Life Support

- Is used for training
- 2nd iteration on its way
  - Differentiated interaction
  - Integration with defibrillator
  - Artifact that fulfill hygienic and robustness demands

Chemotherapy ordering

- Stopped due to integration demands
  - Need for shared information infrastructure

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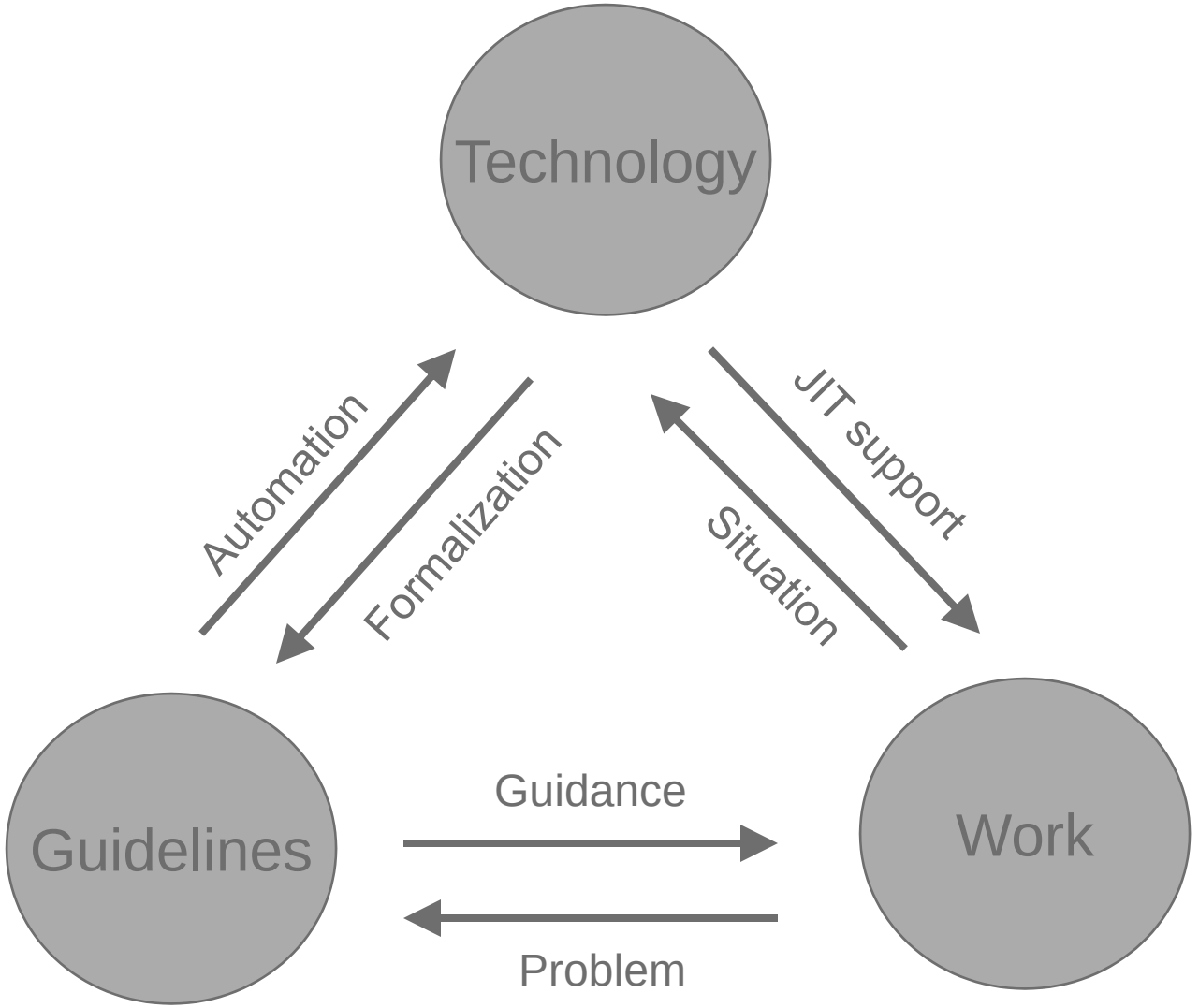
Preliminary conclusions

- There is not one right way to computerize CPG's
- Both application and artifact have to match working conditions
- Clinical guidance is closely related to access clinical information/documentation
- There are currently no standard procedures supporting the transformation from narrative textual CPG to computerized CPG
- There is a need to further exploit the working situation impact on computerization of CPG's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Formalization
JIT support
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Guidelines
Guidance
Problem
Work

For further information please contact:lyng@diku.dk