COST Action IC0604 WG 1: Business processes in Pathology

Thomas Schrader

University of Applied Sciences Brandenburg
Open European Nephrology Science Center, Department of Pathology, Charite, Berlin

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Outline

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1. **The results of Working Group 1, COST-Action**
   - **Business values in Pathology**
   - Business processes in Pathology

2. Results of STSM Cornils & Zhou
   - Comparison different notations
   - STSM Malte Cornils

3. Summary
   - Summary
   - Sources & Literature
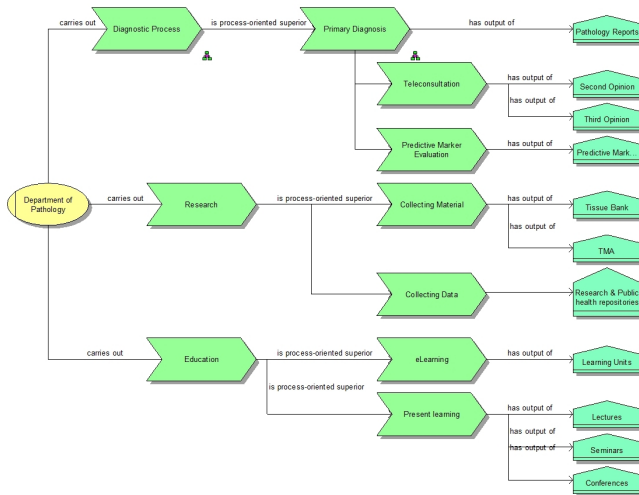
Final "products" of Pathology Department
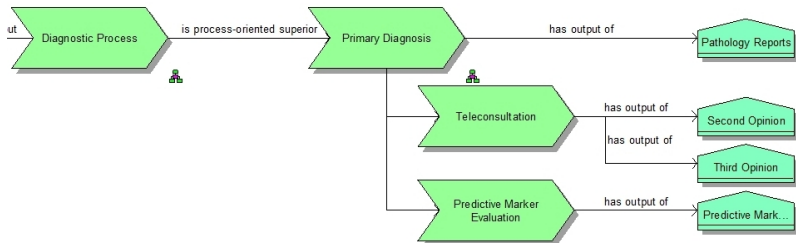

Figure: Business Values - overview

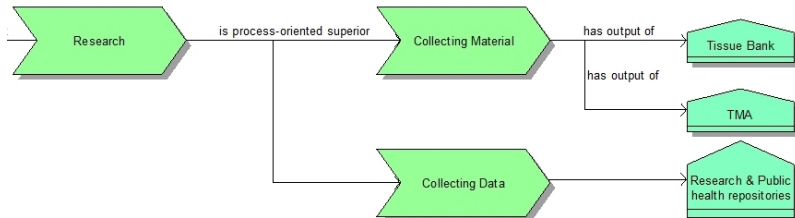# Diagnostic process

Figure: Business Values - detail

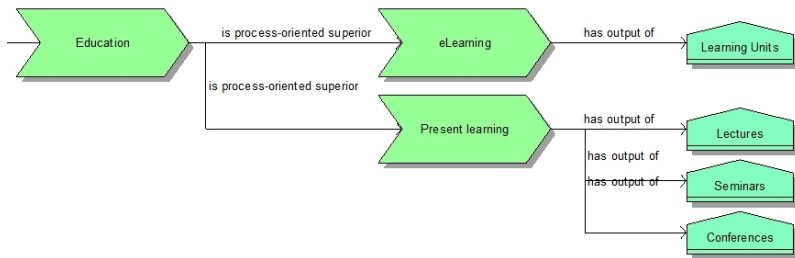# Research

Figure: Business Values - detail

Education

Figure: Business Values - detail
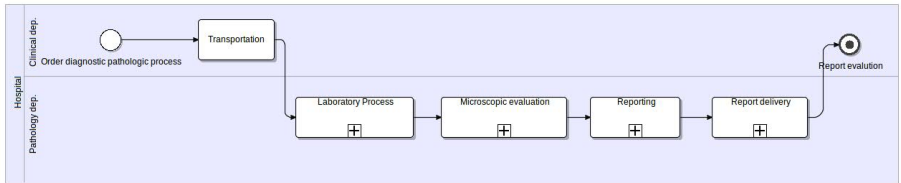
Outline

Overview in BPMN

Figure: BPMN of an abstract view of processes

Basic business process
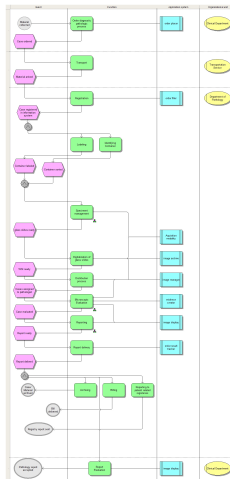

Figure: Overview

EPC Event-Process-Chain

- **Function or Process** - green rectangle
- **Event** as input object or output object - rhombus
- Forks & joints - circles
- Related IHE actors - blue rectangle
- Organizational unit - yellow ellipse

Basic business process - part I

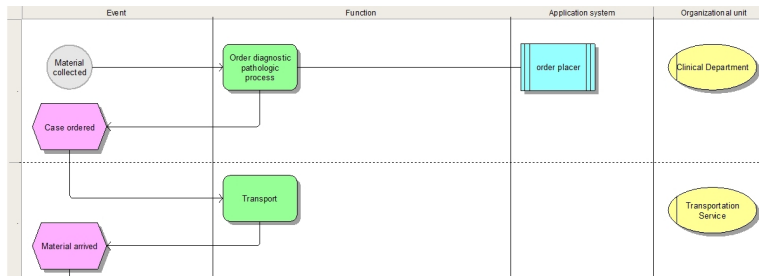Figure: Clinical request & transport

Basic business process - part II

Figure: Labeling & sorting
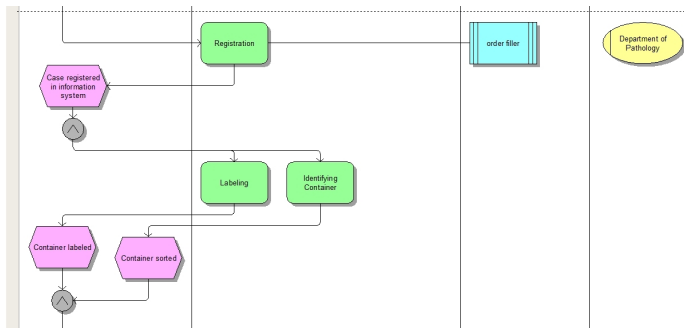
Basic business process - part III
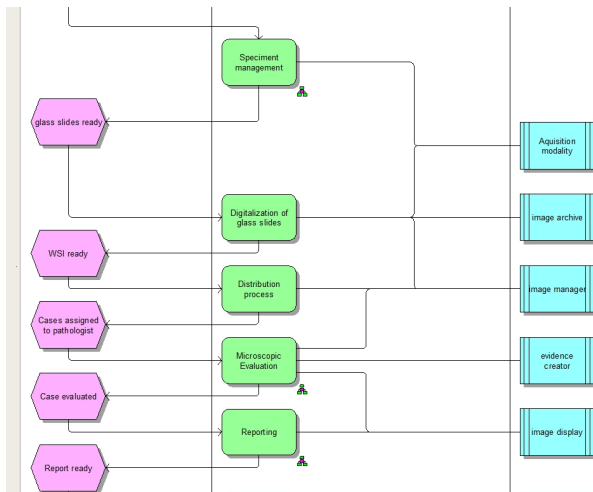
Figure: Laboratory & diagnostic process

Basic business process - part IV
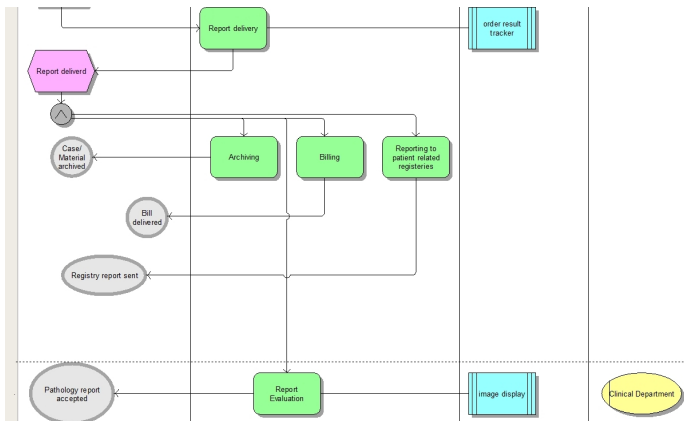
Figure: Report delivery

Macroscopic description
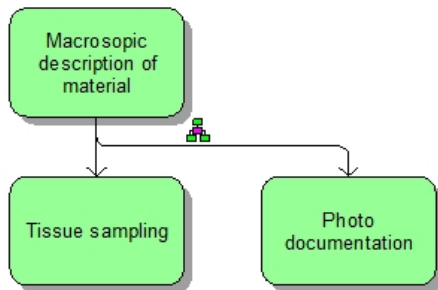
Figure: Function tree of macroscopic description

Mircoscopic Evaluation
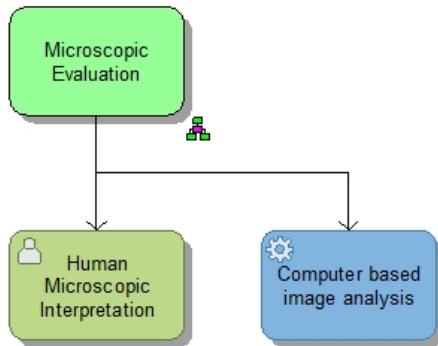
Figure: Function tree of process step microscopic evaluation

Quality Assurance
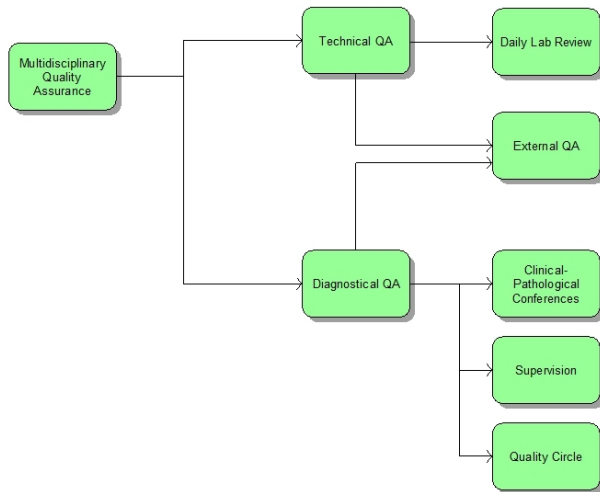
Figure: Function tree for quality assurance processes

Reporting processes
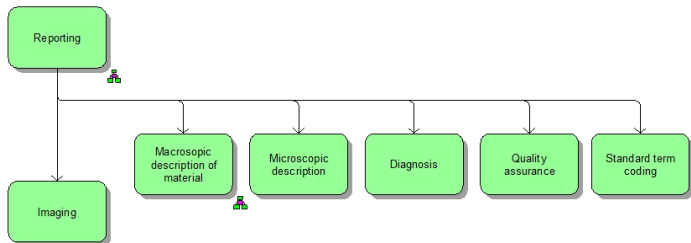
Imaging is a facultative process related to the study (sched. imag. requ. proc.)

Figure: Reporting as function tree

Speciment management
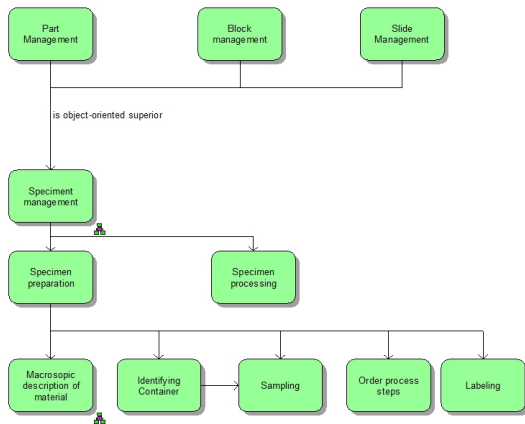
Figure: Complex function tree for specimen processing

Process flow of teleconsultation

Figure: Teleconsultation

Outline

Notations in business modeling

- Business Process Modeling Notation - BPMN
- Event Process Chain - EPC
- UML Activity Diagram

Frozen section model
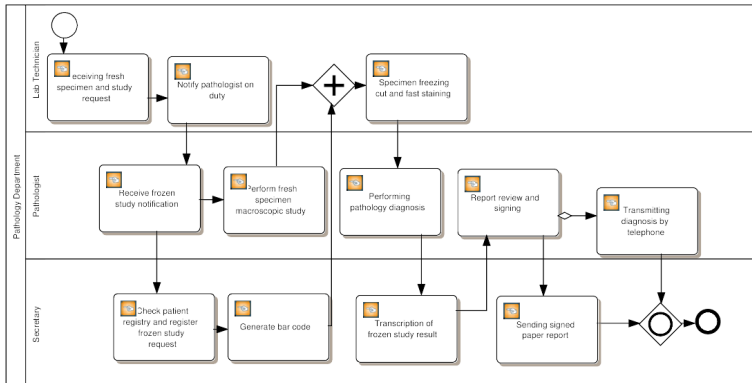
Figure: BPMN model for frozen sections

Frozen section model
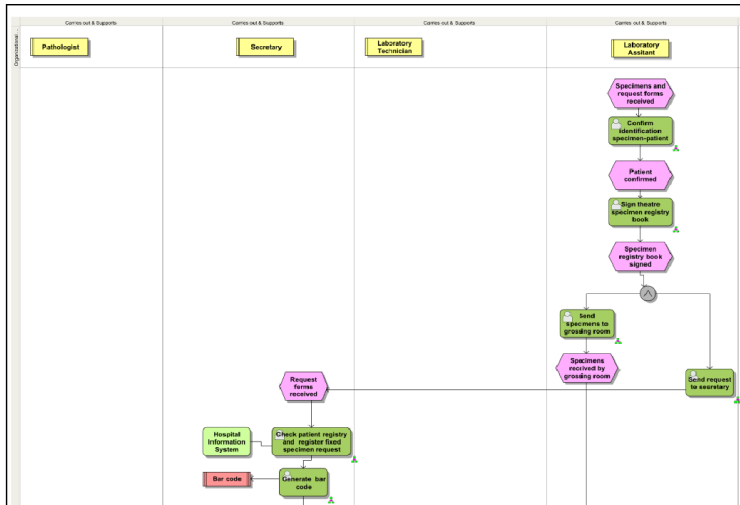
Figure: EPC model

Frozen section model
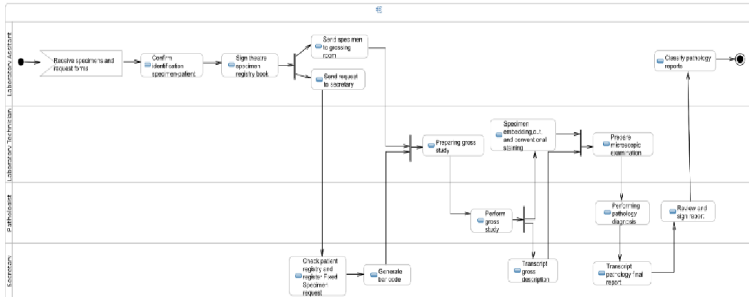
Figure: UML model

Results of comparison

- BPMN is the modelling notation which is clearer and more understandable to pathologists.
- EPC is harder for pathologists to read and understand. It is probably because EPC is not as popular as BPMN and UML AD, so pathologists are not so familiar with the concept of event-driven process.
- The current two pathology processes – Frozen Study and Formalin Fixed Specimen Study – are not complete in some aspects. Further work will be needed to modify the processes according to feedbacks we have gotten from the pathologists.

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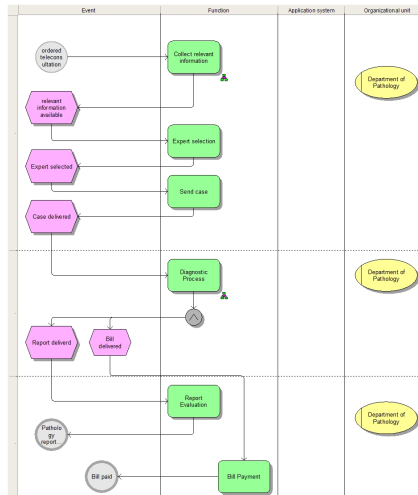   - Business values in Pathology
   - Business processes in Pathology

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Simulating business processes in pathology

- Business modeling simulation theory and methods
- Applicability for the medical domain of pathology
- Concrete examples of business process simulation using modeling languages and tools and a process-driven design process

Tools for simulation

- etibia simulation environment
- eClarus toolkit based on the ActiveVOS software
- Intalio stack
- jBPM - a toolkit developed for JBoss

Global process model

Figure: BPMN model by UCLM

Frozen section model

Figure: BPMN model for frozen sections

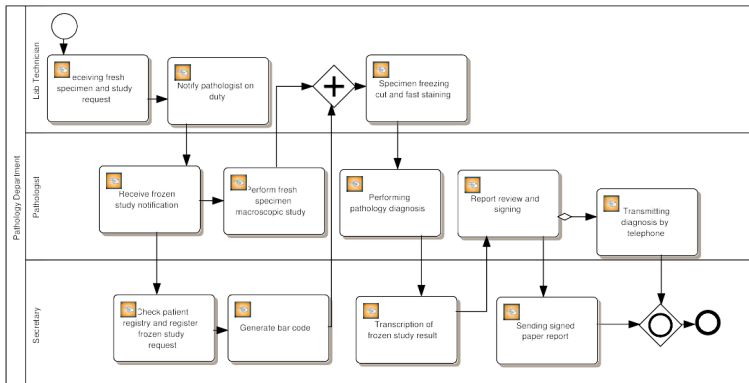# Formalin fixed study process
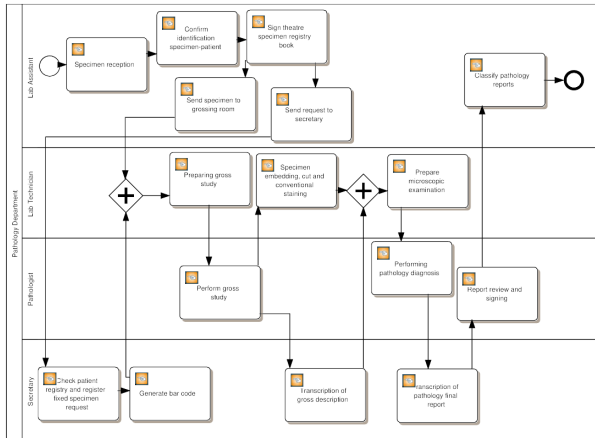
Figure: BPMN model

Simulation

Number	Name	Exp. Time	Min. Time	Max. Time	Failure Probability
13	Receive frozen study notification		10 seconds	5 minutes	elec./manual
14	Perform specimen macroscopic study		1 minute (malignant or not?)	10 minutes (complex)	cplx: borders are clear? distances?
15	Registry of frozen study request		2 min	5 min	if pat. exists
16	Specimen freezing cut and fast staining	w/o stain: fast stain:	3 5 min. 3 5min	30 min. 3 5min	up to 10 specimen, freeze together, cut seperately. 2 cyrostats here
17	Performing pathology diagnosis		1 min	10 min	
18	Transcription of frozen study results		5 minutes	20 min	type yourself, or w/secretary and roundtrips

Figure: Time constrains

Results

- Simulation is a very usefull tool for process evalution
- Current tools with limited functionality
- But the the tools will better in the next future

Outline

Summary

Now Status quo

- A general business process in pathology is desribed.
- The process model has a close relationship to the standards (DICOM, HL7).
- BPMN is choosen as the main modeling language

Future What should be done?

- Transformation from EPC to BPMN
- Convergence to unified process description terms related to SNOMED

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Sources & Literature

- BPMN: www.bpmn.org, de.wikipedia.org
- UML
  - Kecher C. UML 2.0: Das umfassende Handbuch ; [aktuell zum UML-Standard 2.0, alle Diagramme und Notationselemente, Praxisbeispiele in C und Java]. 2., aktualisierte und erw. Aufl., 1. Nachdr. Bonn: Galileo Press; 2007.
  - Zuser W, Grechenig T, Köhle M. Software Engineering mit UML und dem Unified Process. 2., überarb. Aufl. München: Pearson Studium; 2004.
  - Heumann, J. Introduction to business modeling using the Unified Modeling Language (UML) IBM Developer works; 2003.

Sources & Literature

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  - Klückmann, Jörg. ARIS Expert Paper: Auf dem Weg zur SOA; 2006. 2007 Jun 04 (cited 2009 Mar 8).
  - Lehmann FR. Integrierte Prozessmodellierung mit ARIS. 1. Aufl. Heidelberg: dpunkt Verl.; 2008.
  - Oracle. Methods - Oracle Business Process Analysis Suite 10.1.3; 30.08.2006. 2006 Aug 30 (cited 2009 Mar 8).

Reference images

- www.pathologie.uni-wuerzburg.de/geschichte
- www.verein-dominik.org/beateklein/05jan06.htm
- jkjpathology.com/doctors/reports.htm

Thank you for your attention!

Any questions?

Contact   • Prof. Dr. Thomas Schrader
           • thomas.schrader@computer.org