A procedural model and its application in defining and building consensus on domain specific eHealth standards: development, examples and outlook

Hübner U, Schulte G, Cruel E, Flemming D

eHealth in Europe - overview

Table 1: Key fields of national level eHealth activities in the EU27 countries, 2006 and 2010

| Reported eHealth activities	Total 2006 eHealth ERA	Total 2010 eHealth Strategies	Delta
Legal activities	14	22	8
Evaluation	5	21	16
EHR Patient Summary	27	27	0
ePrescription	16	22	6
Telehealth	23	27	4
Patient ID	24	26	2
Professional ID	13	22	9
Citizen card	22	25	3
Professional card	7	18	9
Standards (technical/semantic)	19	27	8

European Commission (2011) eHealth Strategies Report. Available from: http://www.ehealth-strategies.eu/report/eHealth_Strategies_Final_Report_Web.pdf

Why domain specific eHealth standards?
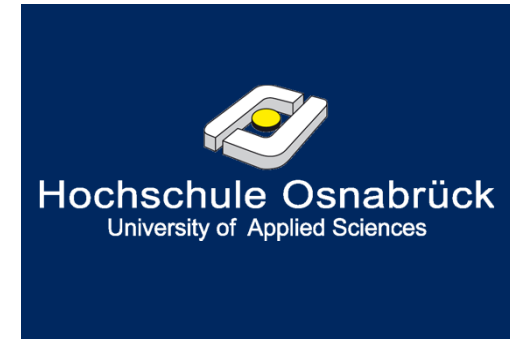
- To provide **useful** and **meaningful** applications for the care providers

- To ensure interoperability at **semantic** level including use of reference information model and terminologies

- To incorporate the knowledge of the **domain**, i.e. the speciality and profession of the care provider
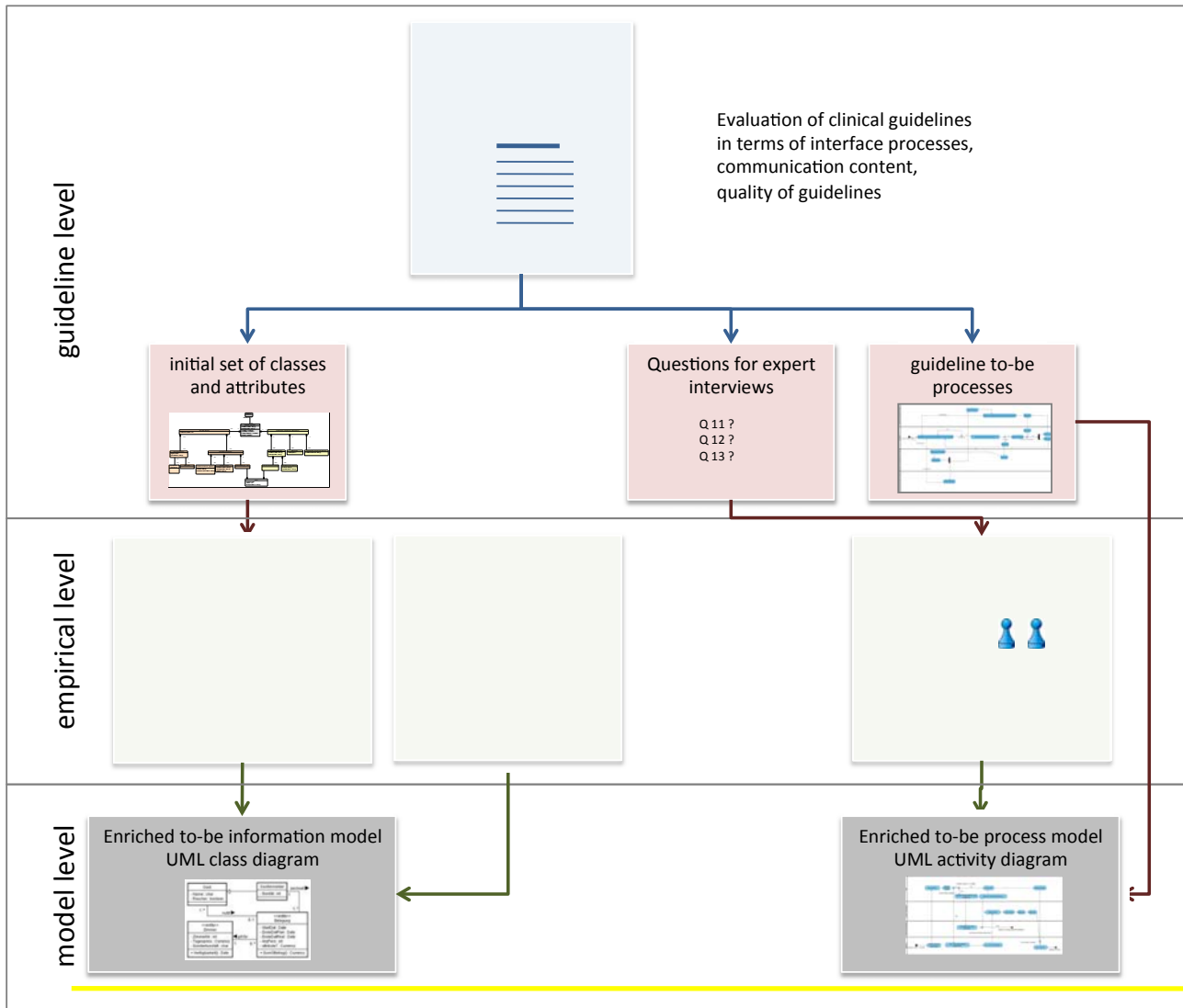
➔**procedural model** for **developing** these standards and for **building consensus** among the care providers

Multi-method procedural model

Evaluation of clinical guidelines in terms of interface processes, communication content, quality of guidelines

guideline level

initial set of classes and attributes

Questions for expert interviews

Q 11 ?
Q 12 ?
Q 13 ?

guideline to-be processes

empirical level

model level

Enriched to-be information model
UML class diagram

Enriched to-be process model
UML activity diagram
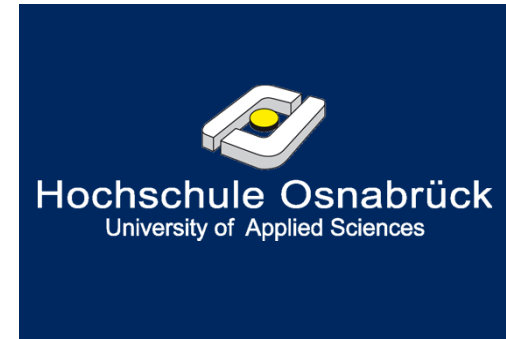
Introduction

Model

Examples

Outlook

Hübner U, Cruel E, Gök M, Garthaus M, Zimansky M, Remmers H, Rienhoff O (2012) Requirements engineering for cross-sectional information chain models.
11th International Congress on Nursing Informatics. Montreal, 2012

Cruel E, Hübner U, Garthaus M, Gök M, Zimansky M, Remmers H, Rienhoff O (2012) Requirements Engineering für Referenzmodelle mittels eines multimethodischen Vorgehensmodells. In: Mattfeld DC, Robra-Bissantz S (Hrsg.) MWKI 2012 Tagungsband, Berlin, Gito Verlag, 317-327.

The extended multi-method procedural model
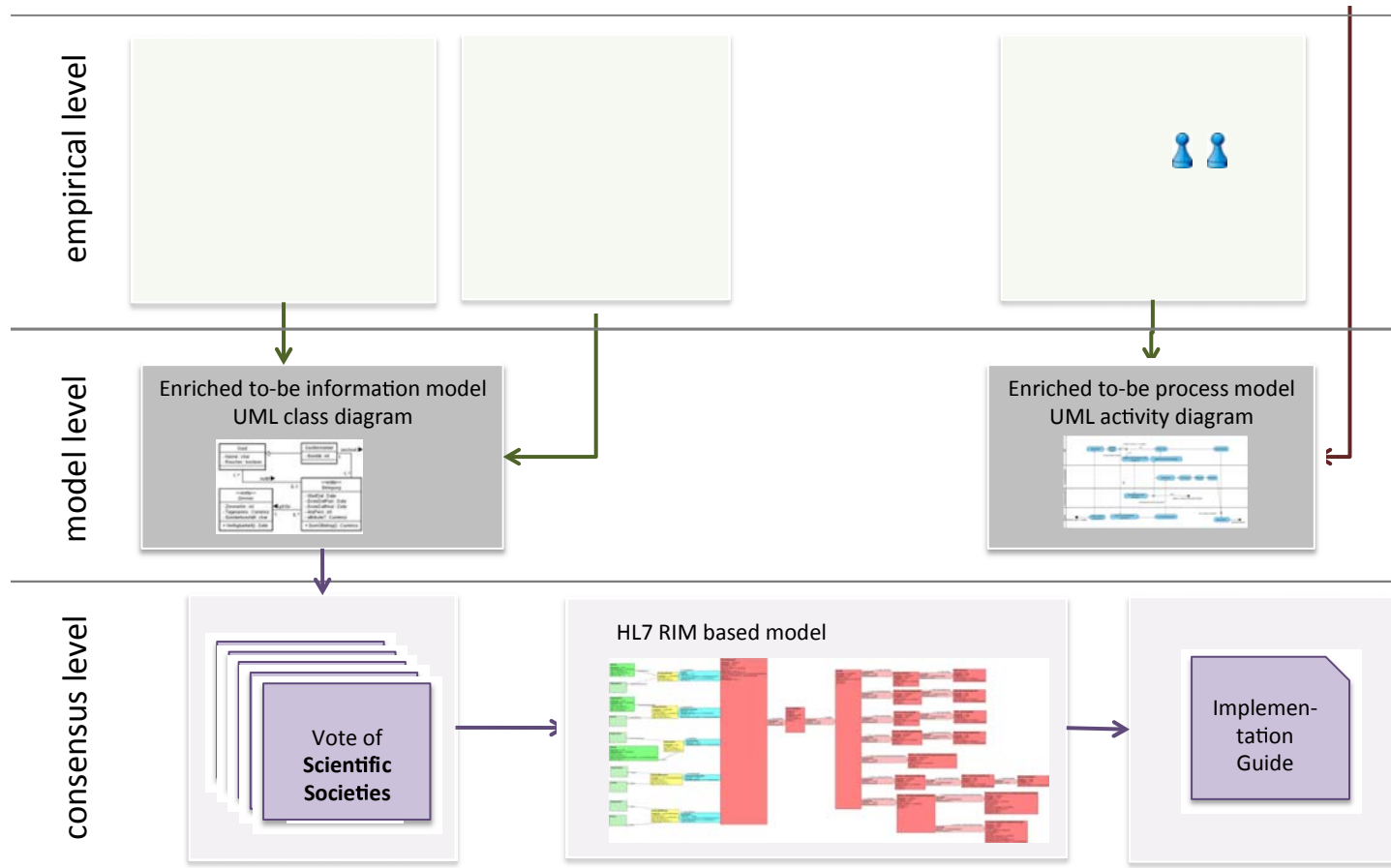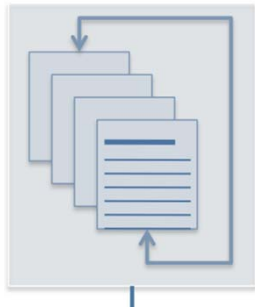

guidelline level ... see above

empirical level

model level

Enriched to-be information model
UML class diagram

Enriched to-be process model
UML activity diagram

consensus level

Vote of
**Scientific
Societies**

HL7 RIM based model

Implemen-
tation
Guide

Multi-method procedural model:
wound care - guidelines

| Scope	Author/Editor (origin)	Date	Titel
Diabetic Foot Syndrom	BÄK et al. (Germany)	2010	NVL Typ-2-Diabetes Fußkomplikation
Chronic Venous Leg Ulcers	Scottish Intercollegiate Guidelines Network (SIGN) (Scottland)	2010	Management of chronic venous leg ulcers. A national clinical guideline
Pressure Ulcer	Registered Nurses' Association of Ontario (RNAO) (Canada)	2007	Nursing Best Practice Guideline: Assessment & Management of Stage I to IV Pressure Ulcers

32 guidelines{quality filter} 3 guidelines

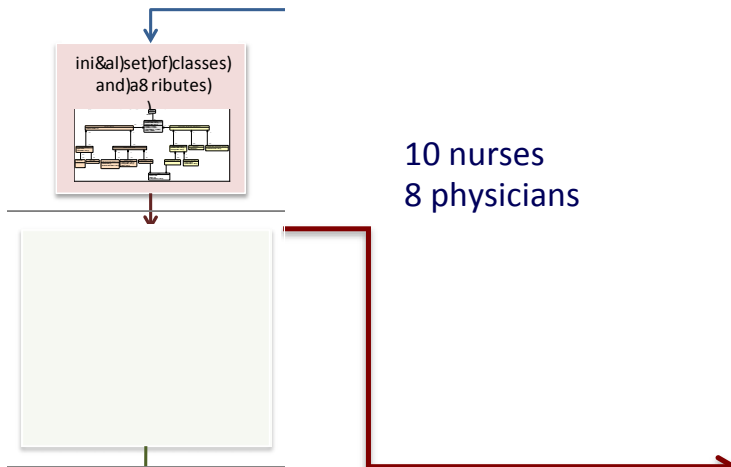{manual extraction}

associations
multiplicities

classes
attributes
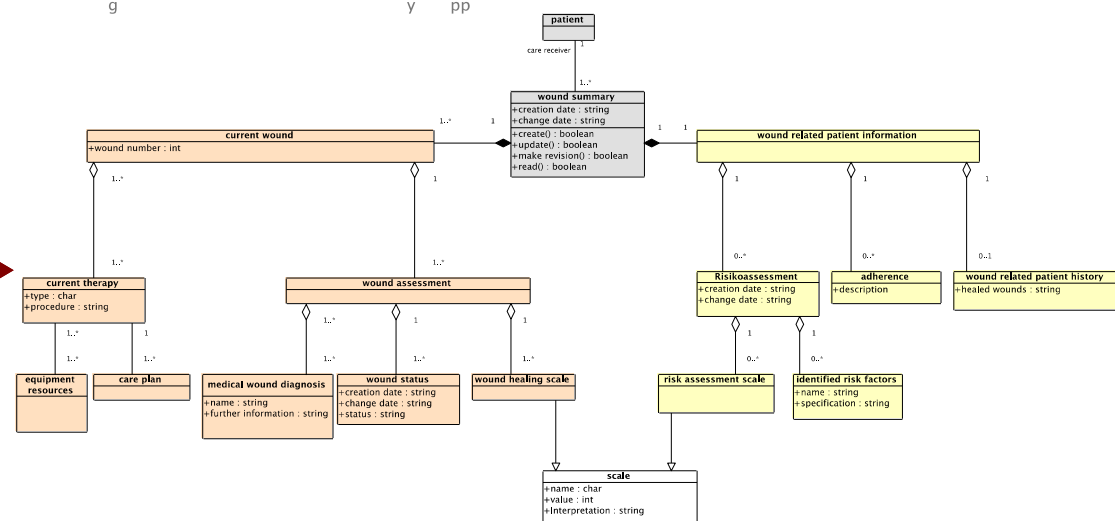
Multi-method procedural model: wound care – delphi surveys

ini&al)set)of)classes)
and)a8ributes)

10 nurses
8 physicians

{selection of information items
by frequency of nomination}

	physician's model	nurse's model	guideline's model
wound assessment	x	x	x
medical wound diagnosis	x	x	x
wound status	x	x	x
patient history: wounds	x	x	x
wound healing scale	x	x	x
current therapy and care management	x	x	x
care plan wound	x	x	x
pain management	x	x	
hygiene measures	x	x	
treatment outcomes	x	x	
equipment and resources	x	x	x
general assessment	x	x	
psycho social actors	social actors	x	
general patient history	x	x	
patient status	x	x	
relevant medical data	x	x	
risk assessment	x	x	x
risk assessment scale	x	x	x
skin assessment	x	x	
hygiene assessment	x	x	
identified risk factors		x	x
health related patient behaviour	x	x	
patient adherence		x	
adherence compliance) &	x	x	x
patient training		x	
wound and therapy related limitations	x	x	
psycho social impairments	x	x	
physical impairments	x	x	

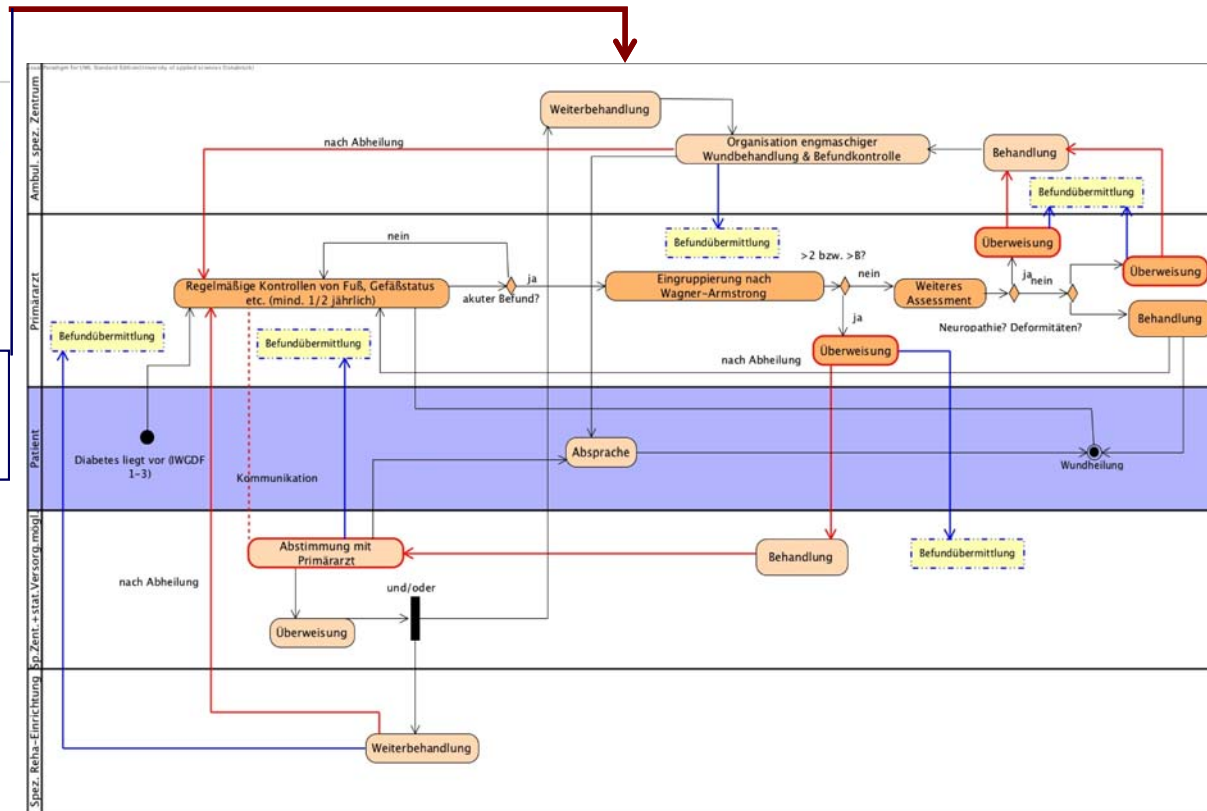|	n	k_1	k_2	k_3
nurses	10	0,64	0,65	0,71
physicians	8	0,57	0,56	0,62

increasing agreement

Introduction

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Multi-method procedural model:
wound care – expert interviews
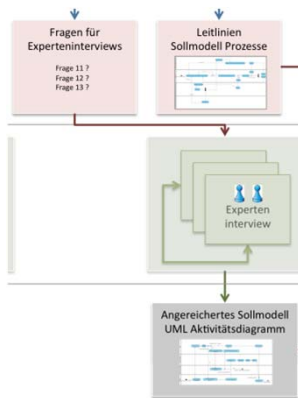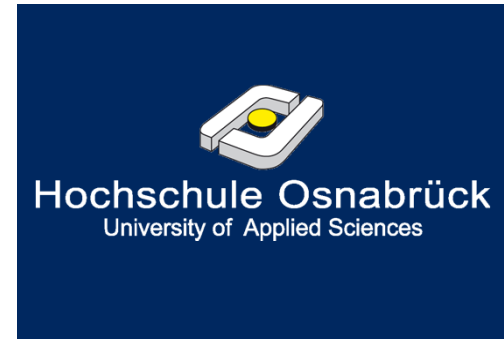
10 nurses and physicians

{adding and marking shared approaches}
{integrating information model}
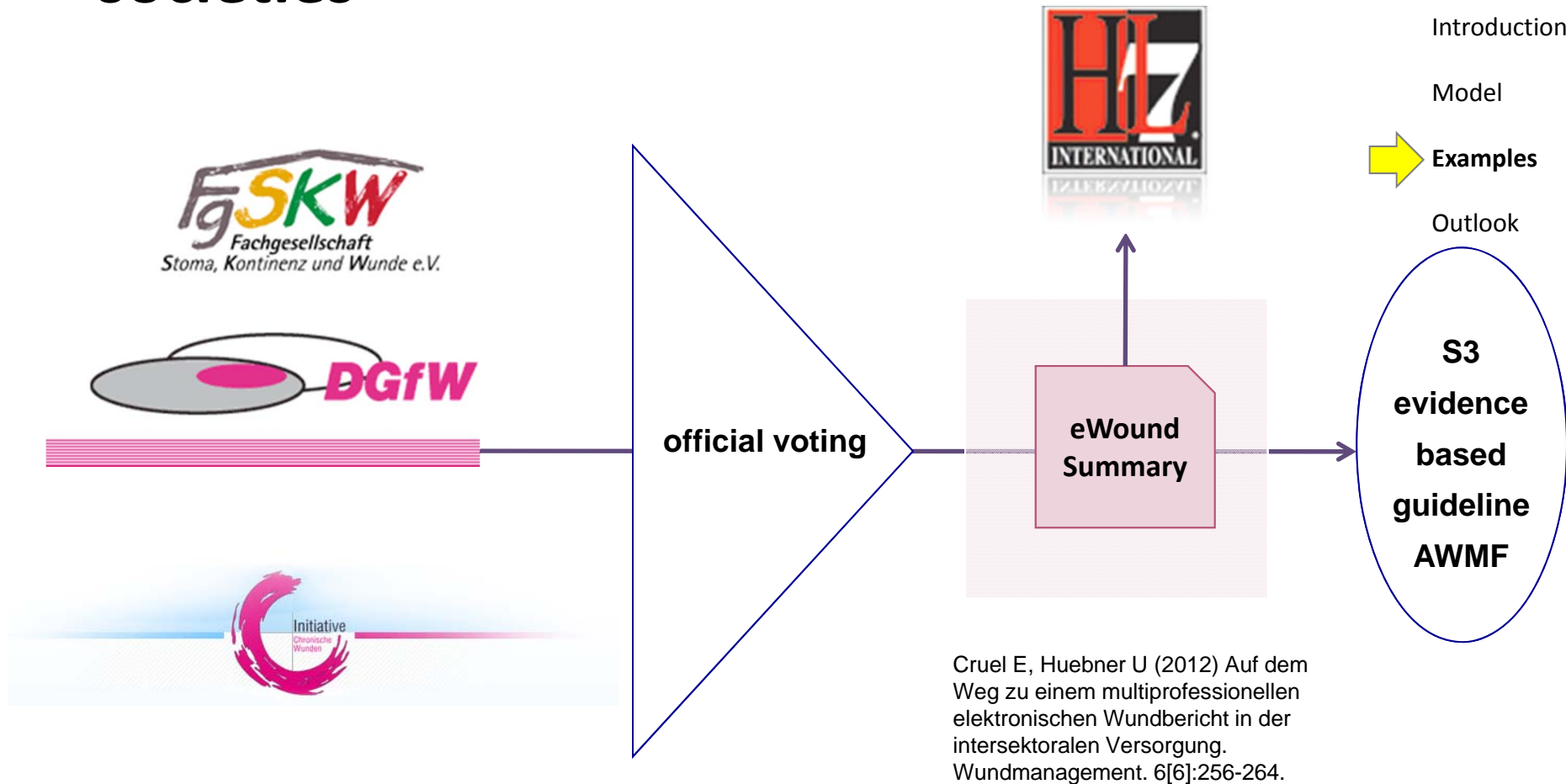{highlighting innovation}

actors
process steps
decision nodes

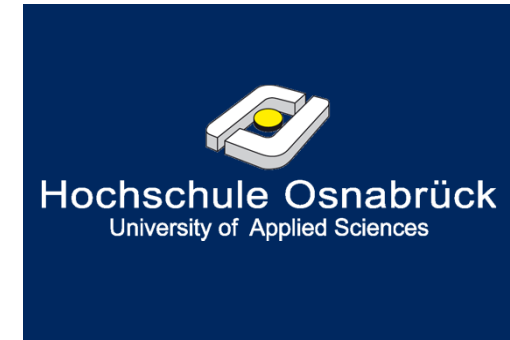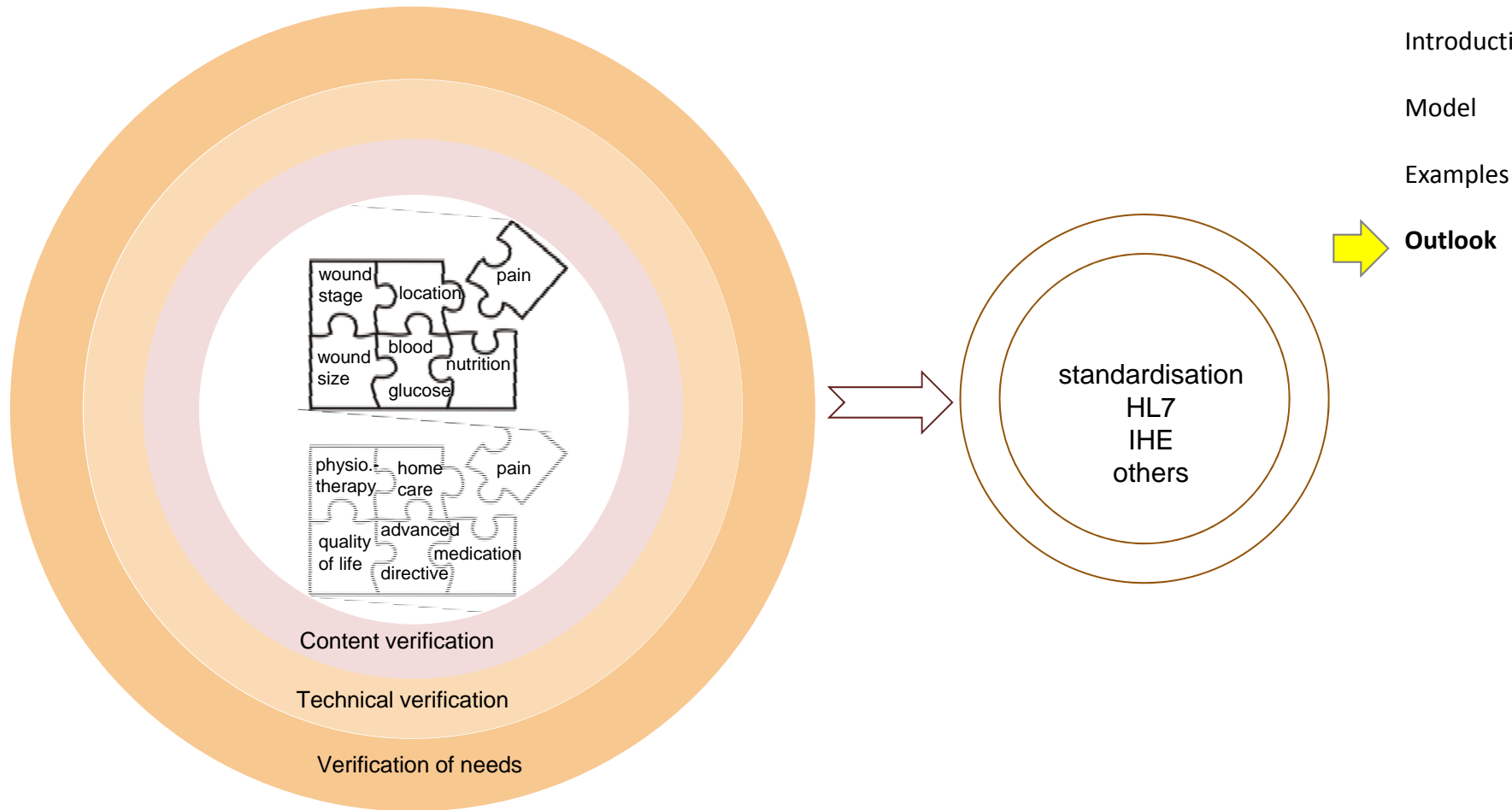# Multi-method procedural model: wound care – vote of scientific societies

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official voting

eWound Summary

S3 evidence based guideline AWMF

Cruel E, Huebner U (2012) Auf dem Weg zu einem multiprofessionellen elektronischen Wundbericht in der intersektoralen Versorgung. Wundmanagement. 6[6]:256-264.

Need for
Domain Specific Clinical Models

wound stage

location

pain

wound size

blood nutrition

glucose

physio. therapy

home care

pain

quality of life

advanced medication

directive

Content verification

Technical verification

Verification of needs

standardisation
HL7
IHE
others
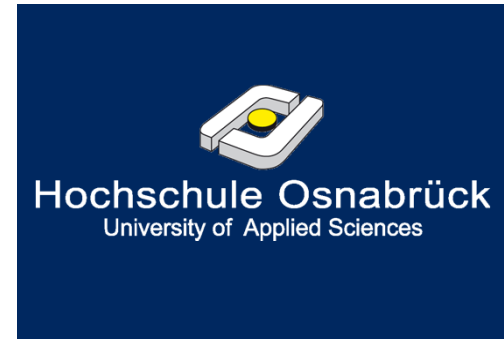
Acknowledgment
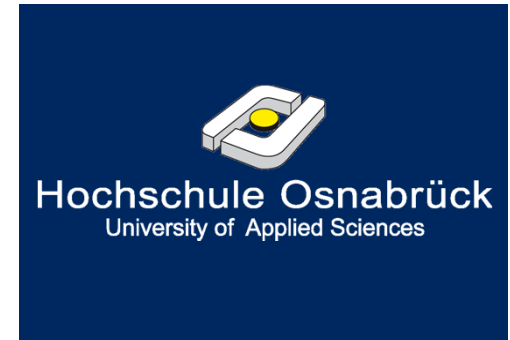
- **Grant**: European Union and State of Lower Saxony Germany

- **Coordinator**:
  - University of Applied Sciences Osnabrück
    - ➤ information chain models for chronic wounds

- **Cooperation partners**:
  - Medical School Göttingen, Medical Informatics
    - ➤ information chain models for chronic back pain
  - University Osnabrück, Nursing Science
    - ➤ information chain models for tumor related pain

- **Special thanks to the experts (nurses and physicians) and the scientific societies !!**

Contact

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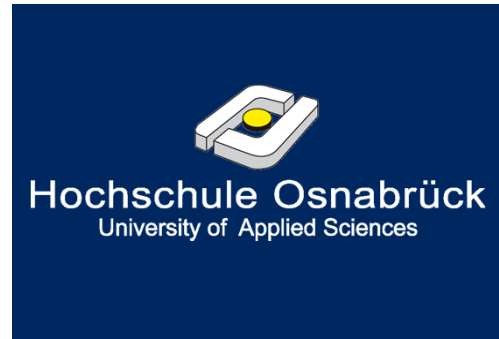
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