Developing a model for the adequate description of electronic communication in hospitals

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Why bother model electronic communication?
How to model it?
Does it make sense?
Why: Challenge of information

„Having information is painful and troublesome. We have all experienced this. If you have information, you must first read it, which is not always easy. You must then try to understand it....

Understanding the information may show that your work was wrong, or may show that your work was needless....

Thus not having and not using information can often lead to less trouble and pain than having and using it”

Calvin N. Mooers
(1919 – 1994)
Why: Challenge of communication (1)
Why: Challenge of communication (2)
**Why:** Challenge of communication (3)

Internal Patient ID | Surname & First Name | Birth date | Address: 
Street & City & ZIP & Country

**HL7-ORM**

**DICOM Image**
**Why:** Identification of problems & reasons

**Wanted:** Seamlessly integrated communication

**Overall objective:** Supporting the detection of possible communication errors before they happen!

**Required:** Adequate descriptions of communication
How: Developing the approach

- 81 communication problems
- 229 reasons & recommendations

600 atomic statements

61 entity types
91 relationships
84 tables
How: Basics of the communication model

Communication process

Connection & Purpose

System 1

Application System

Interface

Information Object

System 2

Services & Operations
How: Details of the model

A System

Purpose
implements
Service
**How: Details of the model**

- **O/R** = optional / required
- **VR** = value representation
- **VL** = value length
- **M** = value multiplicity

**A System**

<table>
<thead>
<tr>
<th>IN</th>
<th>[Standard/Version]</th>
<th>Nomenclature1</th>
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<tbody>
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- Purpose
- Service

**Purpose**

**Service**

**A System** propagates

**IN**

- **O/R** = optional / required
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**How: Details of the model**

- **Purpose**
  - implements

- **Service**
  - propagates

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A System

- Roles
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**Capabilities**

- Operation1
- Operation2
- Operation3
- Operation4
- Operation5
- Operation6

- Access-Management
- Version-Management

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How: Details of the model

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**Operation1**

**Operation2**

**Operation3**

**Operation4**

**Operation5**

**Operation6**

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A System

Roles

Identities

Capabilities

Access-Management

Version-Management

Purpose

Service

Propagates
Does it make sense?

### Categorization

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<th>Class B</th>
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<td>Problem A1</td>
<td>Problem B1</td>
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<td>Reason</td>
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implemented by

**Query-Engine**

- Conflict-Check 1
  - Detail 1
  - Consistency 2
- Conflict-Check j
  - Detail n
  - Consistency m

**Report - Generator**

results in

**Report**

600 atomic statements

81 communication problems

229 reasons & recommendations

84 tables
Does it make sense - formative evaluation

- Field test:
  - Selected process: Radiology-Ordering (ordering > storage)

- Examples of detected problem types (7 of 6 detectable):
  - Attribute values missing
  - Attributes in incompatible formats
  - Inaccessible systems
  - Wrong formats

- Currently: effort of detailed modeling

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Conclusion

Developing a model for the adequate description of electronic communication in hospitals

- “Adequacy” => focussing on communication errors
- “Re-Usability” => template for extending other approaches
Thank you for your attention!

Questions?

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