RFID-based Identification System in a Hospital

Is it the end of errors?
Agenda

- The Spital STS company
- ICT and hospitals: why? Why so late?
- RFID in hospitals: just a hype?
- The IDEF-IS project
- Conclusion
The Spital Simmental-Tun-Saanenland AG

- Beds: 290
- Inpatients/a: 17,000
- Outpatients/a: 40,000
Agenda

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Healthcare, ICT and errors

- Healthcare is not "just another industry"
- Healthcare institutions considered to be complex adaptive systems
- Non-linearity of patient trajectory / many stakeholders / unpredictability
- ICT systems *might* improve patient safety / outcomes
- To Err is human / To Err is system
- Same systems, different outcomes
- Same location, different outcomes
- Socio-technical considerations *most* important
Healthcare, ICT and errors (2)

How Hazardous Is Health Care?

- 5% of inpatients suffer from (mostly avoidable) complications
- Many near-misses
- Increased length-of-stay: 2.9 – 4.5 days due to medication errors
- Average extra money spent per case due to medication errors: $5400.-
Background: transfusions

- Transfusion-related problems (reporting bias...) CH und U.K.:
  - near miss 1/340 transfusion
  - Proceeded, completely incompatible transfusion: 1:100'000
  - Thun: 5'100 transfusions /y, but: incompatible transfusion 1/24 months

- Under-reporting is considered to be immense
Critical incident reporting system

- CIRS:
- 50% of reports due to wrong identifications (patients, blood samples, drugs...), 2-4 reports /week

- "Blood sample coming in to the laboratory with wrong ID-label on the tube"
- "Wrong patient in wrong bed: after surgery, patient "M" is put in bed from patient "L". Written identification remains on bed."
- "G.P. sends patient A for a blood sample and further treatment to the emergency ward. Blood sample is taken, history of the patient does not correspond to the referral letter. In the meantime, G.P. phones to alarm ER personnell: he sent the wrong patient...."
Aims for an identification system

- Right patient
- Right time
- Right plan (to act): prescription e.g.
- Right action
- Right resource
- Right person
- Right place
- Additionally: maximize process-quality/process-knowledge/profit
Agenda

• The Spital STS company

• ICT and hospitals: why? Why so late?

• RFID in hospitals: just a hype?

• The IDEF-IS project

• Conclusion
Possible areas
## RFID: Pros

- Pluripotent compared to barcoding
- Better information/data carrier
- Unique *per se* (without further intervention: UID)
- No 'line-of-sight' problem (!)
- Increasingly available industrial solutions (?)
- Less interfaces / seamless integration
RFID: Cons

- Hardly any experiences in healthcare
- Data protection
- Healthcare environment (xR, ICU, telemedical devices)
- Setting (disinfectants, sterilisation, liquids)
- Patient trajectories (inpatients, outpatients, pts leaving hospital for a few hours)
- Costs
How to tag

- Activ vs. passive
- UHF vs. HF
- UID vs. Hospital-own-ID
- Data vs. ID
- Re-tagging (everything) or only 'on-demand'
Idf-IS (Identification Information System)

- Identification-Information-System STSAG
- 7 R + 3 M
- Cost efficient
- Implementation of existing infrastructure
- Implementation of existing identifications
- Standardisation within the company at least
- Low budget (< 30'000$), high performance
- High usability, high simplicity
Components IdefIS (2)

- Passive Tags (ISO 15693, 13.56 MHz), Precision Dynamics®
- No new barcoding
- No additional information on tag
- Combined reader RFID/barcode linked to laptop
- Software: patient care information system PCIS (SQL, Phoenix®)
- EAN generation
Components Idef-IS
IdefIS: who's who? Good thru? Related to?

EAN/gs1= unique/descriptive (attributes), standardized
Identifikations-Informations-System Idef-IS

Einlesen (3 Identitäten)
=H003007182931
C0E0070000249F26A2
4001000000A8055F2

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<thead>
<tr>
<th>Patient</th>
<th>Person</th>
<th>Ressource</th>
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</thead>
<tbody>
<tr>
<td>UID: C0E0070000249F26A2</td>
<td>Code: 2367065</td>
<td>Name: Herr Walter</td>
</tr>
<tr>
<td>Code: 4001000000A8055F2</td>
<td>Code: 10001102</td>
<td>Code: E3845V00</td>
</tr>
<tr>
<td>Name: Marianne Frau</td>
<td>Code: Blutprodukt</td>
<td></td>
</tr>
</tbody>
</table>

Achtung! Dieser Auftrag ist z.Z. nicht freigegeben (gültig 27.10.2007 08:30:00 bis 29.10.2007 09:46:00)

Auftragscode | Auftragsbezeichnung | Auftragsklasse
### Identifikations-Informations-System Idef-IS

**Einlesen (3 Identitäten)**

<table>
<thead>
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<th>UID</th>
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<td>2367055</td>
<td>Herr Trachsle</td>
</tr>
<tr>
<td>80012828</td>
<td>10000725</td>
<td>Frau Müller</td>
</tr>
<tr>
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</tr>
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</table>

**Ressource**

- 80012828
- Blutprobe
- Laborauftrag

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**Der Auftrag "Blutprobe" ist zur Zeit gültig/frei gegeben für diesen Patienten**

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**CHECK!**

Alles löschen
Identification Information system

- Patients
- Persons
- Blood sample
- Blood product
- Drugs
- Site of operation
- Implantat

Who is who and valid until...

- Stock control, billing
- Feedback
- Transfusion/Action
- Go / No-Go
- Identity-Check
- Analysis / blood match

Computerized Physician Order Entry

Phlebotomy

Blood sample

Stock control, billing

Feedback

Transfusion/Action

Go / No-Go

Identity-Check

Analysis / blood match
So far...

~ 2000 identified patients
~ 5000 cross-checked blood samples (40 mismatches)
> 500 safe transfusion (0 mismatch)

• No software problems

• Hardware problems! Not many industrial solutions for combined readers!
  Not many solutions for healthcare environment, need for feedback/processing real-time
  Need for notebook-alternatives (failed: Motion C5).
  Work in progress for Windows CE application
Things are in place, but where’s the Internet?

Internet of Things, 2008  Thank you!