RFID-based Identification System in a Hospital

Is it the end of errors?

IoT Conference, ETH Zurich 2008

spitalSTSAG

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-Thun-Saanenland AG

- Beds 290
- Inpatients/a: 17‘000
- Outpatients/a: 40’000

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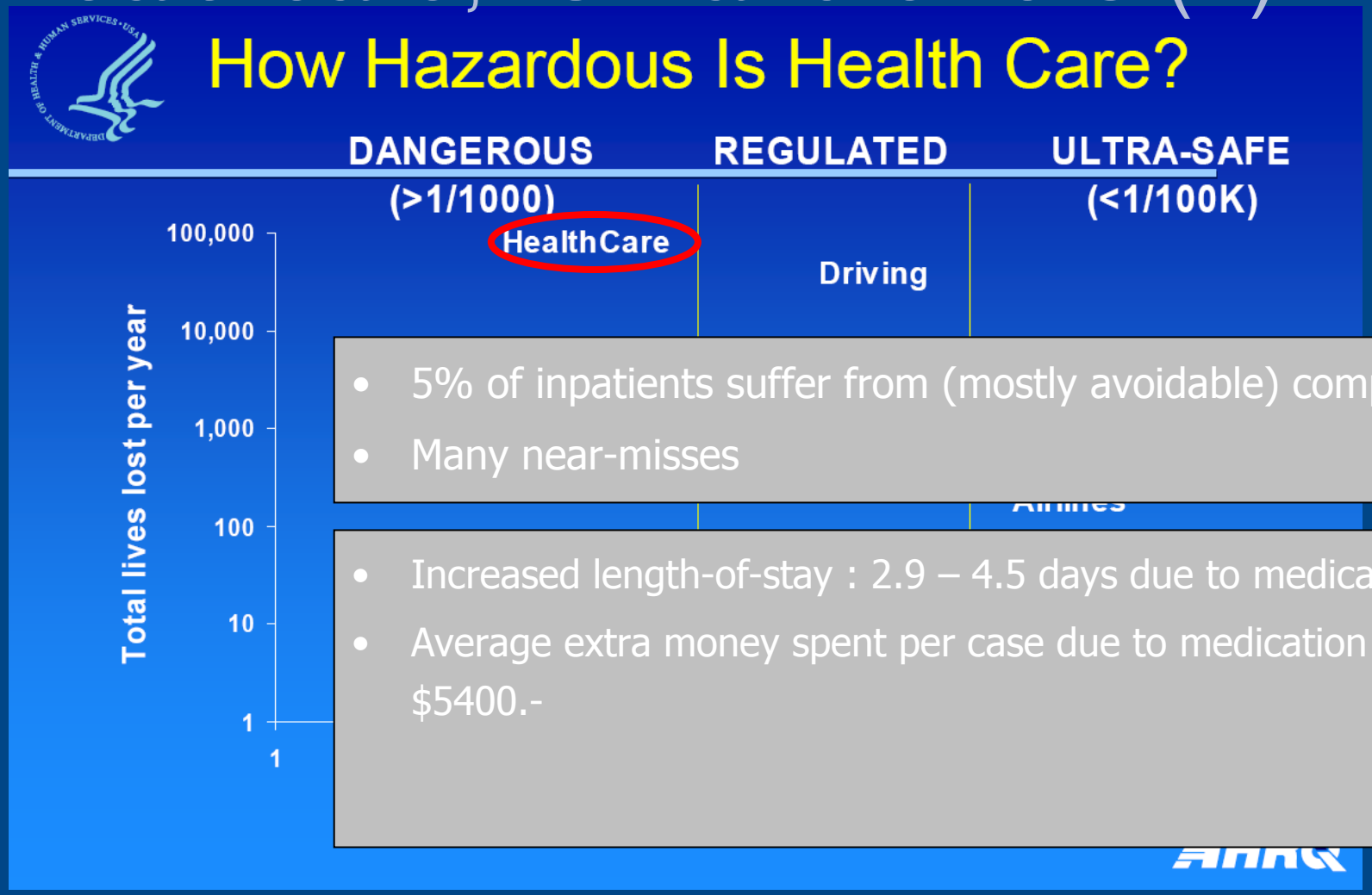
Healthcare, ICT and errors

- Healthcare is not „just another industry"
- Healthcare institutions considered to be complex adapative 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)



- 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

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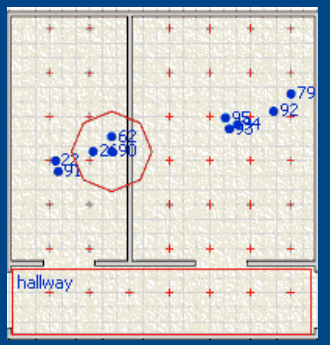
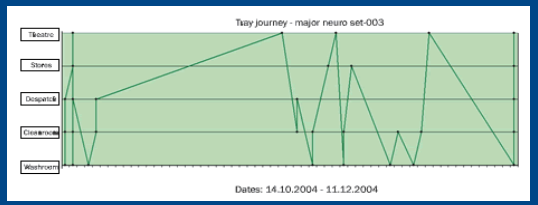
Possible areas





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 (desinfectants, 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'

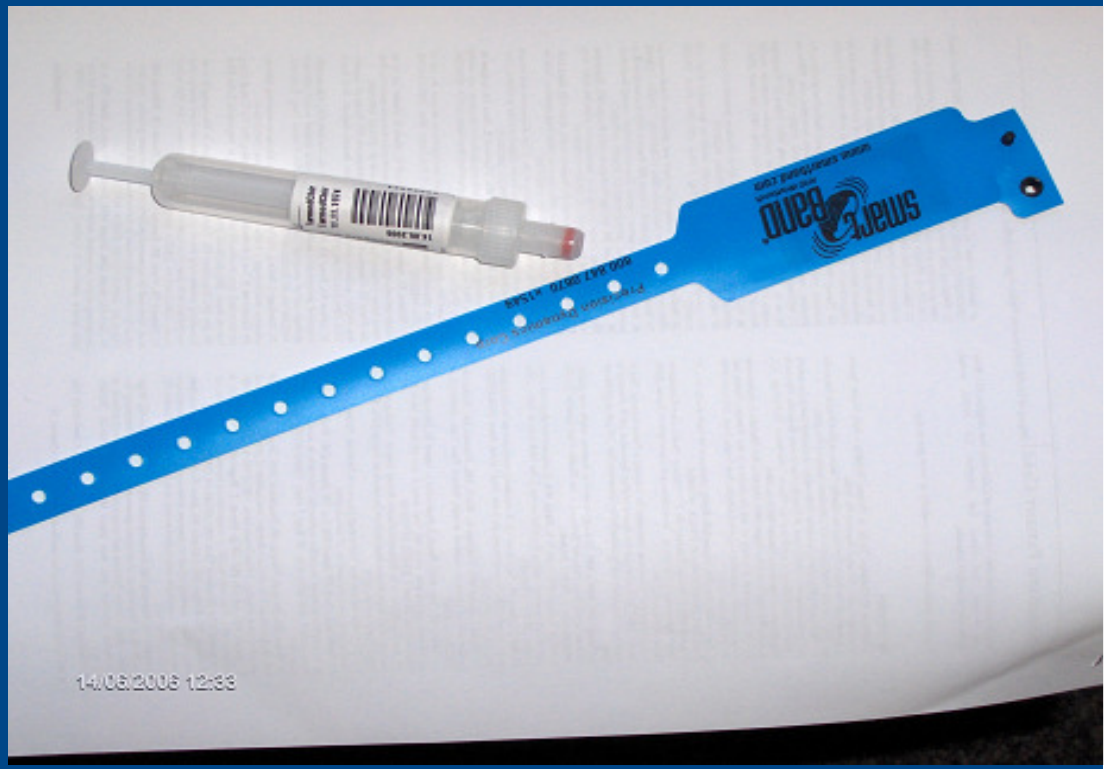
Idef-IS (Identification Information System)

- 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

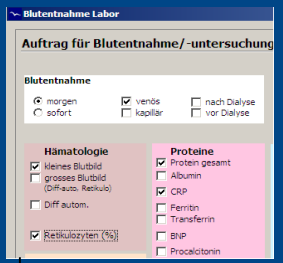
Components IdefIS (2)

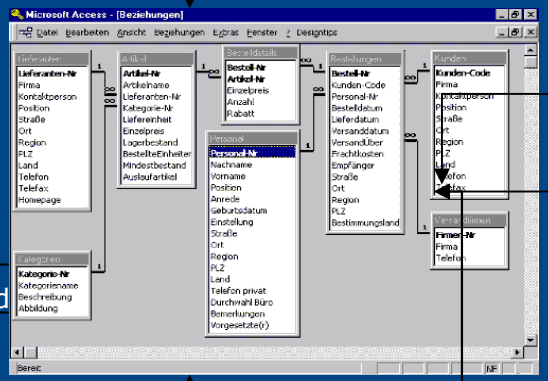
- Passive Tags (ISO 15693, 13.56 MHz), Precision Dynamics ®
- No new barcoding
- No additional information on tag
- Combined reader RFID/barcode linked to laptop
- Software: patient care information system PCIS (SQL, Phoenix®)
- EAN generation

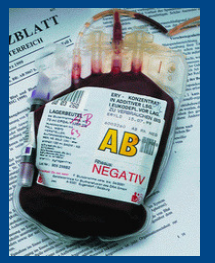
Components Idef-IS



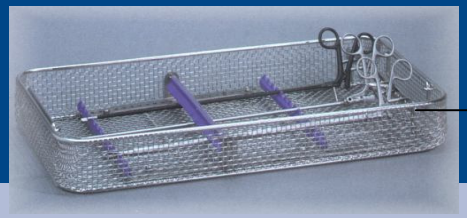
IdefIS: who‘s who? Good thru? Related to?







EAN/gs1= unique/descriptive (attributes), standardized



Überprüfung von Identifikationen

Identifikations-Informations-System Idef-IS

Einlesen (3 Identitäten)

=H003007182931
C0E0070000249F26A2
40010000000A8055F2

CHECK !

Alles löschen

	Patient	Person	Ressource
UID:	C0E0070000249F26A2	40010000000A8055F2	=H003007182931
Code:	2367065	10001102	E3846V00
Name:	Herr Walter	Marianne	Blutprodukt

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:

OK | Abbrechen

Überprüfung von Identifikationen

Identifikations-Informations-System Idef-IS

Einlesen (3 Identitäten)

C0E0070000249F26A2
80012828
400100000033C5DC24

CHECK !

Alles löschen

	Patient	Person	Ressource
UID:	C0E0070000249F26A2	400100000033C5DC24	80012828
Code:	2367065	10000725	Blutprobe
Name:	Herr [redacted] Trachsel	Frau [redacted] Müller	Laborauftrag

Der Auftrag "Blutprobe" ist zur Zeit gültig/freigegeben für diesen Patienten

Auftragscode 80012828 Auftragsbezeichnung: Blutprobe Auftragsklasse: Laborauftrag

OK Abbrechen

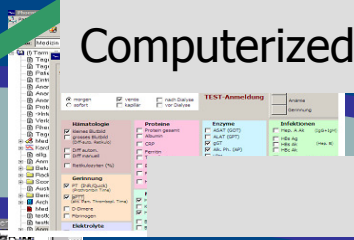
Identification Information system

Patients
Persons
Blood sample
Blood product
Drugs
ite of operation
Implantat
.....

Stock control, billing

Feedback

Computerized Physician Order Entry

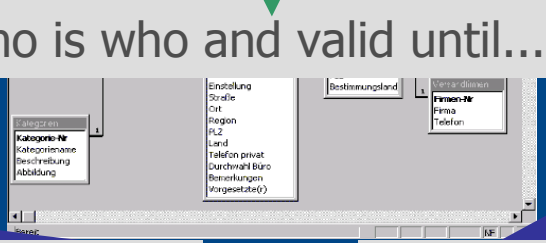


Phlebotomy

Transfusion/Action

Go / No-Go

Identity-Check



Who is who and valid until...

Blood sample

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 feedack/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!