The closed loop: is it the end of errors?
Experiences with an identification information system

Dr.med. Marc Oertle
LA Medizin/Medizininformatik, Spital Thun
Agenda

Introduction

Errors in healthcare

The closed loop identification information system Idef-IS

Results and conclusions
The Spital STS company

Regional, community based non-university hospital

2 campus ↓ 300 beds ↓

16’000 inpatients ↑ 45’000 outpatients ↑ 1’200 employees →

CPOE, eMAR, AMDS established 2002-2003
Errors in healthcare

Bis zu 1700 Kunstfehler pro Jahr in Schweizer Spitälern
Von Susanne Anderegg. Aktualisiert am 26.11.2010 42 Kommentare

Sven Staender mit zwei Fläschchen Verdünnungsmittel. Eine Verwechslung kann fatale Folgen haben.
Bild: Sabina Bobst
Errors in healthcare (2)

- 5% of inpatients suffer from (mostly avoidable) complications

- Many near-misses

- Some estimates (USA):
  - Increased length of stay (LOS): 2.9 – 4.5 due to medication errors
  - Average additional costs per complication: $5400.-

- But: let’s talk about e-iatrogenesis!
  - New and other workflows, different way to work, paper persistence, pattern changes in communication, loss of working routines, emotions, technical failures, false positive alerts, neu failures due to ICT, changes in power structure ....
Transfusion-related errors

- Transfusion related problems (reporting bias...) CH und U.K.:
  - near miss ~1/340-440 transfusion
  - ABO-incompatible transfusion: ~1:30’000
  - Thun: ~5’000 RBC transfusions/a
    : incompatible transfusion ~1/18-24 Monate...

- Under-reporting assumed to be more than relevant
Crossing the quality chasm

• Follows the IOM report „To Err is human“:
  Six specific aims

  • Safety
  • Effectiveness
  • Efficiency
  • Patient centred
  • Timely
  • Equitable

→ ICT usage nearly inevitable
JCAHO aims 2004/05/06/07/08/09/10/11/12...

The Joint Commission

Standards Improvement Initiative (SII)
Chapter Outline

Chapter: National Patient Safety Goals (NPSG)
Program: Hospital

I. Goal 1 – Improve the accuracy of patient identification.
   A. Use of Two Patient Identifiers (revised NPSG.01.01.01)
   B. Not Applicable to Hospital (revised NPSG.01.02.01)
   C. Eliminating Transfusion Errors (revised NPSG.01.03.01)

II. Goal 2 – Improve the effectiveness of communication among caregivers.
   A. Reading Back Verbal Orders (revised NPSG.02.01.01)
   B. Creating a List of Abbreviations Not to Use (revised NPSG.02.02.01)
   C. Timely Reporting of Critical Tests and Critical Results (revised NPSG.02.03.01)
   D. Not Applicable
   E. Managing Hand-Off Communications (revised NPSG.02.05.01)

III. Goal 3 – Improve the safety of using medications.
   A. Not Applicable

- Spital STS AG CIRS: 50% with relation to mismatch / misidentification
CIRS backgrounds

• CIRS:

  Citations:
  - "A blood sample came to the Lab with different labels on the order form an the tube" (paper era)
  - "A blood sample came into the lab with a wrong label (barcode for medication) on the tube"
  - "Patient in the wrong bed: the IMC personnel discovered the mismatch after having sent the blood sample to the lab"
  - "The GP referred patient X for a specific test to the emergency department (...). Blood sample was taken and sent to the lab. Later, the GP called the physician on duty and told him that he has sent the wrong patient. The correct patient arrived 2 hours later."
Aim: the 7 R

- Right patient
- Right time
- Right plan (to act): prescription e.g.
- Right action
- Right resource
- Right person
- Right place
Further aims: the 3M

• Maximizing process quality
• Maximizing process knowledge
• Maximizing ROI

⇒ 7R + 3M = quality
Return on investment

Can you quantify a humans’ life?

- Costs due to complications/adverse events, morbidity
- Reduction of life expectancy
- QALY (LE x f) und costs per QALY
What are patients thinking of identification?

- 96% agree completely, but some:
  - "Personally I think you should just label me with a chip or a barcode when I should become unconscious or suffer from severe dementia. Otherwise I will be able to verify the nurses' activities."
  - "I'm worrying about the data being stored in these codes or chips."
  - "I will get some infusions and iv lines and the wristband could prevent nurses from delivering proper care."
  - "In our religious community, barcodes are a diabolical sign! I would refuse any labels like that and probably not come to your hospital anymore."
One additional piece of Swiss cheese ...
EAN = unambiguous
Initial hardware Idef-IS 2006
Hardware 2013

«Vaccination»

«Identification»

The identification information system Idef-IS • SwissTransfusion 2013 • Dr. med. Marc Oertle
Medikamente/Blutentnahmen/ECK prüfen

Barcode blood sample

Barcode medication

Blood products

Patient
Closed loop system: blood samples/transf.
Closed loop system: medication
Main problems

- Mobility...
- Mobility... ...with full need of information and control of processes
- WLAN-readiness, real-time availability of data
- Handiness, weight, hygiene, size, shock proof
- Stabiliy (WLAN, hardware, cradles, docking stations), ...
- Diversity of products not given
- Workload nurses, Compliance, perceived usefulness
- Thefts, data protection, highly secured WLAN
- Prizes (RFID, IT personnel)
- But not:
  - Homemade software
  - Seamless integration into clinical information system
  - IT Support
  - Patient
Das Identifikationsinformationssystem IDEF-IS

On days like these...

Idef-IS Nutzungsdaten der letzten 120 Tage (vor 01.09.2013)

Korrekt abgewickelte Identifikationen (pro Gruppe)
Blutprodukt: 310
Erythrozytenkonzentrat: 5
Laborauftrag: 4331
Medikation: 7561

Falscher Zeitpunkt oder doppelte Aufträge
Blutprodukt: 34
Laborauftrag: 425
Medikation: 374

Es konnten zudem in den letzten 120 Tagen folgende Verwechslungen verhindert werden:
Fehl-Transfusion: 4
Fehl-Laborauftrag: 9
Fehl-Medikation: 28

Danke, dass Sie mit arbeiten!

Im Spital St. Jakob
Let’s talk about relative numbers...
Avoided and thus near misses

Last 12 months

1’313 transfusions verified (out of 2’505 inpatient-RBC-transf.) : 52%

4 mismatch-warnings (2 false positive due to Lab system)

\[
\frac{2}{1313} = 1.5 \%
\]

Still: selection bias ?!....
Completely safe? NO!

IDEF-IS as an additional element in the safety chain/management

The complete safety: zero mistakes will never happen

Technical tightrope-act with many (vulnerable) components

Huge efforts necessary to reduce seldom events.

But: this transfusion error could be the lethal one...

Don’t forget the «non-electronic» safety measures (double control) in case of non-function/non-availabilty of the electronic safety system!
Last but not least

Incompetent people are, at most, 1% of the problem. The other 99% are good people trying to do a good job who make very simple mistakes and it's the processes that set them up to make these mistakes.

Dr. Lucian Leape, Harvard School of Public Health
The closed loop: is it the end of errors?

NO!

But the end of some (near) misses...
Discussion, questions