Streamlining Hospital IT – Improving the admission process

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Healthcare of the Future, 5 April 2019
Brönnimann’s perspective
Medical Informatics perspective: Vision

An interoperable ICT-based information flow improves

▶ the **efficiency** of work processes
▶ **quality** of treatment
▶ patient **safety**

▶ The goal: improved **integration** of external stakeholders
Brönnimann’s perspective - What'd we do?

- We **analyzed** the *admission workflow in three Swiss hospitals* to detect shortcomings mainly in the administrative admission process due to media breaks.

- We drafted a **concept** for an *open multi center hospital admission portal* based on potential IT-based workflow changes and performed a cost-benefit analysis.

- We designed a prototype of a portal to **improve** the interaction between the referring doctor, the patient and the hospital staff.
9 Workflows

for admission in 3 Swiss hospitals comprising 16 to 29 described process-steps plus associated forms, IT-applications etc.
Brönnimann’s perspective – **Analyzing** ➔ Interviews

Four different admission types must be distinguished:

- **Planned Admission**
  - with Referral by GP
  - Self-Referral by Patient

- **Emergency admission**
  - Walk-In
  - Rescue Services
Many different admission forms - even for a single physician working in that clinic

Processes differ between hospitals, but also within the hospital per clinic

Team-oriented clinic: surgeon and anesthetist talking at the same time to the patient

other clinics, e.g. surgeon and anesthetist talking at different times to the patient

One hospital offers an online portal for self-registration of the patient
patient referral by GP
paper documents to be supplied by the patient
switch between outpatient and inpatient care
Brönnimann’s perspective – Analyzing Deficiencies

<table>
<thead>
<tr>
<th>No</th>
<th>Weakness</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Patient data reconciliation very time consuming</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td>Patient consent is paper based</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td>Several PIDs in different hospital IT systems</td>
<td>No</td>
<td>Unclear</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Appointment dates for multiple consultants not ranked together</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td>In case of name changes and anonymization, relationship between digital docs can be lost</td>
<td>No</td>
<td>Unclear</td>
<td>Yes</td>
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<tr>
<td>6</td>
<td>During consultation patient receives set of disjointed paper docs</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>7</td>
<td>There is no safeguard that patient consent has been given before intervention</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Appointment coordination for different participants of consultation is time consuming</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Outpatient clinics make appointments without consultation of the patient, requiring rescheduling</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td>Most patients do not know the mechanism for online registration</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
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<tr>
<td>11</td>
<td>Patient receives invitation for appointment prior to verification of information</td>
<td>N/A</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>12</td>
<td>GP performs online registration, but data needs to be manually transferred to hospital information system</td>
<td>N/A</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td>Most patient communication is via Outpatient clinic w/o information of central admissions</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td>In multiple visits patient receives redundant information brochures</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td>Despite structured registration forms 70-90% of admissions is done by manual fax or telephone</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td>Patient is used as information carrier</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td>Patient must phone up hospital to find out appointment date</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>18</td>
<td>Due to paper archive, comparing information is difficult</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td>Communication between hospital and patient is by phone or mail</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>20</td>
<td>Allocation of data access on change of admission status is manually</td>
<td>Yes</td>
<td>Unclear</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>Inconsistent registration forms even within on clinic</td>
<td>Yes</td>
<td>Unclear</td>
<td>Yes</td>
</tr>
<tr>
<td>22</td>
<td>Informal appointment making by GPs requires additional enquiries</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 1. Results of weakness analysis for the administrative admission workflow in three Swiss hospitals
Brönnimann’s perspective – Analyzing ➔ The Causes

- Electronic data transfer 1, 12, 15, 16
- Unique identification (MPI) 3, 5
- Data security 15, 19, 20
- Paper 2, 6, 15, 18, 21
- Scheduling 4, 6, 7, 8, 9, 11, 17
- Unclear organization / process flow 4, 7, 9, 10, 11, 13, 14, 21, 22
- Patient experience 4, 6, 9, 10, 14, 16, 17, 19
- Family doctor experience 12, 15, 22

System Architecture

- No ICT at all
- Inadequate ICT in Processes

Brönnimann's Journey
We analyzed the admission workflow in three Swiss hospitals to detect shortcomings mainly in the administrative admission process due to media breaks.

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We designed a prototype of a portal to improve the interaction between the referring doctor, the patient and the hospital staff.

Brönnimann’s perspective - What'd we do?
Brönnimann’s perspective – **Conception** ➔ Cost-Benefit Analysis

<table>
<thead>
<tr>
<th>No</th>
<th>Solution proposal</th>
<th>Could influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>An online portal which synchronizes the calendar of the different hospital physicians (e.g. surgeon, anesthetist) for patient referral with access for the patient.</td>
<td>4,7,8,9,17</td>
</tr>
<tr>
<td>2</td>
<td>• Prototypical open access hospital admission portal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Prototypical open access hospital admission portal</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>• Centralized dispatch and collection of digital forms through central admission</td>
<td>6,14</td>
</tr>
<tr>
<td>4</td>
<td>• Digital provision of all outpatient clinic docs for the patient</td>
<td>6,14</td>
</tr>
<tr>
<td>5</td>
<td>• Direct digital document exchange between referring GP and hospital</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Table 2.** Five IT based proposals to deal with the problems in the admission workflow.
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Brönnimann’s perspective – Improve → Process integrated ICT
Med. Informatics perspective – **Improve ➔ Process integrated ICT**

**Resource Planning and Scheduling**

Support processes "Patient admin/Mgmt", "Pharmacy", "Logistics", "Facility mgmt/cleaning", "Gastronomy", "Hygienics", ...

**Registration**

**Patient Admission**
- Planned Admission
  - with Referral by GP
  - Self-Referral by Patient

**Emergency admission**
- Walk-In
- Rescue Services

**Referral to GP; Instruction of the following health care providers**

**Discharge**

Interoperable information flow?
Med. Informatics perspective – **Improve** ➔ Process integrated ICT

**Registration**
- Support processes "Patient admin/Mgmt", "Pharmacy", "Logistics", "Facility mgmt/cleaning", "Gastronomy", "Hygienics", ...

**Discharge**
- Referral to GP; Instruction of the following health care providers

**Planned Admission**
- with Referral by GP
- Self-Referral by Patient

**Emergency admission**
- Walk-In
- Rescue Services

**Preparatory Activities**
- Documentation, Update Treatment Plan, Report Generation

**Treatment Pathway**
- Consultation, Diagnostics, Intervention
- Medical Post-processing

**Update Treatment Plan**
- Preparatory Activities

**Referral to GP**
- Instruction of the following health care providers

**Berne University of Applied Science | Medical Informatics**
Brönnimann’s perspective – **Improve** ➔ Customers Experience

### Admission
- Friendly reception at the main entrance
- Mrs. Brönnimann doesn't find the outpatient clinic
- The visit is not in appointment management

### Consultation
- The receptionist offers a voucher for a coffee.
- Transport service must be searched
- Registration takes a long time, Mrs. Brönnimann cannot answer all questions

### Intervention
- Mrs. Brönnimann has to wait 40 min
- A planning overview is missing in the secretary's office. It is not possible to give clear information on how long it will take.

### Discharge
- Patient data must be entered manually
- Registration by general practitioner, by telephone, patient receives appointment
Brönnimann’s perspective – Improve ➔ Customers Experience

### Admission
- Friendly reception at the main entrance
- Mrs. Brönnimann doesn’t find the outpatient clinic

### Consultation
- Appointment and questions clarified
- The doctor is very well informed
- Mrs. Brönnimann has to wait 15 min

### Intervention
- A planning overview is in the secretary’s office. All further appointments are listed as daily schedule.

### Discharge
- Transport service in 1 min on site

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- Electronical Registration and appointment by GP
- Patient data transmitted by GP
Collaboration in health care
Thank you very much for your attention
Brönnimann’s perspective: Vision

An interoperable ICT information flow supports:

- the efficiency of work processes
- the quality of treatment
- patient safety
- future-oriented external stakeholder integration

Hospital Treatment Pathway Consultation, Diagnostics, Intervention

Project Focus: Admission Workflow
Brönnimann’s perspective – Improve ➔ System Architecture

Interoperable ICT Information Flow

Core Processes

Dispo

Support Processes

Medis & Material

Service Rec.

LOGISTICS:

FACILITY SERVICES

HOTEL BUSINESS

PHARMACY

• Deploying
• Room-Dispo
• Bed Dispo
• Laundry Service

OP-Dispo

MedControl

TARMED

 Ontology

CDS-Service

Medication

Ontology

MedControl

TARMED

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