Mobile tools to improve patient safety

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Handover (2009 - 2012)

Patient (2012 - 2015)
The Problem

• ‘In many cases of avoidable maternal death identified in the UK Confidential Enquiry, care was hampered by a lack of cross-disciplinary or cross-agency cooperation and communication problems, ...’

List of Errors in Patient Safety

- Share Information with patients 91%
- Tests pending at discharge 65%
- Diagnostic Test Results 38%
- Identified Hospital Dr 25%
- Treatment/hospital course 22%
- Discharge medications 21%
- Main diagnosis 18%
- Follow-up plans 14%
- Physical Findings 11%

WHO High 5 Patient Safety

The World Health Organization (WHO) lists accurate handovers as one of its High 5 Patient Safety initiatives.

Training of handover skills would appear to be a promising approach to improve the quality of patient continue care.

What is a HANDOVER?

Shorter hospitalizations, more frequent patient transitions → high demands on the quality of clinical handovers
Mobile health projects

Handover

EM R

Patient

CELSTEC celsotec.org
Process mapping

Handover info

Electronic medical record in primary care center (photo not available)
Patient’s medication list
Referral report (photo not available)

Patient consultation to Primary Care
Patient referral to specialist
Appointment for first consultation
Admission?
No
Control with specialist
Yes
Inpatient Care

Patient consultation to emergency care
Admission?
No
Patient with a health problem
Yes
Inpatient Care

Surgical intervention
Patient discharge
Patient is attended in Primary care

OR or anesthetic review

Doctor discharge report with detailed information about the hospital care
Nurse discharge report with information about needs (communication, learning capacity, linguistic barrier, self-care capacity, etc.)

Patient is programmed to continue visit with specialist (at hospital or primary care, depending on the specialist)

Information about previous visits and specialist control
Emergency care report
Medication dispensing and administration register (only in paper)
Referral request
Patient stay review chart during the hospital stay
Information regarding GP and primary care nurse contact information
Information available about main clinical reports from other hospitals and primary care center
Handover Toolbox

Welcome Hendrik Drachsler

Find training examples and advice to create your own training in handover.

Become a member and start sharing!

Share knowledge on best practices.

Discuss with other experts in the field.

Start your own group.

Stay up-to-date on the latest developments on handovers.

Find interesting tools to improve your handovers.

Contribute your own handover tools.

Rate and annotate tools and articles.

Add interesting information and experiences to the toolbox.
3 challenges for medical practice
Challenge 1: **Standardisation**

- General
- Name
- Address
- MRN
- DOB
- Hospital
- Ward
- Consultant
- Speciality
- Date admission
- Date of discharge
- GP’s name
Challenge 2: Access (mobile)
Challenge 3: **Information Quality**

**Certified content**

**Community Content**

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**Handover toolbox**

**Handover en Grupos minoritarios**

**Description:**
Este grupo ha sido creado para colaborar en la formación de profesionales sanitarios sobre posibles estrategias para mejorar la comunicación con pacientes pertenecientes a grupos minoritarios.

Desde la perspectiva de la comunicación, entendemos grupos minoritarios, personas que entran en contacto con el entorno sanitario y que puedan tener dificultades para comprender la información entregada por los profesionales sanitarios.

- Personas con barreras idiomáticas
- Personas con bajo nivel de educación
- Personas con problemáticas sociales y limitaciones culturales

¡Bienvenidos a este espacio!

Todas vuestras aportaciones serán bien recibidas!

**Brief description:** Limitaciones en la comunicación con personas que pertenecen a grupos minoritarios

**Tags:** desfasamientos sociales, barreras idiomáticas, comunicación, Transferencia de información

**Website:** [www.fodq.org](http://www.fodq.org)
2 challenges are addressed in the PATIENT project
# 1. Standardisation: (CLAS)

| General          | Personal patient data / GP’s name  
|                 | MRN  
|                 | Hospital  
|                 | Ward  
|                 | Consultant  
|                 | Speciality  
|                 | Date of admission / discharge  
|                 | General details include basic demographic details such as name, address, date of birth, Medical Record Number (MRN), date of admission and date of discharge of patient. Other items include name of hospital, name of ward, name of consultant and speciality. A specific rating exists for identifying the name of the GP (General Practitioner of Family Doctor) i.e. ‘Dear Dr Casey’ rather than ‘Dear Dr’.  
| Problem List    | Is there a problem list?  
|                 | A bulleted list of the patient’s problems provides an immediate snapshot of the patient’s overall status. Ideally, the problem list should be at the beginning of the letter and highlighted in bold typeface.  
| History         | Reason for admission (presenting complaint)  
|                 | History of presenting complaint (details) and other relevant history  
|                 | Past history  
| Physical examination | Pertinent clinical findings appropriate to the case  
|                 | Only pertinent clinical findings appropriate to the case need mention.  
| Investigations  | Investigations done  
|                 | Results of abnormal investigations  
|                 | Test results pending  
| Diagnosis/diagnoses | List of diagnoses  
|                 | Identification and highlighting of  
|                 | List of diagnoses and highlighting of new diagnosis.  

2. Mobile Access: The CLAS App
Pilot study of the CLAS App

- 80 medical students (4th yr)
- Patient casenotes (fictional) given to students in advance of teaching session
- **Experimental group (n=40)** students received instruction on the CLAS scale. Asked to write a patient discharge letter (25 mins)
- **Control group (n=40)** wrote discharge letter without CLAS instruction
Pilot study at UCC

Difficult to prove that mobile educational interventions improve patient safety

• Lack of research describing / assessment of educational interventions to improve handover.

• Transfer of skills to workplace - some evidence

• Improved Patient Safety - no evidence

Gordon M, Findley R. Educational interventions to improve handover in health care: a systematic review. MEDICAL EDUCATION 2011; 45: 1081–1089
Conclusions

1. Use of checklists can improve the overall quality, content, structure and clarity of hospital discharge letters written by medical students.

• Medical students benefit from formal instruction in letter-writing skills.

• Use of the CLAS app at point of practice may improve the quality of hospital discharge letters.
Future Research and Development

1. Analysis of 200 hospital discharge letters from 5 different GP practices using CLAS scale

2. Extending the handover app approach to empower patients

• Pilot phase for CLAS and other mobile apps in the PATIENT project -> TARGET: train 600 students per year with mobile learning tools for handover
Upcoming: E-DL App

• Extending the idea of apps to support handover processes (communication, awareness, reflection competences).

• Extending the handover app approach to empower patients.

• NFC
• Linked Data (ICD9, SNOMED_CT)
New ap
CPR? What?
Why EMuRgency?

• Appr. 50 reanimations/week by emergency services in the EMR
• 8 – 10 people survive
• The survival rate could be doubled if
  • Immediate help by laymen would be in place
  • Professional help would earlier be in place
Why EMuRGency?

Chances for survival...

...through immediate cardiac massage are increased with the factor 3!
Notification System
Mobile Client

EMuRgency

Login Email
Password

Login
Register

User Verified
Logout
Mobile Client
Study about quality & usability of mobile apps

Medical: 19,487 apps
Healthcare & Fitness: 23,727 apps

Source: http://148apps.biz (Sep. 2013)
Study about quality & usability of mobile apps

A Systematic Review of Healthcare Applications for Smartphones

Abu Saleh Mohammad Mosa, Illhoi Yoo, and Lincoln Sheets

Abstract
Background: Advanced mobile communications and portable computation are now combined in handheld devices called "smartphones", which are also capable of running third-party software. The number of smartphone users is growing rapidly, including among healthcare professionals. The purpose of this study was to classify smartphone-based healthcare technologies as discussed in academic literature according to their functionalities, and summarise articles in each category.

Methods: In April 2011, MEDLINE was searched to identify articles that discussed the design, development, evaluation, or use of smartphone-based software for healthcare professionals, medical or nursing students, or patients. A total of 55 articles discussing 83 applications were selected for this study from 2844 articles initially obtained from the MEDLINE searches.

Results: A total of 83 applications were documented: 57 applications for healthcare professionals focusing on disease diagnosis (21), drug reference (6), medical calculators (8), literature search (8), clinical communication (3), Hospital Information System (HIS) client applications (4), medical training (2) and general healthcare applications (7); 11 applications for medical or nursing students focusing on medical education, and 13 applications for patients focusing on disease management with chronic illness (6), ENI related (4), full related (3), and two other conditions (2). The disease diagnosis, drug reference, and medical calculator applications were reported as most useful by healthcare professionals and medical or nursing students.

Conclusions: Many medical applications for smartphones have been developed and widely used by health professionals and patients. The use of smartphones is getting more attention in healthcare day by day. Medical applications make smartphones useful tools in the practice of evidence-based medicine at the point of care, in addition to their use in mobile clinical communication. Also, smartphones can play a very important role in patient education, disease self-management, and remote monitoring of patients.
Study about quality & usability of mobile apps

13 apps included in evaluation step II

Pocket CPR  CPR & choking  Hands-only CPR  1st Aid White Cross  St. John Ambulance 1st aid  SCDF Choking CPR AED  Emergency First Aid & Treatment

Pocket First Aid & CPR  Free CPR  SOS American Red Cross  Leben retten  FDNY Livesaver Beta  Reanimatie
### Study about quality & usability of mobile apps

Kalz, et al., submitted

<table>
<thead>
<tr>
<th>App Name (Language)</th>
<th>Mean SUS Score</th>
<th>SD</th>
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<tbody>
<tr>
<td>Reanimation (Dutch)</td>
<td>82</td>
<td>14.4</td>
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<tr>
<td>CPR &amp; Choking (English)</td>
<td>73</td>
<td>11.01</td>
</tr>
<tr>
<td>FDNY Lifesaver Beta V1.0 (English)</td>
<td>72</td>
<td>14.61</td>
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<tr>
<td>Lebens retten (German)</td>
<td>70.5</td>
<td>19.48</td>
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<tr>
<td>Hands Only CPR (English)</td>
<td>68.5</td>
<td>15.17</td>
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<tr>
<td>St. John Ambulance First Aid (English)</td>
<td>67</td>
<td>23.48</td>
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<tr>
<td>Emergency First Aid &amp; Treatment Guide (English)</td>
<td>65</td>
<td>10.16</td>
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<tr>
<td>Free CPR (aka CPR Steps) (English)</td>
<td>61.5</td>
<td>14.43</td>
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<td>SCDF Choking CPR AED (English)</td>
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<td>11.67</td>
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</table>
Serious Game: HeartRun

Welcome to the Heart Run game. It will help you to be prepared in case of emergency. The instructions on your device will tell you how to save a life.

If somebody collapsed
- look for chest movement;
- listen at the victim’s mouth for breath sounds;
- feel for air on your cheek;
- decide if breathing is normal, not normal or absent.

While your colleague is performing CPR you should now switch the defibrillator on and follow the instructions.

Make sure you do not interrupt chest compressions while attaching the pads.

The game is based on messages which will appear on your device. When closing this message, you will already see the next one. You close this message by using the BACK Button. To open a message, you have to click on it. Messages which you have read are greyed out.
Serious Game: HeartRun

• Addition to school training
• Focus on self-efficacy
• Motivational trigger
Serious Game: HeartRun

Why mobility?

• Location-based
• Role-based
• Authenticity
Serious Game: HeartRun

- Simulates a real situation
- Requires the recall of BLS related knowledge - immediately and correctly
- Integrates tasks and questions

Schmitz, et al., 2013
Public displays

Börner, Kalz, & Specht, submitted
Public displays
Public displays
Incident visualisation
Thank you for attending this lecture!

This slide is available at:
http://www.slideshare.com/Drachsler

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Skype: celstec-hendrik.drachsler
Blogging at: http://www.drachsler.de
Twittering at: http://twitter.com/HDrachsler

Links: patient-project.eu
       handovertoolbox.eu