Innovation of communication technology to improve information transfer during handover

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Handover

“Clinical handover is the process of passing information about patients from one clinical team or professional to another”
Why Handover?

• 80% of adverse events due to communication error$^1$

• Errors common at transition points (e.g. shift change)
Problems with the current system

- Inefficient communication technology
- Limited information transfer
- No formal audit trail
- Sensitive information easy to lose
- Task prioritisation is challenging
Potential solutions

- Smartphones - 80% of UK and US physicians use smartphones
- Web-based instant messaging
- Apps
Technology isn’t a silver bullet

‘CDE’ of mHealth

- Clarify: Determine focus
- Design: Develop solution
- Evaluate: Test formula
Importance of research

'CDE' of mHealth

Clarify
Determine focus

- Qualitative and quantitative academic research
- User centred problem solving approach
- Impact assessment
Aim

1. Identify best evidence regarding handover interventions in surgery

2. Identify problems surrounding handover in UK hospitals

3. Formulate recommendations for the development of communication technology for handover and task management

4. Develop and test the technology
Methodology

- **Best evidence**
  - Systematic review

- **Current issues**
  - Ethnographic Observation

- **Recommendations**
  - Stakeholder focus groups
Methodology 1

- Best evidence
  - Systematic review

- Current issues
  - Ethnographic Observation

- Recommendations
  - Stakeholder focus groups
Phase 1 – systematic review

1. What interventions in the handover process have already been trialled?
2. What strategies have been successful?

970 citations

20 articles selected

1 RCT, 19 cohort studies

8 explored postoperative handover

12 explored ward-based handover
Phase 1 – systematic review results and conclusion

• Most studies reported desktop based interventions or paper checklists

• All studies reported improved handover
  1. Fewer errors
  2. Improved adherence to a checklist

• This didn’t translate to improved outcome

• Apps not explored

• Need to conduct research into feasibility of interventions before development and implementation
Methodology 2

- **Best evidence**: Systematic review
- **Current issues**: Ethnographic Observation
- **Recommendations**: Stakeholder focus groups
Phase 2 – Ethnographic observation methods

• Team: Clinician, designer and software developer

• Aim:
  1. Uncover issues with handover and task management in a UK hospital
  2. Establish how these issues can be overcome

• Timing: 3 hour sessions, both night and day

• Activities: Direct observation and informal staff interviews
Issues and solutions

Solutions:
1. Use notifications on smartphones
2. Allow task details to be seen by all
Issues and solutions

Outstanding task at handover

Solutions:
1. Provide task feedback by smartphone

Patient on list needs examination, and this point is raised at handover meeting.
SHO agrees to do task on her rounds

SHO sets off on rounds expecting to tend to task within an hour of so.

Task is completed by another doctor

Time is wasted. And status of patient remains unknown to SHO who is responsible for updating handover notes.

SHO arrives to discover task already done.
Issues and solutions

Solutions:
1. Co-ordinator role able to assign tasks on urgency or location basis

Excessive time lost through changing locations

SHO undertaking a task on Ward A → SHO receives a bleep → SHO is asked to undertake a task on Ward D, and agrees → SHO completes task on Ward D

SHO is asked to undertake a task on Ward A, and agrees → SHO receives a bleep → SHO is asked to undertake a task on Ward D, and agrees

SHOs spend a lot of time moving from ward to ward because the current system does not allow them to organise tasks by location, even if they are not very urgent.
Issues and solutions

Too many requests in a short space of time

Solutions:
1. All tasks are stored on device, regardless of timing, and require action

It is possible to receive so many bleeps that one cannot keep track of them. It is also only possible to view the last three bleeps. It is therefore possible for requests to get ignored or forgotten.
Conclusions from phase 2

1. Multiple issues with handover and task management

2. Prioritisation is important

3. No overall co-ordination

4. No audit trail of information

5. Potential solution - smartphones and tablet apps
Methodology 3

Best evidence
- Systematic review

Current issues
- Ethnographic Observation

Recommendations
- Stakeholder focus groups
Phase 3 – focus group methods

• Aim: recommendations for app-based communication technology

• Participants: 15 doctors and 11 nurses

• Collection: Audio recording and verbatim transcription

• Analysis: Thematic analysis
## Focus group results

<table>
<thead>
<tr>
<th>Triage by senior staff</th>
<th>Triage based on urgency</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structured data input</td>
<td>Team conversation function</td>
<td>Robust security</td>
</tr>
<tr>
<td>Mobile devices</td>
<td>Staff training</td>
<td>Flexible operating system</td>
</tr>
</tbody>
</table>
Vision

- View all tasks & patients
- Add tasks
- Accept tasks
- Mark tasks as completed
- Add patients (prior to handover)
- Mark patients for removal
- Change priority status of tasks
- Edit tasks and patients
- View team contact details
- Alerts via push notifications when tasks are added
- Alerts via push notifications when tasks are assigned to individuals
- Alerts via push notifications when tasks go up in priority

H@N Manager

- View all tasks & patients
- Add tasks
- Assign tasks (to iPhone users)
- Delete tasks
- Remove patients
- Change priority status of tasks
- Edit tasks and patients
- Accept / remove team members
- View team contact details
- App in constant use
- Push notification when new tasks are added

Registrar

Registrar

Consultant (at home)

A&E

WARD 1

WARD 2

WARD 3

WARD 4
Further steps

• Use these recommendations to:
  1. Develop a clinical handover app
  2. Perform rapid cycle upgrades
  3. Pilot testing
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