

**HECTOR**

# **Evaluation of A PDA Based Clinical Handover System**

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# A bit about me.....



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Glasgow*

**Human computer interaction  
User Requirements  
Design and evaluation of technology  
Multimodal interaction**

**MATCH Project  
Technology to support care at home**

**<http://www.match-project.org.uk>**

# Handheld HECTOR Evaluation

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# HECT in NHS Lanarkshire, Scotland

## Hospital Emergency Care Teams

- Novel emergency care teams in Lanarkshire NHS
- Team of 9 nurses per hospital
- Includes advanced clinical roles
- To help reduce juniors doctor hours
- Lots of data on the move
  - Handheld IT based solution

# HECTOR

## HECT Operational Record

- PDA based operational record to support activities of HECT
- User centred iterative design with Kelvin Connect and HECT
- In use in 3 hospitals for 2 months

# HECTOR Overview

- Supports patient management
- Provides access to evidence based guidelines and patient information
- Facilitates clinical audit

# HECTOR Handheld System



Handover report

100% Save Print

**NHS** Emergency Care Team - Haimyres  
Lanarkshire  
Handover report

printed: 04-12-2005 @ 21:34  
by: user  
full name: User full name

Period: 26-11-2005 @ 09:00 to 30-11-2005 @ 09:00

Documents without a specified date are not included in this report. Patient identity is based on matching Surname, Forenames and Hospital Number.

**Haimyres Medical Wards**

**W09 Queen, Jim 6548**

29-11-2005 @ 13:35 Abdx Request Pending Diagnosis Collapse  
Assess-Full Ainey Patent Colour Normal RR 15 AEL Good AER Good  
RO2 20% SpO2 90%  
HR 55 Rhythm SR  
GCS 4 + 5 + 5 = 14  
Collapse: khg hrg kj  
Actions IV cann FBC Prescribe O2 R/R: No R-assess 30 mins  
29-11-2005 @ 13:39 Actions U+E Status Done  
Actions

**W10 Hall, Harry 698547**

29-11-2005 @ 11:44 Abdx Request Pending Diagnosis Dyspnoea  
Assess-Full Ainey Patent Colour Pallor RR 15 AEL Good AER Good  
RO2 20% SpO2 90%  
GCS 4 + 5 + 5 = 14  
Dyspnoea: mjf kjh kjh kjh  
Actions C. Entz FBC Prescribe O2 R/R: Yes R-assess 15 mins  
29-11-2005 @ 11:48 Actions IV cann Status Done  
Actions

**W10 McKay, Malcolm 14566**

29-11-2005 @ 15:41 Abdx Request Pending Diagnosis Confusion  
Assess-Full Ainey Patent Colour Normal RR 20  
SaO2 90%

**W10 Watson, Bill 54788555**

29-11-2005 @ 13:17 Abdx Request Pending Diagnosis Confusion  
Assess-Full Ainey Patent Colour Normal RR 15 AEL Good AER Good  
RO2 20% SpO2 90%  
GCS 4 + 5 + 4 = 13  
Confusion: dktj l kjs  
Actions ECG FBC Prescribe O2 R/R: Yes R-assess 30 mins  
29-11-2005 @ 13:21 Actions IV cann Status Done  
Actions

**W17 Jones, Jim 698523**

29-11-2005 @ 10:52 Abdx Outreach Pending Diagnosis Arrhythmia  
Assess-Short

# HECTOR Handheld System

1. Set of PDAs running software for recording and reviewing clinical data
2. PC based access to report generation, user and asset management
3. A database server to allow communication between (1) and (2)



# HECTOR Handheld System



# HECTOR Features

1. Clinical information capture at the bedside or on the move
2. A task list component
3. References information for clinical decision support
4. Automated creation of printed shift reports
5. Printed patient assessment at the bedside using mobile printers
6. Detailed activity reports for service planning and monitoring

# Evaluation

- Importance of user evaluation
  - Usability
  - Functionality
  - Acceptance
  - Impact on time and workload
  - Effects on work practice

# Evaluation

## Hypothesis

- The system and its features are used effectively and perceived to be of benefit to the HECT work practice without added perceived time or workload

Within subjects (N=27); no control  
Questionnaire and follow up interviews

# Evaluation Criteria

- How do the HECT nurses use the system?
  - Feature use
  - Where and when
- How is the system perceived by the nurses?
  - Benefits
  - Problems
  - Workload
  - Impact on time
  - Work practice

# Data Collection and analysis

- Questionnaire (N=27)
  - Independently designed
  - Qualitative and quantitative
  - Response frequencies and thematic analysis
- Interviews (N=5)
  - Randomly selected
  - Semi-structured
  - Informed by Questionnaire responses
  - Thematic analysis
  - Coded independently (x3)
  - Emerging themes

# Results

- Regular computer users; handheld novices
- Overall Perceived Experience
  - Ease of Use ++
  - Accessing and sharing information +
  - Effects on time and workload +/

# Results - Time

- Time (-ve)
  - Duplication of work (paper notes)
  - Post hoc data entry



# Results – Feature Use (1)

- Clinical information capture
  - Usable, acceptable, but some duplication
  - Location of data entry (office rather than at bedside)
- Reference information for clinical decision support
  - Used at start then hardly ever again
  - Used by new/junior team members (memory aid)
  - Adapt ref material to be more useful

## Results – Feature Use (2)

- Automated creation of printed shift reports
  - Highly rated
  - To review patients
  - a communication aid (Esp. at handover)
  - Note taking
  - Memory aid
  - Carrying forward outstanding issues
  - Reminder of patient location
  - Identifying higher risk patients
  - a communication aid (Esp. at handover)
  - Evidence of workload

# Conclusions

- HECTOR has been successfully implemented to support the delivery of care by HECT hospital at night teams
- HECTOR is perceived by the team as having significant value without having unacceptable impact on time and perceived workload
- The system has been adopted by 10 other UK hospitals

# Conclusions

- Benefits identified include:
  - Effective communication and patient management
  - Robust clinical audit facilitating service
  - Planning and development
  - Concise clinical handover
- Handheld clinical handover systems could be successfully adopted by other UK hospitals to support service delivery and ensure effective patient care.

# Questions

Thank you!

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