Implementation Of An Electronic Medical Handover Tool Improves Accuracy And Reduces Omission Of Important Information

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Brief outline of unit admissions structure

- 4 inpatient units: A/B/C + ‘Rapid’ unit (for admission less than 48hrs)
- Single point of contact (pager) for all ED admissions
- ED Medical Registrar 0800-1300
- ‘On-take’ Registrar 1300-2130
  - Assisted by other registrars when busy
- Night Medical Registrar 2130-0800
- Minimum 3 registrars admitting over 24 hour period
- Maximum: 7 !!
- Obvious need for effective handover when changing shifts, especially in morning

PGMU morning handover meeting

- 8am, 7 days
- Gen Med Ward seminar room
- Consultant-led
- Attended by:
  - Night medical registrar
  - ‘Post-take unit’ (A/B/C) including consultant
  - ‘Rapid unit’ including consultant
  - ED medical registrar
  - Nursing and allied health staff
- Projector enables everyone present to view pathology, radiology
- Focus on patient handover but also allows teaching opportunities

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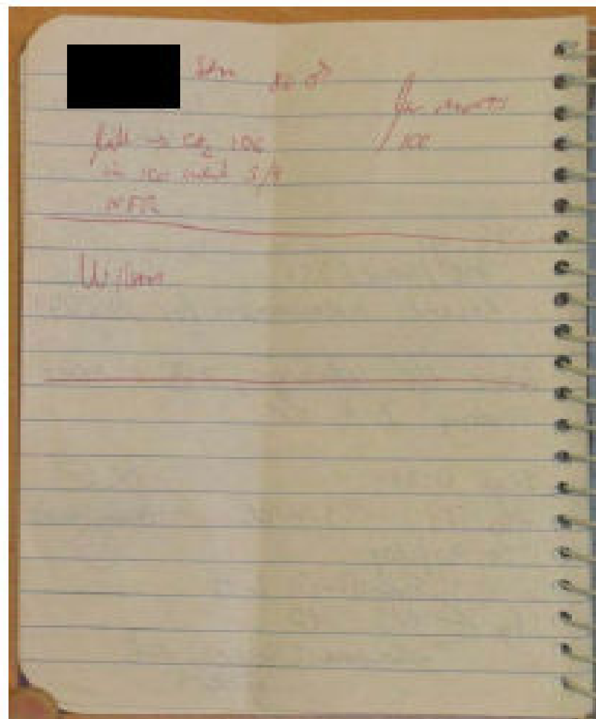
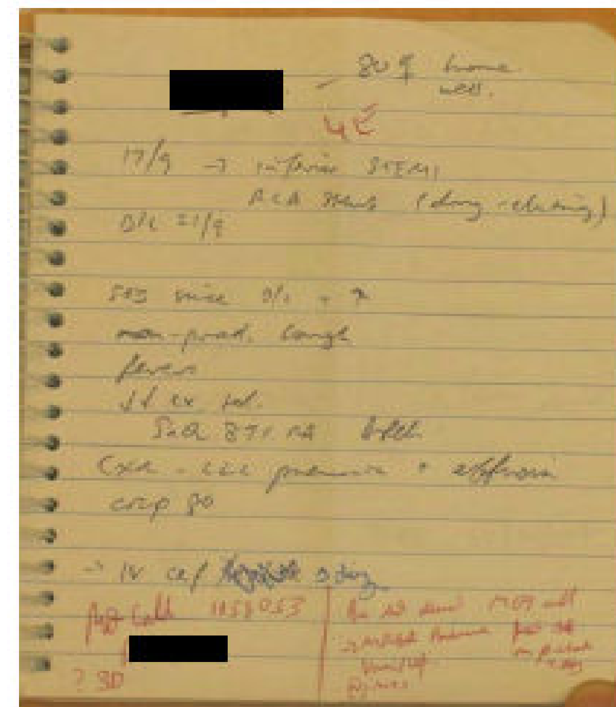
The ‘notorious’ original night handover book





Paper-based handover tool

Registrar name: **Seen by Consultant:**

Patient Label	Date: / /
	Time referred:
	Time seen:
PGMU: A / B / C / Rapid	**Or Referring Unit:**
Illness severity: *Mild* *Moderate* *Severe*	
Residential circumstances	Mobility
PMH	
Issues currently	
Management plan	
Resuscitation status: Full / Modified / NFR	
Suitable for transfer to : AC3 / SDMH / Private / no	Beds available: yes / no

Electronic handover tool

- Developed early 2009
- Built upon previous paper-based handover tool
- Advantages:
  - Clinical data is saved on patients electronic record
  - Data is pre-filled in certain fields for next admission
  - Clinical data pushed automatically to patient unit lists (printed each morning), discharge summary, outpatient record
  - Visual tool for morning handover meeting

PGMU Handover Tool

PGMU Handover Sheet - TEST, ALFREDCENTRE

*Performed on: 15/06/2009 1109 By: Ritchie, Edward

PGMU Handove
Modified Early W

PGMU HANDOVER TOOL

Date 15/06/2009
Registrar Name Ritchie, Edward
Seen by Consultant
Unit ○ PGMU A ○ PGMU B ◉ PGMU C ○ PGMU Rapid ○ Other:

Time Referred
Time Seen
Elapsed Time

Illness Severity
○ Mild
○ Moderate
◉ Severe

Residential Circumstances
○ Home alone ○ LLC
◉ Home with partner ○ HLC
○ Home with family ○ Other
○ SRS

Comment

Mobility
○ Independent ○ Bedbound
○ SPS ○ Other
◉ 4WF

Comment

Past Medical History

Past Medical History
GOUT
Type 2 DM
Free text added in the admission form

Issues Currently

In Progress

Handover tool cont…

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PGMU Handover Sheet - TEST, ALFREDCENTRE

*Performed on: 15/06/2009 1109

By: Ritchie, Edward

PGMU Handove

Modified Early W

Management Plan

9

B U I S

Resuscitation Status	Suitable for Transfer To	Beds Available	Comment on Beds Available
○ Full ◉ Modified ○ NFR	○ AC3 ○ Other ○ SDMH ○ No ○ Private	○ Yes ○ No	

In Progress

Audit/safety data collection potential

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PGMU Handover Sheet - TEST, ALFREDCENTRE

*Performed on: 15/06/2009 1109 By: Ritchie, Edward

PGMU Handove
Modified Early W

Modified Early Warning Score (MEWS)

Please complete this MEWS assessment using the patient's observations when they first presented to the hospital.

SYSTOLIC BLOOD PRESSURE (score: 1)

- ○ <70
- ○ 71-80
- ◉ 81-100
- ○ 101-199
- ○ >=200

TEMPERATURE (score: 0)

- ○ <35
- ◉ 35.0-38.4
- ○ >=38.5

HEART RATE (score: 0)

- ○ <40
- ○ 41-50
- ◉ 51-100
- ○ 101-110
- ○ 111-129
- ○ >=130

AVPU SCORE (score: 0)

- ◉ A - Alert
- ○ V- Reacting to Voice
- ○ P - Reacting to Pain
- ○ U - Unresponsive

RESPIRATORY RATE (score: 0)

- ○ <9
- ◉ 9-14
- ○ 15-20
- ○ 21-29
- ○ >=30

MODIFIED EARLY WARNING SCORE (score: 1)

A score of five or more is linked to increased likelihood of death and admission to an intensive care unit.

REFERENCE:
Subbe C.P., Kruger M., Gemmel L. - "Validation of a modified Early Warning Score in medical admissions." Quarterly Journal of Medicine 2001; 94; 521-6.

In Progress

Decision support potential

Acute Coronary Syndrome - TEST, ALFREDCENTRE

ACUTE CORONARY SYNDROME

Question	Response			Reason
Has aspirin been given?	Yes	No		Reason
Risk stratification?	High	Intermediate	Low	*Right click for Reference Text*

HIGH RISK Acute Coronary Syndrome

Question	Response		Reason
Use of clopidogrel?	Yes	No	Reason
Use of anticoagulation (i.e. heparin or LMWH)?	Yes	No	Reason
Beta blocker?	Yes	No	Reason
Arrangements made for coronary angiography and revascularisation?	Yes	No	Reason

INTERMEDIATE RISK Acute Coronary Syndrome

Question	Response		Reason
Is patient undergoing an accelerated diagnostic evaluation and further assessment to be reclassified as low or high risk?	Yes	No	Reason

LOW RISK Acute Coronary Syndrome

Question	Response		Reason
Has medical therapy been upgraded?	Yes	No	Reason
Does the patient have appropriate follow-up arranged?	Yes	No	Reason

Decision support (cont)

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Emergency department/CCU guidelines for the management of acute coronary syndromes

ACS THERAPY ALGORITHM

Symptoms consistent with ACS

- Commence oxygen and ECG monitoring
- Insert a cannula and obtain 12-lead ECG
- Pain relief
- Blood tests
- Give aspirin 150-300 mg unless already given or contraindicated

Immediate ECG

Doctor to see patient within 10 minutes of arrival
(national triage category 2)

Does patient meet indications for reperfusion therapy?
- Persistent ST elevation ≥1mm in 2 contiguous limb leads; or
- ST elevation ≥2mm in 2 contiguous chest leads; or
- New left bundle branch block pattern

NO → **Continue to monitor:**
- chest pain
- serial ECG
- cardiac markers

Re-evaluate and risk stratify
(+/– cardiology consult)

YES → **Symptom onset**

<1 hour ago PCI available within 1 hour?	1-3 hours ago PCI available within 90 minutes?	3-12 hours ago PCI available within 90 minutes (onsite); or 2 hours (offsite, including transport time)?
YES → PCI	YES → PCI	YES → PCI
NO → Fibrinolysis (unless contraindicated*)	NO → Fibrinolysis (unless contraindicated*)	NO → Fibrinolysis (unless contraindicated*)

Patients in whom fibrinolysis is contraindicated, or with ongoing symptoms or instability, should be transferred for PCI

Note: Reperfusion not routinely recommended in asymptomatic and haemodynamically stable patients who present more than 12 hours from symptom onset.

*** Contraindications for fibrinolysis**

Absolute:
- Active bleeding or bleeding diathesis (excluding menses)
- Significant closed head or facial trauma within 3 months
- Suspected aortic dissection
- Any prior intracranial haemorrhage
- Ischaemic stroke within 3 months
- Known structural cerebral vascular lesion
- Known malignant intracranial neoplasm

Relative:
- Current use of anticoagulants
- Noncompressible vascular punctures
- Recent major surgery (<3 weeks)
- Traumatic or prolonged (>10 min) CPR
- Recent internal bleeding (within 4 weeks)
- Active peptic ulcer
- History of chronic, severe, poorly controlled hypertension
- Severe uncontrolled hypertension on presentation (systolic >180 mmHg or diastolic >110 mmHg)
- Ischaemic stroke >3 months ago, dementia or known intracranial abnormality (not covered in 'absolute contraindications')
- Pregnancy

High-risk NSTEACS
Presentation with clinical features consistent with ACS and any of:
- Repetitive or prolonged (>10 minutes) ongoing chest pain/discomfort
- Elevation of at least 1 cardiac biomarker (troponin or CK-MB)
- Persistent or dynamic ST depression ≥0.5 mm or new T wave inversion ≥2 mm
- Transient ST segment elevation (≥0.5 mm) in more than 2 contiguous leads
- Haemodynamic compromise: systolic blood pressure <90 mmHg, cool peripheries, diaphoresis, Killip class >1 and/or new onset mitral regurgitation
- Sustained ventricular tachycardia
- Syncope
- LV systolic dysfunction (LVEF <40%)
- Prior PCI within 6 months or prior CABG surgery
- Presence of known diabetes (with typical symptoms of ACS)
- Chronic kidney disease – estimated GFR <60 mL/min (with typical symptoms of ACS)

→ Admit to coronary care or other high dependency unit and treat with aggressive medical management → Refer for angiography → PCI or CABG / **Medical therapy**

Intermediate-risk NSTEACS
Presentation with clinical features consistent with ACS and any of:
- Chest pain or discomfort within past 48 hours that occurred at rest, or was repetitive or prolonged (but currently resolved)
- Age >65 years
- Known CHD: Prior MI with LVEF ≥40% or known coronary lesion >50% stenosed
- No high risk ECG changes (see above)
- Two or more of: known hypertension, family history, active smoking or hyperlipidaemia
- Presence of known diabetes (with atypical symptoms of ACS)
- Chronic kidney disease – estimated GFR <60 mL/min (with atypical symptoms of ACS)
- Prior aspirin use

AND NOT meeting the criteria for high-risk NSTEACS

→ Recurrent ischaemia or elevated troponin at follow up testing
- YES → Admit to coronary care or other high dependency unit and treat with aggressive medical management
- NO → Stress test (e.g. exercise ECG)
  - \+ → Refer for angiography
  - – → Discharge with urgent cardiac follow-up (on upgraded medical therapy)

Low-risk NSTEACS
Presentation with clinical features consistent with ACS without intermediate or high risk features e.g.:
- Onset of anginal symptoms within the last month; or
- Worsening in severity or frequency of angina; or
- Lowering in anginal threshold

→ Appropriate period of observation → Discharge with urgent cardiac follow-up (on upgraded medical therapy)

Note: All patients with ACS should be provided with a written chest pain action plan, and referred to comprehensive ongoing prevention and cardiac rehabilitation services.

Summary page

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Task Edit View Help

As Of 9:44

Age:47 years | Sex:Male | UR: | Location: Pre-Admit

Ad Hoc Charting... 962

Allergies: penicillin | Fin Number: | Preoperative

Current Admission Results | Patient Schedule | Form Browser | Patient Information | Task List

Chart Summary Screen | APS Client Summary | PGMU Summary | Orders & Referrals | Clinical Notes | Last 48 Hours Results | Pathology | Transfusion | Anatomical Pathology | Medical Imaging | Assessments

Unit: PGMU Rapid

Suitable for Transfer To: AC3

Beds Available: No

Illness Severity: Moderate

Res. Circumstances: Home alone

Mobility: 4WF

Resus Status: Full

MEWS: 4

Past Medical History as at 30/09/09 09:46

Hypertension
Hyperlipidaemia
Type II Diabetes
Gout
Peripheral Vascular Disease

Issues Currently as at 30/09/09 09:43

1. Left lower lobe pneumonia - PSI Class IV

Management Plan as at 30/09/09 09:46

Blood and sputum cultures
IV antibiotics
Oxygen

Flowsheet: All Results Flowsheet | Level: Biochem Blood

Last 1000 Results

Results	23/03/20 09 9:03	9/12/200 8 11:10	15/10/20 08 16:29	13/10/20 08 12:41	13/10/20 08 11:35	20/08/20 08 7:24
Routine Biochem						
Blood Glucose Level (finger-prick)	7.4	* 6.7	6.6	6.5	7.0	7.0

Flowsheet: Medical Imaging View | Level: Medical Imaging View

24 March 2009 10:40 - 30 September 2009 9:47 (Admit to Current Date)

Medical Imaging View	7/09/200 9 11:32	1/09/200 9 10:33	31/08/20 09 12:12	31/08/20 09 12:02	31/08/20 09 11:53	31/08/ 09 11:
Electrocardiography						
12 Lead ECG						
24 Hour Holter Monitor	24 Hour Hc					
Oto Neurology						
Oto Neurology Results						
Arterial Duplex Scans						
Bilat Leg Artery						

Audit: methods

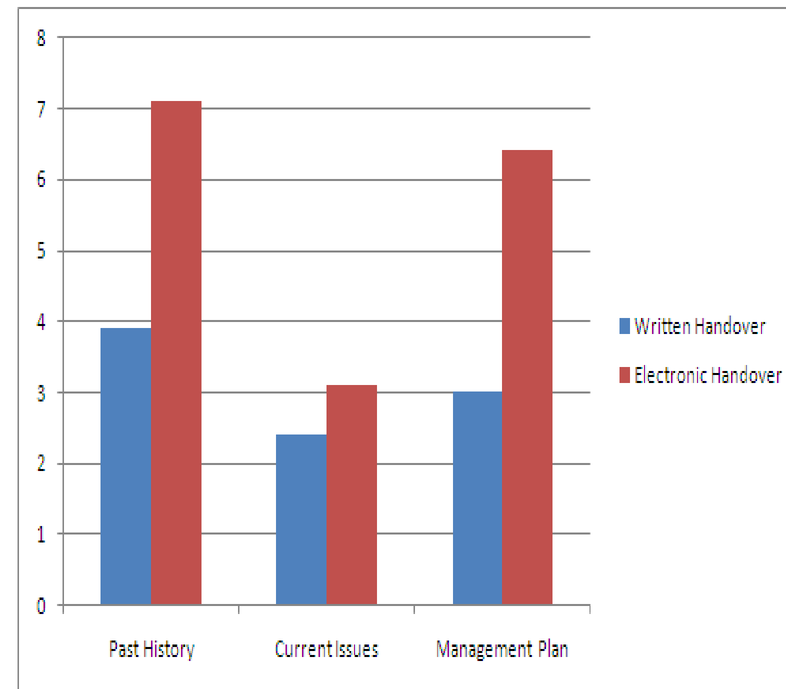
- Fifty randomly selected hand-written patient handover sheets recorded between January and March 2009 were compared with the electronic handover records from fifty admissions during August 2009.
- Each record was examined for the presence of legible information in the following fields which were deemed essential for effective patient handover:
  - Patient name
  - Date of birth or age
  - UR number
  - Admission date
  - Admitting registrar name
- We also recorded the number of items listed in Past Medical History, Current Issues, and Management Plan to determine the ‘completeness’ of clinical information in each handover.

Audit: results

- Key information was missing from the many of the written records:
  - Patient name 2%
  - DOB or age 20%
  - UR number 10%
  - Admission date 6%
  - Admitting registrar name 88%
  - This compared to no such omissions for the electronic record.

Audit results (cont)

- Other clinical information was also less extensively documented in the written vs. electronic record including:
  - Past History 3.9 vs. 7.1 items respectively
  - Current Issues 2.4 vs. 3.1 items
  - Management Plan 3.0 vs. 6.4 items.
- During the trial period, only 50% of handovers were recorded electronically.



Major achievements

- Close collaboration with IT Services to utilise and adapt IT capability that was previously available.
- Uptake of new system by clinicians (approx 80% currently)
- More comprehensive and structured handover
- Better integration, and reduction of duplication of information contained in handover (i.e. to patient lists, discharge summary, outpatient records)
- Potential for audit (MEWS, etc)
- Potential for decision support (acute coronary syndrome guidelines)
- Improves teaching opportunities for morning handover meeting

Challenges

- Achieving 100% uptake of system
- Adapting system for other inpatient units
- Using this system as a template for further expansion into:
  - Inter-unit referrals
  - MET call audit and follow-up
  - Weekend and night handover processes

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Acknowledgments

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