Communication and escalation for deteriorating patients
Escalating Deteriorating Patients - Learning from Patient Safety Congress

Calum McGregor
National Clinical Lead - Acute Care Portfolio
Healthcare Improvement Scotland

Improvement Hub
Enabling health and social care improvement
Improving systems for deteriorating patients

- NEWS
- Rapid response teams
- Sepsis protocols
- Structured response

![NEWS implementation in Scotland's acute hospitals](image)
Can we improve further?

Total rate of Cardiac Arrest for 15 hospitals which have reported consistently from Feb '13 to Feb '18

Baseline Median 1.89

Median 2 = 1.56
Reduction from Baseline
= 17%

Current Ten
Median Provisional from Basel

% 30 day mortality of ICD-10 A40/ A41

Collaborative Launch

Mean 1: 24.8%

Mean 2: 19.5%

24.8% to 19.5% is a 21% reduction post collaborative launch
M.M.

- 77, male
- 4 day history Dyspnoea
- Cough with white sputum
- No fever
- Decrease in exercise tolerance
- Drinks half bottle vodka per day
Past medical history

- Aortic Stenosis
- Gout
- Previous Duodenal Ulcer
- Alcohol XS

Medications:
- Aspirin
- Allopurinol
- Oxytetracycline
- Coracten XL
- Simvastatin

- Allergic to Penicillin
Examination:
• RR 29, SpO2 94% Air in A&E
• Crackles R
• Systolic murmur, mild ankle oedema

Investigations:
• CXR
  – Consolidation Right mid and lower zones
• Bloods
  – CRP 31, WCC 13.9, Urea 6.6
• ECG
  – SR 109, LVH, ST Depression V3-V6 – no change
Diagnosis:
- Right mid and lower zone pneumonia
- Alcohol XS

Treatment:
- PO Doxycycline (Pen allergy)
- CIWA/Pabrinex
- Haematinics
- PPI
- OGD in due course
Day 2 of Admission

14:00 Nursing entry

Sats 94% on 40%. RR 20. HR 115.
Will ask medic to r/v. Obs 2 hourly
Worsening MEWS and short of breath

D/W Med Reg
- PRN nebs
- Escalate Abx to IV Levoflox and metro
- CXR
- Lactate and blood cultures
- Monitor fluid balance
17:35 Nursing entry
- Now on 15L trauma mask, MEWS 6, R/R 34
- 30 minute obs, medic asked to R/V

17:50 FY2 review
- Increasing Oxygen requirements
- Plan: ABG /
- Med Reg informed who will R/V
19:00 Nursing entry

- “Family have advised patient’s wishes for resuscitation & would like not to be resuscitated & for medics to be aware”
- 15 minute obs
- Medic informed of above
Cardiac Arrest 20:05

- PEA
- Adrenaline given x 1
- ROSC ~ 5mins
- GCS 4 (E1V2M1), tolerating OPA

- After discussion with family, and review of patient, treatment switched to palliative

- Patient died 20:35
Any thoughts?
What went well?

• Identified as deteriorating on day 2
• Appropriate initial treatment- pneumonia
• Antibiotics to IV as patient deteriorated
• Obs frequency increased as patient deteriorated
• Medic repeatedly asked to review by nurse
• Medic escalated to registrar
How did this happen?

- Sunday in December
- FY2 was covering for reg who had called in sick
- Med Reg was dealing with 2 very unwell patients in HDU
- One day per week where there is no consultant presence in receiving unit in evening
Why were ITU / medical consultant not phoned?

- Staff Nurse – “If they had been in ward I’d have spoken to them.”
- FY2 – “I called my senior who gave me advice. Didn’t think about calling anyone else.”
- Med Reg – “I knew they were sick but I was dealing with emergencies. I thought they were stable on 15L O2 and could wait.”
- Senior Charge Nurse – “I knew they were sick but medics were dealing with it and no beds in HDU.”
49000 patients with severe sepsis / septic shock

New York State

4% Increased mortality for every hour delay in antibiotic (odds ratio: 1.04 per hour; 95% CI, 1.03 to 1.06; P<0.001)

14% mortality increase after 3 hours

NEJM - 2017;376:2235-44
• “If something good comes from Rory’s death, it will be that we realize we have a broken system.

• Patient care is so fragmented. For the most part, medical professionals aren’t taught the human skills that some deride as ‘soft skills.’ So there’s insufficient sharing of information and ineffective communication. Some in the medical field look upon these deaths as an unavoidable consequence of giving care. But they’re inexcusable and unthinkable.”
Air travel

Air Safety: Comparison with other modes of transport
Deaths per billion passenger hours

- Bus 11.1
- Rail 30
- **Air 30.8**
- Water 50
- Van 60
- Car 130
- Foot 220
- Bicycle 550
- Motorcycle 4840

Air Safety: Comparison with other modes of transport
Deaths per billion passenger journeys

- Bus 4.3
- Rail 20
- Van 20
- Car 40
- Foot 40
- Water 90
- **Air 117**
- Bicycle 170
- Motorcycle 1640

Transportation Research Board 2001 PB2001-917001 Notation 7312*
Space travel?

Challenger 1986
**Cause of disaster**

**Technical data presented**

**Decision making**

- Faulty O rings
- Issue highlighted by engineers
- Issue was raised by staff again night before flight
- Previously OK
- Decision taken to launch
Characteristics of High Reliability Organizations

1. **Preoccupation with failure**
   Regarding small, inconsequential errors as a symptom that something is wrong; finding the half-event

2. **Sensitivity to operations**
   Paying attention to what’s happening on the front-line

3. **Reluctance to simplify**
   Encouraging diversity in experience, perspective, and opinion

4. **Commitment to resilience**
   Developing capabilities to detect, contain, and bounce-back from events that do occur

5. **Deference to expertise**
   Pushing decision making down and around to the person with the most related knowledge and expertise
Factors influencing the activation of the rapid response system for clinically deteriorating patients by frontline ward clinicians

Facilitators:
• Rapid, expert assistance
• Encouragement from colleagues and leaders to activate
• Support with workload
• Clear calling criteria
• Collegiate relationship with responders

Barriers:
Delays in approx 50% of RRT activations(1)
• Condescending tone of responders
• Fear of looking foolish – the role of ‘worry’
• Lack of standardised calling criteria
• Perceived decrease in clinical autonomy or deskilling


Can we improve?

Think about how you can build these facilitators / characteristics into your local board’s context in order to overcome these barriers and achieve high reliability in escalating deteriorating patients?
Deference to expertise

Family / carer activation
Patient activated consultant response

- Patient Activated Consultant Response (PACR)

- “If you are worried, or feel that you, or your family members’, condition is deteriorating, please feel free to phone your consultant, Dr....., on ****”

- Given to all patients on arrival

- Feedback form taken back at 5pm or when patient discharged
Nobody phoned!

- Consultant Response to Activation by Patient (CRAP)
- Failed test
- "Felt safe." "Wasn't worried and could tell staff were busy." "No need." "Staff explained there would be a wait"
- Flatten hierarchy and show willing
Clear calling criteria

Inpatient Sepsis Screening & Action Tool

Patient details (office label):

Staff member completing form:

1. Is NEWS 3 or above? (Yes: \( \checkmark \) No: \( \times \))
   
2. Could this be due to an infection? (Yes: \( \checkmark \) No: \( \times \))
   - Yes, but source unclear at present
   - Pneumonia
   - Urinary Tract Infection
   - Abdominal pain or distension
   - Cellulitis/septic arthritis/infectious wound
   - Device-related infection
   - Meningitis
   - Other (specify)  

3. Any Amber Flag criteria? (Yes: \( \checkmark \) No: \( \times \))
   - Respiratory rate > 25 per minute
   - Clinical signs of wound, device or skin infection

4. Is any ONE red flag present? (Yes: \( \checkmark \) No: \( \times \))
   - Responds only to voice or pain/unresponsive
   - Systolic BP < 90 mmHg (or drop >; 10 mmHg)
   - Heart rate > 130 per minute
   - Respiratory rate > 15 per minute
   - Needs oxygen to keep SpO₂ > 92%
   - Non-blanching rash, mottled/ ashen/cyanotic
   - Not passed urine in last 12-18 hours
   - Urine output less than 0.5 ml/kg/hr
   - Lactate > 2 mmol/L
   - Recent chemotherapy

Low risk of sepsis
- Use standard protocols, review if deteriorates

High risk of sepsis
- Send for fast track assessment
- OR call Confidential Patient Line
- OR call 111

Contact ST3+ doctor to review lab results within 1 hour

Clinician to make antimicrobial Prescribing decision within 3h
Build resilience

Resilience Engineering

- “Learning from what went well”
- Safety 1 v Safety 2
- Make good care happen reliably
Build resilience: create pride in work

Save of the month!

- MDT review of the case
- Establish what went well from each discipline’s perspective
- Agree test to make that desirable “thing” happen more reliably
- Apply model for improvement
Encouragement from seniors to activate

Sepsis guidance

• Lactate >4

• Hypotension not responding to 30mls / kg fluid challenge
Do you have a patient needing R.E.S.C.U.E.d?

YES, if ANY of

- RR ≥ 24 ≥ 24
- NEWS ≥ 5 ≥ 5
- NEWS ≥ 7
- Lactate ≥ 4
- Base excess ≥ -4
- GCS ≤ 12

What next?

- Concern from ANY member of staff
- Failing to improve
- Deteriorating
  - OOH CT or specialty input

Call Consultant

Now
Support with workload

• Junior doctors and nurses report dealing with acutely unwell patients stressful and difficult

• Almost half of newly qualified nurses consider leaving their job within the first year

• > 50% of physicians suffer from burnout

• Psychological safety

• Joy In Work!
First steps

### What matters to STAFF?
- Communication
- Good team work
- Workload manageable
- Psychological Safety

### What makes a good day on-call?
- Clear Instructions
- “Nice” to each other “Civil”
- Sharing tasks between the team, tasks delegated appropriately
- Able to review patients when asked, able to prioritise
- Have equipment available
- Feel valued and supported
- People are nice to me
- Comfortable asking for help
What gets in the way of a good shift? What are the pebbles in your shoes?

- Other staff not pulling their weight
- Talked down to, hard work not appreciated
- Seniors not approachable, or too busy to help
- Politics / arguments between specialties
- Too busy to look after patients
- Cant find equipment / don't know how to refer
- Asked to do things I don’t know how to do
Idea – introduce a staff wellbeing safety brief for busy frontline staff

• Does discussing what matters to staff increase joy in work?

• **Prediction 1**: Using standardised questions will help to frame and focus the discussion

• **Prediction 2**: Having the conversation twice a day will help us to identify and deal with issues close to real-time
Wellbeing safety brief questions

• Any patients causing concern?

• How is your workload? Has anyone been asked to do anything they are not comfortable doing today?

• Has anyone been unable to find equipment or advice that they need today?

• Has anyone had a conversation today that caused stress / conflict today?

• Does anyone want to reflect on anything else that’s happened today?
Some feedback re: wellbeing safety brief

• 83% had good day vs 60% pre-intervention
• “Quick wins” – Equipment / Delegation / De-brief
• “High morale amongst team given it was a Friday”
• “Enjoyed the pep talk – highly motivating and inspiring!”
• “Consultant catch up sessions were great”
• “Senior staff available”
• “Team communicated well. Jobs shared”
In summary....

• Aiming for high reliability will help make best use of available tools
• Barriers to escalation have been identified
• Literature suggests how to improve (facilitators)
• Practical examples of building in facilitators
• Think – how could you apply some of that to your local context?
Avoidable mortality from in-hospital cardiac arrest

Are interventions aimed at recognising and rescuing deteriorating patients associated with lower incidence and mortality?

Dr Helen Hogan
Associate Professor in Public Health
London School of Hygiene and Tropical Medicine
Co-Applicants and Co-Authors

- Nick Black- Professor of Health Services Research, LSHTM
- Andrew Hutchings- Lecturer in Health Services Research, LSHTM
- Catherine Carver- Research Fellow, LSHTM
- Elizabeth Holdsworth- Research Fellow, LSHTM
- David Harrison- Head Statistician, Intensive Care National Audit and Research Centre, London
- Jerome Wulff- Statistician, Intensive Care National Audit and Research Centre, London
- Jerry Nolan- Consultant in Anaesthesia and Intensive Care, Royal United Hospital Bath and Chair of Resuscitation Council
- Martin Kuper- Consultant in Anaesthesia and Intensive Care, Whittington Hospital
- John Welch- Consultant Nurse, Critical Care Outreach, UCLH

This study was funded by a grant from the National Institute of Health Research’s Health Services & Delivery Research programme (12/178/18). The funders had no role in study design, data collection / analysis / interpretation, or composition. The views expressed in this publication are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.
• In-hospital cardiac arrest (IHCA) is an important cause of avoidable mortality
• IHCA requiring resuscitation is linked to failure to recognise deterioration
• National Cardiac Arrest Audit shows 4-6 fold variation in IHCA (requiring resuscitation) rates and outcomes
• Last decade seen introduction of Track and Trigger Systems and Outreach Teams
### Ward: Treat/For DNACPR/ not for DNACPR

### ICU Transfer
Aims and objectives

Which intervention arrangements (TTS and Outreach) are associated with the lowest IHCA incidence and best outcomes.

- Investigate how interventions implemented in practice

- Determine the association between different intervention arrangements and IHCA incidence and short/longer term survival (ROSC>20, to hospital discharge, 30 and 90-day)
Our hypotheses

• **TTS will reduce IHCA rate** by identifying deteriorating patients earlier while there is greater opportunity of reducing their risk of arresting.

• **TTS will have no association with survival following a cardiac arrest**

• **Outreach teams will reduce IHCA rate** by reducing the risk of deteriorating patients arresting more than traditional patterns of response such as ward based staff.

• **Outreach teams will increase survival following a cardiac arrest** by increasing the application of DNACPR orders in deteriorating patients at high risk of an unsuccessful resuscitation.

• **Outreach teams will decrease survival following a cardiac arrest** by improving the management and therefore reducing the incidence of cardiac arrest among those deteriorating patients at lowest risk of an unsuccessful resuscitation.
Method

• Semi-structured interviews to explore variations in practice and barriers to effectiveness for services aimed at deteriorating patients.

• Organisational survey to assess how TTS and Outreach Teams interventions are being implemented in NCAA hospitals between 2009-2015.

• Using statistical approaches (time series and difference-in-difference approaches) to evaluate the association between service configurations and IHCA incidence and outcomes.
Views of hospital staff

60 interviews across 13 Trusts, March- July 2015, wide range of staff involved in acute care
## Track and trigger systems

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provide evidence to back concern</td>
<td>• Decrease in holistic assessment</td>
</tr>
<tr>
<td>• NEWS: Standardisation across organisation, profile and training</td>
<td>• Increased delegation</td>
</tr>
<tr>
<td>• Electronic TTS: complete observations, accurate scores</td>
<td>• Persistent inaccuracies</td>
</tr>
<tr>
<td>• Advantage of automatic alerts</td>
<td>• Delivery of training and support</td>
</tr>
<tr>
<td>• Technological advances: ward screen, hospital-wide cohorting</td>
<td>• Lack of feedback to wards</td>
</tr>
<tr>
<td></td>
<td>• Sensitivity levels (over and under) leading to manipulation of thresholds due to workload implications</td>
</tr>
</tbody>
</table>
## Critical care outreach teams

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Ease of contact by nurses and junior docs</td>
<td>• Level of demand/ getting stuck, decrease education</td>
</tr>
<tr>
<td>• Connectors in MDT</td>
<td>• Substitution: junior doc/ EOL decisions</td>
</tr>
<tr>
<td>• Overview of management of acute illness across hospital</td>
<td>• Skills unevenly distributed through team</td>
</tr>
<tr>
<td>• Training and support for ward staff</td>
<td>• Coverage</td>
</tr>
<tr>
<td>• Role in quality and safety and resource distribution</td>
<td>• Support and recognition in organisation</td>
</tr>
</tbody>
</table>
Findings: Organisational Survey 1

Track & trigger system by quarter 2009-2015

Proportion of hospitals

Time period

2009q1, 2011q2, 2013q3, 2015q4

- Paper (other)
- Paper (NEWS)
- Electronic system
Findings: Organisational Survey 2
Quantitative Analysis: Association between intervention implementation and type and IHCA incidence between 2009-2015

- Time Series and difference in difference approaches
- Random effects Poisson regression models adjusted for case-mix, temporal trend and seasonality (HES/linked HES -NCAA data)
- Two stages:
  - Impact of intervention in all hospitals;
  - Impact of intervention only in hospitals that reported a change in the intervention
Methodological Approach

Hospitals with a change

Hospitals without a change
Quantitative Analysis: Association between intervention implementation and type and survival between 2009-2015

- Four measures of IHCA survival: Return of Spontaneous Circulation (ROSC)>20 minutes, hospital discharge, 30 and 90 days
- Poisson and Logistic regression adjusted for case-mix, temporal trend and seasonality
- Two stages:
  - Impact of interventions in all hospitals;
  - Impact of interventions only in hospitals that reported a change in the intervention
Findings: Background Trends

![Graph showing trends](image_url)

- **Arrest rate (per 10,000)**
- **Crude survival rate (%)**


- **ROSC>20mins**
- **30 days survival**
- **90 days survival**
Findings: Association between TTS and IHCA rates in 106 hospitals

<table>
<thead>
<tr>
<th></th>
<th>Case mix adjusted incidence rate ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Track and trigger</td>
<td>Individual intervention</td>
</tr>
<tr>
<td>Non-NEWS</td>
<td>reference</td>
</tr>
<tr>
<td>NEWS</td>
<td>0.925 (0.890, 0.961)</td>
</tr>
<tr>
<td>p-value for difference in levels</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Annual trend: non-NEWS</td>
<td>0.941 (0.931, 0.950)</td>
</tr>
<tr>
<td>Annual trend: NEWS/NEWS-based</td>
<td>0.921 (0.897, 0.947)</td>
</tr>
<tr>
<td>p-value for difference in slopes</td>
<td>P=0.193</td>
</tr>
<tr>
<td>Paper</td>
<td>reference</td>
</tr>
<tr>
<td>Electronic</td>
<td>0.923 (0.873, 0.976)</td>
</tr>
<tr>
<td>p-value for difference in levels</td>
<td>P=0.005</td>
</tr>
<tr>
<td>Annual trend: paper</td>
<td>0.939 (0.930, 0.948)</td>
</tr>
</tbody>
</table>
Findings: Association between outreach teams and IHCA rates in 106 hospitals

<table>
<thead>
<tr>
<th>Outreach team</th>
<th>Case mix adjusted incidence rate ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outreach team</strong></td>
<td>Individual Intervention</td>
</tr>
<tr>
<td>Non-24/7 outreach team (compared with no outreach team)</td>
<td>0.976 (0.902, 1.057)</td>
</tr>
<tr>
<td>p-value for difference in levels</td>
<td>P=0.554</td>
</tr>
<tr>
<td>24/7 outreach team (compared with non-24/7 outreach team)</td>
<td>1.039 (0.966, 1.119)</td>
</tr>
<tr>
<td>p-value for difference in levels</td>
<td>P=0.305</td>
</tr>
<tr>
<td>Annual trend: no outreach team</td>
<td>0.961 (0.945, 0.978)</td>
</tr>
<tr>
<td>Annual trend: non-24/7 outreach team</td>
<td>0.932 (0.918, 0.945)</td>
</tr>
<tr>
<td>Annual trend: 24/7 outreach team</td>
<td>0.952 (0.939, 0.966)</td>
</tr>
<tr>
<td>p-values for difference in slopes</td>
<td></td>
</tr>
</tbody>
</table>
Findings: Association between interventions (TTS and outreach teams) and survival

- No association between TTS (NEWS or electronic) and survival (ROSC>20, to discharge, 30 or 90 day)

- No association between outreach (non-24/7 or 24/7) and survival
Conclusion 1

- TTS may reduce IHCA through range of mechanisms (early treatment by ward staff, DNACPR, access to CCOT)

- Improving detection and raising the alarm through standardisation of the TTS and automated TTS greatest potential to reduced avoidable mortality associated with deterioration
Conclusion 2

- Outreach contribution?
  - Not effective
  - Low signal
  - Effective but depends on organisation (heterogeneity)
  - Effect is seen in the afferent arm of RRS
Strengths and limitations

• Natural experiment
• High quality clinical database
• Level of detail available for organisational survey/ misspecification
• Relatively few hospitals made changes
• Lack of information on DNACPR (reduced pool of eligible patients)
• Not appropriate outcomes for outreach
Future work

• Outreach contribution- which outcomes?

• Added value of electronic TTS to paper NEWS and for what cost?

• Impact of adding lab results to eTTS

• Need clearer understanding of the impact of changes in EoL care on trends
Thank you to ICNARC, NCAA, ROs, Hospital Staff, and Steering Group

This study used Hospital Episode Statistics and Office of National Statistics Mortality Statistics. Copyright © 2017, re-used with the permission of NHS Digital. All rights reserved.

helen.hogan@lshtm.ac.uk
World Cafe

- 4 “questions”
- 10 minutes on each question
- Introduce yourself on 1st round
- Use A3 sheets to capture conversations for the next group
- A familiar warning will be made 30 seconds prior to moving table
- Groups move together.
Questions

1. How can we make it easier to call for help?

2. What are your standard processes to respond to deteriorating patients and how are you measuring?

3. How are you improving communication within and between teams and care settings to facilitate a structured response?

4. Freestyle topic
Next steps

• Take conversations back to your boards
• Think about what you can do by next Tuesday
• We will collate feedback