Physiological and social predictors of admissions

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Outline

• Background
• Methods
• Results
• Predictor of Admission Score
• Discussion
• Summary
Background: Why?

- Medical Admissions are rising (NCEPOD 2007)
- Healthcare commission 2006:
  - Patients admitted quickly to correct bed
  - Discharged promptly and appropriately
- AMUs help to streamline process (Downing et al 2008)
- NCEPOD report: 5.9% admissions unnecessary
- Elderly most at risk of inappropriate admissions (Cummings et al 2010)
Background: Previous work

• Some work already done
  – Physiological measures (Yong et al 2011)
  – Triaging systems (Wennike et al 2007)
• Majority of existing work focuses on
  – Mortality
  – Preventing adverse outcomes
• Our Markers:
  – Physiological – recommended by NICE 2007
  – Social, mobility, co-morbidities
Methods

- Setting: AMU of a teaching hospital
- Prospective cohort service evaluation
- All attendees ≥ 16 over three consecutive days
- Data obtained from IT system (Oasis®) and case note review
- Admitted defined as LOS ≥ 24 hours
- Demographic, clinical and social factors recorded
- Statistical analysis using Microsoft Excel 2007®
Methods

156 Attenders

12 Excluded

144 Analysed

Planned attendances
Out-patient referrals
Orthopaedic referrals
Incomplete dataset
Notes Inaccessible
Results – Demographic and Clinical characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>68.6</td>
<td>18 – 96</td>
</tr>
<tr>
<td>Gender (Male)</td>
<td>39.6 % (57)</td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>86.5 ± 17.9</td>
<td>50 – 140</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>128.8 ± 22.9</td>
<td>70 – 214</td>
</tr>
<tr>
<td>Hypoxia (Oxygen saturation &lt; 92%, or on oxygen)</td>
<td>Present in 17.4% (25)</td>
<td>77-100%</td>
</tr>
<tr>
<td>Respiratory rate</td>
<td>18.6 ± 4.4</td>
<td>12 – 35</td>
</tr>
<tr>
<td>Temperature</td>
<td>36.5 ± 0.8</td>
<td>34.3°C - 39.9°C</td>
</tr>
<tr>
<td>GCS</td>
<td>14.7 ± 1.2</td>
<td>3 – 15</td>
</tr>
<tr>
<td>Discharged</td>
<td>37.5% (54)</td>
<td></td>
</tr>
</tbody>
</table>
Results: Clinical Characteristics

* = <0.05

- Admitted
- Discharged
Results – Co-morbidities

* = <0.05

<table>
<thead>
<tr>
<th>Condition</th>
<th>Admitted</th>
<th>Discharged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac Failure</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Renal Failure</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Liver Failure</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
<td>Chronic Respiratory</td>
<td>22</td>
<td>18</td>
</tr>
<tr>
<td>Stroke</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>Dementia</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Diabetes</td>
<td>25</td>
<td>20</td>
</tr>
</tbody>
</table>
Results – Mobility

* = <0.05

Patient Numbers

<table>
<thead>
<tr>
<th>Category</th>
<th>Admitted</th>
<th>Discharged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent</td>
<td>70</td>
<td>10</td>
</tr>
<tr>
<td>Stick</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Frame</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Wheel Chair</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Immobile</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>
Results – Residential status

* = <0.05

- **Patient Numbers**

  - **With relatives**: Admitted - 70, Discharged - 60
  - **With carers**: Admitted - 30, Discharged - 20
  - **Residential home**: Admitted - 10, Discharged - 10
  - **Nursing home**: Admitted - 5, Discharged - 5
  - **Sheltered accommodation**: Admitted - 3, Discharged - 3

  *Note: * indicates a significant difference at the p < 0.05 level.
# Predictor of Admission Score*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (≥ 65)</td>
<td></td>
</tr>
<tr>
<td>Respiratory Rate (≥20)</td>
<td></td>
</tr>
<tr>
<td>Cardiac failure</td>
<td></td>
</tr>
<tr>
<td>Renal Failure</td>
<td></td>
</tr>
<tr>
<td>Liver Failure</td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
</tr>
<tr>
<td>Living alone</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
</tr>
</tbody>
</table>

Score 1 for each variable that is present and add total.  
Minimum score 0  
Maximum score 7

*Predictor of Admission Score Tool by The Dudley Group NHS Foundation Trust is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License](http://creativecommons.org/licenses/by-nc-sa/3.0/).
Predictor of admission score

![Bar chart showing average scores for admitted and discharged patients with a statistical significance of P<0.0001.](image)
Predictor of Admission Score

Percentages of patients admitted or discharged

- Admitted
- Discharged

Predictor of admission Scores (PAS)

The Society for Acute Medicine, Spring Meeting, Dublin 3-4 May 2012
Discussion

• Physiology parameters
  – Poor predictor of admission (Fairclough et al 2009)
  – Primacy of respiratory rate (Subbe et al 2003)
  – Supports original premise

• Older age associated with admission
  – Probable reason physiological scores poorly predictive (Fairclough et al 2009)
Discussion (cont)

• Some co-morbidities associated with admission:
  – Renal failure – possible marker illness?
  – Liver failure, cardiac failure & stroke

• Social parameters
  – Living alone associated with admission
  – Not mobility (Effectiveness of Impact Team?)
  – Not nursing home residents (Safe to discharge?)

• PAS tool
  – Looks promising
  – Need larger trial to demonstrate reproducibility
  – Many factors known prior to admission
    • Could be used for early bed planning and facilitating discharges
Summary

• Physiological scores are a poor predictor of admission

• Social, demographic and co-morbidity factors heavily influence likelihood of admission

• When combined into a simple scoring system this shows considerable promise in predicting likelihood of admission

• Many of these are known before presentation to AMU and could help forward planning
Discharge, Referral and Admission: A Structured Evidence-based Literature Review. eHealth Services Research Group. University of 
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Evaluation of a dedicated short-stay unit for acute medical admissions. Clinical Medicine, 2008, vol./is. 8/1, 1470-2118

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Evaluation of a modified early warning system for acute medical admissions and comparison with C-reactive protein/albumin ratio as 
a predictor of patient outcome. Clinical medicine (London, England), February 2009, vol./is. 9/1(30), 1470-2118

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Emergency Admissions: A journey in the right direction? A report of the National Confidential Enquiry into Patient Outcome and Death 

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Acutely ill patients in hospital: recognition of and response to acute illness in adults in hospital.

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The value of the Modified Early Warning Score and biochemical parameters as predictors of patient outcome in acute medical 
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