Boarding Impact on patients, hospitals and healthcare systems

Dan Beckett
Consultant Acute Physician
NHSFV
National Clinical Lead
Whole System Patient Flow Project
Scottish Government

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ACUTE MEDICINE
UK CONSENSUS CONFERENCE

Improving quality of care through effective patient flow – it’s everyone’s business!

Friday 15–Saturday 16 November 2013
at the Royal College of Physicians of Edinburgh

This is an opportunity to hear the latest evidence and contribute to the debate about patient flow for admitting patients with acute medical illness and to shape the future care experience of patients admitted to acute medical units. The key questions being addressed at the conference:

- How can we improve the experience of being admitted to hospital for acute medical patients?
- How can the multi-disciplinary team work together to improve patient experience and clinical outcome?
- What should patient flow look like in a system where acute medical patients experience effective, efficient and timely care, with no adverse impact on other clinical areas?
- How does hospital design influence patient flow through acute medical units?
Patients treated in wrong wards ‘more likely to die’

Call for ‘24/7’ hospital expertise to tackle growing pressures

Senior hospital doctors should be available around the clock and patients must be treated in the right wards in the shortest time, doctors have urged.

‘Genuine’ seven-day working in hospitals needed, say experts

Hospitals must provide ‘genuine’ seven-day care and patients should not be told to return on weekends if they are inappropriate, doctors have said.

‘Genuine’ seven-day working in hospitals needed, say experts

It is clear that the time has come for seven-day working.

It is clear that the time has come for seven-day working.
Important points

• Data belongs to the Scottish Government
• Data is intended be used for management information only
• Data is subject to change pending final analysis
• Final results to be submitted for publication
“Key Learning Point:
All mainland Health Boards rely on a policy of boarding patients at times of increasing system pressure. The degree of boarding between Health Boards differs greatly, and some Health Boards have reduced boarding significantly. There has been an increasing move to board patients from Acute Medical Units, or Emergency Departments, before consultant review. Boarding must be reviewed and minimised.”

“Over winter 2008-2009 in some sites up to 60% of all medical patients were boarders, occupying more than 10% of the total bed complement.”
11 Sep 2009: DG Health to NHS Board Chief Executives:

“Boarding - Health Boards should aim to **eliminate** boarding of patients as a solution to bed capacity problems. Specifically, the **boarding of patients from the Acute Medical Unit and/or Emergency Department should not occur** (this includes 'treat and transfer' policies, with the exception of tertiary care referrals).”
ISD Health and Social Care Data Dictionary:

Boarding

Revised definition

A patient who occupies a borrowed bed is described as boarding.

This includes patients in beds who are:

1. managed by an individual consultant or consultant team outwith the main allocated inpatient area for that consultant, or patient specialty
2. transferred to any non-inpatient bedded area (for example day units)

Please also read the definition of a borrowed bed.

http://www.datadictionaryadmin.scot.nhs.uk/isddd/2141.html
http://www.datadictionaryadmin.scot.nhs.uk/isddd/1913.html
Winter review report 2009/10 -

• 6 Boards reported on sub-specialty boarding (e.g. respiratory patient into cardiology ward)

• 11 Boards reported on inter-specialty boarding (e.g. medical patient into surgical ward)

• Variation in practice, with:
  • 6 Boards reporting boarding predominantly from downstream wards;
  • 3 predominantly from front-door;
  • 4 reporting a mixed boarding model.
Anytown Hospital - Patient boarding: host ward average daily patient boarding activity by parent ward and consultant speciality, August 2010

Average daily boarding activity - Total: 7
Front-door: 0
Observation unit: 0
Unspecified capacity: 0

Source: local unvalidated reporting.
Note: (i) values presented indicate average daily boarding activity for the period under review; (ii) dates for which submissions were not received (including weekends) have been excluded; (iii) "front-door" includes patients with LoS<48 hr and/or boarding from acute assessment areas; (iv) the underlying dataset is under review, therefore the figures presented here are intended for management information purposes only and are subject to change.
Anytown Hospital - Patient boarding: host ward average daily patient boarding activity by parent ward and consultant speciality, August 2010

Average daily boarding activity -
Total: 9
Front-door: 7
Day unit: 0
Flex capacity: 3

Source: local unvalidated reporting.
Note: (i) values presented indicate average daily boarding activity for the period under review; (ii) dates for which submissions were not received (including weekends) have been excluded; (iii) "front-door" includes patients with LoS<48 hr and/or boarding from acute assessment areas; (iv) the underlying dataset is under review, therefore the figures presented here are intended for management information purposes only and are subject to change.
Anytown Hospital - Patient boarding: host ward average daily patient boarding activity by parent ward and consultant specialty, February 2010

Average daily boarding activity -
Total: 35
Front-door: 21
Day unit: 9
Flex capacity: 1

Source: local unvalidated reporting.
Note: (i) values presented indicate average daily boarding activity for the period under review; (ii) dates for which submissions were not received (including weekends) have been excluded; (iii) "front-door" includes patients with LoS<48 hr and/or boarding from acute assessment areas; (iv) the underlying dataset is under review, therefore the figures presented here are intended for management information purposes only and are subject to change.
Hospital A
Admitted patient boarding

Avg boarded patients, by parent and host ward area/consultant specialty

Mon 1 Oct 2012 to Sun 3 Feb 2013

Source: local PAS admitted patient care and ward event extracts, taken May 2013

Ref: Q2013-0101, 12 Sep 2013

Notes:
(i) results are intended for management information only and are subject to change
(ii) presented values are estimates, dependent on unvalidated assumptions concerning standard consultant treatment footprints and ward specialty groupings calculated directly from the source data
(iii) results do not include all type-2 boarding (e.g. patient treatment by HCP within standard ward footprint, but where patient condition is unrelated to HCP specialty, e.g. consequent to delayed discharge or ‘full capacity protocol’)

Overall average:
92.2 Boarded
328.3 Non-boarded
420.6 Total occupied
21.9% boarded
Benefits of speciality treatment (5+)
Direct effects of boarding (3)
Evidence: Literature review
Qualitative data (9)
ED access block (12)
Inpatient outliers:

(1) Heart failure:
- n=243, inpatient outliers have longer LoS by 2.6 days (95% CI 0.47-4.7)
- no statistically significant difference in mortality or readmission rates

(2) Chest pain without ischaemic heart failure:
n=450, observed increase in LoS on transfer to surgical ward (4.3 days) vs cardiology ward (3.6 days); significant correlation between LoS and intra-ward transfer.

(3) Medications omission:
n=162, all outlying patients missed at least one medication (cf 74% non-boarded patients, p<0.001); majority of omissions for analgesics and anti-inflammatory drugs.
Retrospective cohort study using local Health Board PAS/PMS data

Source:
Local unvalidated PAS/PMS extracts from 3 NHS Boards, covering October 2008 to October 2010
Test dataset: 660,212 continuous inpatient stays across 3 health boards in Scotland

Methodology:
Up to 12 specialties assigned to each ward ($W_s$) and consultant ($C_s$)
Boarding defined when, for any episode within a continuous inpatient stay:
(1) $C_s \cap W_s = \emptyset$ (see note iv); or
(2) when a patient is accommodated in a designated day-unit or in flexible capacity across midnight

Note:
(i) Results are preliminary, based on unvalidated data, and intended for management information only.
(ii) HRG4 descriptions relate to dominant code for entire inpatient spell, the accuracy of which should be treated with caution.
(iii) For this analysis, boarded patient activity excludes: (i) patient movements to an area within the treatment footprint of the consultant to whom clinical responsibility is subsequently transferred, and (ii) stays within day unit or flexible capacity areas that do not include midnight.
Patient boarding has a statistically significant, unvalidated impact on adjusted rates of: mortality, emergency readmission, inpatient discharge timing and inpatient length of stay

1 Oct 2008 to 1 Oct 2010

Normalised against primary ICD-10 diagnosis code and patient age-band:

<table>
<thead>
<tr>
<th></th>
<th>Activity (excl. inhospital deaths)</th>
<th>ALoS/day</th>
<th>Inpatient discharge before 11am</th>
<th>Inpatient discharge within:</th>
<th>Activity (inc. inhospital deaths)</th>
<th>Mortality rate:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
<td>7-day</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 days</td>
<td></td>
<td>30-day</td>
</tr>
<tr>
<td>(i) Non-boarded</td>
<td>610,159</td>
<td>4.0</td>
<td>9.2%</td>
<td>4.3%</td>
<td>624,022</td>
<td>2.6%</td>
</tr>
<tr>
<td>Boarded -</td>
<td>51,053</td>
<td>6.5</td>
<td>13.3%</td>
<td>5.1%</td>
<td>52,010</td>
<td>2.8%</td>
</tr>
<tr>
<td>(ii) LoS &lt; 72 hr</td>
<td></td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-boarded</td>
<td>437,735</td>
<td>0.8</td>
<td>8.8%</td>
<td>3.9%</td>
<td>441,670</td>
<td>1.0%</td>
</tr>
<tr>
<td>Boarded</td>
<td>32,587</td>
<td>1.1</td>
<td>14.4%</td>
<td>3.8%</td>
<td>32,756</td>
<td>0.9%</td>
</tr>
<tr>
<td>(iii) LoS ≥ 72 hr</td>
<td></td>
<td></td>
<td></td>
<td>7 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-boarded</td>
<td>172,424</td>
<td>12.1</td>
<td>10.3%</td>
<td>5.5%</td>
<td>182,352</td>
<td>5.1%</td>
</tr>
<tr>
<td>Boarded</td>
<td>18,466</td>
<td>14.9</td>
<td>11.5%</td>
<td>5.8%</td>
<td>19,254</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

Source: local unvalidated PAS and linked SMR01-GRO(S) ACaDMe extracts, taken December 2010
Patient boarding has a statistically significant, unvalidated impact on adjusted rates of: mortality, emergency readmission, inpatient discharge timing and inpatient length of stay

1 Oct 2008 to 1 Oct 2010

Normalised against primary ICD-10 diagnosis code and patient age-band:

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<th>Activity (inc. inhospital deaths)</th>
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<td></td>
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<td></td>
<td></td>
<td>7-day</td>
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<td>(i) Non-boarded Boarded</td>
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<td></td>
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<td>0.9%</td>
</tr>
<tr>
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<td></td>
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<td>11.5%</td>
<td>5.8%</td>
<td>19,254</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

| Initial 48 hr | Final 48 hr | 1 | 0 | 10,540 | 18.0 | 10.9% | 5.6% | 14.1% | 11,010 | 5.8% | 7.8% |
| 0 | 0 | 5,153 | 13.1 | 10.3% | 6.8% | 15.9% | 5,444 | 7.1% | 9.5% |
| 0 | 1 | 2,521 | 11.4 | 17.2% | 5.2% | 13.6% | 2,546 | 7.2% | 9.5% |
| 1 | 1 | 252 | 14.3 | 11.9% | 6.3% | 14.6% | 254 | 7.2% | 9.3% |

Source: local unvalidated PAS and linked SMR01-GRO(S) ACaDMe extracts, taken December 2010
Royal College of Physicians: Hospital beds cuts putting lives at risk

Patients’ lives are being put at risk in Scotland’s hospitals thanks to large cuts in bed numbers, according to a survey published today by the Royal College of Physicians of Edinburgh.

The Royal College of Physicians of Edinburgh has warned cuts in hospital beds is putting patient lives at risk. Photo: GETTY IMAGES

By Simon Johnson, Scottish Political Editor
12:43PM BST 12 Jun 2012

Hospital consultants reported that bed shortages in specialist wards mean increasing numbers of patients are being forced to stay in another unit where they receive less expert care.
Health secretary Sturgeon considers target to reduce patient bed moves

Scotland's Health Secretary Nicola Sturgeon said targets could be brought in to reduce the number of times a patient is moved in hospital.

Her comments came in light of a Royal College of Physicians of Edinburgh survey suggesting patients were routinely taken from specialist wards.

The practice, known as boarding, typically happens in winter.

Ms Sturgeon told BBC Scotland she was would discuss the issue of targets with the Royal College (RCPE).

She has said she would ask the Chief Medical Officer Sir Harry Burns to meet doctors representatives to discuss the matter.

The college's online survey was completed by 21% of the Royal College's members - some 290 doctors and consultants.
Health experts to tackle problem of 'boarding' hospital patients

Headache: Moving patients can increase their risk of blood clots and infections.
'Boarding' increases hospital stays and spreads infections, researchers say

A reduction in bed numbers and an increase in hospital admissions has led to boarding becoming more common.

Moving patients between wards results in them staying in hospital longer and increases the risk of infections spreading, researchers have warned.
CAUTION
WATER ON ROAD
DURING RAIN

DO NOT BREATHE UNDER THE WATER

MEANWHILE, IN SCOTLAND...
BLOWY AS FUCK MAN
ALSO MY LAST DAY

0 FT 6 IN NO DIVING
“In God we trust—all others bring data.”
Retrospective cohort study using local Health Board PAS/PMS data

Initial source:
Local unvalidated PAS/PMS extracts from 5 NHS Boards, covering Jan 2008 to December 2011
Test dataset: 740,096 continuous inpatient stays

Current study dataset: \( n \sim 2,500,000 \) continuous inpatient stays; >60% Scotland inpatient activity for the period

Methodology:
Up to 12 specialties assigned to each ward \( (W_s) \) and consultant \( (C_s) \)
Boarding defined when, for any episode within a continuous inpatient stay:
   (1) \( C_s \cap W_s = \emptyset \) (see note iii); or
   (2) when a patient is accommodated in a designated day-unit or in flexible capacity across midnight

Note:
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(ii) HRG4 descriptions relate to dominant code for entire inpatient spell, the accuracy of which should be treated with caution.
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Describing boarding

1. Finite resources: advancement of medicine has been accompanied by strong evidence for the efficacy of increasingly tailored, specialised treatment.

2. Patients are often treated in hospital environments designed, staffed and equipped for the care of other, dissimilar patients.

We ask what consequences there are for:
- the patient
- the host ward
- the parent ward
Measuring boarding: Consultant view

Consultant = Ward

Patient = Consultant = Ward

Patient ≠ Consultant = Ward

Type 2

Inappropriate treatment environment

Consultant ≠ Ward

Patient = Consultant ≠ Ward

Type 1

Patient ≠ Consultant ≠ Ward

Boarding
### All sites: hospital stays with at least one boarding episode

#### Boarding episodes, n

<table>
<thead>
<tr>
<th>Host area</th>
<th>Acute assessment</th>
<th>Day unit</th>
<th>Flexible/surge</th>
<th>Intensive</th>
<th>Mixed/other</th>
<th>Mental health</th>
<th>Medicine</th>
<th>Surgery</th>
<th>Total</th>
<th>Non-boarded reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute assessment</td>
<td>953</td>
<td>154</td>
<td>4</td>
<td>59</td>
<td>160</td>
<td>0</td>
<td>54</td>
<td>144</td>
<td>1,128</td>
<td>433,008</td>
</tr>
<tr>
<td>Day unit</td>
<td>7</td>
<td>6,724</td>
<td>21</td>
<td>11</td>
<td>71</td>
<td>0</td>
<td>287</td>
<td>302</td>
<td>7,423</td>
<td>587,712</td>
</tr>
<tr>
<td>Flexible/surge</td>
<td>11</td>
<td>9</td>
<td>934</td>
<td>43</td>
<td>576</td>
<td>0</td>
<td>445</td>
<td>416</td>
<td>2,434</td>
<td>1,068</td>
</tr>
<tr>
<td>Intensive</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>830</td>
<td>513</td>
<td>0</td>
<td>918</td>
<td>910</td>
<td>3,188</td>
<td>119,165</td>
</tr>
<tr>
<td>Mixed/other</td>
<td>924</td>
<td>4,624</td>
<td>71</td>
<td>612</td>
<td>15,602</td>
<td>612</td>
<td>71</td>
<td>6,188</td>
<td>28,794</td>
<td>1,110,404</td>
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<tr>
<td>Mental health</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>41</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>48</td>
<td>2,880</td>
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<tr>
<td>Medicine</td>
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<td>10,608</td>
<td>1,037</td>
<td>885</td>
<td>17,853</td>
<td>1</td>
<td>39,507</td>
<td>22,947</td>
<td>49,014</td>
<td>253,136</td>
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<tr>
<td>Surgery</td>
<td>704</td>
<td>15,550</td>
<td>1,174</td>
<td>479</td>
<td>13,338</td>
<td>0</td>
<td>8,177</td>
<td>57,551</td>
<td>65,728</td>
<td>491,200</td>
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<tr>
<td>Total</td>
<td>3,585</td>
<td>37,671</td>
<td>3,244</td>
<td>2,919</td>
<td>41,824</td>
<td>42</td>
<td>55,576</td>
<td>69,477</td>
<td>14,338</td>
<td>2,979,205</td>
</tr>
</tbody>
</table>

#### Boarding occupied bed days, n

<table>
<thead>
<tr>
<th>Host area</th>
<th>Acute assessment</th>
<th>Day unit</th>
<th>Flexible/surge</th>
<th>Intensive</th>
<th>Mixed/other</th>
<th>Mental health</th>
<th>Medicine</th>
<th>Surgery</th>
<th>Total</th>
<th>Non-boarded reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Acute assessment</td>
<td>785</td>
<td>377</td>
<td>5</td>
<td>30</td>
<td>278</td>
<td>0</td>
<td>36</td>
<td>91</td>
<td>1,599</td>
<td>583,980</td>
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<tr>
<td>Day unit</td>
<td>10</td>
<td>10,143</td>
<td>22</td>
<td>7</td>
<td>100</td>
<td>0</td>
<td>604</td>
<td>325</td>
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<td>37</td>
<td>3,575</td>
<td>22</td>
<td>301</td>
<td>0</td>
<td>274</td>
<td>232</td>
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<tr>
<td>Intensive</td>
<td>6</td>
<td>2</td>
<td>12</td>
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<td>376</td>
<td>0</td>
<td>3,282</td>
<td>1,262</td>
<td>8,091</td>
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<td>Mixed/other</td>
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<td>4,469</td>
<td>381</td>
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<td>0</td>
<td>0</td>
<td>160</td>
<td>907</td>
<td>0</td>
<td>0</td>
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<td>72,278</td>
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<tr>
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<td>4,313</td>
<td>12,265</td>
<td>6,500</td>
<td>1,272</td>
<td>65,962</td>
<td>28</td>
<td>215,852</td>
<td>74,244</td>
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<td>19,071</td>
<td>2,736</td>
<td>633</td>
<td>23,632</td>
<td>0</td>
<td>10,507</td>
<td>101,643</td>
<td>158,953</td>
<td>1,604,901</td>
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<tr>
<td>Total</td>
<td>6,570</td>
<td>55,368</td>
<td>15,288</td>
<td>9,553</td>
<td>127,741</td>
<td>935</td>
<td>264,024</td>
<td>198,712</td>
<td>678,190</td>
<td>7,927,485</td>
</tr>
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</table>

### Sites 1-5: Indicative inpatient boarding sample

#### Unadjusted emergency admission within 28 days of discharge, %

<table>
<thead>
<tr>
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<th>Acute assessment</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>Acute assessment</td>
<td>4%</td>
<td>4%</td>
<td>0%</td>
<td>9%</td>
<td>4%</td>
<td>3%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Day unit</td>
<td>-</td>
<td>10%</td>
<td>10%</td>
<td>7%</td>
<td>12%</td>
<td>10%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td>Flexible/surge</td>
<td>-</td>
<td>-</td>
<td>12%</td>
<td>7%</td>
<td>12%</td>
<td>10%</td>
<td>10%</td>
<td>-</td>
</tr>
<tr>
<td>Mental health</td>
<td>12%</td>
<td>23%</td>
<td>7%</td>
<td>12%</td>
<td>18%</td>
<td>8%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Medicine</td>
<td>17%</td>
<td>10%</td>
<td>18%</td>
<td>13%</td>
<td>12%</td>
<td>10%</td>
<td>12%</td>
<td>10%</td>
</tr>
<tr>
<td>Surgery</td>
<td>0%</td>
<td>15%</td>
<td>17%</td>
<td>5%</td>
<td>13%</td>
<td>16%</td>
<td>14%</td>
<td>11%</td>
</tr>
<tr>
<td>Total</td>
<td>9%</td>
<td>9%</td>
<td>13%</td>
<td>15%</td>
<td>11%</td>
<td>10%</td>
<td>11%</td>
<td>9%</td>
</tr>
</tbody>
</table>
## Sites 1-5: Indicative inpatient boarding sample

### Selected exposures summary

<table>
<thead>
<tr>
<th>Selected exposure</th>
<th>Stays</th>
<th>Boarded, %</th>
<th>Unadjusted ALoS, days</th>
<th>Undajusted emergency readmissions within 28 days of discharge, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>644,351</td>
<td>9%</td>
<td>4.0</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9.2%</td>
</tr>
<tr>
<td><strong>Shift</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8am-4pm</td>
<td>125,945</td>
<td>8%</td>
<td>8.2</td>
<td>13.9%</td>
</tr>
<tr>
<td>4pm-midnight</td>
<td>367,949</td>
<td>7%</td>
<td>6.2</td>
<td>3.4%</td>
</tr>
<tr>
<td>Midnight-8am</td>
<td>194,977</td>
<td>12%</td>
<td><strong>12.0</strong></td>
<td><strong>15.0%</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weekday</strong></td>
<td>593,950</td>
<td>8%</td>
<td>8.6</td>
<td>11.7%</td>
</tr>
<tr>
<td><strong>Weekend</strong></td>
<td>110,199</td>
<td>10%</td>
<td><strong>10.7</strong></td>
<td><strong>14.3%</strong></td>
</tr>
<tr>
<td><strong>LoS &gt; 96 hr</strong></td>
<td>143,079</td>
<td>17%</td>
<td>15.8</td>
<td>13.3%</td>
</tr>
<tr>
<td>Not boarded</td>
<td>118,928</td>
<td>15.8</td>
<td>13.3%</td>
<td>16.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>143,079</td>
<td>17%</td>
<td><strong>20.1</strong></td>
<td><strong>16.5%</strong></td>
</tr>
<tr>
<td><strong>LoS &lt; 96 hr</strong></td>
<td>498,974</td>
<td>7%</td>
<td>1.0</td>
<td>8.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>498,974</td>
<td>7%</td>
<td>1.4</td>
<td>9.4%</td>
</tr>
</tbody>
</table>
## Preliminary results
### Summary

<table>
<thead>
<tr>
<th>Spell LoS:</th>
<th>Indirect standardisation, HRG4.2, age, year, site:</th>
<th>Crude rates:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-boarded, no site-specific boarding</td>
<td>Boarded, site-specific boarding present</td>
</tr>
<tr>
<td>Spells</td>
<td>31.7%</td>
<td>8.7%</td>
</tr>
<tr>
<td>Spell LoS:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 days, %</td>
<td>4.6%</td>
<td>7.5%</td>
</tr>
<tr>
<td>30 days, %</td>
<td>7.5%</td>
<td>11.0%</td>
</tr>
<tr>
<td>7 days, %</td>
<td>1.4%</td>
<td>2.8%</td>
</tr>
<tr>
<td>30 days, %</td>
<td>2.0%</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

### Notes
- Indirect standardisation:
- Crude rates:
- HRG4.2, age, year, site:
- Non-boarded, no sitespecific boarding
- Boarded, site-specific boarding present
- Total spells: 789,765, 1,482,510, 215,844, 2,488,119
- Spelling days, %
- Emergency readmission within, of discharge:
- Death within, of discharge:
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
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- 99.9% CI: lower, upper
- 99.9% CI: lower, upper
## Preliminary results

### Summary

<table>
<thead>
<tr>
<th>Spell LoS:</th>
<th>Indirect standardisation, HRG4.2, age, year, site:</th>
<th>Crude rates:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-boarded, no sitespec boarding</td>
<td>Non-boarded, site-specialty boarding present</td>
</tr>
<tr>
<td>Spells</td>
<td>31.7%</td>
<td>59.6%</td>
</tr>
<tr>
<td></td>
<td>2.3</td>
<td>4.2</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;lower&lt;/sub&gt;</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;upper&lt;/sub&gt;</td>
<td>2.4</td>
</tr>
<tr>
<td>Emergency readmission within, of discharge:</td>
<td>4.6%</td>
<td>4.8%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;lower&lt;/sub&gt;</td>
<td>4.5%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;upper&lt;/sub&gt;</td>
<td>4.6%</td>
</tr>
<tr>
<td>30 days, %</td>
<td>7.5%</td>
<td>10.0%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;lower&lt;/sub&gt;</td>
<td>7.4%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;upper&lt;/sub&gt;</td>
<td>7.6%</td>
</tr>
<tr>
<td>Death within, of discharge:</td>
<td>1.4%</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;lower&lt;/sub&gt;</td>
<td>1.3%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;upper&lt;/sub&gt;</td>
<td>1.4%</td>
</tr>
<tr>
<td>30 days, %</td>
<td>2.0%</td>
<td>3.7%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;lower&lt;/sub&gt;</td>
<td>2.0%</td>
</tr>
<tr>
<td></td>
<td>99.9% Cl&lt;sub&gt;upper&lt;/sub&gt;</td>
<td>2.1%</td>
</tr>
</tbody>
</table>
For continuous inpatient spells across acute hospital sites –

<table>
<thead>
<tr>
<th>Patient age on admission</th>
<th>Spells</th>
<th>Occupied bed days</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>of which involved boarding*</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>%</td>
</tr>
<tr>
<td>15-64</td>
<td>1,402,650</td>
<td>107,819</td>
</tr>
<tr>
<td>65+</td>
<td>911,694</td>
<td>109,570</td>
</tr>
</tbody>
</table>

i.e. this suggests:
- older patients are more likely to experience boarding following admission to acute hospitals, where
- this is not trivially explained by their on average longer hospital stays, and
- estimated rates of boarding are higher than self-reported rates currently submitted to Government.

Note: results are calculated from unvalidated local administrative data, *exclude type-2 boarding (i.e. boarding whereby patient is managed by a consultant or consultant team within their main allocated treatment area, but where patient treatment needs are unrelated to consultant specialty, e.g. delayed discharges), and are intended for management information only.
Without ascribing causality (i.e. boarding may be as much symptom as cause of dysfunction), two new points can be drawn from current results:

(1) **Non-boarded patients** treated where boarding is present within their specialty contribute at least as much as boarded patients to the differences between observed and expected outcome values (i.e. combination of smaller effect and larger volume)

(2) **Scale** - the dataset comprises ~2.5m completed spells. Across all systems studied, boarding (poor flow) is associated with increased short-term likelihood of:
   - death
   - emergency readmission
   - protracted LoS

of which the latter two effects positively reinforce the conditions that contribute to boarding (i.e. non-linear, positive feedback)
Conclusions

Boarding is an international problem and we are just beginning to understand the impact.

Acknowledge that boarding is a symptom of poor flow / high bed occupancy. Targeting boarding *per se* could have significant unintended consequences.

In order to tackle boarding, need to address the causes of poor flow:
- Seven day working (primary and secondary care)
- Health and social care integration
- Development of alternatives to admission including Emergency Ambulatory Care – prioritise shift to zero day LOS
- Develop generalist models of in-patient care
- Develop operational management techniques / mathematical models to better understand flow, and match capacity to demand

@djbeckett
Quality and Efficiency Support Team

Whole System Patient Flow
‘Proof of Concept’ Workstreams
Whole System Patient Flow

Queue → Sub-optimal Pathway → Delay

Optimal Patient Pathway

Incomplete

Poor patient flow can mean that patients wait for treatment, might be on a sub-optimal pathway – possibly not as effective or perhaps longer - treatment might be incomplete and the patient could be delayed once their treatment is complete.
‘Proof of Concept’ Workstreams

• Based on Operations Management – business use of Operations Research: underpinned by mathematics
• Data driven.
• Internationally proven
• Institute for Healthcare Optimisation:
  – Operational Management methods such as queuing, modelling and simulation in healthcare,
  – managing variability in patient flow, including the IHO Variability Methodology®.
• Flow, Cost, Quality – Kate Silvester:
  – Clinical systems improvement (PDSA)
  – Lean
  – Theory of constraints
IHO – Plan Phase 1

• Separate flows eg. elective vs. non-elective
• Reduce waiting times for urgent / emergent cases, increase throughput, decrease delays for elective scheduled cases
IHO – Plan Phase 2

• Smooth the flow of electively scheduled cases in order to,

• Decrease the competition between unscheduled (e.g. ED) and elective admissions, increase hospital-wide throughput, achieve consistent nurse-to-patient staffing, increase patient placement in appropriate units.
IHO – Plan Phase 3

• Estimate resource (e.g. beds, ORs, MRIs, staff) needs for each type of flow to ensure right care at the right time and place for every patient
IHO First Quarter Workplan

• Initial work with NHS FV:
  – Analysis of data existing in FV operational information systems.
  – Determine scope and strategy for the FV initiative, to refine and finalize the initiative work plan and timelines.
  – Establish Initiative Implementation Team in NHS FV.

• Begin the capacity and capability building process with national team.

• Begin the capacity and capability building process with the 4 pilot boards including a knowledge and information network.

• Plan for ‘spread’.
Flow, Cost, Quality

Kate Silvester
NHS Lanarkshire
Flow, Cost, Quality
– Improvement Approach

• Understanding the system – study and adjust thinking
• Testing different solutions and implementing new processes - planning and doing
• Measuring for improvement – study and adjust thinking again

• Clinical system improvement – PDSA
• Lean – eliminating waste
• Theory of constraints – the weakest link
Whole System Patient Flow
‘Proof of Concept’ Workstreams

**Investment**
- IHO
  - 3 Programme of work

**Benefits**
- IHO
  - Reduced waiting times for urgent / emergency cases,
  - Increased throughput,
  - Decreased delays for elective scheduled cases,
  - Less delay to unscheduled and elective admissions,
  - Increased hospital-wide throughput,
  - Consistent nurse-to-patient staffing,
  - Reduced boarding.
  - Accurate resource planning to ensure optimal patient flow
  - Knowledge and skill transfer.
Whole System Patient Flow
‘Proof of Concept’ Workstreams

Investment
• Flow, Cost, Quality
  – Anticipated 18 month Programme

Benefits
• Flow, Cost, Quality
  – Reduced mortality,
  – Improved performance against the 4 Hour A&E target and standard,
  – Improved patient experience
  – Improved staff experience
  – Knowledge and skill transfer.
Rethinking Rapid Response Teams

Eugene Litvak, PhD
Peter J. Pronovost, MD, PhD

CURRENT DEBATE IN THE MEDICAL COMMUNITY centers on the benefits of rapid response teams (RRTs), hospital-based teams composed of clinicians with intensive care unit (ICU)-level clinical expertise. These teams rapidly respond when the condition of patients being cared for outside of the ICU suddenly deteriorates, and such patients often require transfer to ICUs.\(^1\) Those on one side of the debate suggest that RRTs save lives; this assertion is supported by common sense, numerous anecdotal reports, and some observational studies.\(^2\) Those on the other side of the debate suggest that preventing, recognizing, and treating deteriorating patients is common sense. How best to achieve this remains elusive based on systematic reviews,\(^3\) which have failed to show benefit of RRTs but note that RRT studies were often of poor quality and clinicians often failed to call an RRT when they should have, leading to uncertainty in the estimates of benefit. Proponents favor further research, encouraging hospitals to experiment with strategies such as RRTs, enhanced nurse staffing, or hospitalists who would respond to deteriorating patients, stressing prevention rather than recovery from deterioration. Those on both sides of the debate are united in their frustration that patients are needlessly experiencing morbidity and agree that preventing patients’ health from deteriorating is the optimal solution.

philosophy of RRTs is premised on the idea that current care is inadequate; therefore, introducing ICU-level care will benefit the patient. If current care is adequate, an RRT is not likely to make a difference.

Underlying inadequate care is that patients have been admitted to a unit that provides inadequate care. A triage error or inability to admit or transfer a patient to the preferred unit is the main driver\(^4\) of patient misplacement.

Underlying the triage error is the way patient flow is managed or mismanaged. Every physician and nurse would prefer that patients are cared for in a unit that can provide the appropriate level of care, where sufficient physician, nurse, and monitoring resources are available. Physicians commonly request that their patients remain in the ICU or are admitted to a specific nursing unit, often with monitored beds, believing care is better in some units than others.

Intensive care units and monitored beds are scarce resources, demand for these resources periodically exceeds supply, and patients are often not admitted to these preferred units.\(^5\) This situation is especially problematic in hospitals without critical care physicians who use clearly defined protocols to coordinate the use of monitored beds. A common although often erroneous solution is to add more ICU and monitored beds. Even if the cost of adding a bed (about $1 million capital for a regular inpatient bed\(^6\) is ignored, experience suggests that adding more beds does not solve this problem. Eventually, demand for these beds will again exceed capacity.

Why, then, is there a seemingly insufficient number of ICU and monitored beds? Why don’t hospitals define which