Using capacity alert calls to reduce overcrowding in a major public hospital

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Elevator Pitch

- Hospitals use various capacity management protocols to combat rising occupancy. However, there is little evidence based on real hospital data to validate the approaches.

- Our study suggests that a capacity alert process achieves a significant reduction in occupancy, thereby arresting and reversing rising occupancy trends.

- The study provides valuable insight into the ability of capacity alert calls to tackle rising occupancy and reduce overcrowding in hospitals.
Summary

• Key problem
  • There was no evidence that a capacity alert process had any impact on hospital overcrowding.

• Aim of innovation
  • Investigate whether capacity alert calls can tackle rising occupancy & sustain any reduction.

• What we did
  • Retrospective analysis of 24 months of inpatient, ED, and capacity alert call log data from a large metro public hospital in Australia.
  • Comparison between capacity alert call days and control case set of days with statistically similar levels of occupancy.

• Outcomes
  • Significant (P < 0.05) reduction in occupancy on capacity alert call days.
  • Capacity alert call days reversed rising occupancy trends
# Capacity management escalation framework

<table>
<thead>
<tr>
<th>ALERT 1</th>
<th>ALERT 2</th>
<th>ALERT 3</th>
<th>ALERT 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;90% occupancy &lt;508 BEDS</td>
<td>90% - 95% occupancy 509-534 BEDS</td>
<td>95 - 105% occupancy 535-591 BEDS</td>
<td>&gt;105% occupancy &gt;592 BEDS</td>
</tr>
</tbody>
</table>

### CRITERIA
- 10% resourced beds available
- Beds available for admission
- Significant patients in ED to be admitted
- Limited beds in ICU/SD
- Insufficient medical / nursing staff to meet demand
- No beds predicted at 1600hrs
- High occupancy in ED

### RESPONSE
- Usual capacity management and timely discharge practices
- Review current bed status & predicted activity
- Ensure all patients have EDD & D/C plans updated
- Target 5 patients for D/C across all services
- Identify rural patients ready to be returned
- Local communication strategies
- Identify 5% of patients for discharge
- Place non-urgent transfers on hold
- Contact ambulance to assist transfer discharges
- Review next days elective list
- General Manager to notify Area Executive Director and other site General Managers
- All staff notified via hospital PA system, SMS texts
- General Manager to consider about non-targeted elective surgical case cancellation
- Notify ambulance to prioritise transfer discharge patients and patient to be taken to closest hospital
- Pharmacy and Radiology to prioritise discharge patient requests
- Orderly and cleaners prioritise transfers and cleans

**RAH RESOURCED GENERAL ADULT BEDS = 564 BEDS**
Alerts reverse trend of rising occupancy

- Significant (P<0.05) reduction in occupancy 1 day after and 2 days after

- Sustained impact
### Flow Parameters (mean values): Alert Days, Non-Alert Days & Control Cases

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Alert Day</th>
<th>Non-Alert Day</th>
<th>P-value</th>
<th>Control Case</th>
<th>P-value</th>
<th>1 day post-Alert</th>
<th>P-value</th>
<th>2 days post-Alert</th>
<th>P-value</th>
<th>1 day post-CC</th>
<th>P-value</th>
<th>2 days post-CC</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midnight occupancy (%)</td>
<td>104%</td>
<td>97%</td>
<td>&lt;0.05</td>
<td>104%</td>
<td>0.60</td>
<td>104%</td>
<td>0.16</td>
<td>103%</td>
<td>&lt;0.05</td>
<td>104%</td>
<td>0.42</td>
<td>104%</td>
<td>0.34</td>
</tr>
<tr>
<td>Minimum occupancy (%)</td>
<td>101%</td>
<td>94%</td>
<td>&lt;0.05</td>
<td>101%</td>
<td>0.74</td>
<td>100%</td>
<td>&lt;0.05</td>
<td>99%</td>
<td>&lt;0.05</td>
<td>100%</td>
<td>0.06</td>
<td>98%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Maximum occupancy (%)</td>
<td>110%</td>
<td>102%</td>
<td>&lt;0.05</td>
<td>110%</td>
<td>0.49</td>
<td>109%</td>
<td>&lt;0.05</td>
<td>107%</td>
<td>&lt;0.05</td>
<td>109%</td>
<td>0.43</td>
<td>109%</td>
<td>0.16</td>
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<tr>
<td>Average occupancy (%)</td>
<td>105%</td>
<td>98%</td>
<td>&lt;0.05</td>
<td>105%</td>
<td>0.70</td>
<td>104%</td>
<td>&lt;0.05</td>
<td>103%</td>
<td>&lt;0.05</td>
<td>105%</td>
<td>0.30</td>
<td>103%</td>
<td>&lt;0.05</td>
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<tr>
<td>Average admission rate (patients/hr)</td>
<td>4.9</td>
<td>4.2</td>
<td>&lt;0.05</td>
<td>4.9</td>
<td>0.86</td>
<td>4.5</td>
<td>&lt;0.05</td>
<td>4.5</td>
<td>&lt;0.05</td>
<td>4.9</td>
<td>0.45</td>
<td>4.5</td>
<td>&lt;0.05</td>
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<tr>
<td>Average discharge rate (patients/hr)</td>
<td>5.0</td>
<td>4.2</td>
<td>&lt;0.05</td>
<td>4.8</td>
<td>0.36</td>
<td>4.8</td>
<td>0.15</td>
<td>4.7</td>
<td>0.07</td>
<td>5.0</td>
<td>0.22</td>
<td>5.1</td>
<td>0.16</td>
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<tr>
<td>Access block cases (cases/hr)</td>
<td>29</td>
<td>22</td>
<td>&lt;0.05</td>
<td>27</td>
<td>0.18</td>
<td>27</td>
<td>0.15</td>
<td>26</td>
<td>&lt;0.05</td>
<td>28</td>
<td>0.21</td>
<td>27</td>
<td>0.34</td>
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<tr>
<td>Avg Occupancy Reduction - 1 Day</td>
<td>1%</td>
<td>0%</td>
<td>&lt; 0.05</td>
<td>0%</td>
<td>0.12</td>
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<tr>
<td>Avg Occupancy Reduction - 2 Day</td>
<td>2%</td>
<td>0%</td>
<td>&lt; 0.05</td>
<td>1%</td>
<td>0.34</td>
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Alerts effective at reducing occupancy
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For additional details about this work, please see:
2. www.csiro.au/patientflow