Mid-term NEAT review: Analysing the improvements in hospital ED performance

Sankalp Khanna a, Justin Boyle a, Norm Good a, James Lind b

a The CSIRO Australian e-Health Research Centre, Brisbane, Australia
b Gold Coast Hospital, Queensland Health, Gold Coast, Australia
62% of our people hold university degrees

Top 1% of global research institutions in 14 of 22 research fields
Top 0.1% in 4 research fields
Highest number of citations per scientist in Australia

CSIRO undertakes $\sim 500M of externally funded R&D each year
Work with partners in over 80 countries
Our Track Record: Top Inventions

1. Fast WLAN
   Wireless Local Area Network

2. POLYMER BANKNOTES

3. RELENZA FLU VACCINE

4. EXTENDED WEAR CONTACTS

5. AEROGARD

6. TOTAL WELLBEING DIET

7. RAFT POLYMERISATION

8. BARLEYMAX

9. SELF TWISTING YARN

10. SOFTLY WASHING LIQUID
CSIRO Digital Productivity And Services Flagship

"More with what we have"

Effectiveness and Efficiency

Old things in new ways

"Technology Evolution"

"Technology Revolution"

New things in ways never thought of before

Informing, enhancing and personalising services
eHealth: Improving Productivity Across Healthcare With The Use Of Digital Technology

Health Informatics
- **What**: Improving patient outcomes, health system performance & productivity from electronic health data
- **How**: Meaningful data interoperability and analysis for decision support, analytics, modelling and reporting

Health Services
- **What**: Improving access to services & management of chronic diseases
- **How**: Service delivery using ICT, such as models utilising telehealth, mobile health & remote monitoring

Diagnostics
- **What**: Faster, more accurate, diagnosis and treatment
- **How**: Bio-imaging, bio-statistics and bioinformatics for personalisation of diagnosis and treatment

Clinically partnered, digitally enabled, services focussed

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The Australian e-Health Research Centre

Partnered for success

Australia’s leading national eHealth research centre

• 60-70 staff, students, visiting researchers
• Embedded in RBWH
• Funding from
  • CSIRO
  • Queensland Health
  • Engagement partners
• Success built on partnering - Government, clinicians, industry
Patient Flow @ CSIRO AEHRC
Enabling hospitals to better manage their resources & hence reduce waiting times

1. Linking ambulance, ED and admissions data
2. Disease surveillance
3. ED Length of stay performance
4. Better bed demand prediction
5. Patient flow visualisation
6. Patient flow and hospital occupancy
7. Bed configuration
8. Adverse event analysis
9. Early discharge strategies
10. Readmission prediction (frequent-flyers)

www.csiro.au/patientflow
The National Emergency Access Target (NEAT)

- Introduced in 2011
- By 31 Dec 2015, **90%** of all patients will leave the Emergency Department (ED) within **4 hours** having been:
  a) discharged,
  b) admitted, or
  c) transferred

**Fig**: 2012 NEAT performance, states and territories

Study Design

- ED data from 30 public hospitals in Queensland
- Analysis period – 2 calendar years – 2012 (1st year of NEAT) and 2013 (2nd Year of NEAT)

- Analysis groups (as per NHPA peer groups)\(^2\):
  - All hospitals
  - Major Metropolitan Hospitals (>20,000 separations/year)
  - Major Regional Hospitals (>16,000 separations/year)
  - Large Metropolitan Hospital (>10,000 separations/year)
  - Large Regional Hospitals (>8,000 separations/year)
  - Medium Hospitals (5-10,000 separations/year)

- Poisson regression modelling.
  - Variations in hour of day and occupancy
  - Variations in between admitted and non-admitted patients
  - Interaction between NEAT and ED occupancy across times of day (staffing patterns)

- Comparison with – Pre-NEAT 5 Year ED Performance - 1 Jan 2007 to 31 Dec 2011

## Results – Improvement

<table>
<thead>
<tr>
<th>Group</th>
<th>2012 Admitted Patients</th>
<th>2012 Non-admitted Patients</th>
<th>2013 Admitted Patients</th>
<th>2013 Non-admitted Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Hospitals</td>
<td>1%</td>
<td>1%</td>
<td>12%</td>
<td>8%</td>
</tr>
<tr>
<td>Major Metropolitan Hospitals</td>
<td>3%</td>
<td>3%</td>
<td>18%</td>
<td>16%</td>
</tr>
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</tr>
<tr>
<td>Large Regional Hospitals</td>
<td>-7%</td>
<td>-3%</td>
<td>-7%</td>
<td>-1%</td>
</tr>
<tr>
<td>Medium Hospitals</td>
<td>2%</td>
<td>0%</td>
<td>10%</td>
<td>1%</td>
</tr>
</tbody>
</table>

### Table

Improvement in 4 Hour Performance as compared to the 2007-2011 Pre-NEAT Analysis Period

**Over 52% of all presentations in 2012-13**

**Less than 6% of all presentations in 2012-13**
Results – LOS Distribution

Figure. Length of stay (LOS) distribution for patients leaving the ED in 2013
Results – The Hour Of Day Effect

Figure. Proportion of ED departures contributing to NEAT non-compliance as a function of hour of day.
Results – The Hour Of Day Effect

Figure. Cumulative NEAT compliance as a function of hour of day in 2013
Figure. Change in NEAT non-compliance from 2007-11 (start of arrow) to 2013 (arrow head) as a function of hour of day (categorised) and standard normal deviance from mean ED occupancy (z-score) (categorised) (all 30 hospitals). The z-score indicates how far the ED occupancy is from the mean, with scores less than 0 indicating lower than mean occupancy, scores >0 indicating higher than mean occupancy, and scores >1 indicating higher than 1 standard deviation above the mean.
Summary And Conclusions

• 2013 performance improvement is heartening

• No change in general patterns of NEAT performance

• Need ‘Radical Change’
  • Perform service level analysis
  • Address specific areas of poor performance
  • Employ a “whole of hospital” approach
Thank you

For more information, please contact:

Justin Boyle
Research Scientist
+61 7 3253 3606
Justin.Boyle@csiro.au
www.aehrc.com

Sankalp Khanna
Research Scientist
+61 7 3253 3629
Sankalp.Khanna@csiro.au
www.aehrc.com