Implementation of the Four Hour Program at Royal Perth Hospital

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Acknowledgements

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  - Royal Perth Hospital Facility Lead 2008-2011

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  - Consultant Geriatrician
  - Clinical Lead Four Hour Program RPH 2011

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  - Director Operations RPH

- Kate Fatovich
  - Project Officer Royal Perth Hospital 2011-2012
Royal Perth Group

- Royal Perth Hospital
  - 583 beds
  - ED 80,000 presentations each year
  - State Adult Major Trauma Centre
  - Admission rate 45%

- Shenton Park Campus
  - 190 beds
  - State rehabilitation services
  - Elective orthopaedics

- Bentley Health Service
  - 224 beds
  - Tertiary mental health services
  - Aged care and rehabilitation
  - Community surgical and obstetric services
Baseline state mid-2008

- Average 166 presentations a day

  - Overall 40% (66 of 166) of presentations admitted or discharged within 4 hours
  - 42% admission rate
  - 52% of discharged within 4 hours
  - 23% (16 of 70 admissions) per day admitted within 4 hours
  - 50% of admissions (35 patients per day) stayed in the ED > 8 hours
### Royal Perth Hospital Daily 4 Hour Rule Report

Compiled by the SMAHS Business Performance Unit

Data Extracted from EDIS daily at approximately 5am

<table>
<thead>
<tr>
<th>Destination</th>
<th>Within 4 Hours</th>
<th>Breaches</th>
<th>Total Cases</th>
<th>% Within 4 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted</td>
<td>60</td>
<td>20</td>
<td>80</td>
<td>75.0 %</td>
</tr>
<tr>
<td>Discharged</td>
<td>103</td>
<td>2</td>
<td>105</td>
<td>98.1 %</td>
</tr>
<tr>
<td>Transferred</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.0 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>164</strong></td>
<td><strong>23</strong></td>
<td><strong>187</strong></td>
<td><strong>87.7 %</strong></td>
</tr>
</tbody>
</table>

*(NOTE: Unknown = Breached patients still in ED at time of extract)*

**How close were we?**

To reach a target of 90% we needed another 5 patient(s) within 4 hours.
The median breach time for these patients: 41 mins.
Longest breach time: 52 mins.

<table>
<thead>
<tr>
<th>Inpatient discharges</th>
<th>R1</th>
<th>R2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>by 10 am</td>
<td>20.41%</td>
<td>50.00%</td>
<td>23.64%</td>
</tr>
<tr>
<td>by 12 midday</td>
<td>38.78%</td>
<td>75.00%</td>
<td>42.73%</td>
</tr>
<tr>
<td>Ward</td>
<td>Within 4 Hours</td>
<td>Admitted</td>
<td>% Within 4 hours</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------</td>
<td>----------</td>
<td>------------------</td>
</tr>
<tr>
<td>10A</td>
<td>0</td>
<td>0</td>
<td>No Cases</td>
</tr>
<tr>
<td>10C/BMTU</td>
<td>0</td>
<td>0</td>
<td>No Cases</td>
</tr>
<tr>
<td>2K</td>
<td>1</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>4A</td>
<td>1</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>5G</td>
<td>3</td>
<td>4</td>
<td>75.0 %</td>
</tr>
<tr>
<td>5H</td>
<td>6</td>
<td>7</td>
<td>85.7 %</td>
</tr>
<tr>
<td>6A</td>
<td>0</td>
<td>2</td>
<td>0.0 %</td>
</tr>
<tr>
<td>6G</td>
<td>0</td>
<td>0</td>
<td>No Cases</td>
</tr>
<tr>
<td>6H</td>
<td>0</td>
<td>0</td>
<td>No Cases</td>
</tr>
<tr>
<td>7A/7B</td>
<td>6</td>
<td>8</td>
<td>75.0 %</td>
</tr>
<tr>
<td>8A</td>
<td>1</td>
<td>2</td>
<td>50.0 %</td>
</tr>
<tr>
<td>9A/9B</td>
<td>2</td>
<td>3</td>
<td>66.7 %</td>
</tr>
<tr>
<td>9C</td>
<td>1</td>
<td>2</td>
<td>50.0 %</td>
</tr>
<tr>
<td>AAU</td>
<td>15</td>
<td>18</td>
<td>83.3 %</td>
</tr>
<tr>
<td>BURNS</td>
<td>1</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>CCU/4F</td>
<td>3</td>
<td>5</td>
<td>60.0 %</td>
</tr>
<tr>
<td>EMW</td>
<td>10</td>
<td>10</td>
<td>100.0 %</td>
</tr>
<tr>
<td>HDA</td>
<td>1</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>ICUS/ICUG</td>
<td>1</td>
<td>1</td>
<td>100.0 %</td>
</tr>
<tr>
<td>STU/STUA</td>
<td>2</td>
<td>2</td>
<td>100.0 %</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Division</th>
<th>Within 4 Hours</th>
<th>Admitted % Within 4 Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP Cancer &amp; Neurosciences Services</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>RP Critical Care</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td>RP Medical Specialities</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>RP Mental Health</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>RP Surgical</td>
<td>17</td>
<td>20</td>
</tr>
</tbody>
</table>

Key:
- Red: <= 75%
- Orange: between 75% and 84%
- Green: >= 85%
Opinions

- Access block has many contributing root causes across the whole hospital (and beyond). There is a wide literature describing the adverse effects of access block on patient outcomes.

- Simultaneous challenge of increased demands on relatively fixed resources.

- Attempts to improve access block by incremental change or generic solutions are seldom successful or sustainable.

- A detailed diagnostic process is required to achieve a detailed quantitative understanding of the root causes of access block for your patients in your hospital.
Any lessons from the United Kingdom Four Hour Rule relevant to Western Australia pertained only to strategy and not solutions.

The strategy we learned from the UK and attempted to emulate:

- Strong consistent political and executive commitment, good governance and performance management
- An urgent stretch target to drive innovation across the whole system
- A collaborative patient-focused data-driven methodology to create solutions based on the identified root causes
We decided that the change around the Four Hour Program needed a strong set of agreed values shared by staff and patients (the *why*).

In our case…

- Quality patient care is effective, safe, personal and timely
- Every patient counts, and to them, every minute counts
- The most important resource in health is its workforce
Delivering access to inpatient services within four hours requires

- Re-engineering of processes across the whole hospital
- A much greater use of business intelligence
- Clear accountability and performance management
- Attention to detail
A large scale change initiative

- We established a state-wide governance structure
  - Standard teams
  - Regular structured reporting
  - Data dashboards

- Hospital teams followed a standard redesign methodology

- Many root causes highlighted problems with governance and organisational cultures
  - Roles and responsibilities
  - Accountability for change and performance
Western Australian Redesign Methodology

- Standardised; uses principles from 6 Sigma, Lean, project and change management

- Suited to large organisations and systems

- Centred on the patient’s care and experience

- Incorporates the voice of the patient and staff

- Led by clinicians; decisions based on data

- Follows a ‘DMAIC’ process
The Three Year WA Four Hour Program

First 6 months

- Define problem
- Measure impact
- Analyse root causes
- Improve process by developing solutions

Next 18 months

Enter Control by…
- Implementing solutions
- Revisiting DMAI
- Measuring impact

24 months/ongoing

- Reach 85% target
- Maintain solutions and target of 90%

Maintain new processes

Implement new processes derived locally

Understand problems at patient level
Resourcing

- Funded by the COAG National Partnership Agreement on Hospital and Health Workforce reform ($76M)

- Each of the 17 hospitals had
  - Clinical lead 0.2 FTE (3 years)
  - Facility program lead (3 years)
  - Seconded central program advisor (First 6 months)
  - Seconded central program data analyst (First 6 months)

- Sites submit business cases for non-recurrent spending to resource solutions derived from the redesign methodology

- Recurrent expenditure sourced from Area Health Service budgets
Spending at Royal Perth Hospital

- General Surgery Ward Renovation - $1.7M
- Renovation to Operations Centre in ED - $70K
- Ward computers - $15K
- Recurrent funding ED
  - 1 FTE consultant
  - 1 FTE Registrar
  - 3.5 FTE Nursing
  - 5 FTE Patient Support and Clerical
- Recurrent funding Acute (medical) Assessment Unit
  - 1.5 FTE consultant
  - 1 FTE Registrar
  - 2 FTE Clerical
**Dashboard indicators by group**

<table>
<thead>
<tr>
<th>Activity and Utilisation Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED Attendances</td>
</tr>
<tr>
<td>Admissions from ED (Total)</td>
</tr>
<tr>
<td>Admissions from the ED (Mental Health)</td>
</tr>
<tr>
<td>% of ED attendances transferred to another hospital</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Integration and Change Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>% ED attendances with LOE ≤ 4 hours (headline KPI)</td>
</tr>
<tr>
<td>% ED admissions with LOE ≤ 4 hours</td>
</tr>
<tr>
<td>% ED transfers with LOE ≤ 4 hours (Total)</td>
</tr>
<tr>
<td>% ED discharges with LOE ≤ 4 hours</td>
</tr>
</tbody>
</table>

| % ED Attendances with LOE > 12 hours                                |
| % Admitted multiday patients discharged before 10:00am              |

**Hospital Resources and Capacity Measures**

| No. of multiday beds                                              |
| No. of same day beds (weekday)                                    |
| No. of same day beds (weekend)                                    |
| Multiday bed occupancy (%)                                        |
| % Multiday beds occupied by patients admitted from ED             |
| Ambulance Ramping (hours)                                         |
## Quality and Clinical Outcome Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unplanned re-attendance to ED within 48 hours (%)</td>
<td>(%)</td>
</tr>
<tr>
<td>- Attendances (%)</td>
<td></td>
</tr>
<tr>
<td>- Patients (%)</td>
<td></td>
</tr>
<tr>
<td>In-hospital mortality for admissions from ED (%)</td>
<td>(%)</td>
</tr>
<tr>
<td>- Rate</td>
<td></td>
</tr>
<tr>
<td>- Standardised mortality ratio</td>
<td></td>
</tr>
<tr>
<td>No. of MRSA infections / 10,000 bed days</td>
<td></td>
</tr>
<tr>
<td>No. of Sentinel Events</td>
<td></td>
</tr>
<tr>
<td>No. of Complaints</td>
<td></td>
</tr>
</tbody>
</table>
Hospital quality and safety indicators

Australian Council on Health Care Standards

November 2009 Australian Health Ministers Agreement

- Hospital standardised mortality ratio (HSMR)
- Death in low-mortality Diagnosis Related Groups (DRGs)
- In-hospital mortality rates for acute myocardial infarction, heart failure, stroke, fractured neck of femur and pneumonia
- Unplanned hospital re-admissions of patients discharged following management of acute myocardial infarction, heart failure, knee and hip replacements, depression, schizophrenia and paediatric tonsillectomy and adenoidectomy
- Healthcare associated *Staphylococcus aureus* bacteraemia, including MRSA
Define

- Patients presenting to the ED admitted, discharged or transferred within 4 hours (85%; 95% and 98% targets)

- Criteria critical to quality (staff and patients)
  - Mortality rate
  - ED representation rate 48 hours
  - MRSA infections
  - Hospital quality and safety indicators
Critical to quality requirements

1. Critical Patient Requirements
   - Time and attention paid to care
   - Waiting time for ward transfer to be less than 3 hours
   - More information between staff and patients about care
   - Care delivered encompassing basic clinical needs and personal needs
   - Coordination and consistency of care
   - Timely discharge with adequate resources
   - Clean facilities with adequate food

2. Critical Hosp Requirements
   - More staff and other resources
   - Less duplication and repetition of tasks
   - Better communication between staff disciplines and between hospital staff and patients
   - Able to deliver quality care

3. Critical to Quality Requirements
   - Waiting time for transfer to ward less than 3 hours
   - Better communication between staff-staff and staff-patients
   - Delivery of quality care
   - Coordination and consistency of care
   - Better level of physical resources, clean and adequate layout
   - Timely and planned discharge with adequate resources at discharge
   - More information between patients and staff about care planning
   - Time and attention paid to care

Source: RPH Unplanned Admissions CSRP Staff Survey, X June 2008
RPH Unplanned Admissions CSRP Process Mapping workshops, X May to X June 2008
Define

Process maps
- Medical
- Surgical
- Psychiatry
- Emergency Medicine
- Critical care
- Bed management
- Ward management
- Discharge
Define

808 issues pertaining to patient flow were identified and classified
Measure

- Baseline ‘level 1 data’ demonstrating normal business across all domains of hospital operations

- 24/7 five day time-and-motion study performed

132 measures analysed across the hospital pertaining to flow
Root cause analysis to determine underlying causes of measured problems

5 whys

Inter-relationship diagrams

\[ y = f(x^1 + x^2 + x^3 + x^n) \]

Null hypothesis testing using data
Root Causes- Emergency Medicine

- No process for allocation of new patients to medical staff
  - Median time triage-doctor September 2008 46 minutes
  - No accountability for who would see the next patient waiting and when
  - Senior medical staff: no clear role agreement or accountability as to they patients saw and when

- Poor communication
  - Between different grades of medical staff
  - Medical-nursing

- Multiple personnel responsible for patient flow in the ED
  - Who is in charge?

- Mismatch between workload and staff roster profiles
Multiple referrals to inpatient teams; inpatient teams often refer ED patients to each other

- 30% of admissions had multiple inpatient team referrals

- ED LOS 11.2 hours v. 6.52 hours (p<0.05)

Inpatient teams have competing workloads and ED usually lower priority

Inpatient teams take longer to see patients in ED if referral made by junior doctor (extra 28 minutes; p<0.003)
Root Causes - Bed Allocation

- Retrospective centralized bed management without access to accurate data. No predictive analysis

- Intra-hospital bed moves (>50% of bed movements are across different wards)

- Lack of business rules around bed allocation
  - Beds kept empty at night while patients wait in ED

- Poor communication between ‘managers’

- No clinicians accountable for access performance
Hypothesis

H1: The majority of beds that are vacant at 7:15 am have been vacant since the previous afternoon

H0: The majority of beds that are vacant at 7:15 am have not been vacant since the previous afternoon

50% of beds that are vacant at 7:15 am have been vacant for over 14.5 hrs i.e. since before 16:45 the previous day

There are on average 10 empty beds at 7:15am across the hospital

20% of beds that are vacant at 7:15 am have been vacant for over 17.5 hrs i.e. since before 13:45 the previous day

80% of beds that are vacant at 7:15 am have been vacant for over 12.3 hrs i.e. since before 18:45 the previous day

Conclusion:
The majority (80%) of beds that are vacant at 7:15 am have been vacant since the previous evening
Root Causes- Ward Process and Discharge

- Poor leadership, management and accountability for all staff working in the ward. Roles and responsibilities ill-defined

- Poor discharge planning and documentation
  - 40% of patients had an estimated date of discharge
  - 15% of patients had a clear plan documented

- Poor discharge communication
  - Between staff
  - With patients- 58% of patients being discharged were not told until the day of discharge

- Afternoon ward rounds and discharges

- Ward bed turn-around times (time from departure of one patient to arrival of the next patient in the same bed; mean 4 hours 12 minutes)
Team-based care
- Every team led by a senior doctor decision maker
- A nurse on every team
- Patients allocated to a team on arrival
- 30 minute and 2 hour time KPIs

Consultant-led ambulatory care stream

ATS 3-5 seen in order of arrival

Inpatient registrars not authorized to decline admissions

ED admission to ward one hour after referral if stable

Emergency Medicine Ward
Major Solutions- Royal Perth Hospital

- **Home wards**
  - Re-allocation of bed resources
  - Quarterly bed plans with monthly review

- **Ward leadership program**
  - Roles and responsibilities defined
  - Leadership training

- **Predictive bed management and ward pull**
  - Daily management meeting
  - Three day capacity-building plans
  - Patient bed allocation and pull to ward devolved to ward staff
  - Operations management streamlined

- **Discharge**
  - Visual management systems
  - Criteria or event-led discharge
  - Long stay committee

- **Surgery**
  - Theatre allocation and utilization
  - Anaesthetic-surgical teams
  - Emergency-elective management

- **Imaging**
  - Clinical liaison roles
  - Prioritization

- **Quality display dashboards**
  - Every clinical area and locally managed
  - Public
Clinical Quality Improvement

Hospital Operations Management

Process Redesign
Vertical Integration of Quality Improvement

- Ward quality boards
- Hospital electronic displays
- Peak governance committees
- Area Health Service strategies
- State strategic planning
Royal Perth Hospital: ED Presentations, Access Block and Four Hour Target Performance July 2008-July 2011
Time Spent In ED C5.0: % of patients departing ED within 8 hours

All patients, whether discharged home by ED or transferred to a ward
Time Spent In ED C6.2: % of patients departing ED within 4 hours

Trend Over Time

- Storm
- 25th
- 50th
- 75th

Patients discharged directly home by ED

Graph showing trends from July 2010 to June 2012.
Time Spent In ED C7.2: % of patients departing ED within 4 hours

Patients who were transferred to a ward in the hospital

Trend Over Time
Time Spent In ED C5.2: % of patients departing ED within 4 hours

All patients, whether discharged home by ED or transferred to a ward

Trend Over Time

- Average 4-hr Target
- Storm
- 25th
- 50th
- 75th
Funnel plot of HRT hospitals with at least 25 deaths in the latest period showing Storm circled in red.
Proportion of Attendances Who Did Not Wait To Be Seen at Stage 1 Four Hour Rule Hospitals, July 2007 to May 2011

Percentage of Attendances Who Did Not Wait

- 4 HR Stage 1 hospitals
- Linear (4 HR Stage 1 hospitals)
RPH Did Not Wait % for ED TRIAGE All Categories

% of Presentations - DNW

Jan 2009 - Jul 2011
Royal Perth Hospital ICU Admission rate within 24 hours of unplanned admission to general ward
Better patient outcomes in a number areas

- No evidence of increased mortality
- No evidence of adverse effects due to patients being transferred to wards prematurely
- No evidence of increased ED or hospital readmission rates
- No evidence of infection control issues

Issues identified

- Junior doctors not having a voice
- Junior doctor work pressure (poor support from consultants)
- Training
- Heterogeneous infection control and cleaning practices
- Patient support staff
- Operating theatre efficiency RPH
- Endorsed Acute Medical and Surgical Units
If I was to do it again I would start with an analysis of the hospital’s organisational culture.

Does it have the characteristics of a high performing organisation?
- Clear shared values
- Seeking value (patient focused)
- Devolved leadership and decision-making
- Clear roles and lines of accountability, but integrated teamwork
- Absolute transparency about performance
- Decisions based on data
- Action orientated culture
- Clear leadership and management training
- Succession planning
From 75% to 90%

- Long stay patients and movement to subacute settings
- Refinement of existing models
  - Acute Medical Unit
  - Emergency Medical Ward
  - Admission avoidance (ambulatory sensitive conditions)
- Service-line reporting and service line management
- Greater predictive bed management
- Operating theatre productivity
- Improved elective waitlist management
Challenges

- Managing expectations
  - “Four Hour Rule” nomenclature
  - Lightening rod for any and all issues
  - Movement towards target cannot start from the first day

- Regional areas
  - Resourcing
  - Logistics
  - Delivery of training on site
Challenges

- Communicating the need for change
  - Talking about ‘why’; not ‘what’ and ‘how’
- Emergency Medicine
- ‘There is no they’
- The role of Clinical Lead
- Capacity arguments
- Resource bargaining
- Executive visibility
- Data analysis and performance management
Essential

- Strong and visible leadership
- Quality improvement and patient focus throughout the program from inception
- Ambitious timeframes to drive change
- Use of a redesign methodology and project management (don’t jump to solutions)
- Standardised reporting and support structures via a central team; an ‘impartial’ reference point for sites and executives
“A wall of sponge rubber six months thick”

Doug Aberle
Former CEO Western Power