Immediate Pathology Results Now Available for all Remote Northern Territorians

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Introduction

Northern Territory Point-of-Care Testing Program:

• Commenced in August 2008
• ICPOCT contracted by NT DoH to develop and manage framework for POCT for acute and chronic care
• 36 selected remote health services
• Honours project in 2009 evaluated effectiveness of the POCT network
# Introduction

## Abbott i-STAT POCT device

<table>
<thead>
<tr>
<th>Clinical Condition</th>
<th>i-STAT Test</th>
<th>Time to Result</th>
<th>Clinical Application</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acute disease</strong></td>
<td>Troponin I</td>
<td>10 mins</td>
<td>Early risk stratification for acute coronary syndrome</td>
</tr>
<tr>
<td></td>
<td>Electrolytes</td>
<td>2 mins</td>
<td>Assessment of hydration status</td>
</tr>
<tr>
<td></td>
<td>Blood gases</td>
<td>2 mins</td>
<td>Assessment of fluid and water balance, respiratory disorders and acid base status</td>
</tr>
<tr>
<td><strong>Chronic disease</strong></td>
<td>INR(^*)</td>
<td>&lt; 5 mins</td>
<td>Monitoring of patients on anticoagulation therapy</td>
</tr>
<tr>
<td><strong>Both acute and chronic disease</strong></td>
<td>Creatinine and Urea</td>
<td>2 mins</td>
<td>Assessment of acute renal failure/chronic renal disease</td>
</tr>
<tr>
<td></td>
<td>Haemoglobin</td>
<td>2 mins</td>
<td>Assessment of acute blood loss/monitoring of anaemia</td>
</tr>
<tr>
<td></td>
<td>Glucose</td>
<td>2 mins</td>
<td>Monitoring glycaemic status</td>
</tr>
</tbody>
</table>
In 2015, the NT DoH funded the expansion to include all 72 remote health services*

2008 to 2015 = 36 health services enrolled
2016 = 72 health services enrolled

*All remote health services with a full-time staff member
Introduction

Management Committee:
- Chairperson (ICPOCT Director)
- Program Coordinator (ICPOCT)
- Scientific Team (ICPOCT)
- Quality and Safety Team Manager (DoH)
- Central Australian Professional Practice Nurse (DoH)
- Top End Professional Practice Nurse (DoH)
- Senior Clinical Advisor (DoH)
- ACCHS Representative (AMSANT)
- i-STAT Rollout Project Manager (DoH)
Methods – Consumable Ordering

Due to short expiration of consumables:

- Central hubs set up to distribute consumables to remote services
- Consumables distributed up based on predicted usage at each service
- Feedback on consumable usage
- Training provided on stock rotation, storage and monitoring
Methods - Flexible Training

Online training resources

Teleconference + GoToMeeting Training - weekly

On-site group training

Large training workshops in Alice Springs, Darwin & Katherine

Hard copy training resources provided
Methods – Training Effectiveness

To determine satisfaction with training:

- Survey sent to all trainees
- Rate their level of satisfaction according to a 10-point sliding scale
- Open questions to get suggestions on improvements and experiences on patient testing
- Results analysed via www.SoGoSurvey.com.au
Methods – Analytical Quality

Analytical quality of the POC tests monitored through:

- Quality testing performed regularly at each remote health service
- Key performance indicators measured are accuracy and precision
- Compared to Australian laboratories as benchmark
Methods – Assessing Cost Effectiveness

Cost effectiveness measured by:

- Patient case audit conducted by a medical registrar
- 27 remote health services in the Top End
- Main outcome measure = evacuations prevented by using i-STAT to stabilise patient or rule out cardiac event (heart attack)
- Patient cases identified where i-STAT had a defined clinical benefit
Results – Program Expansion

Total monthly tests recorded 9 months before and 9 months during the rollout period

Now just over 2000 patient tests being performed each month (March 2017)
Results – Program Expansion

- CG4+ (blood gas) = 10%
- cTnI (troponin I) = 20%
- Chem8+ (electrolytes) = 27%
- PT/INR (INR) = 43%
Results – Program Expansion

Total remote staff completing i-STAT training before and during the rollout period

Now a total of 1374 staff trained since 2008
Results – Training Effectiveness

Summary of training satisfaction survey responses (n = 54/158)

<table>
<thead>
<tr>
<th>Question</th>
<th>No. Responses</th>
<th>Average Weighted Score (0- Very Poor, 10 – Excellent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate the quality of the PowerPoint presentation provided during training?</td>
<td>46</td>
<td>8.7</td>
</tr>
<tr>
<td>How would you rate the quality of the Training Manual?</td>
<td>38</td>
<td>8.4</td>
</tr>
<tr>
<td>How would you rate the quality of the i-STAT “How To” Posters?</td>
<td>27</td>
<td>8.6</td>
</tr>
<tr>
<td>How would you rate the quality of the i-STAT “How To” website videos?</td>
<td>19</td>
<td>9.2</td>
</tr>
<tr>
<td>How would you rate the helpfulness of the trainer?</td>
<td>53</td>
<td>9.2</td>
</tr>
<tr>
<td>How would you rate the quality of instruction from the trainer?</td>
<td>53</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Confidence with using the i-STAT for patient testing after training = 9/10 overall

“I was very satisfied with training and would recommended for anyone wanting to use the i-STAT equipment, thank you very much for your tutorial”
## Results – Analytical Quality

### Table – Representative example from lot number with highest number of repeats during the i-STAT rollout period.

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Units</th>
<th>Lot Number</th>
<th>Lot</th>
<th>Target</th>
<th>Mean</th>
<th>CV%</th>
<th>Median CV%</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>mmol/L</td>
<td>301066</td>
<td>233</td>
<td>122.0</td>
<td>121.5</td>
<td>0.6%</td>
<td>0.9%^</td>
<td></td>
</tr>
<tr>
<td>Potassium</td>
<td>mmol/L</td>
<td>301066</td>
<td>233</td>
<td>2.9</td>
<td>2.9</td>
<td>0.8%</td>
<td>1.4%^</td>
<td></td>
</tr>
<tr>
<td>Chloride</td>
<td>mmol/L</td>
<td>301066</td>
<td>235</td>
<td>72</td>
<td>73</td>
<td>1.2%</td>
<td>1.2%^</td>
<td></td>
</tr>
<tr>
<td>Glucose</td>
<td>mmol/L</td>
<td>301066</td>
<td>231</td>
<td>15.0</td>
<td>15.1</td>
<td>1.0%</td>
<td>2.1%^</td>
<td></td>
</tr>
<tr>
<td>Urea</td>
<td>mmol/L</td>
<td>301066</td>
<td>233</td>
<td>19.3</td>
<td>19.3</td>
<td>2.6%</td>
<td>2.5%^</td>
<td></td>
</tr>
<tr>
<td>Creatinine</td>
<td>µmol/L</td>
<td>301066</td>
<td>234</td>
<td>335.5</td>
<td>336.8</td>
<td>2.9%</td>
<td>2.7%^</td>
<td></td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>mmol/L</td>
<td>301066</td>
<td>234</td>
<td>58</td>
<td>56.3</td>
<td>4.6%</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>n/a</td>
<td>301066</td>
<td>230</td>
<td>7.04</td>
<td>7.05</td>
<td>0.2%</td>
<td>1.4%^*</td>
<td></td>
</tr>
<tr>
<td>Lactate</td>
<td>mmol/L</td>
<td>301066</td>
<td>229</td>
<td>7.1</td>
<td>6.9</td>
<td>2.4%</td>
<td>4.6%^*</td>
<td></td>
</tr>
<tr>
<td>Troponin I</td>
<td>ng/mL</td>
<td>011073</td>
<td>196</td>
<td>0.34</td>
<td>0.31</td>
<td>7.0%</td>
<td>7.7%^</td>
<td></td>
</tr>
<tr>
<td>INR</td>
<td>n/a</td>
<td>291067</td>
<td>274</td>
<td>2.2</td>
<td>2.2</td>
<td>7.1%</td>
<td>n/a</td>
<td></td>
</tr>
</tbody>
</table>

**CV% = Coefficient of Variation percentage**

* Median imprecision achieved by laboratories in the Royal College of Pathologists of Australasia’s (RCPA) General Chemistry and Therapeutic Drugs, Cycle 103, 2016.

* Median imprecision achieved by laboratories in the Royal College of Pathologists of Australasia’s (RCPA) Blood Gas and Co-Oximetry, Cycle 57, 2016.

The lower the imprecision (CV%) the better the quality of result.
Results – Cost Effectiveness

Cost effectiveness audit found:

• Across the 27 Top End Health Services

• 80 patient evacuations were prevented specifically due to the availability of the i-STAT on-site = cost saving of approximately $640,000.

• A further 474 troponin I tests provided reassuring results that the patient was not undergoing a cardiac event = potentially a cost saving of up to $3.8 million.

• A comprehensive cost benefit analysis conducted through a grant awarded by the Emergency Medicine Foundation.
History: 22 month old child brought in by mother with a 24 hour history of vomiting, diarrhoea and fever (38.5°C) + family member recently treated for rotavirus.

Investigations: Stool sample sent to laboratory (900kms).

Treatment: Paracetamol given and patient temperature normal (37.3°C).

Follow up: Returned several hours with temp of 40.1°C.

i-STAT results: sodium = 140 mmol/L (normal 132-143 mmol/L) and potassium = 2.7 mmol/L (normal 3.5-5 mmol/L).

Treatment: On-call paediatrician advised ORS at 15 minute intervals until stabilised.

Follow up: Next day i-STAT results: sodium = 141 mmol/L, potassium = 2.4 mmol/L.

Treatment: Paediatrician advised oral potassium solution and a follow up electrolyte test the next day.

Follow up: Second day i-STAT results: sodium = 144 mmol/L and potassium = 2.8 mmol/L.

Follow up: Third day i-STAT results: sodium = 144 mmol/L and potassium = 3.2 mmol/L.

* The microbiology results were reported 2 days later and were negative for rotavirus (5 days after sample taken).
Conclusion

• Operationally effective & high satisfaction with training
• Analytically sound
• Clinically effective
• Significant cost savings
• NT POCT Program now provides access for all remote Territorians
• Strategies used by rollout of NT POCT Program are translatable to other remote areas of Australia