Northern Territory
Point-of-Care Testing Program

Brooke Spaeth, NT POCT Program Coordinator
Flinders University International Centre for Point-of-Care Testing

Dr Rodney Omond, NT POCT Program Clinical Advisor
Senior RMP, Medical Director Low Acuity Medical Retrievals
Primary Care Medical Unit, Top End Health Service

CQI Collaborative, Darwin
14 November 2017
NT POCT Program – Impact & Growth

2008-2015
The Program started with 25 Remote Health Services in 2008
Expanded to 34 Services by 2015
(30 DoH & 4 ACCHS)

In 2015 approximately 1000 i-STAT tests per month across Territory

2016 - 2018
After coroner’s recommendation
Every NT remote health service included in the Program
72 Remote Health Services
50 DoH (25 CA and 25 TE) + 22 ACCHS

In 2017 almost 3000 i-STAT tests per month across Territory

CG4+ = 10%
Troponin I = 17%
Chem8+ = 20%
INR = 43%

Flinders University
International Centre for Point-of-Care Testing
NT POCT Program – Workforce Capacity

Annual number of operators trained has more than doubled since expansion of program

• 2008 to 2015 = 125 staff trained on average
• 2016 = 328 staff trained
• 2017 = 322 staff trained (to October 2017)
• Total over 1400 staff trained since 2008
NT POCT Program – Current CQI Activities

POC Training & Competency Assessment - involves a theoretical and practical assessment to comply with best practice guidelines for POCT in Australia*

| Your Name: |  |
| Contact email address: |  |
| Health Service Name/Position: |  |
| Preferred (4-digit) I-STAT Operator ID: |  |

Please tick your selected answer(s).

**Q1.** Which of the following statements is FALSE?
- A cartridge must be warmed up to room temperature for at least 5 minutes before use
- A cartridge can be returned to the fridge after it has been at room temperature
- A cartridge can be stored at room temperature for up to 14 days

**Q2.** What is the preferred sample type for an INR test?
- Venous whole blood in an EDTA tube
- Capillary sample, after wiping the first drop away
- Capillary sample, using the first drop

**Q3.** What action do you take if your QC result is in the RED zone?
- Proceed with caution
- Continue patient testing
- Stop testing and call the Finders CPOCT unit to discuss results and troubleshooting

**Q4.** What is the preferred patient sample type for a test on the Chelex® cartridge?
- Venous whole blood in an EDTA tube
- Venous whole blood in a lithium heparin (green top) collection tube
- Capillary sample, using the first drop
- Removing the needle & loading directly from the syringe

**Q5.** A Troponin I test was performed on a patient suspected of having a cardiac event. The result obtained was 0.06ng/mL. This result is: 
- Clearly negative, the person will not had a cardiac event
- Clearly positive, and should be reported to the doctor immediately
- Indeterminate, so the patient needs to have their troponin I tested again

**Q6.** Which of the following statements is TRUE?
- A cartridge can be removed from the I-STAT when it is turned OFF
- A cartridge can be removed from the I-STAT ONLY when “Remove Cartridge” is visible on the screen
- Both of the above

**Q7.** What is the optimal temperature range of the I-STAT device?
- 16 to 30°C
- 0.1 to 50°C
- Any temperature, there is no operational temperature range for the I-STAT device

**Q8.** When performing the INR QC test, once the activator liquid is added to the powder, how long should the solution be mixed for?
- 3 minutes
- 30 seconds
- 60 seconds

---

NT POCT Program – Current CQI Activities

Testing both Quality Control (on every i-STAT device) and External Quality Assurance Testing (at selected hubs) complies with National POCT guidelines*

Table – Representative example of Quality Control testing results for the i-STAT

<table>
<thead>
<tr>
<th>Analyte</th>
<th>n</th>
<th>Target</th>
<th>i-STAT QC Mean</th>
<th>i-STAT QC CV%</th>
<th>Lab Median CV%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>233</td>
<td>122.0</td>
<td>121.5</td>
<td>0.6%</td>
<td>0.9%^</td>
</tr>
<tr>
<td>Potassium</td>
<td>233</td>
<td>2.9</td>
<td>2.9</td>
<td>0.8%</td>
<td>1.4%^</td>
</tr>
<tr>
<td>Chloride</td>
<td>235</td>
<td>72</td>
<td>73</td>
<td>1.2%</td>
<td>1.2%^</td>
</tr>
<tr>
<td>Glucose</td>
<td>231</td>
<td>15.0</td>
<td>15.1</td>
<td>1.0%</td>
<td>2.1%^</td>
</tr>
<tr>
<td>Urea</td>
<td>233</td>
<td>19.3</td>
<td>19.3</td>
<td>2.6%</td>
<td>2.5%^</td>
</tr>
<tr>
<td>Creatinine</td>
<td>234</td>
<td>335.5</td>
<td>336.8</td>
<td>2.9%</td>
<td>2.7%^</td>
</tr>
<tr>
<td>pH</td>
<td>230</td>
<td>7.04</td>
<td>7.05</td>
<td>0.2%</td>
<td>1.4%*</td>
</tr>
<tr>
<td>Lactate</td>
<td>229</td>
<td>7.1</td>
<td>6.9</td>
<td>2.4%</td>
<td>4.6%*</td>
</tr>
<tr>
<td>Troponin I</td>
<td>196</td>
<td>0.34</td>
<td>0.31</td>
<td>7.0%</td>
<td>7.7%^</td>
</tr>
</tbody>
</table>

POC connectivity enables surveillance of all i-STAT tests conducted across the Territory, which allows monitoring and reduces wastage/errors + improves patient safety.
Monthly Feedback Reports to HCMs and DMs provides CQI recommendations to each health service on patient testing, training, errors, QC and QA testing + assists with ordering i-STAT stock (reduces wastage)

### NT POCT Program – Current CQI Activities

**i-STAT Feedback Report**  
**Jul-16**  

**XX Health Centre**

#### Total Tests by Cartridge Type (current month)

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Total Cartridges</th>
<th>Errors</th>
<th>Chem8+</th>
<th>CG4+</th>
<th>PT/INR</th>
<th>Troponin I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>25</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Average Monthly Usage (past 3 months)

<table>
<thead>
<tr>
<th>Cartridge Type</th>
<th>Chem8+</th>
<th>CG4+</th>
<th>PT/INR</th>
<th>Troponin I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
<td>5</td>
<td>24</td>
<td>8</td>
</tr>
</tbody>
</table>

#### Total Tests by Operator

<table>
<thead>
<tr>
<th>Operator Name</th>
<th>Total Cartridges</th>
<th>Successful Tests</th>
<th>Unsuccessful Tests/Errors</th>
<th>% Errors</th>
<th>Competency Expiry Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane Doe</td>
<td>25</td>
<td>23</td>
<td>2</td>
<td>8%</td>
<td>15/07/2018</td>
</tr>
<tr>
<td>Joe Bloggs</td>
<td>20</td>
<td>20</td>
<td>2</td>
<td>8%</td>
<td>15/07/2018</td>
</tr>
<tr>
<td>Fred Flinstone</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>0%</td>
<td>23/07/2018</td>
</tr>
</tbody>
</table>

Temp ID User

| Total Tests | 50 | 48 | 2 | 4% |

Percentage of untrained operator use: 10%

#### Total Errors by Type

<table>
<thead>
<tr>
<th>Error Type</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cartridge Handling</td>
<td>2</td>
</tr>
<tr>
<td>Insufficient Sample</td>
<td>2</td>
</tr>
<tr>
<td>Overfilled Cartridge</td>
<td>2</td>
</tr>
<tr>
<td>Unable to Position Sample</td>
<td>0</td>
</tr>
<tr>
<td>Underfilled Cartridge</td>
<td>0</td>
</tr>
<tr>
<td>Thermal Contact</td>
<td>0</td>
</tr>
<tr>
<td>Environment</td>
<td></td>
</tr>
<tr>
<td>OTHER</td>
<td>2</td>
</tr>
</tbody>
</table>

*Other* Errors described below. A summary of each of these error types is contained at the end of this report.
Publications:


Research Project Title: Point-of-Care Testing for Better Management of Acutely Ill Remote Patients (Sponsored by Emergency Medicine Foundation - EMF)

- Investigated clinical and cost effectiveness of using the i-STAT as a decision support tool for triaging acutely ill patients
- Focussed on 3 common acute clinical presentations in 200 patients (chest pain [n=147], missed dialysis [n=28] and acute diarrhoea [n=25])
- 6 remote health centres (small, medium, large) with access to POCT
- POCT enabled early diagnosis and treatment for those appropriately evacuated (n=21)
- Access to POCT resulted in the prevention of 60 medical evacuations
- Health Economist extrapolated results to provide Territory-wide estimates of cost savings
- Territory-wide cost saving of $20.93 million per annum for NT health system through prevention of unnecessary medical evacuations for just these 3 presentations.
- POCT also delivered improved clinical outcomes for acutely ill patients in remote communities.
Priorities for Duty RMP consultations

- Problem - determines order
- Clinical Observations - T, P, RR, BP
- Other clinical information
- POCT information
- ECG, CXR
- Ring Duty RMP
Siemens DCA Vantage POCT device

HbA1c for diabetes management & diagnosis

Urine ACR for detection of early kidney disease

Results in < 7 minutes

Primarily AHP/AHW trained as operators

Medicare Rebates Available

Significant improvements in diabetes control if integrated into clinical practice*

HemoCue WBC DIFF

- Total and 5-part differential white cell count (Lymphocytes, Neutrophils, Monocytes, Basophils, Eosinophils)
- Result in < 5 minutes
- Analytically sound in remote environment*
- 2017 evaluation in 13 remote health services in NT to research clinical, operational and cost effectiveness

HemoCue WBC DIFF Trial Results

Clinical Effectiveness / Patient Safety:
- Sepsis
- Respiratory infections
- Appendicitis
- Fever + undifferentiated symptoms
- Monitoring Clozapine medication

Cost benefit:
- Cost savings through prevented evacuations = $500,000 across 13 sites over 6 month period

Operational benefits:
- High satisfaction / ease of use
- 37% of FBE pathology reports returned with WCC not reliable / not reported (+ cost benefit)

Quote from Rural Medical Practitioner: “[The HemoCue WBC DIFF] is a piece of equipment that should be in every remote community.”
NT POCT Program – Future Directions

HemoCue Hb 201+

• Currently no training or quality structure in place (as for the i-STAT)
• Concerns raised regarding reliability of Hb results
• No clinical protocol available to assist with results that do not fit clinical picture
• Confusion between test methods available (HemoCue, i-STAT, Pronto, laboratory)
Thank you to... all the members of NT POCT Program Management Team

NT DoH
- Dr Rodney Omond
- Dana Dabrowska
- Malcolm Auld
- Tina Quirk
- Casey Vandermeer
- Steve Schatz
+ many other past members

AMSANT
- Margie Cotter

Flinders ICPOCT
- Prof Mark Shephard (chair)
- Brooke Spaeth
- Lauren Duckworth
- Bek Milloss
- Janet Richards
Discussion and Questions?

i-STAT
• Operationally effective
• Cost benefit to NT
• Improved patient safety
• Anything else to investigate?

QAAMS / DCA Vantage
• How to better incorporate into routine clinical practice?
• Issues with current use?

Other POC tests?
• HemoCue WBC DIFF
• HemoCue Hb 201
• Others e.g. Syphilis, Strep A, Influenza, CRP, Lipids......

Thank you