# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Executive Summary</strong></td>
<td></td>
<td>4</td>
</tr>
<tr>
<td><strong>Section 1: Service Data</strong></td>
<td>Clinical Toxicology Unit staffing levels</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Activities</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Yearly presentations 2014-2015</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2015 Monthly presentations</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Presentations by age and gender</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Patient flow management</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Length of Stay 2015</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Prescription Drug Presentations</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Recreational Drug presentations</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Bites and envenomations</td>
<td>20</td>
</tr>
<tr>
<td><strong>Section 2: Research and Educational Activities 2011-2015</strong></td>
<td>Research – Publications</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Research – Conference presentations</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Research – Conference posters</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Book Chapters/Sections</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Reviews for Journals</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Educational Activities/Presentations/Course Instructor</td>
<td>28</td>
</tr>
</tbody>
</table>
Executive Summary

The Clinical Toxicology Unit (CTOX) was established at the Princess Alexandra Hospital (PAH) in February 2014, and is the first of its kind in Queensland. It has just completed its first full calendar year of operation providing inpatient management, and advice on patients suffering from the effects of prescription and recreational drugs taken therapeutically, accidentally or in overdose. It also provides crucial toxicology advice regarding the management of patients with stings and bites, including snake bite envenomation. In addition, it provides an informal consultation service to other hospitals within South East Queensland who are aware of the unit.

The aim of the service is to coordinate & improve the quality of care of the toxicological patient with an emphasis on reducing length of stay while maintaining high quality evidence based medicine. It commenced with no funding and a registrar borrowed from the Department of Emergency Medicine (DEM) and its results are remarkable when benchmarked against other hospitals based on Health Round Table (HRT) data over the last five years.

Achievements:
1. In 2015 the unit managed 1787 patients with a median length of stay of 11.5 hours.
2. Relative length of stay index in 2015 based on HRT data of 56% (133% prior to the unit’s commencement).
3. Number 1 in beds saved at PAH in 2014 & 2015 with 1400 bed days saved over this 2-year period again based on HRT data.
4. Nominee for the 2015 Metro South health Board Chair’s Award “ideas into action”

In addition to its clinical success, the CTOX unit has now achieved funding to the level of 1.0 FTE through the PAH and the Lady Cilento Children’s Hospital (LCCH). This goes part way to providing a financial basis for the unit’s continual operation. Formal links through the establishment of a medical director position with the Queensland Poisons Information Centre (QPIC) based at the LCCH has been negotiated with this funding. Accreditation has also been approved for registrar training as a special skills term in Toxicology with the Australasian College for Emergency Medicine.
Research continues to be a major priority of the unit’s activity and 2015 has seen the publication of two large studies examining the safety of droperidol in acute behavioural disturbance and the safety of a new regimen of N-acetylcysteine, the antidote used in paracetamol toxicity. The Australian TOxicology Monitoring (ATOM) Study commenced in 2014 will be the cornerstone of future toxicological research at PAH and in Queensland examining drug toxicity with laboratory confirmation of serum drug levels and markers of drug toxicity.

In 2016, the CTOX unit will commence training of a second toxicologist and the teaching and research will continue to grow as we expand our workforce. A formal, advertised consultation service for the Metro South Hospital & Health Service will be established and plans will commence on moving the QPIC to the PAH.

Lastly the success of the unit over the last 2 years could not have been achieved without the support of my emergency department colleagues and the director of the DEM Dr Phil Kay. My thanks also to the department of general medicine in particular Professor’s Peter Pillans and Ian Scott whose support has been critical not only to the formation of the unit but its ongoing role within the hospital.

Dr Colin Page  
MBChB FACEM MMedSci (Clin Epid)  
Clinical Toxicologist  
Director of Clinical Toxicology & Medical Director QPIC
Service Data

Clinical Toxicology Unit staffing

Physician/Director – Dr Colin Page (0.5 FTE)

Clinical Toxicology Fellow – Dr Katherine Isoardi (Commencing February 2016)

Registrars
   ED – 1.0 FTE post-exam ACEM Advanced trainee
      Melanie Armitage (Jan-July) Julia Kelly (Aug–Jan)
   Ward – Dr Sivarajah Ilango (Internal Medicine trainee)

Nursing
   Dale Mason - CNC ED Short Stay Ward
   Ian Ross – CNC Ward 5A

Administration – Jillian Vernon – Office Manager

Activities

• Seven days a week ward rounds of toxicology patients in ED, ED short stay ward, Intensive Care & wards.
• Database of unit’s activities (Filemaker relational database)
• Monthly unit meetings – Unit activity & audit (length of stay, NEAT compliance), case presentations, journal club, research & 6 monthly morbidity and mortality.
• Regular presentations at PAH ED teaching program
• Medical Grand Rounds
• Presentations at other Brisbane ED’s
• QPIC toxicology consultant calls
• QPIC continuing medical education meetings
Yearly Presentations 2014 - 2015

Yearly presentations

Number of patients

Year

2014 (May-Dec) 2015

924 1787
2015 Monthly Presentations

Presentations by month

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>179</td>
</tr>
<tr>
<td>February</td>
<td>149</td>
</tr>
<tr>
<td>March</td>
<td>160</td>
</tr>
<tr>
<td>April</td>
<td>126</td>
</tr>
<tr>
<td>May</td>
<td>126</td>
</tr>
<tr>
<td>June</td>
<td>136</td>
</tr>
<tr>
<td>July</td>
<td>129</td>
</tr>
<tr>
<td>August</td>
<td>143</td>
</tr>
<tr>
<td>September</td>
<td>127</td>
</tr>
<tr>
<td>October</td>
<td>174</td>
</tr>
<tr>
<td>November</td>
<td>154</td>
</tr>
<tr>
<td>December</td>
<td>183</td>
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</table>
Presentations by Age and Gender

Presentations by Gender

Female
49%

Male
51%
Presentations by Age & Gender

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>58</td>
<td>92</td>
<td>150</td>
</tr>
<tr>
<td>20-29</td>
<td>235</td>
<td>150</td>
<td>385</td>
</tr>
<tr>
<td>30-39</td>
<td>208</td>
<td>167</td>
<td>375</td>
</tr>
<tr>
<td>40-49</td>
<td>167</td>
<td>106</td>
<td>273</td>
</tr>
<tr>
<td>50-59</td>
<td>106</td>
<td>91</td>
<td>197</td>
</tr>
<tr>
<td>60-69</td>
<td>42</td>
<td>35</td>
<td>77</td>
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<tr>
<td>≥70</td>
<td>23</td>
<td>20</td>
<td>43</td>
</tr>
</tbody>
</table>
Patient Flow Management

Admission Location

- Remain in ED: 67.90%
- Short Stay Ward admission: 22.60%
- Admitted by other team: 6.80%
- ICU admission: 1.73%
- Consult: 0.39%
- Mental health admission: 0.22%
- Transferred to LCCH: 3.70%
All Patients final disposition

- MH facility: 14.40%
- Discharged: 82.70%
- Died: 0.29%
- Correctional Services: 2.60%
Length of stay 2015

Median Length of stay by month 2015

<table>
<thead>
<tr>
<th>Month</th>
<th>Length (hours)</th>
</tr>
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<tbody>
<tr>
<td>January</td>
<td>9.6</td>
</tr>
<tr>
<td>February</td>
<td>9.3</td>
</tr>
<tr>
<td>March</td>
<td>10.8</td>
</tr>
<tr>
<td>April</td>
<td>8.6</td>
</tr>
<tr>
<td>May</td>
<td>10.6</td>
</tr>
<tr>
<td>June</td>
<td>9.7</td>
</tr>
<tr>
<td>July</td>
<td>10.6</td>
</tr>
<tr>
<td>August</td>
<td>12.6</td>
</tr>
<tr>
<td>September</td>
<td>11.6</td>
</tr>
<tr>
<td>October</td>
<td>14.7</td>
</tr>
<tr>
<td>November</td>
<td>10.5</td>
</tr>
<tr>
<td>December</td>
<td>12.1</td>
</tr>
<tr>
<td>2015 Median</td>
<td>11.5</td>
</tr>
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</table>
Trend of Relative Stay Index over time

Relative Stay Index (%)

Financial Year

PAH

All HRT
Prescription Drug Presentations

Most Common Prescription Drug Presentations

Number of presentations

Diazepam 322
Quetiapine 152
Temazepam 96
Paracetamol 310
Oxycodone 81
Promethazine 62
Ibuprofen 72
Oxazepam 60
Codeine 144
Presentations by Class of Drug

- non-opiate analgesics (paracetamol/NSAIDs/tramadol)
- Benzodiazepines
- Opioids (excluding heroin)
- Antidepressants
- Antipsychotics
Recreational Drug Presentations

Presentations by Recreational Drug

<table>
<thead>
<tr>
<th>Drug</th>
<th>Number of Presentations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis</td>
<td>113</td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>226</td>
</tr>
<tr>
<td>Amphetamines</td>
<td>69</td>
</tr>
<tr>
<td>MDMA</td>
<td>42</td>
</tr>
<tr>
<td>LSD</td>
<td>23</td>
</tr>
<tr>
<td>Cocaine</td>
<td>17</td>
</tr>
<tr>
<td>GHB</td>
<td>6</td>
</tr>
<tr>
<td>Heroin</td>
<td>110</td>
</tr>
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</table>
Research and Educational Activities

Research - Publications 2011-2015

Armitage MC, Woolfield KI, Page CB. Serotonin toxicity caused by the interaction of fentanyl and serotonergic medications. Emergency Medicine Australasia. 2015 Dec 17. Early online


Bateman DN, Page CB. Antidotes to coumarins, isoniazid, methotrexate and thyroxine, toxins that work via metabolic processes. BJCP 2015 early online

Isbister GK, Page CB. Brown snake envenoming: Why are we left in the dark? Clin Toxicology 2015 Nov;53(9):925


Isbister GK, Maduwage K & Page CB. Antivenom cross neutralisation in a suspected Asian pit viper envenoming causing severe coagulopathy. Toxicon 2014;90:286-90

Williams MM, Taylor PJ, Page CB & Martin JH. Clinical research in synthetic cannabinoids — do we need a national approach. MJA 2014;201(6): 1-3


Isbister GK, Page CB. Drug induced QT prolongation: the measurement and assessment of QT interval in clinical practice. BJCP 2013 Jul;76(1) 48-57


Isbister GK, Page CB. Earlier endoscopy or CT in caustic injuries: A re-evaluation of clinical practice. Clinical Toxicology 2011;49:641-1
Page CB, Wilson PA, Foy A, Downes MA, Whyte IM & Isbister GK. Life-threatening hypokalaemia associated with ibuprofen-induced renal tubular acidosis. MJA 2011;194: 613-4
Research – Conference Presentations 2011-2015

Vlad I, Page C, Brown J & Cairns R. Jungle Juice or When Oxygen Does not Turn Blue into Red. TAPNA 2015

Page C. Toxicology Knicks Knacks. The new NAC. A novel infusion protocol for the administration of N-acetyl cysteine. Autumn Symposium (Queensland ACEM) May 2014

Chiew A & Page C. Just another paracetamol overdose. TAPNA 2014

McNamara KP, Sellors K, Isbister GK, Whyte IM, Page C, Downes M. Death following recreational use of alph-pyrrolidinopentophenone (alpha PVP): A case of excited delirium syndrome. TAPNA May 2013

McNamara KP, Isbister GK, Whyte IM, Page CB, Downes M. Sustained release paracetamol toxicity: A case of kinetics. TAPNA May 2013


Research – Conference Posters 2011 – 2015


Page C, Berling I & Isbister G. Rate dependent bundle branch block in drug overdose a case report. TAPNA 2014.

Calver LA, Downes MA, Page CB, Chan B & Isbister GK. Droperidol for sedation of acute behavioural disturbance. ASEM meeting May 2012 Chicago.

Calver LA, Downes MA, Page CB, Chan B & Isbister GK. Safety of droperidol for sedation of acute behavioural disturbance. ASEM meeting May 2012 Chicago.
Book Chapters/Sections


**RBH prescribing guidelines – toxicology section 2011 & 2013**


**PAH prescribing guidelines – toxicology section 2011**

**Section Editor – Toxicology – Emergency Medicine Australasia (2013-)**
Reviews for Journals

Annals of Pharmacotherapy

Human & Experimental Toxicology

Journal of Clinical Psychopharmacology

Emergency Medicine Australasia

Emergency Medicine Journal

General Hospital Psychiatry

Medical Journal of Australia

Australian Prescriber

Neuropsychiatric Disease and Treatment

CNS Drugs

European Journal of Emergency Medicine

Journal of the Neurological Sciences
Educational Activities/Presentations/Course Instructor 2011-2015

TPCH – Consultant CME November 2015 – Paracetamol guidelines 2015

PAH Grand Rounds November 2015 – Haemodialysis in Lithium toxicity

LCCH – Consultant CME August 2015 – Paracetamol guidelines 2015

PAH Grand Rounds June 2015 - Acute Digoxin Toxicity

ACEM QLD Autumn Symposium 2015 – Toxicology workshop

TAPNA - Toxicology course (1 day) May 2015

Redcliffe Emergency Department teaching May 2015 – QT Interval

Redcliffe Hospital Grand Rounds – May 2015 The NAC study

PAH Grand Rounds November 2014 – Tricyclic antidepressant overdose

Haematology special interest group – Haematologist and snakebite October 2014

Logan Hospital Grand Rounds October 2014 - Making sense of the QT interval in drug overdose

RCH Grand Rounds September 2014 - Making sense of the QT interval in drug overdose

QE2 Hospital Nurse Practitioner teaching August 2014. Acute behavioural disturbance in the ED

Toxicology update – College of Intensive Care Meeting Brisbane June 2014
PAH Grand Rounds June 2014 – Making sense of the QT interval in drug overdose

TAPNA - Toxicology course May 2014

TAPNA – Metabology workshop May 2014

PAH Haematology meeting – Haematologist and snakebite March 2014

QE2 Hospital ED teaching meeting March 2014. Acute behavioural disturbance in the ED

PAH Grand Rounds November 2103 – Acute behavioural disturbance in the ED

Logan Hospital ED training meeting July 2013. Acute behavioural disturbance in the ED

PAH Grand Rounds June 2013 – Insulin overdose

TAPNA Sedation of the agitated patient workshop presenter May 2013

Royal Brisbane & Woman’s Hospital November 2012 – Sedation of the agitated patient

Toxicology Course November 2012 - Sydney

PAH Grand Rounds November 2012 – Paracetamol toxicity

London Air Ambulance November 2012 – Droperidol for the sedation of the agitated patient

TPCH Grand Rounds November 2012 – Sedation of the agitated patient

Society of Hospital Pharmacists of Australia Seminar in Emergency Medicine – Presenter -September 2012

Newcastle toxicology course (1 day course) May 2012

NSW PIC Toxicology Meeting (2 day meeting) – Presenter April 2012
RPA Toxicology Course (1 day course) December 2011

PA Hospital Grand Rounds September 2011

Autumn Symposium (Queensland ACEM) – Management of the behavioural disturbed patient. May 2011