Outbreak of *Clostridium difficile* 027 in a private healthcare facility alarms other healthcare organisations

*Mal Butler*
Epworth HealthCare

- Acute Campuses – 5
- Rehabilitation Campuses – 3
- Transitional Living Centres, Medical Clinics
- 1200 beds
- In excess of 2000 surgical procedures
- In excess of 30000 bed days per month across all sites
International perspectives

- UK outbreaks – mortality > 2000
- Canadian outbreaks - mortality > 1270
- Appears to be spreading across Europe
- Further outbreaks in the Netherlands, Belgium and France
- Generally not the same high mortality as reported in North America - but still significant
CDI in Asia

• Little is known about *C. difficile* in many areas of South-East Asia.

• Recent work from China (Shanghai), Taiwan

• Singapore, Hong Kong and earlier work from Thailand.

• No useful data from Indonesia

• Nothing from Vietnam, Philippines, Malaysia, Cambodia, etc.

• Some data from India, none from Sri Lanka

• Data from Japan/South Korea but not much
What happened?

- Laboratory called with possible resistant strain
- Communication
- Reputation
- Impact on IC
- Impact on patients
'Killer' stomach bug strikes Australia

A DEADLY stomach bug that has killed thousands of people in North America and Europe is in Australia.

A private hospital in Melbourne last night confirmed three people have been infected and it has probably been transmitted to other patients.

The relatively new, hypervirulent Clostridium difficile bacteria, known as the Quebec strain after it caused the death of 1270 people in the Canadian province in 2003, was responsible for 8324 deaths in Britain in 2007 and in March this year killed 29 people in Copenhagen hospitals.

Epworth Hospital executive medical director Megan Robertson said last night the killer strain had been found in three elderly patients at the inner-city hospital. The first case was confirmed in March and two patients had since recovered and been released. The third is still being treated for an unrelated illness. Tom Riley, a professor of microbiology and immunology at the University of Western Australia who has been tracking the spread of the strain since the Quebec outbreak, said confirmation of the Melbourne cases was "of huge concern".

Professor Riley has been warning the medical fraternity since 2006 about the risks of an Australian C. diff epidemic and the ill-preparedness of the health and hospital system to respond to a fatal outbreak.
No way to fingerprint deadly hospital bug: clostridium difficile

by: Leigh Dayton and Chip Le Grand    May 29, 2010 12:00AM

THIS week's revelation that three people in a private Melbourne hospital contracted a deadly gut bug responsible for the deaths of thousands of patients in European and North American hospitals has highlighted the need for a national network of laboratories able to identify the killer strain.

Only two laboratories, one in Perth, the other in Sydney, are equipped to detect the genetic signature of the virulent version of Clostridium difficile.

While so-called genetic typing of the strain -- C. difficile PCR ribotype 027/North American pulsed-field type 1, the Quebec strain for short -- is not critical for treating patients, experts claim it's essential to track an outbreak of it should one occur. "The most important thing is that we have a very clear idea of the number of the cases we're seeing," says Westmead Hospital microbiologist Lyn Gilbert, who heads the Sydney laboratory able to type C. difficile strains.
• **C. difficile superbug threatens Australia**

• AUSTRALIA faces an onslaught of antibiotic-resistant strains of the “superbug” Clostridium difficile unless surveillance and monitoring systems are quickly stepped up, an expert believes. Until this year, Australia had been protected by a combination of luck, relative geographical isolation and conservative policies regarding fluoroquinolone use, said Professor Thomas V. Riley, a microbiologist and immunologist at the University of WA. An outbreak of the fluoroquinolone-resistant ribotype 027 strain of the C. difficile infection (CDI) had already occurred in Australia this year, he said, the same strain responsible for outbreaks across North America and Europe that resulted in high ...
New “super bug” threatens Australian hospitals

By John Mackay  19 May 2011

Last month’s edition of the Medical Journal of Australia provided a new warning that a virulent strain of a hospital-acquired bacterial infection, responsible for the deaths of at least 2,000 patients in Canada in 2003-2004, had arrived in Australia.

The organism has also spread to Europe and there are reports now of cases in Asia and Central America. While most infections have been in hospitals, increasing numbers of community-associated cases are being reported in the US and Europe, demonstrating the “super-bug’s” capacity to also infect vulnerable individuals outside healthcare facilities.

The Journal provided a case study involving a potent strain of the bacteria Clostridium difficile (C. difficile). The January 2010 infection occurred in an elderly man, nine days after cardiac surgery in Melbourne’s Epworth hospital, the largest private hospital in the state of Victoria.
What are the major risk factors for *C. difficile*?

- Exposure to the organism
- Exposure to antibiotics - particularly clindamycin and extended spectrum cephalosporins (until now)
- Old age
<table>
<thead>
<tr>
<th>Patients</th>
<th>Age</th>
<th>Admission day</th>
<th>Onset of diarrhoea post admission</th>
<th>Days between admission and diagnosis</th>
<th>Previous admissions in past 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient A</td>
<td>83</td>
<td>28/01/10</td>
<td>6</td>
<td>19</td>
<td>nil</td>
</tr>
<tr>
<td>Patient B</td>
<td>66</td>
<td>21/03/2010</td>
<td>On admission</td>
<td>40</td>
<td>2 weeks</td>
</tr>
<tr>
<td>Patient C</td>
<td>87</td>
<td>10/04/2010</td>
<td>16</td>
<td>23</td>
<td>nil</td>
</tr>
<tr>
<td>Patient D</td>
<td>63</td>
<td>*16/05/2010</td>
<td>On admission</td>
<td>0</td>
<td>January 2010 (5 months)</td>
</tr>
<tr>
<td>Patient E</td>
<td>88</td>
<td>*29/05/2010</td>
<td>On admission</td>
<td>0</td>
<td>nil</td>
</tr>
<tr>
<td>Patient F</td>
<td>77</td>
<td>10/06/2010</td>
<td></td>
<td>0</td>
<td>March 2010 (4 months) ~with diarrhoea</td>
</tr>
<tr>
<td>Patient G</td>
<td>97</td>
<td>*03/08/2010</td>
<td>13</td>
<td>16</td>
<td>February 2010 (6 months)</td>
</tr>
</tbody>
</table>

* Nursing home admission
## Analysis

<table>
<thead>
<tr>
<th>Patients</th>
<th>Bed Moves</th>
<th>Linked beds/rooms</th>
<th>Campus</th>
<th>Linked wards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient A</td>
<td>4</td>
<td>Nil</td>
<td>1</td>
<td>4 EE/6/ICU</td>
</tr>
<tr>
<td>Patient B</td>
<td>6</td>
<td>Nil</td>
<td>1</td>
<td>2ES</td>
</tr>
<tr>
<td>Patient C</td>
<td>8</td>
<td>Nil</td>
<td>1 &amp; 2</td>
<td>6/2ES/ICU /2West</td>
</tr>
<tr>
<td>Patient D</td>
<td>12</td>
<td>Nil</td>
<td>1</td>
<td>ICU /4EE</td>
</tr>
<tr>
<td>Patient E</td>
<td>3</td>
<td>Nil</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Patient F</td>
<td>3</td>
<td>Nil</td>
<td>1 &amp; 2</td>
<td>2 West</td>
</tr>
<tr>
<td>Patient G</td>
<td>4</td>
<td>Nil</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Patient A & D – 6 days between occupation - ICU  
Patient A & C - + 30 days - ICU  
Patient A & C - + 30 days between occupation – Level 6  
Patient A & D – 19 days between occupation -  
Patient B & C – 30 days between occupation
Epidemiologic discussion

*Clostridium difficile* PCR ribotype 027

- Of all *Clostridium difficile* isolates between February 2010 and September 2010 seven were the same resistant strain
- Independently confirmed (three laboratories)
- Three patients admitted with diarrhoea and all other patients had an onset of diarrhoea >48 hrs post admission
- Geographical and temporal link for all cases
<table>
<thead>
<tr>
<th>Pre May 2010</th>
<th>Post identification of cluster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not reportable to the Department of Health</td>
<td>Reportable to Department of Health</td>
</tr>
<tr>
<td>Faecal specimens tested only as per request</td>
<td>All faecal specimens tested for C difficile</td>
</tr>
<tr>
<td>Precautions – 48 hours</td>
<td>Precautions – 72 hours</td>
</tr>
<tr>
<td>Bed moves as required</td>
<td>Bed moves scrutinized for suitability</td>
</tr>
<tr>
<td>Cleaning post discharge with detergent and water unless an identified resistant organism then a bleach clean</td>
<td>All discharge cleaning with a bleach product (Divercleanse)</td>
</tr>
<tr>
<td>Tuffie wipes used for equipment cleaning</td>
<td>Introduced Tuffie 5 wipes for all equipment cleaning</td>
</tr>
<tr>
<td>Education as per annual schedule</td>
<td>Education introduced for patients, families and staff for all patients in precautions</td>
</tr>
<tr>
<td>Clostridium difficile not reported at internal meetings</td>
<td>Clostridium difficile monthly reporting at IC and Quality meetings</td>
</tr>
<tr>
<td>No antimicrobial stewardship program</td>
<td>Antimicrobial stewardship program commenced</td>
</tr>
</tbody>
</table>
Why?
What is driving this apparent epidemic?

- Aging population
- New fluoroquinolone use
- Gastric acid suppressant use
- ?Animal reservoir, pigs/cattle for example
In Australia

• Study at Melbourne Pathology of 186 patients – no hypervirulent strain detected
• We have CDI + different hypervirulent strains
• We have hyper-toxin A & B producers
• No evidence of widespread quinolone resistance (~1%)
• First 027 case reported 2009 (Riley et al. Med J)
• Cost estimates A$15,625 per patient (Riley et al. Med J)
• Continued surveillance required
Epworth HealthCare

• To date no further cases identified at any of our hospitals
Thank you

- Dr Lyn Waring Director of Microbiology, Melbourne Pathology
- Lauren Phillips Infection Control at Epworth HealthCare
- Dr Daniel Stefanski Infectious Diseases Registrar Melbourne Pathology and Monash Medical Centre
- Professor Tom Riley Principal Research Scientist, PathWest Laboratory Medicine, WA