Melioidosis campaign event

*Anthony Draper and Jennifer Fry, CDC Darwin*

**Background**

Melioidosis is caused by the bacterium *Burkholderia pseudomallei* which lives in the soil but surfaces after heavy rainfall and is found in surface water and mud and can even become airborne. The bacteria usually enter the body through cuts and sores or when contaminated dust or water droplets are breathed in.

People most at risk of getting melioidosis are those with diabetes and those who consume large amounts of alcohol (including binge drinkers). Also at risk are people with kidney or lung disease, those with cancer, people with weakened immune systems or those undergoing immunosuppressive therapy including with steroids.

Healthy people can also contract melioidosis if they come in contact with surface water or mud without good hand or foot protection (see Figure 1).

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**Figure 1. Protective hand and footwear**

*Photograph: Charles Rantz Strebor*
The Northern Territory (NT) has the highest recorded incidence of melioidosis in the world.

The 2011-2012 wet season saw the highest ever number of recorded cases of melioidosis in the NT with 97 cases and 9 deaths. This exceeded the previous record of 91 cases which occurred during the 2009-2010 wet season. Cases of melioidosis occur every wet season however increased numbers usually follow above average rainfall.

Figure 2 shows the number of melioidosis cases each year in the NT since 1998.

Every year before and during the wet season, The Centre for Disease Control (CDC) of the NT’s Department of Health (DoH) puts out media releases and talks with print, radio and TV reporters as well as community groups about melioidosis. Information about the disease, which includes describing the characteristics of those most at risk of the disease and what can be
done to reduce exposure is shared. It is a constant challenge to keep the public informed and particularly to make newcomers and visitors to the Top End aware of the presence of *B. pseudomallei* in the environment and the risk it presents. With the rates of disease rising over the past 3 years to record highs a new melioidosis campaign was developed to heighten awareness of the disease and to enable wider dissemination of information about melioidosis to the community.

**Melioidosis awareness campaign event**

CDC held a media event on 7 December 2012 to increase public awareness of melioidosis for the wet season. The Health Minister, Honorable David Tollner MLA and Her Worship, Ms Katrina Fong-Lim, Lord Mayor of Darwin were present to unveil the poster entitled “Melioidosis; Are you at risk this wet season?” (Figure 3) and to highlight the need for Top Enders to be aware of the disease. Helen Bateman, Minister Tollner’s electoral officer, described developing melioidosis after Cyclone Carlos in 2011. She lives in a 2nd floor apartment in Darwin and believes that she contracted the disease via airborne particles. Ms Bateman who reported she had diabetes, a risk factor for melioidosis, survived the disease after a lengthy stay in intensive care.1,2

Darwin Lord Mayor Katrina Fong Lim supported the need for greater public awareness of melioidosis, which claimed the life of her father in the 1990s.2 Lord Mayor Fong Lim said her father, Alec, who was also a Lord Mayor of Darwin, was a diabetic and died from complications associated with the soil-borne disease in the 1990’s. "It's a constant reminder, to please be careful," she said. The Lord Mayor herself is a diabetic and said "We've also got more people who might be susceptible to melioidosis; people like myself".3

The poster has been distributed to nurseries, hardware stores, sporting clubs, health services and other places where people congregate. The poster aims to inform the public about melioidosis and the presence of *B. pseudomallei* in the soil of the Top End. Precautions such as wearing gloves and enclosed shoes (Figure 1) and staying indoors during heavy winds and rain are simple steps one can take to reduce the risk of becoming infected.

For more information about melioidosis, contact the CDC in your region:

<table>
<thead>
<tr>
<th>Region</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alice Springs</td>
<td>8951 7540</td>
</tr>
<tr>
<td>Darwin</td>
<td>8922 8044</td>
</tr>
<tr>
<td>Katherine</td>
<td>8973 9049</td>
</tr>
<tr>
<td>Nhulunbuy</td>
<td>8987 0357</td>
</tr>
<tr>
<td>Tennant Creek</td>
<td>8962 4259</td>
</tr>
</tbody>
</table>

To download the melioidosis poster and fact sheet:


**References**


*Melioidosis is caused by a bacterium *Burkholderia pseudomallei*, not a virus as reported.

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Abstract

Typhoid is a systemic illness endemic to many developing countries but largely eliminated in Australia by appropriate sanitation and water treatment practices. However, from the period September 2011 to August 2012, there were 6 confirmed cases of typhoid in the Northern Territory (NT). The presentation, origin, and management of these cases including the NT Centre for Disease Control’s public health response were examined. All cases were imported. While only 3 of the 6 cases were cleared strictly by the relevant guidelines, it was felt that overall, the public health response was adequate in investigating and managing public risk. Some suggestions for process improvements are given.

Key words: typhoid fever, public health, Northern Territory, population surveillance

Introduction

Typhoid is a systemic illness caused by the bacteria Salmonella enterica serotype Typhi. Transmission is via the ingestion of food or water contaminated with faeces or urine of infected people. It has been largely eliminated from Australia by good sanitation and clean water sources but remains endemic to many developing countries. During the 12 month period September 2011 to August 2012 there were 6 typhoid notifications in the Northern Territory (NT). The NT Centre for Disease Control (CDC) is responsible for the public health response. These cases and their management are reviewed here.

Method

The Northern Territory Notifiable Diseases System was used to find the confirmed typhoid cases in the NT over the 12 month period from September 2011 to August 2012. All cases were included. Each case’s medical chart and CDC investigation file were reviewed. National data on typhoid fever cases are from the National Notifiable Diseases Surveillance System and NT and Australian population and travel are from data from the Australian Bureau of Statistics.

The NT CDC uses the national case definition as determined by the Communicable Diseases Network Australia (CDNA). A confirmed case of typhoid requires culture or detection of Salmonella Typhi (Salmonella enterica serotype Typhi). Paratyphoid fever is a similar but usually less severe illness, caused by Salmonella enterica serotype Paratyphi. It is not classified as typhoid and does not fit the case definition and such cases are not included here. The public health response for typhoid cases is guided by Heymann’s Control of Communicable Diseases Manual (CCDM) and this audit therefore uses this Manual as the standard. The public health response will be assessed on the following elements:

- Isolation of the case of typhoid and enteric precautions while ill
- Identification of the source of infection
- Hygiene advice
- Case clearance of the infection (by 3 consecutive negative faecal cultures at least 24 hours apart, at least 48 hours after any antimicrobials, and not earlier than 1 month after onset)
- Investigation of household contacts and co-travellers, especially those who are in sensitive occupations.

Results

Table 1 shows the number of notified cases of typhoid in the NT and Australia since 1991. There were 4 cases of typhoid in the NT as at 30 August 2012 and 3 in 2011, with 6 of these 7 notified in a 12 month period. The numbers vary considerably year-to-year and when calculated as a rate per 100,000 population, there appears to be a gradual upward trend, consistent with the apparent trend Australia-wide (Figure 1).

None of the typhoid cases were related. All were returned travellers. At least 4 had been visiting family abroad as well as travelling. Destinations for the cases were all countries with endemic typhoid and included Indonesia (2), Myanmar (1), Bangladesh (1) and India (2). All patients had consumed local food and water while travelling.
Of the 6 patients, 2 were female. There was one 3 year old child and the other 5 cases were aged between 21 and 38 years. There were 2 who worked in occupations of note: 1 as a community care nurse visiting clients in their homes and the other a part-time supermarket worker with limited food-handling duties.

All patients were previously well with no past medical history of immunocompromising disease or medications. Although 5 of the 6 patients presented with fever the other presenting features were quite different. These presentations are shown in Table 2. All patients were previously well. Abdominal pain was present in half the patients but was the primary complaint for just 1 patient. There were 5 patients who were hospitalised. Of these 2 were hospitalised only after being recalled to the Emergency Department following results of blood cultures showing growth of Gram negative organisms.

No cases had been immunised against typhoid fever and none had a previous known history of typhoid fever.

While 5 of the 6 cases became unwell within the expected range (3-60 days) of travel, 1 case had travelled to a typhoid endemic country 6 months prior to diagnosis. This case was asymptomatic until he presented with abdominal pain and diarrhoea and was found to have a positive faecal culture for *S.Typhi* and investigated with an abdominal CT scan. This showed 2 gallstones in his gallbladder with no associated inflammation.

Of the 4 available serogroup subtypes, 3 were serogroup subtype A and 1 was E1. The latest 2 are as yet untyped. All cases were fully susceptible to ampicillin and trimethoprim/sulphamethoxazole. Ceftriaxone susceptibility testing was only requested in 3 of the cases and all were susceptible. There was 1 case resistant to ciprofloxacin. This patient had travelled to Bangladesh. Susceptibility testing and antibiotic treatment are summarised in Table 3. All the cases except the ciprofloxacin-resistant case.

### Table 1. Notified cases of typhoid in the Northern Territory and Australia since 1991

<table>
<thead>
<tr>
<th>Year</th>
<th>NT</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1</td>
<td>69</td>
</tr>
<tr>
<td>1992</td>
<td>1</td>
<td>41</td>
</tr>
<tr>
<td>1993</td>
<td>2</td>
<td>80</td>
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<td>1994</td>
<td>3</td>
<td>67</td>
</tr>
<tr>
<td>1995</td>
<td>0</td>
<td>69</td>
</tr>
<tr>
<td>1996</td>
<td>0</td>
<td>78</td>
</tr>
<tr>
<td>1997</td>
<td>4</td>
<td>81</td>
</tr>
<tr>
<td>1998</td>
<td>1</td>
<td>57</td>
</tr>
<tr>
<td>1999</td>
<td>0</td>
<td>63</td>
</tr>
<tr>
<td>2000</td>
<td>1</td>
<td>58</td>
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<td>2001</td>
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</tr>
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<td>50</td>
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<tr>
<td>2005</td>
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<td>52</td>
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<tr>
<td>2006</td>
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<td>3</td>
<td>90</td>
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<td>1</td>
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<td>0</td>
<td>115</td>
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<tr>
<td>2010</td>
<td>2</td>
<td>96</td>
</tr>
<tr>
<td>2011</td>
<td>3</td>
<td>134</td>
</tr>
<tr>
<td>2012 (to 30 August)*</td>
<td>4*</td>
<td>81</td>
</tr>
</tbody>
</table>

### Table 2. Symptoms of cases

<table>
<thead>
<tr>
<th>Case</th>
<th>Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Abdominal pain, diarrhoea</td>
</tr>
<tr>
<td>2</td>
<td>Fever, abdominal pain, diarrhoea, vomiting</td>
</tr>
<tr>
<td>3</td>
<td>Fever, nausea, anorexia, headache, myalgia, weakness, non-productive cough, shortness of breath</td>
</tr>
<tr>
<td>4</td>
<td>Fever, watery diarrhoea, nausea, anorexia, headache, myalgia</td>
</tr>
<tr>
<td>5</td>
<td>Fever, nausea, anorexia, headache, myalgia, tiredness, photophobia, stiff neck</td>
</tr>
<tr>
<td>6</td>
<td>Fever, abdominal pain, nausea, headache, lethargy, photophobia, rigors, sweats</td>
</tr>
</tbody>
</table>
were treated with ceftriaxone in hospital. Oral ciprofloxacin was prescribed for 3 on discharge. The ciprofloxacin-resistant case was given azithromycin and the 3 year old was given amoxicillin on discharge. All patients improved within 1 week of antibiotic treatment with the longest hospital stay being 7 days. There were no serious complications.

Isolation and contact precautions fall within the scope of responsibility of the treating doctors and as far as records indicate they appear adequate (Table 4). Isolation and contact precautions were implemented for 3 cases, 2 were undocumented and 1 case was not hospitalised. It is likely that the same was implemented for the 2 undocumented cases, but this cannot be confirmed. Hygiene and prevention of transmission was discussed with 5 cases, with the 6th case undocumented. The patient who was not hospitalised had hygiene practices discussed in depth. Half of the cases were given supporting information, 2 were undocumented and 1 was not provided with a factsheet.

The CCDM criteria\(^4\) for releasing a case from supervision are:
- 3 consecutive negative cultures of faeces (and urine in patients with schistosomiasis) at least 24 hours apart and at least 48 hours after any antimicrobials and not earlier than 1 month after illness onset.

There were 3 cases which were cleared completely according to the criteria and 3 only partially. All had at least 1 negative culture. Of those only partially cleared:
- 1 had only 2 of the 3 required negative cultures. There are no further notes in the file after the second specimen was cleared. This case was not in a high-risk category nor did the case have any high-risk contacts.
- 1 case had 3 consecutive negative cultures, more than 48 hours after the last antimicrobial, but these were completed

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**Table 3. Case culture susceptibilities and respective antibiotic treatment**

<table>
<thead>
<tr>
<th>Case</th>
<th>Ampicillin</th>
<th>Ceftriaxone</th>
<th>Ciprofloxacin</th>
<th>TMP-SMZ*</th>
<th>Inpatient antibiotic treatment</th>
<th>Outpatient antibiotic treatment</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>S</td>
<td>N/A</td>
<td>S</td>
<td>S</td>
<td>Ceftriaxone</td>
<td>Amoxicillin</td>
</tr>
<tr>
<td>2</td>
<td>S</td>
<td>N/A</td>
<td>R</td>
<td>S</td>
<td>Azithromycin</td>
<td>Azithromycin</td>
</tr>
<tr>
<td>3</td>
<td>S</td>
<td>S</td>
<td>N/A</td>
<td>S</td>
<td>N/A</td>
<td>Azithromycin</td>
</tr>
<tr>
<td>4</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>Ceftriaxone</td>
<td>Ciprofloxacin</td>
</tr>
<tr>
<td>5</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>Ceftriaxone, then</td>
<td>Ciprofloxacin</td>
</tr>
<tr>
<td>6</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>S</td>
<td>Ceftriaxone</td>
<td>Ciprofloxacin</td>
</tr>
</tbody>
</table>

*Trimethoprim/Sulphamethoxazole

**Table 4. Public health response**

<table>
<thead>
<tr>
<th>Public health response</th>
<th>Yes</th>
<th>No</th>
<th>Undocumented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of probable source of infection</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isolation &amp; contact precautions*</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hygiene and preventing transmission of <em>Salmonella</em> discussed</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Salmonellosis information provided (brochure)</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Case cleared according to CCDM criteria</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Contacts advised about action if they become unwell</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*hospitalised cases only*
within 1 month of onset. This case was working as a community care nurse and had been excluded from duties until cleared.

- 1 patient had only 1 negative faecal culture after completing antibiotic treatment. Notes state that the case failed to collect specimen containers and that repeated attempts to contact the case were unsuccessful. This person was not in a sensitive occupation and did not have high-risk contacts.

Among the 6 cases, they had a total of 16 household contacts and/or co-travellers. Of these household contacts, 2 were working as food-handlers at the time. A total of 5 contacts had faecal cultures that all returned negative results. The extent of the activity regarding other contacts is uncertain, mostly due to minimal documentation. Notable was that many case contacts were referred to in case files simply as, for example ‘Mum’, ‘Dad’, or ‘brother’ without any names or hospital registration numbers. For most contacts, documentation was incomplete e.g. their occupations were not listed and what was communicated about them was limited.

**Discussion**

Recognising the low-cost airfares from Darwin to various southeast Asian destinations, the strong Australian dollar and packages which make travel holidays more affordable, it seems most likely that the apparent increase in NT typhoid cases in recent years is due to more people travelling to endemic countries. Given that most, if not all cases appear to be imported (via returned travellers), similar to typhoid cases in most developed countries the incidence might better be assessed as a proportion of overseas travel. When looking at the number of typhoid cases in Australia compared to the numbers of Australian residents travelling overseas (ABS ‘short-term movement, resident departures’), as illustrated in Figure 2, the trend appears to be gradually increasing since a low in 2005. Unfortunately a breakdown by state is not available although it would seem likely that the Australian trend would also be reflected in the NT. It is possible that more testing for typhoid is occurring. Of returned travellers who get typhoid, a large proportion tend to be those visiting friends and relatives. These travellers probably are less likely to seek pre-travel advice than other travellers and was the situation in at least 4 of the 6 NT cases.

Globally, typhoid incidence is difficult to measure and, hence, it is difficult to compare NT and Australian trends to the overall world picture. Crump, Luby and Mintz in their 2004 paper attempted to estimate the global burden of typhoid fever. Their extrapolations showed an increase in typhoid fever cases, but this was accompanied by an increase in the world population. They found some data suggesting that typhoid fever incidence may actually have decreased over the last several decades, including in India to which 2 of the 6 cases travelled. In all, it seems the incidence in Australia is declining and it would be appropriate to assume we can explain the apparent increase in cases by a rise in overseas travel overall.

In endemic areas, children and adolescents are more commonly affected than adults. However, most of the NT cases were in adults, and this is consistent with a case series in a country with imported cases which showed

**Figure 2. Incidence of typhoid fever in Australian travelers (Short-term Movement, Resident Departures) 1991-2012 (projected 2012 figures)***

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*The Northern Territory Disease Control Bulletin Vol 19, No. 4 December 2012*
similar findings.\textsuperscript{12} That the cases had not been immunised against typhoid is not surprising as travellers visiting friends and/or family have been recognised as being less likely to seek pre-travel advice.\textsuperscript{13}

Common symptoms of typhoid fever include fever, abdominal pain, myalgia, and dry cough.\textsuperscript{5,10} This was reflected in the range of presentations of these 6 cases, but a non-productive cough was recorded for only 1. Headache was, as expected, also a feature in 4 of the presentations. Rose-spots are classically described for typhoid fever\textsuperscript{5} however they were not observed in any of the cases.

The typical time from infection to symptoms is 1-2 weeks with a range of 3-60 days.\textsuperscript{4} Only 1 of the 6 cases presented more than 6 months after travel, raising the concern that this may have been either a locally-acquired case or a long-term carrier. Chronic carriage is defined as “excretion of the organism in stool or urine >12 months after acute infection.”\textsuperscript{14} This 1 case falls somewhere in between the recognised incubation period and chronic carriage. This case also was found to have gallstones. Patients with gall stones or cholelithiasis have been identified as being more likely to have chronic \textit{S.Typhi} carriage than patients without.\textsuperscript{14} The presence of gallstones strengthens suspicion that this patient presented as a potential chronic carrier. Fortunately no other cases have emerged that appear linked to this case so treating this patient’s infection (whether it be acute or chronic) should be adequate in managing the public risk.

Guidelines recommend that typhoid acquired in southeast Asia or the Indian subcontinent be treated with azithromycin or ceftriaxone intravenous (IV) (rather than ampicillin) due to patterns of resistance.\textsuperscript{11,15} This recommendation is even if cases are fully-susceptible to ampicillin which all the NT cases were. All cases had at least 1 negative faecal culture for the pathogen following treatment suggesting the infection was successfully cleared.

Comments on the public health response include:

- Isolation and contact precautions were well observed although not well documented. Improvement could be gained by clearly documenting any need for isolation and contact precautions and the circumstances for action.
- There is some room for improvement in reinforcing good patient hygiene and in prevention of transmission. Mode of disease transmission and appropriate hygiene should be clearly discussed with the patient, a factsheet provided, and the process clearly documented in case notes.
- On balance of risk and resources available, it seems the risk to the public has been adequately managed. Follow-up of cases is challenging and often time consuming and an inefficient use of resources. During the period that clearance specimens are to be obtained, patients have often recovered, feel well and do not want to or feel the need to continue to engage with the healthcare system. This makes fulfilling all clearance criteria quite a difficult task. Often it requires the CDC staff member to make an informed judgement on the public risk versus utilisation of resources to follow up cases that may already have become extremely low risk in a country with good ablution facilities and the capacity for good hygiene practices.

Assessing the extent of risk to contacts was challenging because for most cases, names, hospital registration numbers and occupations were not recorded. This made it difficult in most cases (without re-contacting cases now), to check results if screening had been arranged.

Although only 3 of the 6 cases were cleared exactly according to guidelines, the degree of the response in the remaining 3 is likely sufficient to minimise any risk to public health via transmission from these cases. While ideal practice, the benefit from 3 stool samples being negative given that the first is negative, would be marginal. For some where the information is incomplete, it may be that public health activities were indeed carried out (e.g. isolation and enteric precautions) but have not been documented. Also, the lack of a CDC-produced typhoid factsheet that can be given to cases and their contacts meant there was no consistent resource information to distribute. Those who were provided information were given a factsheet from another source, although the source was not recorded.
Suggestions for improvement of the public health response include:

- Finalise a NT typhoid factsheet and provide a link. Ensure it is distributed to all cases and their contacts during each response.

- Increase preventative activity: Increase communication to travellers, particularly those visiting family or country of origin, about accessing pre-travel health advice including immunisation for typhoid.

- Better documentation of contact names, occupations, and any screening done or justification for not screening recorded. This could easily be tabulated in each case file. See Table 5 for a suggested format.

- Make a checklist for screening activities including timing of faecal cultures, and list of contacts.

Overall, the public health response, though not perfect, appeared adequate in investigating and managing the public risk from typhoid cases in the NT over the 12 month period from September 2011 to August 2012.

Further information

Typhoid and paratyphoid factsheet (see P 11).

For health advice for travellers: [http://health.nt.gov.au/Travelling to South East Asia](http://health.nt.gov.au/Travelling to South East Asia)


Acknowledgement

I would like to thank Dr Vicki Krause and Dr Peter Markey for the idea for this paper and in assistance with its formation and focus.

References


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Alzheimer’s Australia NT

On 21 December 2012 CDC Darwin received a letter of thanks for their donation of $75 from Alzheimer’s Australia NT. The money was raised from recycling drink cans and bottles. Thank you to all Building 4 staff who contributed.

Alzheimer’s Australia is the charity for people with dementia and their families and carers. As the peak body, it provides advocacy, support services, education and information. www.fightdementia.org.au.

National Dementia Helpline: 1800 100 500 (The National Dementia Helpline is an Australian Government initiative).

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Typhoid and paratyphoid fever

What are typhoid and paratyphoid fever?
Typhoid fever is a disease caused by the bacteria Salmonella Typhi, while paratyphoid fever is caused by Salmonella Paratyphi. They are both known as 'enteric fevers' and are common in some developing countries. Typhoid and paratyphoid fever do not normally occur in Australia but are infections usually acquired in countries where they are endemic.

What are the symptoms?
The symptoms of typhoid and paratyphoid fever are similar although paratyphoid tends to be less severe than typhoid. Those infected can experience fever, headache, lack of appetite and perhaps a dry cough. Some people may experience diarrhoea but on the other hand some may get constipation. Some cases, particularly those with light skin, may develop pink spots on the trunk. A few people who become infected may only have a short mild illness or no symptoms at all, but continue to harbour the bacteria for long periods of time. These 'carriers' can pass the typhoid bacteria on without knowing that they are infected. A small number of people may develop severe complications such as intestinal perforation, pneumonia, meningitis or kidney failure.

Typhoid and paratyphoid fever are diagnosed from a blood or faeces (stool) specimen.

How is it spread?
Spread of disease occurs when people consume food or water that has been contaminated by the faeces of other people carrying the disease. Raw fruits and vegetables, milk and shellfish are the types of food most associated with the illness.

What is the infectious period?
The time between infection and the appearance of symptoms can vary, but generally people show symptoms around 8 to 14 days after they were infected but it can be up to 2 months. People with typhoid can shed the bacteria in their faeces for 2 to 6 weeks. Between 1-4% of people continue to shed the bacteria for months or years if not treated with antibiotics.

Who is at risk?
Anyone can be infected with typhoid or paratyphoid, however people most at risk are travellers to countries where typhoid is common. Household contacts and co-travellers of cases are also at risk. People with a lowered immune system may become infected with typhoid much more easily and can develop a more severe disease. Anti-ulcer and anti-reflux medications can increase the risk of typhoid fever by lowering the acid level in the stomach.

What is the treatment?
Some people may require hospitalisation and treatment with antibiotics. Others who may not show symptoms of typhoid but are carriers of the disease will also require treatment with antibiotics.

How can it be prevented?
People travelling in developing countries where typhoid is common should be vaccinated prior to travel and:
- avoid uncooked foods, including fruit unless it is able to be peeled
- avoid untreated water, including ice
- drink beverages from sealed containers
- wash their hands after going to the toilet and before eating
• avoid eating from street stalls
• ensure hot food is thoroughly cooked and eaten while hot.

Typhoid vaccine is available from your local GP or travel clinic and is either a 1 dose injection or a course of 3 capsules. Even if you have previously lived in an area where typhoid is common, you will need to be vaccinated if you travel back on holiday. The vaccine only covers typhoid fever, but not paratyphoid fever, and is not 100% effective. It is therefore extremely important to follow the food and hygiene recommendations, even if you have had the vaccination. The vaccine only gives protection for about 3 years so it is important to check that you are up to date with your vaccinations every time you travel abroad, as booster doses may be needed.

How can it be controlled?

It is very unusual for typhoid and paratyphoid fever to spread in Australia. People with typhoid or paratyphoid fever are followed up to ensure that they have cleared the disease. In addition, their travelling companions and, in certain circumstances, their household contacts are screened for the disease. Cases should not prepare food for others.

A number of stool tests will be required to assess when a person is cleared of infection with Salmonella Typhi; this is done in collaboration with the local Centre for Disease Control and the case’s doctor.

All doctors and laboratories in the Northern Territory must notify cases of typhoid fever to the local Centre for Disease Control. Laboratories are also required to notify cases of paratyphoid fever.

For more information contact the Centre for Disease Control in your region

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or

www.nt.gov.au/health/cdc
Northern Territory measles cases in September and October 2012: 
Public health management in action

Heather Cook, CDC Darwin

Abstract

In September – October 2012, there were 3 cases of measles linked to a New South Wales outbreak followed up in the Northern Territory (NT) by the Darwin Centre for Disease Control. A total of 214 persons were identified as exposed to an infectious case through contact within the household, general practice surgeries, Royal Darwin Hospital Emergency Department and a childcare centre. The public health management of contacts included offering vaccination, normal human immunoglobulin, serology screening for IgG antibody and recommending isolation and exclusion from childcare and health care facilities for those found to be non-immune. These measures in addition to a high level of measles immunity within the community contributed to the interruption of measles transmission within the NT.

Key words: measles, outbreak, National Guideline, PCR, contact tracing, immunity, vaccination, MMR, isolation

Introduction

A marked increase in the number of measles cases has been recorded in Australia in 2012. The majority of these cases came from New South Wales (NSW) where an ongoing outbreak started in April 2012, associated with a returned traveller from Thailand. In the Northern Territory (NT) a total of 3 cases and 214 identified contacts have been followed up by the Centre for Disease Control (CDC) linked to the NSW outbreak.

Case 1

In September 2012 a 14 year old female from NSW travelled to the NT via a commercial airline flight. She reported feeling mildly unwell at the time of travel. On 14 September she developed cough, coryza, sore throat, vomiting and fever. She visited a general practice (GP) surgery in Palmerston, NT on 2 occasions over the following days before presenting at a NT remote community clinic with a florid rash.

Measles screening via serology was undertaken at the remote clinic. A positive IgM result received on 26 September from a private laboratory alerted the CDC to the presence of an infectious measles case in the NT.

Case 2

On 24 September a 10 month old child in Darwin, NT reportedly developed ‘flu-like symptoms’. The child attended childcare on 24, 25 and 26 September before presenting to 2 GP surgeries with subsequent referral to Royal Darwin Hospital (RDH) on 28 September. A diagnosis of measles was made and confirmed via polymerase chain reaction (PCR) testing.

Case 3

A 12 month old contact from childcare of Case 2 developed possible measles symptoms of fever and cough on 6 October and was screened for measles via PCR by the CDC on 10 October. This child had received a measles containing vaccine, measles-mumps-rubella (MMR) vaccine, as part of the childhood immunisation schedule on 2 October 2012. Further analysis of the PCR sample received on 22 October revealed ‘wild measles virus’ strain.

Methods

The National Guideline for public health units, developed by the Communicable Diseases Network of Australia (CDNA) for the management of measles cases was used to guide the follow up of each of the cases. Follow-up includes case confirmation and determination of measles vaccine history, case isolation during the infectious period and contact tracing. The management of contacts includes providing general advice on signs and symptoms of measles, determining the contacts immune status and for those non-immune, offering measles vaccine (MMR) or normal human immunoglobulin (NHIG) where required and time allows. If appropriate post-exposure prophylaxis is not provided, exclusion measures from childcare and health care facility
workplaces is required during the period when contacts are most likely to develop disease. The period for transmitting the measles infection is up to 14 days following the onset of rash in the index case.

Providing information to potentially susceptible contacts not followed-up individually was achieved through distribution of information and advice via the airline, the affected childcare centre and the media. In addition, alerts were distributed to clinicians throughout the NT. The other States and Territories were notified via the CDNA.

Results

Case 1 who had travelled to the NT from NSW had received 2 measles-containing vaccines at 1 and 4 years of age. Although no known contact with a confirmed measles case could be ascertained the family advised that a fellow student who travelled on the same school bus in NSW as Case 1 had developed a measles-like rash and was known to have been exposed to a previously confirmed measles case in NSW. Case 1 travelled to the NT during the early prodromal stage of her infection and therefore was probably infectious both at the airport and during the flight from Sydney to Darwin. However as more than 14 days had elapsed it was decided no other passenger follow up was required. The airline was contacted, requesting relevant staff be on alert for measles signs and symptoms. All associated airline staff were found to be immune. Prior to diagnosis the case had visited Darwin, Palmerston, Jabiru, Katherine and Daly Waters. Contact tracing included travel companions, the GP surgery (located within a large shopping centre) visited on 2 occasions and a remote health clinic with a total of 108 persons identified. Details of individual contact tracing and outcomes are outlined in Table 1.

Case 2 was too young to have received any scheduled measles vaccination. No specific contact with Case 1 was identified; however the child resided in Palmerston and was likely to have frequented the shopping centre which includes the GP surgery visited by Case 1. In addition to follow up of identified household and other known contacts, Case 2 contact tracing included persons exposed at a childcare centre, 2 GP surgeries and the RDH Emergency Department during the infectious period. Rapid notification of the positive result to CDC enabled timely contact tracing and intervention opportunities for some non-immune contacts.

MMR vaccine was administered to 22 persons and 1 person received NHIG. Immunity was confirmed via serology for 9 contacts that were unsure of their immune status and therefore NHIG was not needed for these individuals. See Table 2 for further details of contact tracing outcomes. The RDH Infection Control Department was responsible for follow-up of hospital staff and inpatients exposed through the ED visit and these data are not included in this report.

Two non-immune adults who worked in a healthcare setting and 3 unimmunised infants from the childcare centre were requested to remain in home isolation during the period they would be likely to develop measles.

Sequencing of the PCR sample revealed the strain to be genotype D8, the NSW outbreak strain and therefore Case 2 most likely became infected through exposure to Case 1.

Case 3, being 12 months of age was due for his first MMR immunisations at the time of exposure to Case 2 at the childcare centre. More than 7 days had elapsed when Case 3 was followed up as a contact of Case 2 therefore MMR or NHIG were unable to be offered. This child was one of the 3 unimmunised children requested to remain in home isolation following exposure to Case 3. On the 1st day of childcare exclusion the child was taken to a health centre and received the routine 12 month vaccinations (MMR, meningococcal C and *Haemophilus influenzae* type B). Four days following immunisation and 12 days following the first exposure at the childcare centre Case 3 became unwell with pallor, fever and cough. Symptoms persisted and in the ensuing days a rash developed starting on the face and neck and spreading to the trunk and extremities. Conjunctivitis was also reported by the mother via a phone call follow up. A CDC medical officer conducted a home visit and PCR samples were taken from the child and the mother (also a contact of Case 2 whose immune status was unknown and who had reported feeling unwell).
Serology was also collected from the mother for measles IgG and IgM testing. Measles IgG was detected from the mother and all other tests were negative. Both urine and throat swabs from the child (Case 3) were positive for measles. Follow up revealed the 5 other household members and 2 social contacts were all fully immunised for measles. Until the diagnosis of measles could be confirmed as ‘wild type’ (and also genotype D8) the child remained at home in isolation therefore no additional contact tracing was required (see Table 3).

During the outbreak (including 2 incubation periods following the onset of Case 3) 15 suspect cases were reported to CDC via GPs, school nurses or the general public. None of these had a known history of contact with a confirmed case. Through the RDH laboratory 13 were screened and found to be negative for measles by PCR testing and 2 were assessed on clinical symptoms and did not warrant further investigation. A number of other specimens from GPs for measles screening were received at RDH or other NT laboratories though the exact number is unknown.

**Discussion**

A measles containing vaccine was first registered in Australia in 1968 and a 2 dose schedule has been in place since 1992. Despite Australia having a robust childhood
immunisation program with over 90% coverage for 2 doses of MMR, measles cases still occur, usually derived initially from an imported case. The ongoing outbreak in NSW has seen 170 cases reported as of October 2012 with 58 of this total reported in September, including the initial case reported in this article. In Australia nationally notifiable diseases are reported to the Australian Government *Nationally Notifiable Diseases Surveillance System* by place of residence, therefore Case 1 does not appear in national disease reports for the NT.1

Case 1 travelled extensively in the NT and visited a busy shopping centre on at least 2 occasions while infectious. It is likely large numbers of the general population were exposed to the measles virus. In the NT childhood immunisation coverage rates for MMR are consistently over 90%4 and it is therefore thought that overall population immunity to measles is high. This theory is supported in this report as the only subsequent NT cases occurred in the susceptible, unimmunised age cohort.

Several factors in the public health management of measles cases are highlighted in the review of these 3 cases. The benefit of early diagnosis is clearly evident in minimising the extent of contact tracing required and ensuring the full range of management options can be offered. In the NT rapid measles PCR testing is available at the RDH laboratory for the investigation of a suspicious measles-like illness. This service is best facilitated through the CDC who can provide advice on specimen collection and transport. Diagnosis of measles virus solely through IgM serology can be unreliable in the early stages of the disease, takes considerably longer and does not allow for genotype testing which is useful for determining links to other outbreaks. Identifying the genotype D8 for Cases 2 and 3 provided some assurance that the measles cases have been acquired from the NSW outbreak.

If contact tracing can occur within 72 hours of exposure, MMR is effective in preventing disease. This relatively simple cost-effective measure can be initiated where measles immunity cannot be established and was useful for Case 2 follow-up. If the exposure is greater than 72 but less than 144 hours, screening via serology for the presence of IgG is preferable to NHIG administration. This was initiated for 12 identified contacts in this report.

Of the GP surgery waiting room contacts for Case 1, 26% were unable to be verbally reached via available telephone contact details. A brief message alerting the individual to their exposure was achieved in 85% of these instances. Using a standardised text message to mobile phone numbers was found to be an effective and time efficient method to relay advice for contacts.

The exclusion of susceptible contacts from places where there is a high risk of measles transmission was implemented as part of the public health management of Case 2. This practice was shown to be an effective and useful strategy in minimising contacts of Case 2. The outbreak investigation identified 2 health care personnel who were not immune to measles. Ensuring all staff are immune to vaccine preventable diseases they may encounter in the workplace is an important and cost effective human resource measure.

The reporting and investigation of suspicious but ultimately negative measles cases is an important part of a robust disease surveillance system. The number of non-measles cases investigated during this outbreak is evidence the NT surveillance system for rash illness investigations is functional.

The public health follow-up of measles cases usually requires urgent attention and many CDC staff members as well as external persons were involved in this most recent response to measles cases in the NT. The willingness to prioritise and the teamwork approach of all involved contributed to the success of this outbreak control.

In April 2012, the World Health Organisation (WHO) launched the Global Measles and Rubella Strategic Plan 2012–2020 in an effort to work towards achieving a world without measles, rubella and congenital rubella syndrome. It is reassuring that 3 of the core principles of the strategy (high population immunity, effective surveillance and rapid outbreak response) were evident in this outbreak.
Conclusion

Although the NT population has a high level of measles immunity, cases still occur and follow-up is still required. Implementation of the public health management principles within the National Guidelines can be resource intensive but is effective in minimising further cases. The important aspects needed for measles control in the NT in this response are outlined in the following Figure. It is important for all persons to be aware of their immune status for measles, either through reliable history of disease or documentation of 2 measles containing vaccines at least 1 month apart for those age-eligible for the vaccine.

Figure. What is needed for measles control in the NT

1. Early diagnosis
2. Early CDC notification (can assist with rapid testing for diagnosis)
3. Genotype testing
4. Text messaging for contact tracing
5. Exclusion of susceptible contacts for high risk measles settings
6. Ensuring all health care workers are measles immune
7. Prioritising measles public health follow-up.

Acknowledgments

CDC ‘roster’ staff involved in this public health response include Rowena Boyd, Paul Burgess, Charles Douglas, Anthony Draper, Vicki Krause, Peter Markey, Chris Nagy, Lesley Scott, Steve Skov and Helena White. I would also like to acknowledge the Darwin TB clinic and Immunisation Register teams for their assistance. In addition the CDC would like to thank the RDH laboratory and infection control staff, the GP surgeries involved and the childcare centre management for their cooperation and assistance with this response.

References

**Kidsafe NT Update**

*Jennifer Fry, CDC Darwin*

**Introduction**

The Northern Territory (NT) Centre for Disease Control (CDC) has had an historical link with *Kidsafe NT*. The Department of Health (DoH) is the major funder of *Kidsafe NT* and the position of Community Paediatrician has traditionally chaired the Board. The CDC supports *Kidsafe NT* as part of the DoH’s commitment to injury prevention.

Dr Keith Edwards has held the position of Chair of *Kidsafe NT* since 2002. At the Annual General Meeting on 10 September 2012 he stepped down from this position after 10 years in the role and Dr Laurie Barrand has been appointed as the new Chair.

This report is to acknowledge Dr Edwards’ work in the role, introduce the new Chair and Board and provide an update on *Kidsafe NT*’s activities.

**Kidsafe NT Board**

Dr Keith Edwards was the Chair of *Kidsafe NT* from 2002 until September 2012. Dr Edwards is currently the Community Paediatrician at CDC, a specialist paediatrician at Royal Darwin Hospital (RDH), a Senior Lecturer in Child Health, Flinders University and adjunct Senior Research Fellow at Charles Darwin University.

As the Section Head for Community Paediatrics in CDC he supervises the community paediatric registrar. In this position he also serves as the NT Manager of the RHD Program and has chaired the Rheumatic Heart Disease Control Program Advisory Committee for many years. Until recently he was the medical adviser for the NT Trachoma Elimination Program and still contributes to that program. He oversees the NT Head Lice Control Policy and the Cerebral Palsy Register. At RDH Dr Edwards covers paediatric teaching and ward service and is on-call for 3 months of the year. He is responsible for provision of regular paediatric outreach clinics to 12 Top End communities. He also undertakes weekly clinics in RDH and urban clinics in Darwin.

Dr Edwards has worked closely with the Menzies School of Health Research in regard to supporting operational research into health problems affecting Northern Territory children.

Dr Edwards’ major achievements while Chair of *Kidsafe NT* include:

- A study into NT drownings and near drownings
- Influencing change to pool fencing legislation
- A report into childhood injuries in remote communities
- Securing funding and overseeing development of *Safety tips and circus tricks* video
- Overseeing campfire safety education material
- Introducing child vehicle restraint hire and checking service
- Development and distribution of a remote community child injury prevention poster
- Presentations on childhood injury in the NT
- Representing NT on *National Kidsafe* body.

Dr Edwards will remain on the Board of *Kidsafe NT*, but after 10 years, was ready to hand over the responsibilities of Chair to Dr Laurie Barrand.

Laurie Barrand, PhD, spent many years in the medical and biological research arena, working with diseases such as diphtheria and later in the management of disease prevention. Dr Barrand has also worked within the immunisation field in Victoria to achieve better immunisation coverage. This led him to the NT to look after private immunisation programs and eventually to work within the NT Department of Health as a cancer education coordinator and quality advisor. Dr Barrand has spent much of his life working to protect and allow children to stay well. He sees working for *Kidsafe NT* as the continuation of a lifetime protecting children from preventable diseases now shifting to focussing on preventable accidents.

The other members of the *Kidsafe NT* Board are Ms Jane Singleton, who has a background in
corporate management, media, and public advocacy; Ms Shaan Novak, with a background in public health planning and promotion; Dr David Read who is a General Surgeon and the Director of Trauma at the National Trauma and Critical Care Centre at RDH and Ms Jennifer Fry, an Occupational Therapist who works at CDC.

**Kidsafe NT programs**

*Kidsafe NT* is the lead non-government, not-for-profit, charitable organisation dedicated to the prevention of unintentional childhood injuries. It operates with 3 energetic and dedicated part-time staff in Darwin and is looking to secure additional funding through partnerships with businesses with the hope to increase remote and regional child injury prevention work.

Currently, *Kidsafe NT* provides a range of services focussed on reducing unintentional childhood injuries including:

- Community education through face-to-face interaction with the public at their safety products retail and resource centre (currently at 1/9 Charlton Court, Woolner, NT).
- A telephone advisory service. Telephone (08) 8941 8234.
- Community events and education sessions for parents and professional groups on topics including road safety and child restraints, home safety, playground safety, burns and scalds, poisons, choking, children and electricity, child safety products and safe toys and nursery furniture.
- In-vehicle child restraint fitting service (at 1/9 Charlton Court, Woolner, NT).

*Kidsafe NT* employs qualified child car restraint fitters to sell, hire and fit child car restraints in line with current road safety legislation. As discussed on pages 20-21 of this edition of *The Bulletin*, new NT legislation will come into effect on 1 February 2013. These new laws require all children under 7 years of age to be secured in an approved child restraint or booster seat when travelling in a vehicle. The new laws are based on Australian Road Rules and are designed to ensure that children are better protected when travelling in cars and other vehicles.

*Kidsafe NT* have recently moved to new, larger premises in Woolner. This is to accommodate a new contract they have entered with TIO, taking over the hire of TIO’s baby capsule and vehicle child restraint service. There are plans to expand this service to Katherine and Alice Springs over the course of the next 12 months. Contact *Kidsafe NT* on (08) 8941 8234 or via their website [www.kidsafent.com.au](http://www.kidsafent.com.au).
New NT child car restraint laws
Meredith Neilson and Steven Skov, CDC Darwin

On 1 February 2013 new child car restraint laws for children up to 7 years of age will apply in the Northern Territory (NT). The new laws are designed to ensure that children are better protected when travelling in cars.

Transport injury

The NT has the highest rate of motor vehicle crash fatalities and hospitalisations compared to all other jurisdictions of Australia.1 Motor vehicle crashes are a common cause of injury in children aged 0 to 7 years of age.2,3 In the period 2002-2011, 16 children under the age of 7 years were killed as a result of road crashes in the NT and 178 children were hospitalised.4

Child car restraints

The evidence is clear that appropriately used child car restraints reduce the rate of serious injury or death due to motor vehicle crashes in children5,6. A child restraint protects the child from being ejected from the vehicle and distributes the extreme crash forces over the strongest parts of the child’s body.7

Children are often incorrectly restrained in motor vehicles.8 A recent cross-sectional observational study of children in NSW found serious errors in how restraints were being used in over 50 per cent of cases9. Children are often placed in restraints inappropriate for their age and size which has been shown to increase their risk of serious injury.10

Many parents move their children into normal seats with adult seatbelts from around 5 ½ years of age.11 Research indicates that this is too early and increases the potential for injury.10 Children up to 7 years of age are at least 4 times as likely to sustain a head injury in a motor vehicle crash when using an adult seatbelt compared with children in an appropriate restraint.11

The best crash protection is provided when the restraint suits the age and size of the wearer and when the restraint is installed and used correctly.10 Seating children from age 4 to under 7 years in an appropriate booster seat reduces the risk of injury in a crash by almost 60% compared with sitting in a normal seat with an adult seatbelt and no booster seat.11

New NT legislation

Currently in the NT, only infants under the age of 12 months are required to use a child restraint. The new laws will require children up to 7 years of age to be secured in an age-appropriate approved child car restraint when travelling in a car or vehicle. The new legislation is based on the Australian Road Rules and national model legislation and has been implemented in all other Australian states.

The new child restraint legislation requires children:
- under 6 months to be in a rear facing child restraint or baby capsule
- aged 6 months to under 4 years to travel in a rear or forward facing restraint
- 4 years to under 7 years to be seated in a forward facing child restraint or booster seat
- more than 7 years should use an adult seatbelt or booster seat.

There are also laws about where children can sit in the vehicle:
- children under 4 years of age must not be in the front seat of a vehicle that has 2 or more total rows of seats
- children from 4 to under 7 years of age can only sit in the front seat of a vehicle with 2 or more rows of seats if all of the other seats are occupied by children of a lesser age in an approved child restraint.

The ages specified above are a guide for the safety of the child. If the child is too small for the restraint it is recommended that the child be kept in the previous level of restraint for as long as possible. If the child is too large for the restraint, they may move to the next level of restraint.

Penalties apply if children are not appropriately restrained. A fine of $500 (including a Victims of Crime levy) and 3 demerit points per child
will be applied to the driver of the vehicle. Exemptions will apply for commercial passenger vehicles and buses with more than 12 seats.

The restraint used should be appropriate for the child’s age and size. It must be an approved child restraint that complies with Australian Standards (AS/NZS1754:2004) and is marked as complying with the Australian Standard.

When fitting the restraint it is important that the specifications from the child restraint manufacturer are followed. If the parent or carer is unsure of how to install a child car restraint, help is available through Kidsafe NT, the Automobile Association of the NT (AANT), specialty retailers, and some vehicle inspection stations.

Implementation of the NT child car restraint laws will ensure that children travelling in cars in the NT will be better protected should a motor vehicle crash occur.

More information


Automobile Association of the NT (AANT), www.aant.com.au, ph: 08 8925 5901

Department of Transport, Road Safety, www.roadsafety.nt.gov.au, ph: 1800 720 144


Acknowledgements

Our thanks to Jennifer Malone, Manager Road Safety Policy and Acting Manager Road Safety Education, Department of Transport, for her helpful comments on a draft of this article.

References

“I’ve just had a lovely phone call from a parent who really appreciated receiving our 4 year old birthday card/immunisation reminder. She is the mother of 5 children and her 5th child has just turned 3 years and 6 months of age. She said she would have forgotten the immunisations without the reminder. Her daughter was very excited about the card, and went along to Casuarina Community Care Centre quite happily to receive her booster vaccines.

The mother just wanted to say well done and keep up the good work.”

…..call taken by an Immunisation Unit Registered Nurse.

While immunisation coverage rates for the 12 to <15 month and 24 to <27 month age cohorts remain above 90% in all jurisdictions of Australia, the coverage rates for children aged 60 to <63 months are considerably and consistently lower both nationally and in some areas within the Northern Territory (NT). The main reasons for incomplete immunisation are well noted in research and include a combination of socioeconomic factors, parental attitudes, health care system barriers, variability in provider practices and missed opportunities to immunise.

In accordance with the current Australian Childhood Vaccination Schedule, children vaccinated at 18 months of age do not need to present for vaccination again until they are 4 years of age (48 months) at which time they will receive a diphtheria, tetanus, pertussis and poliomyelitis vaccine along with a measles-mumps-rubella (MMR) vaccine. In 2010 in response to an ongoing epidemic and several deaths in infants from pertussis in Australia, the Australian Technical Advisory Group on Immunisation recommended that the diphtheria, tetanus, pertussis and poliomyelitis vaccine encounter be given at 3 years and 6 months (42 months). To avoid splitting this vaccine encounter the second dose of MMR vaccine could be safely given at this time.

In 2011 the Immunisation Timeliness Officer from the Centre for Disease Control, along with the General Practice Network Northern Territory (now known as NT Medicare Local) and the NT Medicare Australia Field Officer at the Department of Human Services worked together with immunisation providers to develop a range of resources to promote and improve vaccine coverage and timeliness especially in the 31/2 to 4 year old age group.

The main aim of this awareness project was to provide a physical prompt to remind parents and carers to ensure that their children receive booster vaccinations before they are 4 years old. Most children begin preschool or school at this time and parents have often lost touch with their child health and immunisation service provider.

Since January 2012, using a shared Medicare Australia generated list, CDC has posted a birthday card and immunisation reminder to all children in the NT when they turn 3 years and 6 months. The letter explains that the free booster vaccinations can be safely given from 3 years and 6 months at Community Care Centres, GP surgeries or Aboriginal Medical Services.

Each month on average 250 birthday cards are sent to the child’s current Medicare Australia address. Approximately 10% of cards are returned mostly due to an incorrect address listing and this information is then fed back to Medicare Australia.

As children present for vaccination they are offered reward/promotional items such as stickers and a bravery certificate which have been produced as part of this project.

The pilot phase of this project has targeted children living in urban Darwin and urban Alice Springs largely due to the lower coverage rates in these areas and the accessibility to a street or private post office box address.

In areas where vaccine coverage rates are higher for example in Katherine and East Arnhem, project materials including birthday cards, immunisation reminder letters, stickers and bravery certificates have been distributed to regional community care centres and are utilised at the vaccine provider’s discretion.
To date as the above quote demonstrates, feedback from parents and immunisation providers has been positive. Several parents have reported that the reminders have been helpful especially while they are in the mayhem of getting children ready for school, since they often overlook their child’s immunisation status at this time. The reminders also give parents the opportunity to immunise the children in a timely manner without impacting on their financial government-based allowances and entitlements.

Evaluation of this project is ongoing and several indicators will be used to evaluate this project’s success including monitoring vaccine coverage rates and notifiable disease surveillance in 4 to 5 year old children.

Data collected by the Australian Childhood Immunisation Register (ACIR) for the June 2012 quarter show 87.7% of Darwin children and 89.7% of Alice Springs children aged 5 years are fully immunised.

The Darwin coverage rates represent a big rise from the same period 12 months ago, where coverage was 81.7% and Alice Springs 89.6%. The marked improvement in coverage rates in this short period of time is heartening and may be attributable in part to the impact of this project and the new regulations surrounding parenting allowances.

The project will continue in 2013, ongoing evaluation and securing of additional funding will determine if the project will be extended into 2014.

References

A snapshot of the Royal Darwin Hospital campus workforce
Bart Currie and Dianne Stephens, Northern Territory Medical Program, Royal Darwin Hospital

Abstract

A snapshot of the demographics of 124 attendees at the Royal Darwin Hospital Grand Rounds on 29 October 2012 shows the critical role in the Northern Territory (NT) health workforce of medical and other health staff trained overseas and supports concerns that to date relatively few past medical graduates from the Northern Territory Clinical School have returned to work longer term in the NT.

Discussion

On 29 October 2012, over 120 people attended the Royal Darwin Hospital (RDH) Grand Rounds, titled “Why Work in the NT? Fleeing Traffic Jams and the Worried Well?” The meeting began with collation of the demographics of the audience (see Table). While the limitations of such a snapshot of the campus health staff workforce are clear, there are no similar data available and the breakdown provides an interesting insight into the unique makeup of those choosing to work in the NT. It also emphasises the critical role played by overseas trained health staff. Since the Northern Territory Clinical School (Flinders University South Australia) took its first year 3 medical students at RDH in 1998 there have been 256 doctors graduate from what is now the Northern Territory Medical Program; 210 from Flinders University graduate entry 4 year medical program and 46 from James Cook University’s undergraduate 6 year medical program where students can spend their last 2 years of training at RDH within the Northern Territory Medical Program. Nevertheless, while the shorter term retention of these Flinders University and James Cook University medical graduates in the NT has been excellent,1,2 with them making up a substantial component of the junior medical workforce at Royal Darwin and Alice Springs Hospitals, the snapshot supports concerns that a large majority of these 256 graduates have not returned to work longer term in the NT. This snapshot should encourage further data collection on the outcome of NT medical graduates in order to determine ways in which we can attract and retain these graduates to stay or return to the NT in the longer term.

Follow the link to ABC News report on increasing the number of Indigenous doctors in the NT.

http://www.abc.net.au/news/2012-12-07/nt-medical-school/4416204

References


Table. Demographics of 124 attendees at RDH Grand Rounds, 29 October 2012

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* Northern Territory Clinical School
† International Medical Graduate

***************
The evaluation of a HIV travel campaign
Jan Holt, CDC Darwin

Abstract

HIV infection has been identified in Northern Territory residents returning from overseas travel. A social marketing campaign was conducted with the aim of raising awareness of acquiring HIV while travelling, increasing condom use, increasing testing for HIV on return from overseas travel and to inform travellers of sexual health choices. This campaign was evaluated. Results indicate that best health promotion outcomes occurred as a result of posters displayed at the airport, with poorer results from radio and cinema advertising. Future HIV travel campaigns should consider use of posters at airports as well as trialling social media to improve reach of sexual health messages.

Key words: HIV, Northern Territory, health promotion

Background

In response to a small but increasing number of travellers returning from overseas with HIV infection, the Northern Territory (NT) Centre for Disease Control (CDC) Sexual Health and Blood Borne Virus Unit, in partnership with the NT AIDS and Hepatitis Council (NTAHC), conducted a social marketing campaign between April 2010 and January 2011 targeting Territorians aged 18-70 years who were travelling overseas.

The aim of the campaign was to raise awareness about the risk of acquiring HIV while travelling overseas, to encourage people to use condoms when travelling overseas, to increase HIV testing among travellers returning from overseas (particularly south east Asian countries) and to inform travellers of sexual health services.

The campaign resources included 2 posters (Figure 1), 2 radio advertisements (on 2 commercial radio stations), 2 display banners, in-flight magazine advertising and 2 cinema advertisements (Figure 2). All were branded with one of the 2 campaign slogans: ‘Be prepared and pack condoms’ or ‘Had a slip up? Get a check up’. The posters and banners were prominently displayed on all the toilet doors at the Darwin Airport’s domestic and international airport lounges.

Methods

Approval to conduct the evaluation was granted by the Human Research Ethics Committee of the NT Department of Health and the Menzies School of Health Research.

To evaluate the effectiveness of the campaign travellers at the Darwin Airport were asked to
participate in a survey (see p 28). The survey asked if they had seen the campaign resources, if they could recall the messages and if the messages had influenced them in any way. The survey was undertaken in the final month of the campaign period (December 2010 – January 2011). People at the airport domestic lounge were selected at random. Survey staff introduced themselves, explained the survey and asked them to volunteer to participate in the evaluation of the campaign. Only people who had lived in the NT for 6 months or more were asked to participate. People attending Clinic 34 Darwin were also invited to fill out the same survey questionnaire while waiting to be seen at the clinic.

Four health organisational stakeholders who support those with HIV were interviewed and asked to provide feedback about the campaign with regards to the messages, resources and whether they thought the campaign was effective. Attempts were made to conduct a focus group with advertisements being placed in the *NT News* and at Charles Darwin University inviting people to attend a focus group and receive a monetary payment for participating. However this failed to attract anyone.

**Results**

A total of 69 people were surveyed (42 at the Darwin airport and 27 at Clinic 34) (Table 1).

Of the 69 people surveyed 57% (n=39) recalled seeing the posters. The most remembered messages from the poster were ‘*Anyone can have HIV*’, ‘*Condoms help prevent HIV*’ and ‘*Pack condoms when travelling*’) (Table 2). Those surveyed at the airport had a better recall of the posters than those surveyed at Clinic 34.

When asked if they had heard the radio advertisements, out of the 59 respondents who answered this question, only 19 respondents (32.2%) reported having heard the campaign radio advertisement. Of those 19 all could recall at least one message from it (Table 3). The most remembered message was ‘*It is risky having unprotected sex overseas*’.

The 19 respondents identified actions they would consider after hearing the radio advertisements.

<table>
<thead>
<tr>
<th>Table 1. Demographics of people who completed the survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Age group</td>
</tr>
<tr>
<td>&lt;20</td>
</tr>
<tr>
<td>20-29</td>
</tr>
<tr>
<td>30-39</td>
</tr>
<tr>
<td>40-49</td>
</tr>
<tr>
<td>50-59</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 2. Messages recalled from the campaign poster by survey site (n=39)

<table>
<thead>
<tr>
<th>Messages remembered</th>
<th>Airport</th>
<th>Clinic 34</th>
<th>Total</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Anyone can have HIV</em></td>
<td>13</td>
<td>5</td>
<td>18</td>
<td>30.0%</td>
</tr>
<tr>
<td><em>Condoms help prevent HIV</em></td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>23.3%</td>
</tr>
<tr>
<td><em>Get an HIV test</em></td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5.0%</td>
</tr>
<tr>
<td><em>Get tested at Clinic</em></td>
<td>4</td>
<td>0</td>
<td>4</td>
<td>6.6%</td>
</tr>
<tr>
<td><em>HIV is on the rise in the NT</em></td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>6.6%</td>
</tr>
<tr>
<td><em>Pack condoms when travelling</em></td>
<td>15</td>
<td>2</td>
<td>17</td>
<td>28.3%</td>
</tr>
<tr>
<td><strong>Total recall of messages</strong>¹</td>
<td>44</td>
<td>16</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>

¹Respondents may recall more than 1 message.

Table 3. Messages recalled from the campaign radio advertisement by survey site (n=19)

<table>
<thead>
<tr>
<th>Messages remembered</th>
<th>Airport</th>
<th>Clinic 34</th>
<th>Total</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘<em>If you have had a slip get a check up at Clinic 34</em>’</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>36.8%</td>
</tr>
<tr>
<td>‘<em>It’s risky to have unprotected sex overseas</em>’</td>
<td>5</td>
<td>4</td>
<td>9</td>
<td>47.4%</td>
</tr>
<tr>
<td>‘<em>People who are sexually active should have a regular check up</em>’</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>36.8%</td>
</tr>
<tr>
<td>‘<em>Sex just happens and people forget to use a condom</em>’</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Total recalls of messages</strong>²</td>
<td>10</td>
<td>14</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

²Respondents may recall more than 1 message
advertisement (Table 4). Of the respondents, 42.1% indicated they would go for an HIV test, 36.8% said they would think more about the risk of HIV but only 15.8% said they would start using condoms.

**Discussion**

Overall, feedback from organisational stakeholders and people surveyed found the range of resources and the campaign slogans to be appropriate and that using multiple forms of print and mass media to broadcast campaign messages had achieved a moderate exposure of the campaign.

The posters at the airport were prominently displayed in all toilets and above urinals. The same posters were also displayed at Clinic 34. The 3 most recalled messages from all the respondents were also the most important messages the campaign intended to deliver to people: ‘Anyone can have HIV’, ‘Condoms help prevent HIV’ and ‘Pack condoms when travelling’. However, the recall rates were not ideal as none of these messages were recalled by more than half of those surveyed at the airport. Despite this, on balance, it is recommended that future sexual health campaigns targeting travellers should consider this strategy of placing messages at the airport or in in-flight reading material as this provides information and awareness at the point of travel.

The evaluation found a poor recall rate from radio advertisements aired on 2 commercial radio stations. HOT100 and MixFM were chosen to capture as much of the targeted group as possible. The majority of people who listen to HOT100 are people aged 35 years and under, while MixFM attracts an older audience of 35 years and older. Given that the targeted group was all travellers aged 18-70 years, using only 2 radio stations possibly did not provide appropriate reach to all radio listeners in the target group.

Radio advertising is relatively expensive and any future campaign would need to consider this cost when attempting to provide messages to a large target group. It would be useful to determine if there has been a decrease in the number of people listening to radio given the huge uptake of social media platforms. Consideration could also be given to using radio and television community service messages.

The cinema advertisements had the least exposure among all forms of media in the population that was canvassed as only 14 respondents reported having seen the advertisements. This form of media in this demographic was not a particularly effective strategy and did not appear to provide the desired outcome for the cost.

This campaign utilised print and electronic media (now called ‘traditional media’) which did not have the desired reach. Poster messages (pictures and text) and cinema format (cartoon versus real-life situations) will be reconsidered. Investigating the use of social media platforms may provide new and innovative ways to engage with target groups to provide health messages.


See the HIV travel campaign anonymous survey on page 26.

**Acknowledgement**

Thank you to NTAHC staff for their involvement in the campaign.
HIV TRAVEL CAMPAIGN
ANONYMOUS SURVEY

The Department of Health and the NT AIDS and Hepatitis Council is evaluating a recent HIV Travel Campaign. We want to know what you thought of it and how many of the resources and messages you can remember. This survey is part of this evaluation. We would appreciate it if you could give us feedback by filling out this questionnaire. Please **do not** put any names or other identifying information on the form this is a totally anonymous survey. This campaign began in April 2010 and ended in January 2011.

Please **tick**

Male □ female □ Your Postcode ..........  

Do you travel overseas in the past year? Yes □ No □

Age □ 18-19 □ 20-24 □ 25-29 □ 30-34 □ 35-39 □ 40-44 □ 50-54 □ 55-59 □ 60-64

1. Have you seen any of the HIV travel posters at the airport?  
   □ Yes (Go to Question 2)  
   □ No (Go to Question 4)

2. What messages do you remember from the posters? (Tick as many boxes as you like)
   □ Condoms help prevent HIV □ Anyone can have HIV □ Pack condoms when travelling
   □ HIV is on the rise in the NT □ Get a HIV Test □ Get tested at Clinic 34

3. Did you like the posters?  
   □ Yes What did you like about them?  
   □ No What didn’t you like about them?

4. Do you listen to radio HOT 100 □ Yes □ No

5. Do you listen to radio MIXFM? □ Yes □ No

6. The HIV travel ads were played on HOT100 and MIXFM did you hear any of them?
   □ Yes (Go to question 7)
   □ No (Go to question 11)

Please Turn Over
7. If yes, what messages do you remember from the radio ads? (tick as many boxes as you like)
- □ It’s risky to have unprotected sex overseas
- □ Sex just happens and people forget to use a condom
- □ If you have had a slip up you should get a check up at Clinic 34
- □ People who are sexually active should have a regular check up

8. Did the ads influence you in way?
- □ Yes (Go to Question 9)
- □ No (Go to Question 11)

9. Did the messages encourage you to do any of the following (Tick as many boxes as you like)
- □ Go for a HIV test
- □ Think more about the risk of HIV
- □ Talk to my friends about HIV
- □ Use Condoms
- □ change my sexual behaviour

10. Did you like the radio ads?
- □ Yes
  - What did you like about them? .................................................................
- □ No
  - What didn’t you like about them? .............................................................

11. Have you seen the HIV and travel ads at the movie theatre?
- □ Yes (Go to question 12)
- □ No  (Go to question 13)

12. Who do you think this campaign is aimed at?
- □ Don’t know
- □ Backpackers
- □ men
- □ All people who travel
- □ People who travel for sex

13. Have you seen any of the other HIV travel resources? (Please tick the ones you have seen)
- □ T shirts
- □ Pens
- □ In flight magazine ads
- □ Safe Sex No Regrets website
- □ banners at the airport

14. Where in Darwin could you go to get a HIV test?

........................................................................................................................................

Thank you for helping to evaluate this project

Department of Health is a Smoke Free Workplace  www.nt.gov.au
The Northern Territory Sexual Health Advisory Group (SHAG) – 6 years on

Nathan Ryder, CDC Darwin

The Northern Territory (NT) Sexual Health and Blood Borne Virus (SHBBV) program is governed by the Sexual Health Advisory Group (SHAG). This group provides high level governance and strategic direction to the program. By bringing together stakeholders from a wide variety of services the group also provides a valuable information sharing forum for developments in the area.

The SHAG was established in October 2006 and continued to meet regularly since then. The group is currently chaired by the Chief Health Officer, NT Department of Health. Two full day face to face meetings are held annually, alternating between Darwin and Alice Springs, with additional meetings conducted by teleconference at least once per year.

The Advisory Group consists of representatives from key stakeholders involved in implementing the sexual health and blood borne virus program activities:

- Health Protection, Department of Health
- Remote Health, Department of Health
- Office of Aboriginal and Torres Strait Islander Health
- Aboriginal Medical Services Alliance NT
- Northern Territory AIDS and Hepatitis Council
- General Practice Network NT
- NT Family Planning and Welfare Association
- Kirby Institute
- Baker IDI
- Student Services Division, NT Department of Education and Training.

The key functions of the Group are to:

1. Coordinate, promote and support sexual health and blood borne virus program activities within both government and non-government sectors.

2. Contribute to the planning and monitoring of sexual health and blood borne virus program activities, including setting program direction, resource allocation and research priorities.

3. Contribute to the development of new policy and program initiatives.

4. Engage with Commonwealth and State funding bodies to advocate for appropriate and adequate resourcing of sexual health and blood borne virus programs throughout the government and non-government sector.

5. Be aware of the social determinants of health in remote primary health care and their implications for program direction, planning and sexual health outcomes.

Recent key activities include:

- Strengthening the planning and monitoring of the remote sexual health program.
- Developing a framework and position paper on the role of presumptive or mass treatment for sexually transmitted infections in NT remote communities.
- Developing a contact tracing policy and framework.
- Promoting the development of a national program for the elimination of syphilis transmission in remote areas of Aboriginal Australia.
- Developing a policy and clinical framework for sexual health and blood borne virus testing and management in prisons.
- Commissioning an external evaluation of the needle syringe program evaluation.
- The development of an accessible online sexual health orientation package for the remote health workforce.

If you would like further information on the SHAG please contact the Section Head for Sexual Health & Blood Borne Virus on 8922 8606.
World TB Day 2013
(Advertorial content from www.stoptb.org*)

“World TB Day, falling on March 24th each year, is designed to build public awareness that tuberculosis today remains an epidemic in much of the world, causing the deaths of several million people each year, mostly in developing countries. It commemorates the day in 1882 when Dr Robert Koch astounded the scientific community by announcing that he had discovered the cause of tuberculosis, the TB bacillus. At the time of Koch’s announcement in Berlin, TB was raging through Europe and the Americas, causing the death of one out of every seven people. Koch’s discovery opened the way towards diagnosing and curing TB.

In 2013 the second year of the 2-year “Stop TB in my lifetime World TB Day campaign” continues. At a time when partners working for and funding TB control are calling for zero TB deaths, we need to make a stronger statement that the world's failure to stop deaths from TB is an outrage. TB is airborne and can kill - every day 4000 people lose their lives to TB. It’s curable at low-cost. But the fight against TB is grossly underfunded.

This year, there is a call to make your voice heard about what you expect in your lifetime:
- Zero deaths from TB
- Universal access to TB care
- Faster treatment
- A quick, cheap, low-tech test
- An effective vaccine
- A world free of TB

Tell the world what you will do to make it happen. TB care delivers - it has a proven track record saving lives and growing economies and is one of the world's best buys in health. However only a few countries have ambitious plans for universal TB coverage and just US$ 500 million - 6% of the overall needs for TB care - come from international sources. Each individual can do his or her part to advocate for increased commitment, visibility and funding for TB care and research”.

Reference
* World Health Organisation www.stoptb.org

Contact: stoptbadvocacy@who.int
HIV testing rate in the top end of the Northern Territory of Australia: room for improvement

G Mattison\(^1\), V Krause\(^2\), J Y Su\(^2,3\), J Broadfoot\(^2\) and N Ryder\(^2\)

\(^1\)Warwick Medical School, University of Warwick, Coventry, UK; \(^2\)Centre for Disease Control, Department of Health, Northern Territory; \(^3\)Menzies School of Health Research, Charles Darwin University, Darwin, NT 0810, Australia

International Journal of STD & AIDS 2012; 0: 1–3

The Northern Territory of Australia has an exceptionally high prevalence of sexually transmitted infections (STIs), particularly in remote areas. In contrast there are few notified cases of HIV at present. This study describes HIV testing rates in both primary care and sexual health clinics in the Top End region. In 2010 medical records were reviewed for a random sample of patients from a sexual health clinic and three remote primary care clinics. Among sexual health clinic patients 51.4% overall, and 59.7% of those with an STI, were tested for HIV. In people diagnosed with an STI in remote primary care clinics 19.1% were tested for HIV. HIV testing rates in the Top End of the Northern Territory do not meet the standard of national and international guidelines, with implications both for the early initiation of therapy and the accuracy of surveillance in a region with very high rates of STIs.


Simon Graham\(^1\), Rebecca J Guy\(^1\), Basil Donovan\(^1,2\), Hamish McManus\(^1\), Jiunn-Yih Su\(^1\), Carol El-Hayek\(^1\), Kellie S H Kwan\(^1\), Amalie Dyda\(^1\), Handan C Wand\(^1\), James S Ward\(^6\)

\(^1\)Aboriginal and Torres Strait Islander Health Program, Kirby Institute, University of New South Wales, Sydney, NSW; \(^2\)Sydney Sexual Health Centre, Sydney Hospital, Sydney, NSW

The Medical Journal of Australia 2012; 197: 642–646


Design and setting: We assessed trends in national notification rates using univariate Poisson regression and summary rate ratios.

Main outcome measures: Crude notification rates and summary rate ratios, by Indigenous status, sex, age and area of residence.

Results: Over the 10-year period studied, chlamydia notification rates per 100,000 increased by 80% from 1383 in 2000 to 2494 in 2009 among Indigenous people, and by 335% from 51 in 2000 to 222 in 2009 among non-Indigenous people. The Indigenous versus non-Indigenous summary rate ratio was 23.92 (95% CI, 23.65–24.19; \(P < 0.001\)). Gonorrhoea notification rates per 100,000 increased by 22% from 1347 in 2000 to 1643 in 2009 among Indigenous people, and by 70% from 10 in 2000 to 17 in 2009 among non-Indigenous people. The gonorrhoea summary notification rate ratio in Indigenous compared with non-Indigenous people was 173.78 (95% CI, 170.81–176.80; \(P < 0.001\)). In Indigenous people, the highest chlamydia and gonorrhoea notification rates were in women, 15–19-year-olds, and those living in remote areas.

Conclusions: Chlamydia and gonorrhoea notification rates have increased in both populations but were higher among Indigenous people. Our findings highlight the need for targeted prevention programs for young people, especially Indigenous Australians residing in remote areas.
A comparison of adult mosquito trapping regimes across seasons and ecosystems in Darwin, Australia

Susan P. Jacups¹,² and Peter I. Whelan³

¹School for Environmental Research, Institute of Advanced Studies, Charles Darwin University, NT, Australia; ²School of Public Health and Tropical Medicine and Rehabilitative Services, James Cook University, Cairns, Queensland, Australia; ³Medical Entomology, Centre for Disease Control, Northern Territory Department of Health, Darwin, NT, Australia


Mosquitoes are problematic as vectors and pests in many tropical cities, including Darwin, the principal city in the Northern Territory of Australia. To monitor peaks in mosquito populations, the Medical Entomology unit of the Health Department sets overnight CO2-baited traps weekly. Trap setting and retrieving, followed by mosquito counting and identification, are labor intensive. Aiming to reduce this workload, we tested the hypothesis that fortnightly trapping is as effective as weekly trapping across seasons and ecologically distinct systems in Darwin. We applied cross-sectional negative binomial mixed effects models, which adjusted for rain and calendar month, to existing historical data. Culex annulirostris peaks were effectively identified using fortnightly trapping across all three ecological systems, during wet/dry and build-up seasonal patterns. For Aedes vigilax, fortnightly trapping was adequate in identifying peaks during wet and dry season months, but inadequate during build-up months across all three ecological systems. Therefore, weekly trapping should continue during build-up months, but trapping could be reduced to fortnightly for wet and dry season months for all ecological systems. Trapping for Cx. annulirostris monitoring could be reduced to fortnightly in all areas and seasons. Evaluation of programs can maximize staff efficiency and improve service delivery by reducing the need for unnecessary tasks.

Invasive pneumococcal disease in Australia 2007 and 2008

C Barry¹, VL Krause², HM Cook², RI Menzies³

¹Vaccine Preventable Diseases Surveillance Section, Office of Health Protection, Department of Health and Ageing, Canberra, Australian Capital Territory; ²Centre for Disease Control, Northern Territory Department of Health, Darwin, NT, Australia ³National Centre for Immunisation Research and Surveillance


Enhanced surveillance for invasive pneumococcal disease (IPD) was conducted in all Australian states and territories in 2007 and 2008 with comprehensive comparative data available since 2002. There were 1,477 cases of IPD notified to the National Notifiable Diseases Surveillance System in Australia in 2007; a notification rate of 7.0 cases per 100,000 population. In 2008 there were 1,628 cases; a notification rate of 7.6 cases per 100,000 population. The overall rate of IPD in Indigenous Australians was almost 6 times the rate in non-Indigenous Australians in 2007 and almost 5 times in 2008. By 2008, the 4th year of a funded universal infant 7-valent pneumococcal conjugate vaccine (7vPCV) program in Australia with a 3+0 schedule, vaccine serotype IPD notification rates in those identified as non-Indigenous decreased in all age groups compared with 2002 levels, most significantly by 96% in children aged less than 5 years. However, rates of disease in non-vaccine serotypes increased by 168% in children aged less than 5 years, including a four-fold increase in the number of cases due to serotype 19A. For the Aboriginal and Torres Strait Islander population, national pre-vaccination data are not available, as the vaccine program was funded for this group from 2001. From 2002 to 2008, the proportion of disease due to 7vPCV serotypes in children aged less than 5 years decreased by 77%, while disease due to non-7vPCV serotypes increased by 76%. In Indigenous adults (≥50 years), rates of 23vPPV serotypes increased by
92%. There were 120 deaths attributed to IPD in 2007 and 113 in 2008, although it should be noted that deaths may be under-reported. The number of invasive pneumococcal isolates with reduced penicillin susceptibility remains low and reduced susceptibility to third-generation cephalosporins is rare.

Seroepidemiologic Effects of Influenza A(H1N1)pdm09 in Australia, New Zealand, and Singapore

James M. Trauer,1 Don Bandaranayake,2 Robert Booy,3 Mark I. Chen,4 Michelle Cretikos,5 Gary K. Dowse,6 Dominic E. Dwyer,7 Michael E. Greenberg,8 O. Sue Huang,2 Gulam Khandaker,3 Jen Kok,7 Karen L. Laurie,9 Vernon J. Lee,10 Jodie McVernon,11 Scott Walter,12 Peter G. Markey,13 for the Australia, New Zealand and Singapore Pandemic Serosurveillance Study Group

Emerging Infectious Diseases. Vol 19, No 1, January 2013

To estimate population attack rates of influenza A(H1N1)pdm2009 in the Southern Hemisphere during June–August 2009, we conducted several serologic studies. We pooled individual-level data from studies using hemagglutination inhibition assays performed in Australia, New Zealand, and Singapore. We determined seropositive proportions (titer >40) for each study region by age-group and sex in pre- and postpandemic phases, as defined by jurisdictional notification data. After exclusions, the pooled database consisted of 4,414 preponderance assays and 7,715 postpandemic assays. In the prepandemic phase, older age groups showed greater seropositive proportions, with age-standardized, community-based proportions ranging from 3.5% in Singapore to 11.9% in New Zealand. In the postpandemic phase, seropositive proportions ranged from 17.5% in Singapore to 30.8% in New Zealand, with highest proportions seen in school-aged children. Pregnancy and residential care were associated with lower postpandemic seropositivity, whereas Aboriginal and Torres Strait Islander Australians and Pacific Peoples of New Zealand had greater postpandemic seropositivity.

A National Prospective Surveillance Study of Acute Rheumatic Fever in Australian Children

Sara Noonan,1 Yvonne A Zurynski,2 Bart J Currie,1,4,5 Malcolm McDonald,6 Gavin Wheaton,7 Michael Nissen,8 Nigel Curtis,9 David Isaacs,8 Peter Richmond,10 James M Ramsay,11 Elizabeth J Elliott,3 Jonathan R Carapetis.1,4

Pediatric Infectious Disease Journal; January 2013 - Volume 32 - Issue 1 - p e26–e32

Background: Acute rheumatic fever (ARF) is an important cause of heart disease in Indigenous people of northern and central Australia. However, little is known about ARF in children across all Australian population groups. This national prospective study was conducted to determine patterns of disease, and populations and regions at highest risk.

Methods: The Australian Paediatric Surveillance Unit surveillance model was used to collect data on children with ARF across Australia. Children up to 15 years of age were included if they had an ARF episode diagnosed between October 1, 2007 and December 31, 2010 that met the case definition.
Results: ARF was identified in 151 children: 131 Indigenous Australians, 10 non-Indigenous Australians, 8 Pacific Islanders and 1 African (1 unknown). Common presenting features were joint symptoms, fever and carditis. Sydenham chorea was reported in 19% of children. Aseptic monoarthritis was a major manifestation in 19% of high-risk children. Seven non-Indigenous Australian children presented with classic, highly specific features compared with 23% of high-risk children, suggesting that subtle presentations of ARF are being missed in non-Indigenous children. Recent sore throat was reported in 33% of cases, including 25% of remote Indigenous children. There were delays in presentation to care and referral to higher-level care across urban/rural and remote areas.

Conclusions: ARF may be more common than previously thought among low-risk children. These data should prompt an awareness of ARF diagnosis and management across all regions, including strategies for primary prevention. There should be renewed emphasis on treatment of sore throat in high-risk groups.

********************

Upcoming Conferences

The Communicable Disease Control Conference and the ASID Annual Scientific Meeting are linking up in 2013.

The Communicable Disease Control Conference 2013 (CDCC 2013) (Canberra 19-20 March) will address issues in controlling emerging infectious diseases in Australia and the region. The Communicable Diseases Network of Australia (CDNA) is organising the CDCC 2013 to facilitate discussion about strategies to improve control of infectious diseases. The conference supports the work of the CDNA, health departments and non-government organisations.

The conference aims to bring together public health physicians, policy makers, public health nurses, epidemiologists and researchers involved in public health aspects of communicable disease control.


The CDCC 2013 will partner with the Australian Society for Infectious Diseases (ASID) to host co-located conferences in Canberra at the Hyatt Hotel. The CDCC 2013 to be held on 19-20 March will overlap for 1 day with the ASID Annual Scientific Meeting held 20-23 March.

The ASID Annual Scientific Meeting 2013 aims to explore what the future holds for infectious diseases. Specific topics include the origins and spread of new infectious diseases, how host factors may determine outcomes from infection, what tools we can use to predict, diagnose, manage and monitor infections, as well as a range of other topics including malaria, travel-related infections, viral hepatitis, antimicrobial use and abuse, current controversies in infectious diseases and the emergence and spread of multiresistant organisms in the community. International speakers with diverse areas of expertise have been invited to contribute to these meetings.

For more information on the ASID conference: http://www.asid.net.au/Annual-Scientific-Meeting
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<td><strong>42</strong></td>
<td><strong>91</strong></td>
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<td><strong>244</strong></td>
<td><strong>276</strong></td>
<td><strong>411</strong></td>
<td><strong>452</strong></td>
<td><strong>2525</strong></td>
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**NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS**

1 July to 30 September 2012 & 2011
Ratio of the number of notifications (3rd quarter 2012 cases to the mean of 3rd quarter 2007-2011): selected diseases

- Influenza
- Ross River Virus
- Pertussis
- Shigellosis
- Pneumococcal disease
- Salmonellosis
- Campylobacteriosis
- Meningococcal infection
- Campylobacteriosis
- Chickenpox
- Acute Post Strep GN
- Rotavirus
- Dengue
- Adv Vacc Reaction
- Cryptosporidiosis
- Rheumatic Fever
- Malaria

Ratio of the number of notifications (3rd quarter 2012 cases to the mean of 3rd quarter 2007-2011): sexually transmitted diseases

- Hepatitis B - new
- Hepatitis C - unspec
- HTLV 1 asymptomatic/unspec
- Chlamydia
- Trichomoniasis
- Hepatitis C - unspec
- Hepatitis B - new
- HIV

Beyond 2SD of mean of previous 5 years
Malaria

There were 7 cases of malaria notified during the 3rd quarter which was 2.5 times the 5-year mean of 2.8 cases. However, numbers in previous quarters in 2012 were very low (3 total), suggesting that the increase simply reflects statistical variation.

Acute rheumatic fever

There were 39 cases of acute rheumatic fever which was twice the number expected. This continues the rise which was detected in the previous quarter and may reflect the increase in Group A streptococcal disease in the NT in 2011 and 2012 as previously noted. It may also reflect improved case detection due to health promotion activities by the Rheumatic Heart Disease Program.

Cryptosporidiosis

There were 18 cases of cryptosporidiosis reported in the 3rd quarter which was a decrease from the 72 in the second quarter but still 1.8 times the expected number based on the 5 year mean for that quarter.

***************

NT Malaria Notifications July – September 2012
Elizabeth Stephenson, CDC Darwin

There were 7 cases of malaria notified in the 3rd quarter of 2012. The following table provides details about where the infection was thought to be acquired, the infecting agent, whether chemoprophylaxis was used and where the patient lived.

<table>
<thead>
<tr>
<th>No. cases</th>
<th>Origin of Infection</th>
<th>Reason Exposed</th>
<th>Agent</th>
<th>Chemoprophylaxis</th>
<th>NT Region</th>
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<tr>
<td>4</td>
<td>West Papua</td>
<td>Expatriate visiting relatives</td>
<td><em>P. falciparum</em></td>
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<td>Darwin</td>
</tr>
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<td>1</td>
<td>Philippines</td>
<td>Holiday</td>
<td><em>P. falciparum</em></td>
<td>Nil</td>
<td>Alice Springs</td>
</tr>
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<td>1</td>
<td>Indonesia</td>
<td>Irregular Maritime Arrival</td>
<td><em>P. falciparum</em></td>
<td>Nil</td>
<td>Darwin</td>
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<td>1</td>
<td>Liberia</td>
<td>Holiday</td>
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### Immunisation coverage for children aged 12-<15 months 30 September 2012

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<th>Region</th>
<th>Number in District</th>
<th>% DTP</th>
<th>% Polio</th>
<th>% HIB</th>
<th>% Hep B</th>
<th>% Fully vaccinated</th>
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</thead>
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<tr>
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<td>290</td>
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<td>93.4%</td>
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<tr>
<td>Winnellie PO Bag</td>
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<td>91.8%</td>
<td>91.8%</td>
<td>91.8%</td>
<td>91.8%</td>
</tr>
<tr>
<td>Palm/Rural</td>
<td>232</td>
<td>93.5%</td>
<td>93.5%</td>
<td>93.5%</td>
<td>93.5%</td>
<td>93.5%</td>
</tr>
<tr>
<td>Katherine</td>
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<td>92.2%</td>
<td>92.2%</td>
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</tr>
<tr>
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<tr>
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### Immunisation coverage for children aged 24-<27 months 30 September 2012

<table>
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<th>Region</th>
<th>Number in District</th>
<th>% DTP</th>
<th>% Polio</th>
<th>% HIB</th>
<th>% Hep B</th>
<th>% MMR</th>
<th>% Fully vaccinated</th>
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<td>93.0%</td>
<td>92.7%</td>
<td>92.3%</td>
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<td>97.6%</td>
<td>97.6%</td>
<td>97.6%</td>
</tr>
<tr>
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<td>96.9%</td>
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<td>96.5%</td>
<td>95.1%</td>
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<td>95.9%</td>
<td>95.9%</td>
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<td>95.9%</td>
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<td>98.0%</td>
<td>98.0%</td>
<td>98.0%</td>
</tr>
<tr>
<td>East Arnhem</td>
<td>51</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>NT</td>
<td>934</td>
<td>95.8%</td>
<td>95.9%</td>
<td>96.0%</td>
<td>95.7%</td>
<td>94.9%</td>
<td>93.8%</td>
</tr>
<tr>
<td>Australia</td>
<td>75,613</td>
<td>95.0%</td>
<td>95.0%</td>
<td>95.1%</td>
<td>94.5%</td>
<td>94.1%</td>
<td>92.8%</td>
</tr>
</tbody>
</table>

### Immunisation coverage for children aged 60-<63 months 30 September 2012

<table>
<thead>
<tr>
<th>Region</th>
<th>Number in District</th>
<th>% DTP</th>
<th>% Polio</th>
<th>% HIB</th>
<th>% MMR</th>
<th>% Fully vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Darwin</td>
<td>265</td>
<td>86.4%</td>
<td>86.8%</td>
<td>86.8%</td>
<td>86.8%</td>
<td>85.7%</td>
</tr>
<tr>
<td>Winnellie PO Bag</td>
<td>0</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
<td>97.2%</td>
</tr>
<tr>
<td>Palm/Rural</td>
<td>72</td>
<td>86.6%</td>
<td>86.6%</td>
<td>86.6%</td>
<td>86.6%</td>
<td>86.2%</td>
</tr>
<tr>
<td>Katherine</td>
<td>72</td>
<td>94.1%</td>
<td>94.1%</td>
<td>92.9%</td>
<td>92.9%</td>
<td>92.9%</td>
</tr>
<tr>
<td>Barkly</td>
<td>0</td>
<td>91.7%</td>
<td>91.7%</td>
<td>91.7%</td>
<td>91.7%</td>
<td>91.7%</td>
</tr>
<tr>
<td>Alice Springs</td>
<td>14</td>
<td>90.4%</td>
<td>90.4%</td>
<td>91.3%</td>
<td>90.1%</td>
<td>90.4%</td>
</tr>
<tr>
<td>Alice Springs PO Bag</td>
<td>5</td>
<td>97.3%</td>
<td>97.3%</td>
<td>97.3%</td>
<td>97.3%</td>
<td>97.3%</td>
</tr>
<tr>
<td>East Arnhem</td>
<td>91</td>
<td>94.7%</td>
<td>94.7%</td>
<td>94.7%</td>
<td>94.7%</td>
<td>94.7%</td>
</tr>
<tr>
<td>NT</td>
<td>31</td>
<td>90.0%</td>
<td>90.1%</td>
<td>90.1%</td>
<td>89.5%</td>
<td>89.5%</td>
</tr>
<tr>
<td>Australia</td>
<td>52</td>
<td>91.2%</td>
<td>91.2%</td>
<td>91.0%</td>
<td>90.7%</td>
<td>90.7%</td>
</tr>
</tbody>
</table>
Immunisation coverage rates for NT children by regions based on Medicare address postcode as estimated by the Australian Childhood Immunisation Register are shown on page 39.

For girls turning 15 years old in 2011, the NT had a human papillomavirus (HPV) vaccination coverage rate of 79.5%. This information is obtained from the National HPV Register.

**Background information to interpret coverage**

Winnellie PO Bag is postcode 0822, which includes most Darwin Rural District communities, some East Arnhem District communities and some people who live in the Darwin ‘rural area’ who collect mail from the Virginia store or Bees Creek. Alice Springs PO Bag is postcode 0872, which includes Alice Springs District, Nganampa and Ngaanyatjarra communities.

The cohort of children assessed at 12 to <15 months of age on 30 Sep 2012 were born between 1 April 2011 and 30 June 2011 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 2 or 3 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine. All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to <27 months of age on 30 September 2012 were born between 1 April 2010 and 30 June 2010 inclusive. To be considered fully vaccinated, these children must have received 3 or 4 valid doses of vaccines containing diphtheria, tetanus, pertussis, 3 doses of vaccines containing poliomyelitis antigens, either 3 or 4 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine and 1 dose of measles-mumps-rubella (MMR) vaccine. All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to <63 months of age on 30 September 2012 were born between 1 April 2007 and 30 June 2007 inclusive. To be considered fully vaccinated, these children must have received 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of MMR vaccine. All vaccinations must have been administered by 60 months (5 years) of age.

**Interpretation and comment**

Immunisation coverage in NT children was above the national average across the 12 to <15 and 24 to <27 months cohorts though lower than the national average in the 60 to <63 months cohort.

The NT had the highest coverage rate of all jurisdictions for HPV vaccination in girls turning 15 years in 2011. To be fully covered, 3 doses of the vaccine are required. The extension of the HPV vaccination program to boys in 2013 will provide an additional challenge for us, in our efforts to maintain this high coverage rate across both urban and remote areas of the NT.

Further information about the Australian Childhood Immunisation Register coverage may be found at: [http://ncirs.edu.au/immunisation/coverage/index.php](http://ncirs.edu.au/immunisation/coverage/index.php)

Further information about the National HPV Register may be found at: [http://www.hpvregister.org.au](http://www.hpvregister.org.au)
Disease Control staff updates

Alice Springs

Nina Missen (Rheumatic Heart Disease Program) has commenced maternity leave for 1 year as of mid December with her baby due in January.

We wish Allina Matthews, Carolyn Lloyd (Trachoma Program) and Belinda Davis (Sexual Health & Blood Borne Viruses Unit) all the best in their new endeavours.

Darwin

The Northern Territory Immunisation Register Team were sorry to lose Robyn (Jo) Langham and Sierra Cutchie but wish them both well in their future endeavours.

Congratulations and best wishes to Kimberley Caffery (TB Unit) following her wedding on New Year’s Eve. A surprise pre-wedding morning tea was held at CDC, complete with watermelon pink outfits, in anticipation of the bridesmaid’s gowns.

We farewell Dr Paul Burgess who completed 2 years of Specialist Public Health Medicine training with CDC as well as serving the TB Unit. He will return to Remote Health. He will be missed. Congratulations also to Paul on topping the class in his final examination for entry into the Fellowship of Public Health Physicians.

Welcome back to Dr Frances Daily, who is filling in as the TB Public Health doctor over the December/January period.

Congratulations to Brendan Johnson (Trachoma Program) and Monica on the safe arrival of their beautiful baby boy, Kai Frederik.