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Extension of HPV vaccination to boys in the Northern Territory in 2013

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On 12 July 2012, the Minister for Health, the Honourable Tanya Plibersek MP, announced that from 2013, the National Human Papillomavirus (HPV) Vaccination Program would be extended to include boys aged 12-13 years of age (Year 7). In addition a catch-up program (over the next 2 years) will aim to vaccinate boys in Year 9.

Since 2007, all girls aged 12-13 years in Australia have been offered the HPV vaccine as part of the ongoing National Immunisation Program. In the Northern Territory (NT), the vaccine is primarily offered to girls in Year 7 as part of a school-based program, although in remote areas the vaccine is also offered opportunistically through health clinics. Vaccine administration is recorded on the National HPV Register by each jurisdiction and recent data show that in the NT each year 70-82% of 12-13 year old girls successfully complete the 3 dose vaccine course.¹

The Australian Government has committed to providing a national communication strategy for vaccine providers, families and communities to support the extension of the HPV vaccine program.

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HPV and vaccination

There are more than 100 different serotypes of HPV, which are classified into high risk (oncogenic) and low risk (non-oncogenic) groups. Oncogenic serotypes are linked to a variety of cancers, including cervical, anal, vaginal, vulval, penile and some head and neck cancers, whereas non-oncogenic serotypes are linked to skin and genital warts.

There are 2 HPV vaccines currently registered for use in Australia; Cervarix[®] and Gardasil[®]. The HPV vaccine most widely used in Australia is Gardasil[®]. This vaccine provides highly effective protection against persistent infection caused by 4 sexually-acquired HPV serotypes; 6, 11, 16 and 18, in those who have not been previously infected. HPV serotypes 16 and 18 are linked to 70% of cervical cancers and serotypes 6 and 11 are linked to approximately 90% of genital warts cases. Immunisation of children against these serotypes prior to them becoming sexually active has the potential to substantially reduce the incidence of both cervical cancer and genital warts in this group. Cervarix[®] is a bivalent vaccine which protects only against serotypes 16 and 18.

Immunisation with either vaccine is complete after receiving 3 doses ideally over a 6 month period.

Rationale behind male vaccination

The HPV vaccine has been shown to be immunogenic in men and vaccinating males in addition to females brings several additional benefits:

- reduction in incidence of genital warts in males²
- potential reduction in incidence of penile, anal³ and head and neck cancers in males
- further protection of non-immune females by a general increase in herd immunity and thereby a decrease of circulating virus.

Implementing the HPV vaccine program in the NT for boys

The NT Department of Health has had preliminary discussions with school-based vaccine providers about the introduction of this HPV vaccination program in the NT for boys and further consultation with education and remote health service providers will occur in the coming months.

The exact timing and implementation plan for this vaccine program is still being negotiated with national, state and territory health departments. Delivery of this vaccine to boys in these cohorts will require a co-ordinated response from a wide variety of stakeholders including; remote and urban vaccine providers, Aboriginal medical services and education providers. A major component of the program will be community education and encouragement for all eligible boys to attend for vaccination.

For further information contact the NT Centre for Disease Control in your region.

Alice Springs 8951 7540

Darwin 8922 8044

Katherine 8973 9049

Nhulunbuy 8987 4259

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or

www.nt.gov.au/health/cdc

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Change of BCG vaccine in Australia

Chris Nagy, CDC Darwin

Background to recall of BCG vaccine

On 20 June 2012 the Therapeutic Goods Administration (TGA) recalled all doses of the Sanofi Pasteur manufactured tuberculosis vaccine, Bacillus Calmette-Guérin (BCG), in Australia because sterility of the product could not be assured.

On 21 June all maternity wards, Aboriginal Medical Services, child health and remote clinics were advised by urgent email and memorandum by the Northern Territory Centre for Disease Control (CDC) to immediately cease vaccinating with this vaccine and return all unopened vials of BCG to their regional pharmacy.

The Department of Health and Ageing provided a factsheet on their health alerts webpage to respond to provider queries and that link was forwarded to all Northern Territory vaccine providers.

All clinics were advised to maintain a spreadsheet of those children who were eligible for BCG, but would be unable to receive the vaccine in the period until an alternative vaccine could be acquired and distributed.

BCG vaccine is currently recommended on the Northern Territory Childhood Vaccination Schedule (1 October 2011) for the following groups of infants:

- all Indigenous newborns
- all newborns who will live in Indigenous communities
- newborns of parents from high prevalence TB countries who will be returning for frequent visits to high TB prevalence countries in the first 5 years of life; and
- newborns in families who have been treated for leprosy.

BCG vaccine is ideally administered prior to discharge from hospital and is administered as a 0.05ml dose given intradermally in the left arm (at the insertion point of the deltoid muscle). The vaccine is presented as a multidose vial and requires reconstitution with a specifically provided diluent.

Introduction of BCG Vaccine SSI

On 7 August 2012 the TGA and Sanofi Pasteur announced the sourcing of an alternative vaccine known as BCG Vaccine SSI. All relevant vaccine providers were notified by email and memorandum of the availability of the new vaccine.

The indications, administration route and dosage for BCG Vaccine SSI are identical to the previous BCG vaccine.

BCG Vaccine SSI should be reconstituted immediately prior to use and can be stored between 2–8°C for a maximum of 4 hours after which time it should be discarded in the sharps container.

Providing catch up vaccine

The Tuberculosis Units in each regional CDC are coordinating the recall of all infants who did not receive BCG vaccine while the product was unavailable. Additional clinics are being held on Friday afternoons at the CDC in Darwin where the majority of catch-up vaccination is required. Please phone 89228804 for an appointment.

BCG Vaccine SSI has been added to the currently used electronic recording systems of Community Care Information Systems (CCIS) and Primary Care Information Systems (PCIS). The Australian Childhood Immunisation Register is being updated to accommodate this vaccine name change.

Please contact your regional CDC or Tuberculosis Clinic for further advice.

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Alice Springs	89517540
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Firework-related injury survey report 2012

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Abstract

Territory Day, celebrated on 1 July is the only day of the year when people in the Northern Territory (NT) can buy and ignite fireworks without a permit. Since 1998 the Centre for Disease Control (CDC) has conducted yearly firework-related injury surveys where injury data are collected to inform future fireworks safety campaigns that aim to educate the public regarding injury prevention and harm minimisation.

This year's survey was conducted in NT public hospitals and the Australian Defence Force health care facilities. Data were collected on people presenting with firework-related injuries between midnight 28 June - 4 July 2012.

There were 13 firework-related injuries with ages ranging from 9 to 51 years old. Bystanders accounted for 77% of injuries. This year 1 person was admitted to hospital with a severe injury, 8 people sustained moderate injuries requiring multiple visits to health care providers and 4 people received mild injuries. Multishot fireworks accounted for 5 injuries.

The number of firework-related injuries this year was less than the average of 18 injuries per survey period; however injury numbers fluctuate unpredictably year to year. Future firework injury campaigns should target younger age groups, bystanders and use of multishot fireworks.

Key words: Northern Territory; fireworks; Territory Day; injuries

Introduction

Territory Day on 1 July marks the anniversary of the institution of Northern Territory (NT) self-government in 1978. It has traditionally been celebrated with both professional public fireworks displays and private individuals being able to let off their own fireworks. Since the Australian Capital Territory banned the personal use of fireworks in 2009, the NT remains the only jurisdiction in Australia where fireworks can be bought and used without a permit.¹

On 1 July fireworks can be purchased without a permit by anyone 18 years or older and ignited from 6pm to 11pm.

Since 1998 the CDC has conducted annual surveys of patients attendances at acute health care facilities for fireworks-related injuries. The objectives of each survey are to describe the number and severity of firework-related injuries along with circumstances leading to the injuries. The findings of the surveys are used to inform future safety campaigns to prevent or minimise injuries related to fireworks.

Each year the CDC coordinates a fireworks safety campaign. This year the campaign, included a flyer that provided direction on safe handling of fireworks, with particular focus on sparklers and 'dud' fireworks, along with advice on first aid care in the event of injury. The flier was available on the Department of Health website, the Department of Education and Training intranet website and was distributed at the point sale of the fireworks.

Methods

The Australian Defence Force and the 5 NT public hospitals were contacted to participate in the 2012 survey. Survey and consent forms along with information sheets for clinicians and patients were distributed to health facilities to record people with firework-related injuries who presented between midnight 28 June 2012 and midnight 4 July 2012. These forms were faxed to CDC daily. Emergency departments were contacted by telephone in the morning of 2 July for a verbal report of the number of patients seen by staff overnight. Health facilities were contacted at the end of the survey to ensure all firework-related presentations had been included in the survey.

Survey questionnaires included demographic information, details of time, place and circumstances of the event as well as clinical information and a grading of the severity of injury. Hospital patient records were reviewed to gather further clinical data from the first and any follow-up visits.

Table 1: Severity of injury by age group

Age	Severity of injury			Total
	Severe	Moderate	Mild	
≤ 5 yrs	0	0	0	0
6 – 15 yrs	1	1	0	2
16 – 25 yrs	0	3	3	6
26 – 35 yrs	0	1	0	1
≥ 36 yrs	0	3	1	4
Total	1	8	4	13

Results

Between 28 June and 4 July 2012, 13 people presented to acute care health facilities in the NT with a firework-related injury. There were 11 burn injuries, 1 joint dislocation and a facial laceration. Only 1 injury required hospital admission for skin grafting, with 3 people undergoing surgical intervention. Moderate injuries were sustained by 8 people, cumulatively requiring over 38 visits to a health care provider. Table 1 shows severity of injury by age group. A 'mild' injury required only 1 visit, a 'moderate' injury required more than 1 visit and 'severe' denotes an injury requiring hospital admission.

Ages of injured persons ranged from 9 to 51 years old with an average age of 28 years. Males accounted for 69% of the injured with a median age of 20 years old. Females ranged in age from 23 to 49 years old with a median age of 38 years.

Bystanders, that is people who were not lighting the firework themselves sustained 77% of injuries with the remaining 23% of injuries incurred by people who lit the firework. In one case a bystander was injured in their private residence by a firework ignited on the street.

Limbs were the most common site of body part affected accounting for 10 of the 13 injuries. Figure 1 shows site of injury.

Of the 13 injuries 8 occurred in the suburbs of Darwin, with 1 injury each occurring in Berry Springs, Palmerston, Alice Springs, Katherine and Tennant Creek. Location of injury occurrence was recorded for 10 people with 3 injuries incurred at private residences, 2 at parks, 2 on the beach/foreshore area, 2 on the street, and 1 in a camping area. NT residents were the main victims with only one injury occurring in an interstate visitor.

Injuries were sustained on 1 July between 6:45pm and 10:30pm in 11 (85%) cases. The remaining 2 injuries occurred on the 2 July at 3am and 10am respectively. Time from injury to health care presentation is available for 9 people with time ranging from 30 minutes after injury to 92 hours post injury. Following injury 4 people delayed accessing health care until at least 2 days after the time of injury.

Multishot fireworks heading in unexpected directions accounted for 5 injuries. In 3 out of 5 cases the multishot firework fell over following the initial shot. Scrub fires were the cause of 2 burn injuries with a third scrub fire injury incurred when attempting to extinguish the flames. Another injury was caused by an acquaintance intentionally dropping a firecracker inside the victims clothing. A sparkler was the cause of 1 hand injury with another hand injury occurring when powder from a firework left in an ashtray was ignited by a cigarette.

Discussion

The 13 firework-related injuries this year were less than the average of 18 injuries per survey

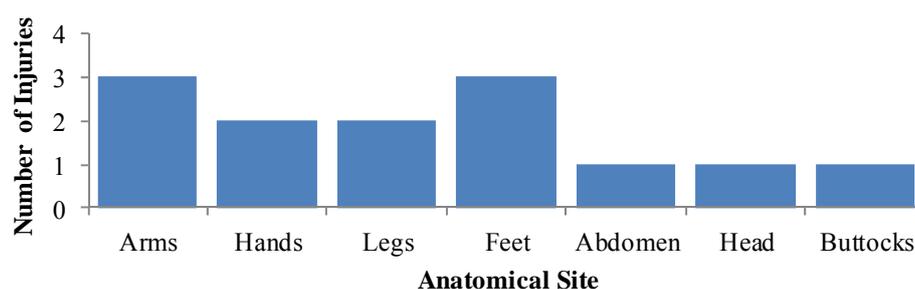
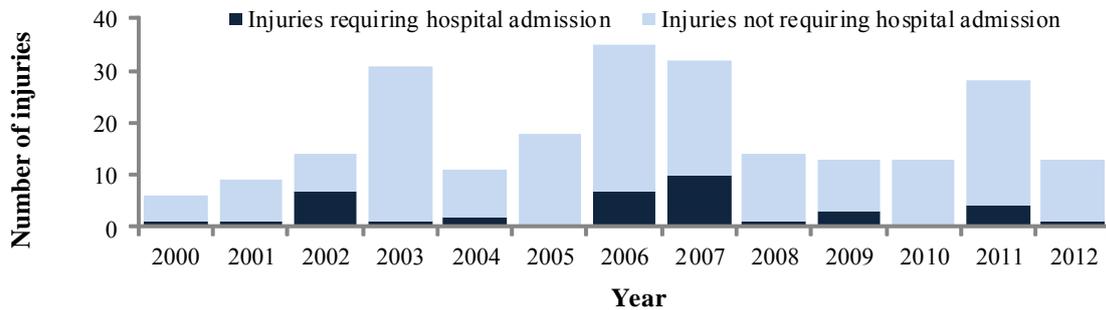
Figure 1. Injuries by anatomical site

Figure 2. Number of firework-related injury presentations to health facilities by year with frequency of hospital admissions



period recorded since 1998. Hospitalisation due to firework-related injury was below the average of 3 hospitalisations per survey period. A greater proportion of injuries were again seen in younger people, bystanders and males.

Since 2000 there have been 237 firework-related injuries recorded, ranging from 6 injuries in 2000 to 35 in 2006. Figure 2 shows the number of injuries since 2000 with the number of hospitalisations. Injury numbers fluctuate from year to year with no upward or downward trends discernible. Prior to 2008 general practitioners and community health centres were included in the survey, accounting for 3 to 7 injuries per year.

Risk factors for injury

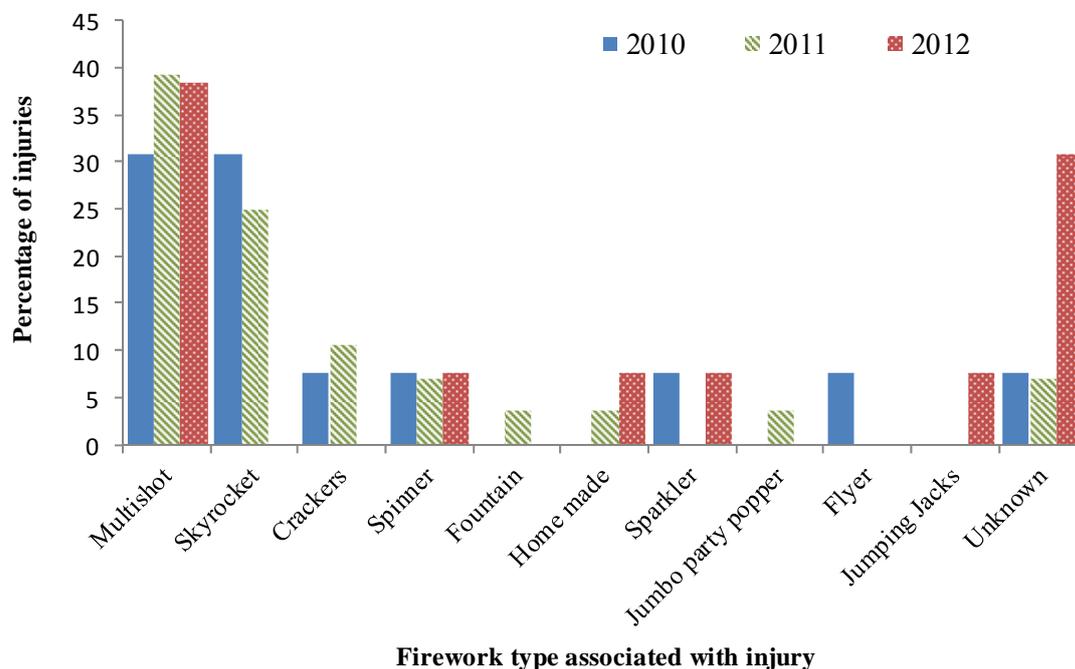
Since 2000, 65% of firework-related injuries recorded in the NT have occurred in males, a slightly lower percentage than that reported in

the literature of 77 to 96%.²⁻⁵ Bystanders have accounted for 41% of NT injuries, similar to 47-50% reported internationally.^{2,4}

A large proportion of injured people are under the age of 30 years with 64% of injuries since 2000 occurring in this age group. This is consistent with international data where younger age is associated with firework-related injury.²⁻⁵

Of the different types of fireworks multishots have been responsible for the greatest number of injuries over the past 3 consecutive years (see Figure 3). In 2012 at least 3 injuries occurred as a result of multishot fireworks falling over following the first shot, directing the subsequent shots horizontally and causing injury. Future safety messages should concentrate on safe use of multishot fireworks, in particular the secure anchoring of the device before ignition.

Figure 3. Percentage of type of firework causing injury 2010-2012



Prevention of firework-related injuries

Restricting personal use of fireworks through legislation is the most effective way of reducing firework-related injuries.^{2,6} This however requires both political will and community support.² Where fireworks are allowed to be ignited by the public, factors that have been shown to contribute to decreasing firework-related injuries include quality control of fireworks available to the public, provision of professional firework displays and aggressive public firework-safety awareness campaigns.^{3,7}

This year there were 15 professional fireworks displays advertised on the NT Government webpage for the 1 July.⁸ The largest professional display occurs at Mindil Beach, an area associated with large crowds and a hazardous environment for the general public to be letting off fireworks. In 2009 Darwin City Council implemented by-laws prohibiting possession and ignition of personal fireworks within a designated safety zone at Mindil Beach.⁹ Since implementation of this intervention there have been no reported cases of people attending emergency care facilities with firework-related injuries acquired at Mindil Beach.

In years past, the surveys have found that severe burns to the hand have commonly occurred as a result of holding and lighting several sparklers at the same time. As a result, CDC safety campaigns specifically focused on this practice and since then there have been no injuries associated with multiple simultaneous sparkler ignition suggesting that targeted education can be an effective means of reducing common mechanisms of injury. Future campaigns should also utilise social media and online forums to deliver fireworks safety messages to the public, particularly to target younger population groups and bystanders.¹⁰

Personal use of fireworks remains a controversial issue in the NT with public opinion as reported by print media being divided.¹¹ In addition to personal injuries and associated health care costs, other costs identified are increased call-outs for police, fire brigade and animal welfare groups such as the RSPCA to attend distressed or missing animals.¹² Environmental costs include noise pollution, property damage, fires and the post Territory Day clean up.¹² However, many in the

community are in favour of the personal use of fireworks, expressing enjoyment derived from personal fireworks use and identification with a day that is unique to the NT.¹¹

The CDC will continue to work for the prevention of injury from fireworks. While the personal use of fireworks is permitted in the NT, CDC will continue to coordinate the firework-related injury survey to provide information to the public regarding numbers and mechanisms of injury and inform future firework safety campaigns.

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Dangerous liaisons – sea water, box jellyfish and humans are a risky combination

Meredith Neilson and Steven Skov, CDC Darwin

Stinger season is about to commence in the coastal areas of the Northern Territory (NT). The major box jellyfish, *Chironex fleckeri*, has rapidly acting venom on its tentacles that is capable of killing a person in less than 5 minutes. Children are the most vulnerable to *C. fleckeri* stings accounting for the last 14 fatalities in the NT.¹ The message to avoid the sea water between 1 October and 31 May is clear and serious attention needs to be paid to this advice during the oncoming stinger season.

Facts about *Chironex fleckeri*

C. fleckeri are almost invisible in the water with a bell up to 35 cm in diameter, and up to 60 tentacles each of which can reach 3 metres long. Covering each tentacle are millions of stinging cells (nematocysts) which inject their venom into the skin on contact.² The person immediately feels excruciating pain and within minutes white welts appear where the tentacle contact occurs. These welts change to become red whip-like lines and subsequent skin death may lead to permanent scarring. A large dose of venom may cause rapid cardiorespiratory arrest and death within a few minutes.³

Top End hospitals and health clinics report around 40 people presenting with jellyfish stings per year in the Northern Territory.³ There have been 68 deaths in Australia attributed to *C. fleckeri* since the first death was reported in 1883.¹ The last reported death in the NT was in November 2007 when a 6 year old boy from a remote Aboriginal community died from confirmed *C. fleckeri* envenomation.¹ Children are more at risk of life-threatening envenomation due to their smaller body mass in relation to the volume of venom injected.²

Large numbers of *C. fleckeri* appear in Northern Australian waters between October and May each year, attracted to the warmer sea surface temperatures. Although the majority of jellyfish stings have occurred in the stinger season of October to May, confirmed jellyfish stings have occurred in every month of the year.⁴ A prospective study of *C. fleckeri* stings between April 1991 and May 2004 documented that 83% of stings occurred in shallow waters less than

1 metre deep and 17% occurred while victims were entering the water.⁴ The study further demonstrated that stings were least common on outgoing tides and most common on days with still conditions with wind speed less than the month's average.⁴

Protection from *C. fleckeri*

The best protection from *C. fleckeri* stings is to stay out of the sea water between 1 October and 31 May. However the presence of box jellyfish is determined by weather and water temperature conditions and not the calendar date. An early finish or late start to cooler, dryer weather may mean that jellyfish reappear earlier or remain for longer than the official stinger season dates.

Recognition that stings do occur outside the official stinger season has led to the recommendation that protective clothing should be worn, especially by children, when bathing in tropical waters between June and September. Long sleeved tops or rash-shirts and long shorts will provide a good level of protection, but a full-body lycra suit is better. Shallow water is where the jellyfish are most commonly found and they are extremely difficult to see. The best advice is to avoid the water's edge, tidal creeks and around boat ramps or wear protective clothing if entering the water is necessary. Should a person enter the water it is recommended they enter the water slowly to give the *C. fleckeri* time to move away. Furthermore people are reminded not to touch stingers washed up on the beach as they can still sting.

Treatment for *C. fleckeri* stings

Immediate first aid is vital and cardiopulmonary resuscitation may be needed.

- Remove the person from the water.
- Call for help (dial 000).
- Assess the person and commence CPR as necessary.
- Liberally douse the stung area with vinegar to neutralise the stinging cells—do not wash with fresh or sea water or rub with towels or sand.

- If vinegar is unavailable, pick off any remnants of the tentacles - fingertip skin is too thick to penetrate.

Seek medical assistance and transport to hospital immediately.

The main message remains:

DO NOT enter sea water during the stinger season (October to May) and most importantly DO NOT let children enter sea water at this time.

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A foodborne disease outbreak associated with a ‘high tea’ platter, caused by norovirus

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Abstract

In January 2012, staff from the Centre for Disease Control and Environmental Health Program investigated a foodborne disease outbreak associated with a local restaurant. There were 22 cases of gastrointestinal illness in diners who had consumed food items from a ‘high tea’ platter served at the restaurant on 1 day in January. The etiological agent was found to be norovirus. A cohort study suggested that possible vehicles for the outbreak were chicken and/or egg sandwiches or cocktails.

Key words: outbreak; gastroenteritis; foodborne disease, norovirus; cohort study; food safety; food handler

Background

On 24 January 2012, a member of the public informed the Environmental Health Program of a complaint regarding gastrointestinal illness amongst guests of a birthday party who had attended a ‘high tea’ at a local restaurant on 21 January 2012. Interviews were conducted by the

Northern Territory Centre for Disease Control (NT CDC) with these party goers and subsequently with other guests who had high teas on the day in question. In total 22 cases were identified and the epidemiological and environmental health findings of the investigation are presented here.

Initial investigation and case finding

Methods

The original informant was able to contact all other diners by text message and ask them to contact outbreak investigators for interview. In total 16/19 people from the original group contacted the NT CDC and of these, 13 people met the investigation case definition.

Interviews were conducted with all 16 members of the birthday party who contacted NT CDC. A menu of items on the high tea platters was quickly established and clarification of items was later obtained from the restaurant. The high tea served at the restaurant consisted of a 3-tiered platter of foods. Each platter contained sandwiches on one tier, savoury dishes on

another and sweets on the third tier. Each tier usually contains a sample of 4 dishes which are shared between small groups of 2 to 4 people. As part of the high tea, there was an option to also have a cocktail (alcoholic or non-alcoholic) with the platter and this cocktail might have been shared between 2 or more people.

Bookings for high tea were necessary so the use of the booking list facilitated case finding. Attempts to contact all diners from 21 January 2012 were made and, of those that could be contacted, there were 3 additional groups who had experienced illness after eating the high tea, all of them in the afternoon. Patrons who had ordered other meals on that day had not become unwell. There was one group who had the high tea earlier in the day who reported no illness. Diners from other groups who partook of high tea on the 21 January were contacted via the booking lists and asked to provide contact details for their co-diners. Some diners did not wish to provide contact details directly, so were asked to contact their fellow diners and ask them to contact the NT CDC. This resulted in nearly all diners from the affected groups contacting the NT CDC, with the exception of 3 reportedly well group members.

The outbreak appeared to be restricted to a particular day. There was no reported illness in

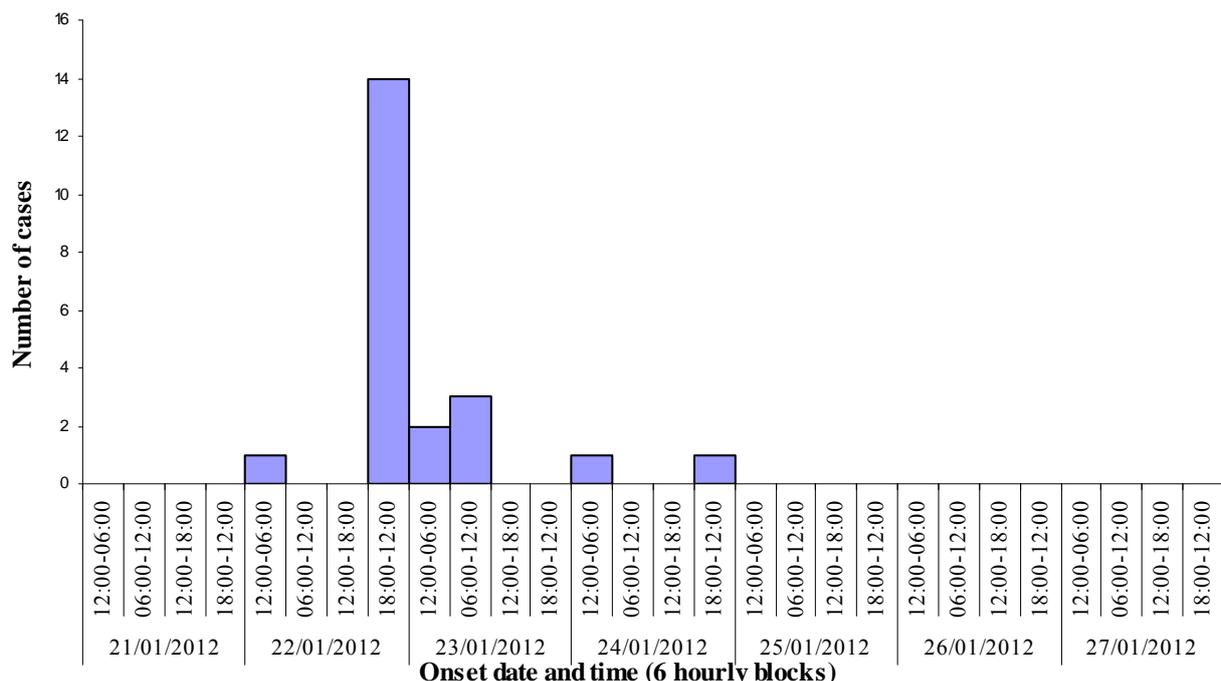
the 2 parties of diners who partook of high tea on the 22 January. No high teas were booked for the 20 January. In consequence, the investigation concentrated only on the groups from 21 January.

Results

In total 22 cases of illness were identified who met the investigation case definition. Cases were defined as 'any person who had eaten the high tea from the restaurant on the 21 January 2012 who experienced vomiting and/or diarrhoea for 6 to 72 hours'. Cases were ill between 22/01/12 and 24/01/12 (see Figure). The median age of cases was 42.5 years, and 91% were female. Symptoms experienced by cases included vomiting (86%) nausea (95%) fever (27%) abdominal pain (45%) and diarrhoea (82%), lethargy (27%) and headaches (9%).

The symptom aetiology was suggestive of a viral infection. The median incubation time was 32 hours (mean 36, range 29-80). The attack rate was high, with 21 of 31 (67.7%) of diners ill in the 4 groups who had dined in the afternoon. This epidemiology supported the hypothesis that the etiological agent was likely to be norovirus. One specimen was submitted to the laboratory and norovirus was detected by nucleic acid amplification.

Figure. Epidemic curve for cases showing onset date and time of illness



During the investigation it was found that several items that had been served to groups in the afternoon were not included in the platters served earlier in the day prior to lunch. These included 2 types of sandwiches (egg and chicken) and also 1 dessert (chocolate cake). The group who ate in the morning also did not drink any cocktails or wine.

Analytical epidemiology

Methods

A cohort study was performed using questionnaires based on the menu items from high tea. The cohort was defined as those diners who partook of high tea on the 21 January 2012. The questionnaire was administered over the phone to those who dined in the afternoon but for logistical reasons was sent by email to those who dined in the morning. Also of note, there were 3 items available to the afternoon diners which were not on the morning menu; hence a sensitivity analysis was performed excluding this group from the analysis.

Data were entered into MS Excel and analysed using Intercooled Stata™ 11.0.

Results

Out of the recorded 38 eligible, 30 answered the questionnaire, 22 of whom were cases. The risk

ratios for each food item consumed as part of the high tea on 21 January are given in the Table. Egg sandwiches, chicken sandwiches, chocolate triangles and cocktails were all statistically associated with illness. Exclusion of the morning group resulted in a reduction in the relative risks for these items such that they became non-significant. For the afternoon groups egg sandwiches, chicken sandwiches and tostados all had a risk ratio of 1.58 (95%CI:0.77-3.26;p=0.091) while chocolate triangles had a risk ratio of 1.07 (95%CI:0.73-1.58;p=0.58), cocktails 1.35 (95%CI:0.96-1.976; p=0.072) and wine 0.35 (i.e. was protective, 95%CI:0.07-1.73; p=0.029).

Given the small number people in the study, and the nature of the high tea dining experience (everyone sharing common foods) the risk ratios were identical for several of the items. Identification of a single vehicle was not possible; multivariate analysis did not identify an individual vehicle and given the nature of the high tea and the small number of people in the study, this is not surprising. The univariate results are suggestive of contamination of the sandwiches initially (either during preparation or when served to the platters by staff) and possibly spreading of the virus to other items on the platter by the diners handling or moving items as they were being eaten (as the tostadas were common to all platters but associated with illness only in the afternoon groups). As all

Table. Results from analysis of high tea items showing risk ratios, confidence intervals and p values; cohort including the morning group

	Exposed ill/not ill	Not exposed ill/not ill	Risk Ratio	95% Confidence Interval	P value
Egg sandwiches	19/1	3/7	3.17	1.22-8.21	0.0004
Capsicum sandwiches	18/7	4/1	0.90	0.54-1.49	0.595
Chicken sandwiches	19/1	3/7	3.17	1.22-8.21	0.0004
Salmon wraps	18/6	4/2	1.00	0.61-2.07	0.519
Quiche (various)	20/8	2/0	0.71	0.57-0.9	0.531
Goat's cheese balls	21/8	1/0	0.72	0.58-0.91	0.733
Tostados	19/6	3/2	1.27	0.6-2.68	0.405
Chocolate triangles	17/2	5/6	1.97	1.01-3.83	0.015
White rum balls	16/7	6/1	0.81	0.54-1.22	0.377
Profiterole	13/7	9/1	0.72	0.49-1.06	0.154
Fruit Flan	18/7	4/1	0.90	0.54-1.49	0.595
Water	21/7	1/1	1.50	0.37-6.1	0.469
Tea	15/5	7/3	1.07	0.66-1.73	0.548
Coffee	10/3	12/5	1.09	0.71-1.67	0.518
Wine	1/2	21/6	0.43	0.09-2.15	0.165
Cocktails	14/0	8/8	2.00	1.23-3.26	0.002

platters appeared to have contaminated items (based on the fact diners from 4 different groups were ill) it does not appear to be a result of an individual diner contaminating the items.

Environmental Health investigation

Method

Officers from the Environmental Health (EH) Program had been to the restaurant for a routine scheduled inspection a few weeks prior to the outbreak and found no major issues of concern, though there were some structural and minor cleaning issues that required rectification.

Following the outbreak, several visits were made to the restaurant to examine the processes involved in food preparation at the restaurant, particularly the food items on the high tea menu.

The restaurant management were asked about staff illness and exclusion periods for symptomatic staff.

Results

All items on the platters were prepared by the restaurant daily and no items were carried over into the following day(s). Several items were not prepared on site at the restaurant but supplied from external suppliers; these include quiches and all dessert items. All sandwiches were prepared in the morning and were distributed to platters by staff. Sandwiches were also served from other outlets within the same complex. No other reports of illness from people that may have eaten the sandwiches in other areas were reported to the management of the complex or to EH.

It was found that fruit was prepared for the cocktails in the bar area and a sink used for hand washing was also used to wash fruit (when the fruit was washed). As a result of this investigation, the restaurant was required to prepare fruit for cocktails in the kitchens, with the sink in the bar area to be dedicated for hand washing only. No staff had reported any gastrointestinal illness prior to the outbreak.

During the outbreak investigation, EH Officers found that the restaurant did not have a documented food safety plan. While there is no

legal requirement for them to provide this it is considered good practice and would have assisted in providing evidence relating to the date of the incident. Temperatures for food storage equipment were allegedly being monitored but no records of temperatures had been kept to prove this was occurring. As a result of the investigation, the restaurant has been instructed to document and implement a food safety plan.

The managers of the restaurant were advised to remind staff that they are legally obliged to report any symptoms of food-borne disease and cease any food handling activities, which may involve being excluded from work duties and that staff should not return to food handling activities until 48 hours after symptoms have ceased.

Discussion

Norovirus is one of the most common pathogens associated with foodborne outbreaks in the United States¹ and other parts of the world.² Outbreaks in Australia are commonly reported in a range of settings.³ Norovirus outbreaks in the NT occur usually as a result of person-to-person transmission in institutional settings or childcare centres, but there have been foodborne outbreaks investigated by the NT CDC⁴.

This investigation was an interesting example of how technology and communication can provide alternative ways to carry out an investigation. Traditionally, investigations often rely on obtaining phone numbers for potential cases from other cases in an outbreak and calling them to try obtaining information on their illness and exposure. Often this can be labour intensive and difficult to achieve in a timely fashion. In this instance, mobile phones and text messaging provided almost instant access to potential cases via the first case who contacted the Department of Health. Email was also a useful method for obtaining information from the early group from that day – once again being a rapid way of communicating and obtaining information.

The slightly different way of obtaining information (one by phone interview, the other email) for this cohort study meant that results based on the inclusion of these data needed to be

interpreted with caution. Of greater importance is the exposure variables in the study – as several items were not on the early group of platters so the early diners were not exposed to them but were nevertheless potentially exposed. Including the early group had the effect of increasing the risk ratios and decreasing the p values in the foods which were suspicious based on the afternoon sub-group analysis. Unfortunately 8 diners in the cohort were unable to be contacted and this also limited the power of the study.

Based on the information from this investigation and the epidemiological study, it is likely that contamination of the egg sandwiches, chicken sandwiches and possibly cocktails by norovirus was the cause of the outbreak. These sandwiches were not apparently ready for the platters served to the group in the morning. How and why this contamination occurred is not known, but it was likely to have taken place in the kitchen despite no staff reporting illness to restaurant management. The contamination was unlikely to have been caused by a sick patron at the restaurant, as all platters served to all groups in the afternoon were associated with illness. Asymptomatic carriage of norovirus in food handlers had been commonly reported as a cause of outbreaks^{3,5,6} and food handlers may not always report illness.² No food handlers were screened as part of the investigation. However, this can only be put forward as one possible cause of the outbreak.

The cocktails were significantly associated with illness. The cocktails consisted of several different types and many of the cocktails were shared between 2 or more people in the groups. As nearly all the cocktails were different between groups, there was a possibility that there was an item in the drinks - such as a piece of fruit - that might have been contaminated, even though not all cocktails contained fruit. Given the EH finding regarding the hand washing sink that was used for the washing and preparation of fruit for drinks, this is another possible factor which may have contributed to the outbreak.

The lack of a documented food safety plan at the restaurant was of note, and while it may not have prevented the outbreak from occurring, the

restaurant has been asked to formulate and implement a safety plan as part of the continuing registration as a food businesses. Documentation of temperature checks (that were reportedly being performed) would have aided the investigation.

The restaurant advised they would remove the option of self-serve high tea platters from the menu, instead making the high tea a meal that was served by wait staff in the restaurant. In terms of risk management, this decision is probably beneficial for prevention of possible outbreaks in the future. However, in this specific instance self-service was not thought to be the main cause of the outbreak, but may have contributed to contamination of some other items on the platter from the initial vehicle.

Conclusions

The cohort study identified possible vehicles for the outbreak as either chicken or egg sandwiches or possibly the cocktails, but due to some methodological aspects of the study these results should be interpreted with caution. It is suspected that contamination occurred either during preparation of the food for the platters, before the platters were served or after the platters left the kitchen. As all platters served in the afternoon were associated with illness, this contamination is thought to have occurred in relation to either the chicken or egg sandwiches that were not on the morning platters. It is also possible the cocktails were the vehicles of infection. The source of the contamination was possibly a food or beverage handler at the restaurant.

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A look at enteric disease in the NT during 2011 from the OzFoodNet perspective

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Abstract

The Northern Territory (NT) OzFoodNet site is responsible for the follow up and reporting of enteric disease epidemiology in the NT. During 2011 there were 678 notifications of foodborne or potentially foodborne disease reported in the NT, with salmonellosis cases accounting for the majority of these notifications. Overall, the number of cases for most enteric disease notifications was less than expected. The article below discusses the epidemiology of enteric diseases reported in the NT and also summarises briefly the foodborne and non-foodborne outbreak investigations conducted during 2011.

Key words: enteric; salmonellosis; campylobacteriosis; cryptosporidiosis; shigellosis, hepatitis A; foodborne disease, outbreak

Background

In 2011 there were 678 notifications of foodborne or potentially foodborne disease reported in the Northern Territory (NT). This is 23% less than the 5 year mean (885) and 21% less than the previous year (861). Salmonellosis notifications accounted for 61% of the foodborne disease notifications in the NT, followed by campylobacteriosis notifications (25%) and shigellosis notifications (12%). In 2011 the number of salmonellosis cases was 18% less than expected (415 vs. 508 5 year mean). Campylobacteriosis case numbers were

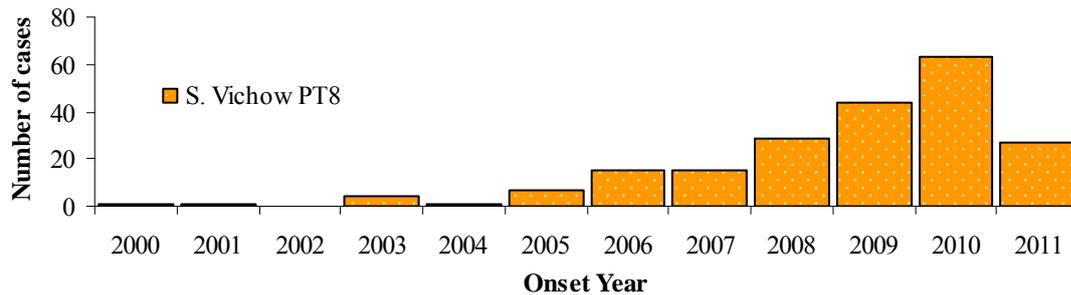
30% less than expected (168 vs. 239, 5 year mean) and shigellosis case numbers were 38% lower than expected (81 vs. 130, 5 year mean).

There were some problems with the receipt of notifications from a laboratory in the later part of 2011 which may have contributed to the lower number of enteric disease notifications in the NT. It is possible that there was not a fall in enteric disease notifications, but under-notification of enteric diseases in 2011.

There were 5 foodborne or suspected foodborne outbreaks investigated in 2011. The etiological agents in the foodborne outbreaks were *S. Typhimurium* PT9 (1), *S. Typhimurium* PT141 (1) and *S. Saintpaul* (1). The etiological for 2 foodborne outbreaks was unknown. There was 1 suspected waterborne outbreak with *Giardia* suspected to be the etiological agent. There were 9 non-foodborne investigations and 9 cluster investigations conducted this year.

Salmonellosis epidemiology

There were 415 notifications of salmonellosis in the NT, 18% less than expected and 31% less than the previous year (604). The overall rate of salmonellosis was 181 cases per 100,000. The median age of salmonellosis cases was 3 years. There was no difference in the rate of disease between males and females in the overall population, with a rate ratio of 1.03 (95% CI=0.905-1.185, p=0.287). The Indigenous population had a higher rate of salmonellosis

Figure 1. Salmonella Virchow PT8 case notifications in the Northern Territory, 2000-2011**Table 1. Top 10 Salmonella serovars in the NT during 2011**

Serovar	Count
<i>S. Saintpaul</i>	48
<i>S. Ball</i>	28
<i>S. Virchow PT8</i>	27
<i>S. Lansing</i>	24
<i>S. Muenchen</i>	18
<i>S. subsp I ser 16:l,v:-</i>	17
<i>S. Weltevreden</i>	15
<i>S. Litchfield</i>	12
<i>S. Chester</i>	9
<i>S. Mgulani</i>	9

than the non-Indigenous (230 cases per 100,000 vs non Indigenous 148 cases per 100,000), equating to a rate ratio of 1.56 (95% CI=1.32-1.823, $p<0.0001$).

The greatest numbers of notifications were in the 0-4 year age group with 217 cases and a rate of 1157 cases per 100,000. There was no significant difference between the rate of disease in the Indigenous (1152 cases per 100,000) and non-Indigenous (1084 cases per 100,000) populations in this age group, with a rate ratio of 1.06 (95% CI 0.85-1.3; $p=0.3021$). Male children under 5 years of age had a higher rate of disease than females in this same age group, with 1371 per 100,000 population vs. 931 cases per 100,000 population (rate ratio=1.47; 95% CI 1.23-1.75, $p<0.0001$).

In 2011, 99% of *Salmonella* isolates were identified to the serovar level. The serovars with the highest number of notifications were *S. Saintpaul* ($n=48$) followed by *S. Ball* ($n=28$) and *S. Virchow PT8* (27 cases). *S. Ball* and *S. Saintpaul* are thought to have established an ecological niche in the NT. *S. Virchow PT8* has been reported in increasing numbers for the past several years (Figure 1). However in 2011, case numbers were less than then the previous year

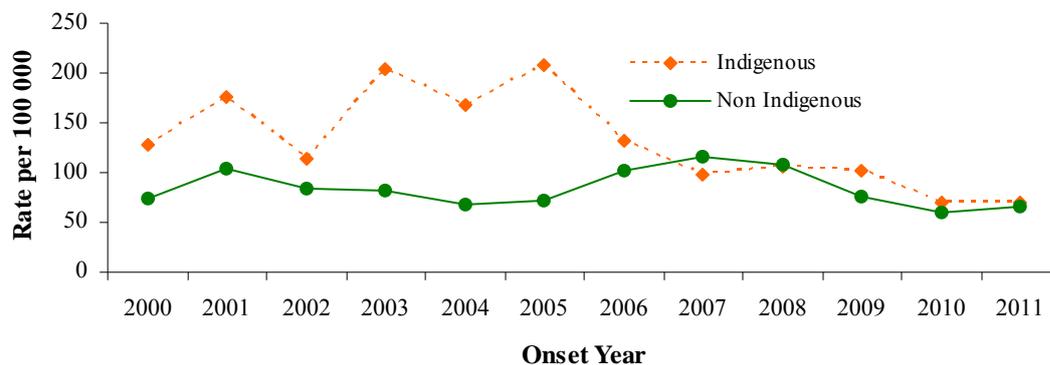
when notifications peaked at 63 cases. This year 27 cases of *S. Virchow* were reported which was 19% less than expected based on the 5 year mean for this serovar (33 cases). This serovar may also have established an ecological niche in the NT. The top 10 serovars reported in the NT during 2011 are shown in Table 1.

Campylobacteriosis epidemiology

There were 168 notifications of campylobacteriosis in the NT during 2011. This was 30% less than expected (FYM 239) and 3% less than the previous year. The overall rate of campylobacteriosis was 73 cases per 100,000. The median age of cases was 20 years. There was no significant difference in the rate of disease between the sexes or by Indigenous status. The rate of disease in the Indigenous population was 70 cases per 100,000 and 65 cases per 100,000 in the non-Indigenous population (rate ratio 1.08; 95% CI 0.802-1.43; $p=0.28$).

The highest rate of disease was on the 0-4 year age group, with 298 cases per 100,000. Within this age group, there was no significant different in the rate of disease between the sexes, but the rate of disease was higher in Indigenous children, with 376 cases per 100,000 compared to 228 case per 100,000 in non-Indigenous children in this age group (rate ratio 1.6; 95% CI 1.12-2.34, $p=0.0049$).

There has been a continual decline in the rate of campylobacteriosis in the NT over the last several years. The reasons for this decline are unknown. Anecdotally there have been changes in the national chicken meat industry with the implementation of the *Primary Production and Processing Standard for Poultry Meat*¹ over the last 2 years. There is essentially no local chicken meat industry in the NT and much of the chicken product that enters the NT from interstate is

Figure 2. Rate of campylobacteriosis in the NT by Indigenous status 2000-2011

frozen or chilled (Frost, *pers comm.*). The decline in the rate of disease has occurred in both the Indigenous and non-Indigenous population (Figure 2).

Shigellosis epidemiology

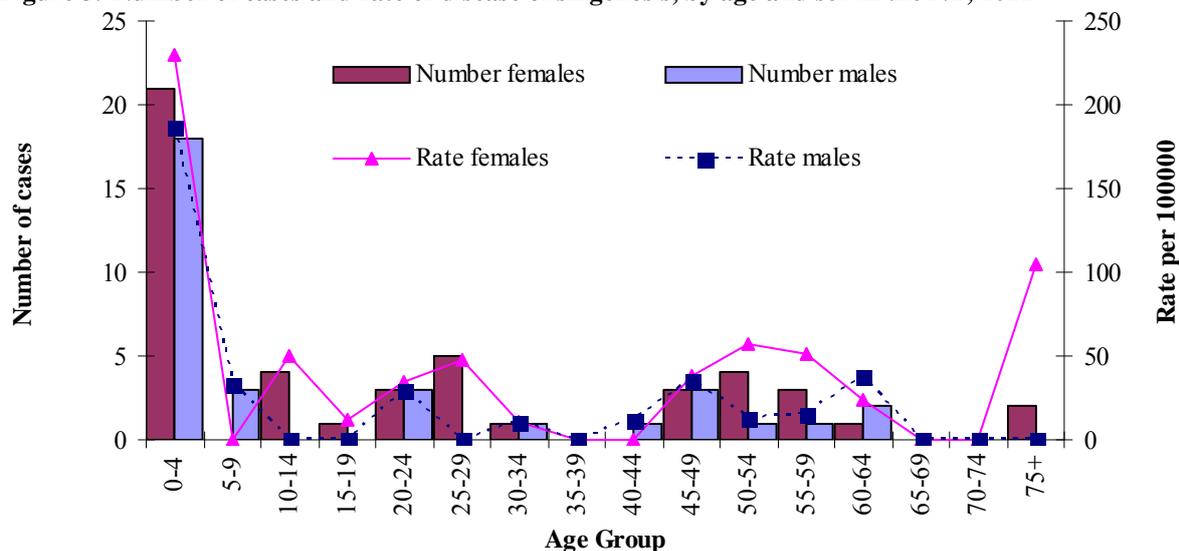
There were 81 cases of shigellosis notified in the NT. This was 38% less than expected (FYM 130 cases) but 3% more than the previous year (79 cases). The overall rate of shigellosis was 35 cases per 100,000 and the median age of case was 7 years.

Shigellosis is more commonly reported in the Indigenous population. In 2011, 69 cases notified were in the Indigenous population (85%). The rate of disease in the Indigenous population was 100 cases per 100,000 compared to 7 cases per 100,000 in the non-Indigenous population (rate ratio 14.6; 95% CI 11.34-18.45,

$p < 0.0001$). Of note, there was a higher rate of disease among females than males (43 cases per 100,000 vs. 28 cases per 100,000). This equates to a rate ratio of 1.6 (95% CI 1.15-2.07, $p = 0.0018$).

The highest rate of disease was seen in the 0-4 age group with 208 cases per 100,000 (39 cases notified). All cases in this age group were Indigenous, and the rate of disease was 473 cases per 100,000 for Indigenous children in this age group. There was no difference between the rate of disease in males and females in this age group.

There were moderately high rates of disease seen among older Indigenous people particularly females (Figure 3). This may be, in part, a reflection of cultural practices where aunts and grandmothers are often involved in the care of young children in Indigenous populations.

Figure 3. Number of cases and rate of disease of shigellosis, by age and sex in the NT, 2011

Shigella species and biotypes

The most commonly reported species of *Shigella* was *Shigella sonnei* (61 cases) followed by *Shigella flexneri* (19 cases). The most commonly reported biotype was *Shigella sonnei* biotype a (52 cases) followed by *S. flexneri* 4a mannitol negative (11 cases).

Shigella sonnei biotype a re-emerged in 2011 as the predominant biotype after several years in which relatively few cases of this biotype were reported. *S. flexneri* 4a mannitol negative was predominant over the last 5 years and now seems to be on the decline. The reasons for the changing patterns in the different biotypes reported are unknown. It is possible there are seasonal or environmental factors that may influence the distribution or survival of different biotypes. Cases of shigellosis have often been sporadic in nature, with few clusters or outbreaks detected.

Cryptosporidiosis epidemiology

In 2011 there were 97 notifications of cryptosporidiosis. This is 10% lower than expected compared to the 5 year mean (108 cases) and 3% lower than the previous year (100 cases). The median age of cases was 1 year.

Cryptosporidiosis is predominantly a disease reported in children, with the 0-4 year age group making up the majority (81%) of cases reported in 2011. The rate of disease was higher in males than females in this age group with 519 cases per 100,000 in males vs. 318 cases per 100,000 in females, with a rate ratio of 1.64 (95% CI 1.21-2.15; $p=0.0006$).

The rate of disease is higher in the Indigenous population with 103 cases per 100,000 compared to 16 cases per 100,000 in the non-Indigenous population, rate ratio 6.35 (95% CI 4.95-8.01; $p<0.0001$). This difference is also apparent in the 0-4 year age group, where the rate in Indigenous children is 800 cases per 100,000 compared to non-Indigenous children with a rate of 124 cases per 100,000, rate ratio 6.48 (95% CI 5.00-8.25; $p<0.0001$).

Other enteric diseases of note

There were 3 cases of typhoid reported in the NT during 2011. All cases were overseas acquired, with 1 case acquired in the Philippines and 2 cases acquired in Bali, Indonesia. All cases recovered and no related cases were identified among household contacts or co-travellers of cases.

Of note this year was the 7 cases of *Vibrio* food poisoning notified in the NT. In previous years there have only been 1-2 cases per year notified. Nearly all cases were overseas acquired (6/7 cases) with 4 cases acquired in Bali in Indonesia, 1 case from an unspecified region of Indonesia, and 1 case acquired in Vietnam. Consumption of seafood was mentioned by most cases. *Vibrio parahaemolyticus* was isolated in 5 cases (4 overseas acquired) and *V. cholerae* (nonO1, nonO139) was reported from 2 cases (acquired in Bali and Vietnam). These isolates were not the epidemic strain of *V. cholerae* associated with cholera outbreaks.

During 2011 there were reports of rarely notified diseases. These included 1 STEC case in a 25 year old non-Indigenous female. The infection was likely to have been locally acquired and the isolate was identified as an *E. coli* O128:H2. A single HUS case was notified in a 53 year old Indigenous male but no organism was isolated from cultures and the source of infection is unknown. There was 1 listeriosis case notified in a 55 year old Indigenous male. The case had end stage renal disease and was immunocompromised.

There were 3 cases of hepatitis A notified in 2011 with 1 case acquired in Java, Indonesia, 1 case acquired in India and 1 case in an irregular maritime arrival (IMA) which was acquired while at sea. There were no locally acquired cases of hepatitis A in the NT during 2011. Over the last 5 years there has only been an average of 1 locally acquired case of hepatitis A per year and of these cases, all have been reported in non-Indigenous people.

Table 2. Summary of foodborne or waterborne outbreaks investigated in the Northern Territory in 2011

Onset month	Aetiology (no lab confirmed cases)	No. Exposed	Cases	Transmission / Vehicle	Setting Exposed
January	<i>S. Tm</i> PT9 (1)	3	3	Suspect foodborne/unknown	Camp
February	Unknown	21	3	Suspect foodborne/unknown	Camp/Tour bus
March	<i>Giardia</i> (1)	Unknown	7	Suspect waterborne/water supply	Community
May	<i>S. Tm</i> PT141 (2)	Unknown	5	Suspect foodborne/suspect curry & rice	Sports event
August	<i>S. Saintpaul</i> (6)	Unknown	8	Suspected foodborne/suspect smoothies	Festival/fair / Markets
October	Unknown	12	3	Suspected foodborne/unknown	Private residence

Outbreak investigations

In 2011 there were 5 foodborne/suspected foodborne outbreaks and 1 suspected waterborne outbreak investigated. The foodborne outbreaks involved *Salmonella* Typhimurium PT9, *S. Typhimurium* PT141 and *S. Saintpaul*. The etiological agent for 2 outbreaks was unknown and *Giardia* was reported from 1 case in the suspected waterborne outbreak. The settings exposed for the outbreaks were varied and included camps (2), the general community (1), a sports event (1) a market (1) and a private residence (1). A summary of these outbreaks is included in Table 2.

There were 9 non-foodborne outbreaks investigated in the NT during 2011. These outbreaks occurred in childcare centres (5), aged care facilities (3), and a hospital (1). Norovirus was implicated in 2 of the outbreaks. The etiological agent for the remaining 6 outbreaks was unknown. Transmission in these outbreaks was thought to be person to person, with possibly some fomite transmission involved in 2 outbreaks.

There were 9 cluster investigations conducted during 2011. Of these cluster investigations, 6 investigations concerned *Salmonella* serovars, with *S. Weltevreden* (2 cases), *S. Lansing* (4 cases), *S. Typhimurium* PT60 (3 cases) and 2 separate clusters of *S. Saintpaul* (3 family cases in one cluster and a separate community cluster

of 11 cases). No common sources could be identified for most clusters with the exception of the community cluster of *S. Saintpaul* cases which led to the identification of a foodborne point source outbreak where fruit smoothies were the suspected vehicle (see Table 2). There were 2 cluster investigations into *Shigella sonnei* biotype a undertaken through the year but no common source was identified in either investigation and person-to-person transmission was suspected. A cluster of *Vibrio parahaemolyticus* cases was followed up and found to be a husband and wife who acquired their illness in Bali.

For more information on OzFoodNet, please see www.ozfoodnet.gov.au

Acknowledgments

The NT OzFoodNet site would like to thank the public health staff across the NT CDC, the staff in the NT and interstate laboratories for all their work and contributions as well as the epidemiologists and members of the national OzFoodNet network.

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Rheumatic Heart Disease Control Program: Overview for 2011

Marea Fittock and Keith Edwards, CDC Darwin

Abstract

Acute rheumatic fever (ARF) and rheumatic heart disease (RHD) continue to be major health issues in Northern Territory (NT) Indigenous communities. This report details the outcomes from the RHD Control Program planning days held in 2011, and provides recommendations to improve health outcomes for ARF and RHD patients throughout the NT

Key Words: rheumatic heart disease; acute rheumatic fever; penicillin G benzathine; Northern Territory

Background

There are currently 2,130 patients registered on the Northern Territory (NT) Rheumatic Heart Disease (RHD) Register. Of these 1,252 patients are identified as requiring 4 weekly penicillin G benzathine injections. In 2011 the NT RHD Control Program held 2 planning sessions. These sessions have provided

direction to the program specifically to improve health outcomes for acute rheumatic fever (ARF) and RHD patients throughout the NT. These outcomes are noted at the end of this document.

Acute rheumatic fever (ARF) episodes

Confirmed RHD notifications for 2011 are shown below in Figure 1. Figure 2 compares ARF episodes notified from 2000 to 2011. There has been an increase in the cases of ARF over this period with no apparent cause for this increase. Anecdotally, the program notes that perhaps more cases are being diagnosed as a result of improved education processes across the health sector. The data show that there were 45 1st episodes ARF; 31 recurrent episodes and 5 unknown episodes. Unknown episodes are 'possible' ARF episodes. These cases are followed up and subsequently treated for 6 months until the specialist makes a definitive diagnosis of established ARF or not.

Figure 1. Confirmed ARF notifications during 2011

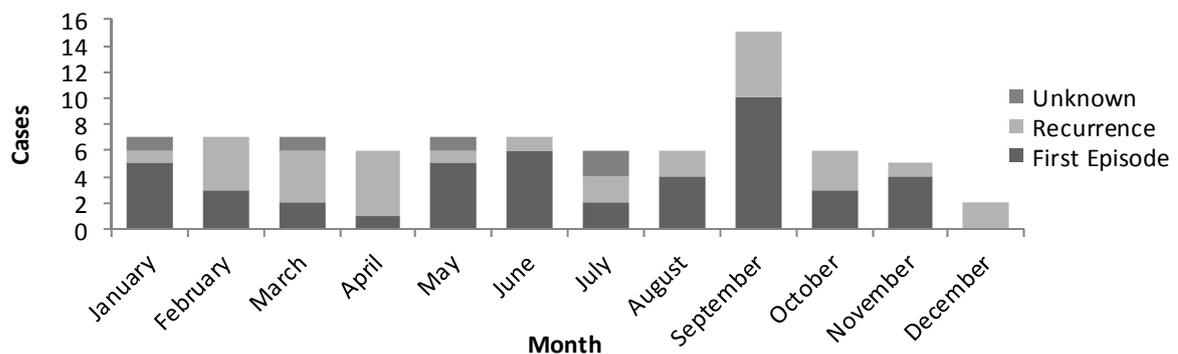


Figure 2. Confirmed ARF notifications 2000 - 2011

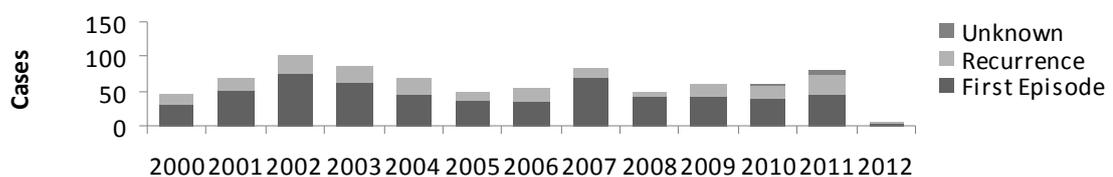
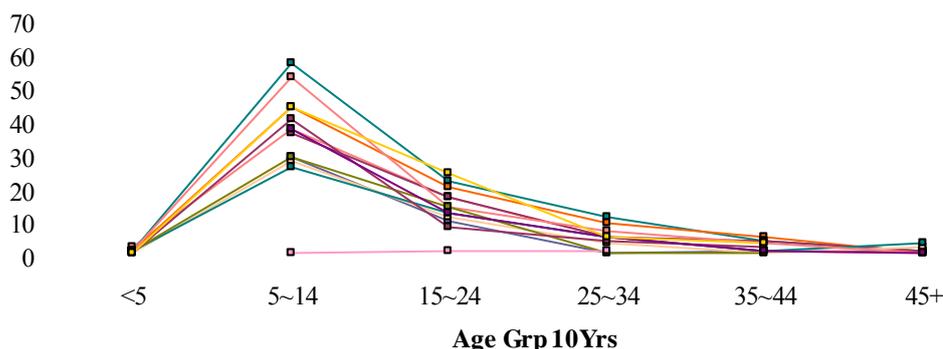


Figure 3. Age breakdown of ARF notifications

Age breakdown

Figure 3 shows the 5-14 year age group are notified with the most episodes of ARF in the NT which is consistent with other studies that report that this age group is the most effected by ARF.

Prophylaxis adherence rates

Currently there are 1,252 patients identified as requiring 4 weekly penicillin G benzathine injections. Best practice supports that each patient should receive at least 80% of their yearly treatment requirements. Even this percentage leaves too many 'at risk days'. At risk days refer to the days where there is no antibiotic cover leaving the patient at risk of ARF recurrence. Figure 4 and 5 show the coverage in the NT since 2007 overall and by percentage groups respectively.

Educational sessions on ARF/RHD

771 staff within the NT health sector had an educational session given by RHD Unit from CDC in 2011.

Surgery

25 RHD patients underwent surgery for heart valve repair or replacement during 2011.

Figure 4. Coverage of benzathine penicillin in the NT 2007 – 2011

Year	Overall Coverage
2007	54.6%
2008	56.2%
2009	59.7%
2010	61.1%
2011	59.0%
Total	58.2%

Figure 5. Prophylaxis coverage in the NT 2007 – 2011

Year	<50%	50-80%	>80%
2007	44.35%	33.88%	21.77%
2008	42.37%	36.24%	21.39%
2009	35.39%	40.71%	23.90%
2010	32.58%	41.54%	25.88%
2011	35.0%	44.0%	20.0%

Deaths

There were 2 patients who died from RHD causes, 1 aged 23 years and the other 39 years. A further 29 patients with RHD, both adults and children, are known to have died from causes other than RHD.

Recommendations to improve health outcomes

To further improve health outcomes by reducing episodes of ARF and thereby RHD in NT, the following are recommended:

- intensify a structured continuous quality improvement systematic approach with each health service
- broaden education processes across communities and health care providers with programs such as Train the Trainer
- continue networking across the health sector to improve cardiac patient care and to raise the profile of ARF and RHD
- improve regular reporting and support for health centres
- broaden the public health preventative processes through health promotional activities.

Adverse outcomes following the use of azithromycin for trachoma treatment in babies

Cath Milne, CDC Darwin

Abstract

Unlike the current 2006 national guidelines for trachoma, Northern Territory trachoma guidelines (2008) state azithromycin should be administered to infants less than 6 months of age, who are then actively monitored for adverse events; the monitoring however proved logistically difficult. A retrospective cohort study was designed using existing health records to review children less than 12 months of age for possible adverse events in the 4 weeks following azithromycin treatment.

The records of 93 children were reviewed and only 14 events were considered to be associated with azithromycin treatment, although 9 of these might have had other causes.

The study failed to identify any significant adverse events and the minor adverse events were observed in lower numbers than seen in previous studies.

The study had a number of limitations but does give some support to treating this age group; further monitoring is needed to validate these findings.

Based on this study, we continue to support the current "Guidelines for management of trachoma in the NT, 2008" regarding treatment of infant contacts of trachoma cases, and believe this strategy makes an important contribution to the elimination of trachoma in the NT.

Key words: azithromycin; trachoma; infants; adverse reaction

Introduction

Trachoma is an eye disease caused by infection with ocular-specific serovars of *Chlamydia trachomatis*. It is the leading cause of infectious blindness worldwide and occurs predominantly in areas of poor hygiene and overcrowding.¹ Australia is the only developed country which has endemic trachoma, although this is mainly found in remote areas. Repeated infections can

lead to scarring of the eyelid, which may progress to trichiasis (inturned eyelashes) in adulthood and subsequent blindness if not treated with surgery.

The prevalence of active trachoma is highest in preschool children. Younger children also have higher chlamydial loads than older age groups in hyperendemic areas. Trachoma is strongly clustered by households. It is important that these younger age groups are targeted effectively in trachoma control strategies.

Trachoma control programs rely on mass treatment of communities with antibiotics once a certain threshold of trachoma prevalence in the community has been reached. According to the *Guidelines for the public health management of trachoma in Australia (2006)* single-dose azithromycin is the treatment of choice for trachoma for adults and children over 6 months of age.² In infants under 6 months, oral erythromycin or topical tetracycline are suggested as alternative treatments to azithromycin.²⁻⁶ Although azithromycin is listed on the Pharmaceutical Benefits Scheme for the treatment of trachoma,⁷ it is not currently registered in Australia for trachoma treatment in children under 12 months of age,⁸ nor do the manufacturers recommend it for this age group.⁹

Interestingly, current guidelines for pertussis in both Australia and the United States, recommend azithromycin for treatment and prevention of pertussis in infants less than 6 months and especially in those under 1 month of age¹⁰⁻¹² despite similar manufacturer restrictions.^{7,9,13}

These restrictions were likely due to the lack of safety data in this age group rather than evidence indicating azithromycin is unsafe for use, and given the safety record in this age group for treatment of pertussis, the *Guidelines for management of trachoma in the NT, 2008* recommended that infants less than 6 months of age be treated with single-dose azithromycin¹⁴⁻¹⁷ and then be followed up for 4 weeks post-treatment for side effects.¹⁷⁻¹⁸

NT trachoma guidelines recommend that children under 6 months of age be treated with azithromycin if they are household contacts of identified trachoma cases. If a screening activity determines a community prevalence of 10% or greater with no obvious household clustering, treatment should be extended to include all infants in the community. The purpose of this report is to document post-treatment consultations to provide an indication of any azithromycin side effects in children under 12 months of age within 4 weeks of treatment.

Methods

Compliance with the *Guidelines for management of trachoma in the NT, 2008* recommendation to monitor infants post-azithromycin was difficult due to constraints on resources and logistics. Community members were not contactable by phone and individual communities could not be visited. Hence a retrospective cohort study was designed using existing electronic health records and any centralised paper-based records available.

Children under 12 months of age who received azithromycin for trachoma between 1 January 2009 and 16 June 2011 were identified through the National Trachoma Surveillance and Reporting Unit (NTSRU) database, through various patient information systems, and through

hard copies of screening/treatment lists. Different sources were used to ensure we captured every infant in the search process. Although NT trachoma guidelines recommend follow up of children under 6 months of age,¹⁷ we included all children under 12 months of age, partly to increase the sample size but also as the manufacturers do not indicate use in children in this age group.⁹

Electronic records of these identified children were then reviewed, looking for any consultations or hospital admissions in the 4 weeks post-treatment. The 4 weeks prior to azithromycin administration were also reviewed to give an indication of any current medical conditions/medications. A patient form was completed for each child who was allocated to 1 of 5 possible outcomes. Data was collated and summarised in a spreadsheet for review.

Previous studies on azithromycin treatment in children were examined for prevalences of different adverse events (Table 1).

The types of adverse events anticipated included, but were not limited to:^{4,9,19}

- gastrointestinal: abdominal pain, vomiting, nausea, diarrhoea, constipation, anorexia, antibiotic associated pseudomembranous colitis, pyloric stenosis

Table 1. Review of adverse events within published literature

Adverse event	Number of events per sample (n)				Events per 100 children
	n = 412 [20]	n = 48 [22]	n = 90 [21]	n = 125 [24]	
Nausea	-	-	-	2	1.6
Vomiting	78	3	5	-	15.6
Abdominal pain	107	10	23	-	25.5
Diarrhoea	106	5	10	-	22
Fever	470	1	1	-	85.8
Cough	154	-	-	-	37
Headache/ body pain	325	2	2	-	59.8
Earache/ discharge	27	-	-	-	6.6
Poor appetite	-	2	1	-	2.2
Misc (chest pain, worms, scabies)	-	-	3	-	3.3

- central nervous system: headache, fever, dizziness, fatigue
- skin conditions: eczema, rash
- arthralgia
- candidal infections
- ototoxicity, hearing disturbances
- allergic reactions, including anaphylaxis
- altered cardiac conduction.
- if a condition was present prior to the administration of azithromycin, the condition was not considered to be a reaction to azithromycin
- if a presentation was for health checks, screens, immunisations or reviews, the presentation was considered routine and not due to azithromycin intolerance (unless a new symptom was evident)
- presentations for most infections were not thought to be due to azithromycin administration. Candidiasis, however, has previously been associated with antibiotic use; therefore if seen post treatment, consideration was given to a possible connection to azithromycin use
- injuries/lacerations were not deemed due to azithromycin administration
- presentations for administrative purposes were not associated with azithromycin intolerance.

Outcomes were recorded as follows:

- no patient contact within 4 weeks of treatment
- patient contact within 4 weeks of treatment with no adverse events documented
- patient contact within 4 weeks of treatment with adverse events documented
- follow up of tolerance within 4 weeks of treatment recorded with no adverse events documented
- follow up of tolerance within 4 weeks of treatment recorded with adverse events documented.

We could only review the clinic records of infants who resided in communities with health centres using the Department of Health's Primary Care Information System (PCIS). This meant that if an identified infant resided in a community whose clinic used either paper-based records or an alternative patient information system (eg. Communicare), we could not access the community-based medical records. We were therefore unable to determine the extent to which these infants had minor reactions, which did not require admission to hospital. Hospital records were accessible for all infants.

For the children who were found to have presented to a clinic within 4 weeks of receiving azithromycin, we made the following assumptions:

The presentations were sorted by time since azithromycin administration, into 'within 1 week' and '4 week' categories. The following symptoms seen within 1 week of administration we considered could possibly be a reaction to azithromycin (unless it was evident prior to administration): diarrhoea, vomiting, fever, rash (including nappy rash) and cough. Other symptoms occurring within 4 weeks of treatment considered as potentially due to azithromycin intolerance were reviewed on a case by case basis but included candidiasis, eczema and weight loss. These symptom lists are not exhaustive.

Results

119 children were identified as being suitable for review with 93 of these having been treated in a clinic which used PCIS (Table 2).

Table 2. Results of patient record reviews

Outcome	Number children
1 No patient contact within 4 weeks of treatment	29
2 Patient contact within 4 weeks of treatment with no adverse events documented	53
3 Patient contact within 4 weeks of treatment with adverse events documented	11
4 Follow up of tolerance within 4 weeks of treatment recorded with no adverse events documented	0
5 Follow up of tolerance within 4 weeks of treatment recorded with adverse events documented	0

Outcome 1: There was no record of these infants having presented to a health facility in the designated time period.

Outcome 2: The children presented for a number of different reasons, from routine health checks and immunisations, through to various infections, growth issues and reviews. No symptoms were considered due to azithromycin administration, with many conditions evident prior to treatment.

Outcome 3: Table 3 details those children who had an adverse event documented, even if this was not the reason for presentation. Of these

children, 3 had more than one symptom, with 14 events documented in total. Some of the cases, however, had alternative indications which could also explain the presence of these symptoms, making the connection with azithromycin use weaker.

Outcome 4/5: There was no documentation of any follow up of adverse events in any child.

Overall, 11.8% (11/93) children reviewed were considered to have had an adverse event due to azithromycin administration. There were 14 events in total; this was broken down as presented in Table 4.

Table 3. Adverse events

Outcome 3: Patient contact within 4 weeks of treatment with adverse events documented					
Patient ID	Age (mths)	Symptom	Timing (within 1 or 4 wks)	Reason	Possible alternative cause
17	9	Thrush	4	Likely adverse event	-
17	9	Diarrhoea	Unknown	Likely adverse event – dates not given – unable to determine	-
18	4	Diarrhoea	1	Within 1 day of treatment – likely adverse event	Using baby bottles – cleanliness?
31	<1	Nappy rash	1	Possible adverse event	Heat or hygiene related?
60	8	Hot	1	As per carer – 1 day post treatment – likely adverse event	Teething
64	5	Oral thrush	4	Presented at 2 ½ weeks post treatment – likely adverse event	Had 4 week course of amoxicillin for Otitis media, starting 1 week prior to treatment
67	7	Hot	1	As per carer	-
82	9	Nappy rash ‘resolved’	1	‘Resolved’ – no onset date given – could be due to treatment	Had 2 week course of amoxicillin for Otitis media and URTI approx. 3 weeks prior to treatment
82	9	Oral thrush	4	Presented almost 3 weeks post treatment – likely adverse event	Had 2 week course of amoxicillin for Otitis media and URTI approx. 3 weeks prior to treatment
83	9	Nappy rash	1	At 1 week post treatment – likely adverse event	Had antibiotics within 3 weeks prior, and immunisations 2 days prior to treatment
115	6	Nappy rash	4	At 8 days post treatment – possible adverse event	Carer given skin cleansing advice 3 weeks prior to treatment – due to poor hygiene?
117	3	Vomit	1	4 days post treatment – may be adverse event	May be due to normal feeding
117	3	Diarrhoea	1	4 days post treatment – may be adverse event	-
121	3	Eczema	4	Almost 2 weeks post treatment – adverse event?	-

Table 4. Rates of adverse events

Symptom	No. events (Sample size n=93)	Events per 100 children
Thrush	3	3.2 (0.7, 9.1)
Diarrhoea	3	3.2 (0.7, 9.1)
Nappy rash	4	4.3 (1.2, 10.6)
Fever	2	2.2 (0.3, 7.6)
Vomit	1	1.1 (0.03, 5.8)
Eczema	1	1.1 (0.03, 5.8)

Of these 14 events, we considered that 5 were related to azithromycin administration. The other 9 had other possible causes making their potential relationship to azithromycin weaker.

Discussion

When designing the trachoma control strategy for the NT, the Department of Health (DoH) Trachoma Program was mindful of the difficulties in treating infant contacts of trachoma cases. It was agreed that single-dose azithromycin be used in children under 1 year of age, with active follow up post-treatment.

In this review, rates of diarrhoea, vomiting and fever were seen at considerably lower rates than expected, compared to previous studies (Appendix 2). Thrush, rashes and eczema are associated with antibiotic use; this review however did not have specific prevalences in this age group from previous studies for comparison.

Many of the adverse events identified had other possible causes (Table 2) and were common conditions in childhood so the degree to which they were caused by azithromycin is conjectural. To date there has not been a single notification to the DoH Trachoma Program of any serious adverse reaction following administration of azithromycin for trachoma in this age group.

There were a number of limitations identified in this review.

- The identification and review of patient records of infants who received azithromycin was challenging. The children reviewed were from across the NT, with the majority (61%) coming from the Alice Springs remote region. The Katherine region has a higher proportion of clinics which undertake their own treatment programs and have their own

patient primary care software (Communicare). De-identified summary data from some of these sites is provided to the NT DoH Trachoma Program. In addition, government-run clinics which did not use the PCIS patient information system at the time of treatment had paper-based records held in the community; this review did not have access to these records. Hospital software programs (CareSys and Clinical Workstation) were accessed to provide details of any hospital presentations and admissions, so for those children whose relevant community records were not available, more serious adverse reactions following azithromycin administration would have been identified. This may provide some explanation for the lower than expected numbers seen in this review for a few of the more minor reactions as described previously.

- Comparisons with other studies were generally problematic. There were differences in health-seeking behaviours: in previous studies participants were investigated as part of a structured research study, whereas our review examined clinic and hospital presentations.
- There were also differences in methodology. Only 2 of the previous studies included children under 12 months of age in their samples that were treated with azithromycin,^{20,21} and neither of these reported adverse events stratified by age. For one study,²¹ the sample group ranged from 9 months to 60 years in age; it is not specified how many children were under 12 months of age, or which adverse events occurred in children as opposed to adults. Subjects in other studies were children rather than adults but again, adverse events were not reported stratified by age.²²⁻²⁶ This made comparison with the prevalence of adverse events seen in this report difficult as age groups between studies were not compatible. Yet, for lack of more suitable alternatives, prevalences from these previous studies have been used, with the lack of age stratification noted as a limitation.
- The size of the infant population at risk of trachoma is relatively small. In 2006, there were approximately 3640 babies born to NT mothers, of which 39% were Indigenous.²⁷ Infants are only treated as contacts of trachoma cases identified through school-

based screening. The infant population itself is not screened, which further reduces the sample size. The sample size observed in this review was small but does give some assurance and support to the decision to treat this age group. It should be noted however that this study did not have the power to detect any rare adverse events associated with azithromycin. Larger studies of this age group are needed to demonstrate azithromycin safety.

- Another limitation is that this review has been done retrospectively; this type of study in itself is known to have weaknesses.

This review identified that for most cases, the treatment notes of the children's medical records had no specific reference made to the earlier azithromycin administration for trachoma. For some children active follow-up may not have occurred. This situation is compounded by the transient nature of the population, and also the high staff turnover of health professionals in remote areas. For other children it is considered likely that tolerance was enquired about in a more informal manner; for example, as a brief inquiry as to an infant's wellbeing whilst undertaking a consultation for a sibling, or opportunistically when passing a parent/carer in the street. A parent/carer is less likely to present to clinic for follow-up if a child is well. In an ideal situation the remote health professional would spend time undertaking follow-up activities and locating these children; however, time for this kind of activity is scarce for these remote practitioners, with heavy workloads.

Conclusion

This review observed low numbers of adverse events associated with azithromycin in infants under 1 year of age; much lower than found in other studies, even after considering the limitations described earlier. Given the levels of trachoma and trichiasis seen in remote populations in Australia,¹ and the sizeable effect infants have on the reservoir of chlamydia in these communities, we continue to support the current trachoma strategy protocols and post-treatment follow-up of infants as detailed in the *Guidelines for Management of Trachoma in the Northern Territory*.¹⁷ Single-dose azithromycin treatment of infant contacts of trachoma cases

makes an important contribution to the elimination of trachoma in the NT.

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A medical student's perspective on trachoma

Milad Modabber, medical student at McMaster University, DeGroot School of Medicine, Hamilton, Ontario, Canada.

Abstract

A Canadian medical student's perspective on the presenting challenges of and opportunities for addressing endemic trachoma among the Indigenous population of Central Australia.

Key words: trachoma; Central Australia; Indigenous; community engagement

Introduction

“Trachoma was one hell of a beast!” And so my interest in trachoma was piqued.¹ As a student, I took part in a course on Visual Science and Disability, where I became captivated by the devastating impact of this blinding eye disease throughout recorded history. I was struck to learn that even the first dedicated eye institutions

in the world—Moorfields and the Massachusetts Eye & Ear Infirmary—were established primarily to treat trachoma.² Subsequently in medical school, I had the opportunity to witness trachoma firsthand through an international clinical elective. Australia, being the only developed nation in the world where endemic trachoma still exists was my overseas elective destination and that is where trachoma became a clinical reality for me.

Australian elective

Upon arrival at Alice Springs, I was immediately immersed into the final preparations for the annual Australian Rules Football, or ‘footy’, clinic held at the independent Indigenous Yipirinya Primary School. This collaborative program for trachoma awareness and football

skills is intended to reinforce the importance of hygiene in preventing trachomatous infection among children. This is the 'F' in the WHO-adopted 'SAFE' trachoma management strategy³:

- S Surgery: for trichiasis
- A Antibiotics: for cases and contacts of active trachoma
- F Facial cleanliness: to promote clean faces to reduce spread of infection
- E Environmental health : to improve water access, good sanitation, waste and fly control, and reduce overcrowding.

The involvement of players from the renowned Melbourne Football Club as well as the popular TV mascots Milpa, the Trachoma Goanna and Yamba, the Honey Ant, brought further into focus the primary message of 'clean faces, strong eyes'. The children's enthusiasm throughout the day reflected the success of this program in utilizing community engagement to approach this critical health issue.

Subsequently on my travels to remote Indigenous communities across Central Australia, I worked alongside members of the Northern Territory Centre for Disease Control (NT CDC) in engaging community groups, schools and medical clinics to promote trachoma awareness. We screened for and treated trachoma while collecting community prevalence and treatment data. This was then submitted to the National Trachoma Surveillance and Reporting Unit (NTSRU) in Sydney, where all community reports are compiled to ultimately produce the annual *Australian Trachoma Surveillance Report* (with the 2011 report hot on the press!).

Along with the NT CDC, I had the privilege of working with Dr Tim Henderson, the ophthalmologist in Central Australia. 'Dr. Tim' travels most weeks of the year to many of the 32 larger Indigenous communities throughout Central Australia to provide specialist eye services treating various eye conditions, including trachoma. The unique challenges he faces are immense: severely advanced eye conditions commonly complicated by various co-morbidities, language and cultural barriers uniquely inherent to Central Australia and competing patient priorities of which personal health does not often take precedence.

Yet, Dr. Tim seeks to bridge these cultural barriers by using interpreters and even learning a few pertinent words in the local language to better communicate with his patients, no small feat given the 20 or so distinct languages spoken across Central Australia—over an area the size of Spain. This regional eye health team works to empower patients and in doing so gains their trust and respect. The lasting relationships forged are especially crucial within the Indigenous population, where the successes and failures of any treatment are relayed throughout the communities, often inter-generationally, via word-of-mouth. Continuity is crucial in fostering engagement and uptake of services; services which although widely accessible, are not consistently utilized.

In my brief yet enriching experience in Australia, I have gained a deeper appreciation of the barriers faced in implementing the SAFE strategy to achieve the WHO-mandated *Global Elimination of Trachoma by the year 2020* (GET 2020).⁴ My personal experiences have only begun to scratch the surface of the complex reality of providing Indigenous healthcare in Central Australia. Nevertheless, when I first became aware of the endemicity of trachoma in the region, my initial assumption was that this was due to inadequate Indigenous access to healthcare provisions. Yet this view proved to be overly simplistic.

There is a dedicated albeit limited presence of healthcare professionals who travel to these remote regions to provide care locally. However, the tendency witnessed in some Indigenous community dwellers to not seek care even when readily accessible perhaps reflects a cultural divergence between the intended care provided and the Aboriginal people's perceptions and prioritization of such services in the context of their unique experiences. Undoubtedly, the underlying factors influencing these realities are multifaceted and complex. Therefore, only through candid self-reflection and systematic investigation can we address the challenges and opportunities that exist within Australia's trachoma endemic regions in the 21st century.

Will Australians succeed in eliminating trachoma by the year 2020? I simply do not know. However, in witnessing the tireless efforts and relentless courage of the individuals I have had the privilege to work alongside, I am

hopeful for Australia's future: a future wherein 'trachoma' is no longer spoken in the present tense.

Note: Milad Modabber is a 2nd year medical student at McMaster University, DeGroot School of Medicine, Canada with an interest in ophthalmology as well as Indigenous and international public health.

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Trachoma Mass Drug Administration Program in Maningrida

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Centre for Disease Control's (CDC) Trachoma Team conducted a Trachoma Mass Drug Administration (MDA) Program in Maningrida from 10 - 14 September 2012 (see Figure 1). It was the third of 5 MDA 6-monthly treatments over a 3 year period .

Azithromycin was administered to over 1500 people from babies of 3kg weight to the elderly. The aim of the Trachoma MDA Program is that everyone in the community is given an age-appropriate dose of azithromycin.

The community based program consisted of 7 teams going house-to-house. Each house was visited at least twice and some more.

Figure 1. Trachoma MDA team arriving in Maningrida



The program will be evaluated and results reported in forthcoming issues of *The Bulletin*. Milpa (see Figure 2), the trachoma mascot, was used to raise awareness and assist in the health promotion message of clean face, strong eyes.

The trichiasis screening started during the previous MDA held in March 2012 and was completed at this screen. All people over the age of 40 years were screened for trichiasis. At this screen only 5 people were found to have a problem and these were referred to the District Medical Officer (DMO) and visiting ophthalmologist.

Additional programs were conducted in conjunction with the MDA treatment week to foster community involvement. The Jimmy Little Foundation ran music workshops for youth and put on a community concert. They also visited the school to promote the message of clean face, strong eyes. Trachoma is now one of the 3 specific programs supported by the Jimmy Little Foundation. This visit was funded by the Trachoma Program. The Department of Health (DOH) Health Development team's nutritionist conducted a 'Cook Up' before the concert, funded by The Fred Hollows Foundation.

Mid-week 5 trainee Aboriginal Health Workers (AHW) came to Maningrida for a day to gain

experience regarding an MDA and to assist with the Cook Up. There were 2 Family as First Teachers (FaFT) from the NT Department of Education who participated in the program and now have extra employment as a result, having trained as Eye Health Workers for “The Fred Hollows Foundation”.

The MDA treatment week staff numbered over 35 people with staff from a range of DoH programs including CDC, Environmental Health, Health Development as well as staff and volunteers from medical and nursing schools, and from Royal Darwin Hospital. In addition the Department of Education FaFT Program, Maningrida Health Centre, community based workers and the Jimmy Little Foundation rounded out the team.

Congratulations need to be given to the Trachoma Team Leader Brendan Johnson, and to Gabrielle Watt and Jenine Gunn (Public Health Nurses from the Trachoma Team at CDC). Also thanks to the other CDC staff; Suzanne Connor, Joy Pascall and Kimberly Caffery and thank you to all our ‘volunteers’. The efforts of all who participated were not appreciated.

Figure 2. Milpa, the trachoma mascot



TB workshop 2012

The Tuberculosis (TB) Unit, Centre for Disease Control held a 2 day workshop in August 2012. The aims of the workshop were to present new initiatives in the management of TB, review outcomes to date and to prepare a new 5 year business plan. The workshop was well attended by Medical Officers/Public Health Physicians, Public Health Nurses (PHN), students and pathology staff.

The Northern Territory (NT) *Guidelines for the management of TB* are currently being updated and highlights from these updates were covered. The guidelines address evidence-based changes to management and care and also broaden the areas for quick and easy access to best practice information. Newer diagnostic tests and vigilance for timely case detection of multi drug resistant tuberculosis (MDRTB) were covered. Other topics presented at the workshop included the epidemiology of TB in the NT and Australia, issues around TB screening in specific populations such as for refugees, the immunosuppressed (eg renal and cancer patients) school aged children from high incidence settings, prisoners and irregular marine arrivals (IMAs).

Recent years have seen changes in work-practice and workload for the TB team but most marked have been in addressing the screening and TB burden of the IMAs. Dedicated effort and consistent and commendable team work have led to praiseworthy outcomes. A case series review of IMA TB cases in the unit over the past 2 years was a standout presentation.

Another emerging condition addressed was around the knowledge and skill required for diagnosing, treating and managing MDRTB cases. Issues around nontuberculous

Figure 1. The Merv Fairley Memorial Award



mycobacteria (NTMs) and leprosy also were presented which resulted in useful discussion.

The workshop was the ideal forum for the inaugural award presentation in honour of a very much missed and long serving staff member who passed away last year, Merv Fairley. This award (Figure 1) was presented to a team member who displays outstanding dedication to the people in the NT receiving care for TB. The recipient for this inaugural Merv Fairley Award was Tracy Popple, Public Health Nurse (Figure 2). Tracy is a most admirable award winner as her attention and dedication to patients and families, particular among the Aboriginal communities, is legend.

Congratulations Tracy.

Figure 2. Tracy Popple receiving the inaugural Merv Fairley Memorial Award



Photography - Charles Rantz Strebor

Merv Fairley - 7 March 1949 – 13 October 2011

Who was Merv Fairley?

Merv Fairley was a Clinical Nurse Consultant with the Centre for Disease Control (CDC) and had served the Northern Territory Department of Health for at least 29 years. He passed away following a battle with cancer just over a year ago. Merv held various positions including working as a remote health nurse in the Katherine Region and at Maningrida Health Centre and in Darwin Urban Community Health including working as the Manager for Berrimah and Palmerston Community Health Centres.

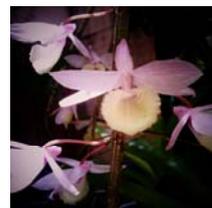
He worked in the Alcohol and Other Drugs Program for a while before coming to CDC in 1997 where he worked in the area of tuberculosis (TB) control and also was the 'go to' staff member for leprosy control. In the last 10 years or so he also ran the CDC's malaria surveillance, following up the imported notified malaria cases.

During Merv's time at CDC he worked tirelessly and professionally to provide TB control

services to the Darwin Region and beyond. His knowledge and attention to culture and caring for people and families were invaluable in carrying out community screening and education as well as in the day to day unit work.

In recent years his specific interest had been working with prison health services to ensure that TB screening and preventive treatment effectively occurred in the Darwin prison system. Those who knew and worked with Merv will remember him as an intensely private bloke who went about his work in a quiet methodical manner but with a quirky sense of humour. He was a fountain of knowledge and, when you pushed him, a great source of stories from the past. He cared about the individual and had a great sense of duty.

Merv also had a green thumb and a generous creative nature and because of this we at CDC have a garden of wonder and beauty.



Photography - Charles Rantz Strebor

Centre for Disease Control Conference 4 – 6 September 2012

The annual Centre for Disease Control (CDC) Conference was held in Darwin at the Mal Nairn Auditorium, Charles Darwin University on 4, 5 and 6 September 2012.

The conference was attended by approximately 110 participants, with speakers from interstate, other NT Health branches and divisions and non-government agencies as well as from the Centre for Disease Control. (see *The Bulletin*, Vol.19, No 2, June 2012 page 40).

The program provided a forum for CDC staff to network, present their work and discuss public

health issues, encouraging a multidisciplinary approach. Participation in the conference enables different program areas to learn from others, challenge each other and improve networks across the regions. The event showcased the work of all sections and regions, with the use of props being a highlight of this year's conference. It also provided an opportunity to acknowledge the depth of experience within CDC, with over 45 staff having greater than 10 years of service with CDC.

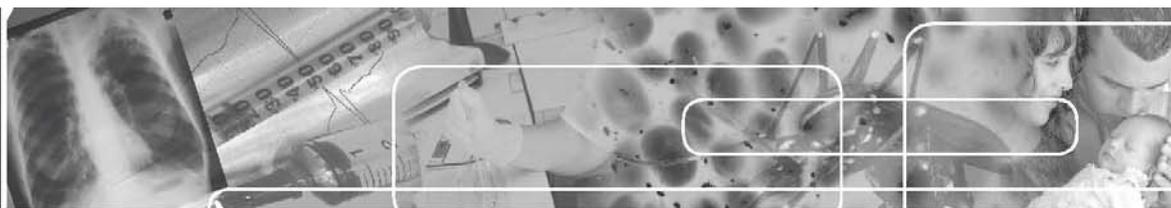
It was estimated that CDC has combined experience of over 1000 years!



Photography - Charles Rantz Strebtor



Northern
Territory
Government



Centre for Disease Control

September 2012

Chironex fleckeri (Box jellyfish)

DO NOT ENTER THE SEA AND MOST IMPORTANTLY DO NOT LET CHILDREN ENTER THE SEA DURING THE STINGER SEASON - OCTOBER TO MAY

'*Chironex fleckeri*', also known as the major Box Jellyfish has the most rapidly acting venom known to science and is capable of killing a person in under 5 minutes.

Season

The official 'stinger' season for the Northern Territory is from 1 October until 1 June. However stings have been recorded in all months of the year.

Distribution

Chironex fleckeri inhabit the shallow waters of the northern Australian coast, and are more numerous after local rain and in calm seas, especially near river and creek outlets and around boat ramps.

Appearance

The bell of *Chironex fleckeri* is a rounded box shape with the bottom missing, with four fleshy appendages, one at each corner, from which tentacles trail.

The jellyfish is difficult to see in the water because the bell is colourless, and although the outermost tentacles are sometimes purple near their base the others are white or dull yellow.

An adult jellyfish may have 40 or more tentacles, each of which may be up to 2 metres or more in length long. Visible baby Box Jellyfish have bodies 2-5cm in diameter, while the larger mature specimens can often be 20cm across or even larger.

Envenomation

The tentacles contain millions of 'nematocysts' which store and can inject venom. A sting occurs when the tentacles contact the bare skin causing these

nematocysts to inject millions of little doses of venom into a large area of tissue, which allows very rapid absorption. The venom is fired into the skin within 3 milliseconds of being triggered – 10 times faster than the inflation of an airbag in a car crash.

Signs and symptoms

The venom has cardiotoxic (attacks the heart) and highly dermatonecrotic (destroys skin) components.

A sting causes immediate severe localized pain. Within minutes white welts appear where the tentacle contact occurred, followed by red whip-like lines which may later blister. Subsequent skin death may lead to permanent scarring.

A massive dose of venom can cause cardiac dysfunction, resulting in loss of consciousness and cardiac arrest and death within 5 minutes of being stung.

Children are at greater risk of severe, life threatening envenomation because of their smaller body mass.

Injury and deaths

Around 40 people present to Top End hospitals or health clinics each stinger season with an injury attributed to a jellyfish sting.

Chironex fleckeri has been responsible for at least 64 deaths since first reported in 1883. The last recorded *Chironex fleckeri* death in Australia was in a 6 year old boy from a remote NT Aboriginal community in November 2007.

The last 14 stinger deaths in the NT have all been children.



CENTRE FOR DISEASE CONTROL

Prevention

The best prevention is to stay out of the water especially during the stinger season.

If entering the water wear protective clothing. Any clothing, even if very thin, will provide protection as long as there are no gaps or exposed skin. The more skin that is covered, the greater the protection.

Treatment

Immediate first aid is vital and cardiopulmonary resuscitation may be needed.

- Remove the patient from the water and restrain if necessary
- Call for help (dial 000 or get a surf life saver or life guard to help you)
- Assess the patient and commence CPR as necessary
- Liberally douse the stung area with vinegar to neutralize invisible stinging organelles – do not wash with fresh water
- If vinegar is unavailable, pick off any remnants of the tentacles (the skin of the pads of the fingers and palm is thicker so any stinging will usually be minor) and rinse sting well with salt water (not freshwater)
- Seek urgent medical assistance with rapid transport to hospital. Antivenom may be required in severe stings.

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

Alice Springs 8951 7540

Darwin 8922 8044

Katherine 8973 9049

Nhulunbuy 8987 0357

Tennant Creek 8962 4603

or

www.nt.gov.au/health/cdc

Abstracts from peer reviewed published articles related to the Northern Territory

Evidence in Australia for a case of airport dengue

Peter Whelan¹, Huy Nguyen¹, Krispin Hajkowicz², Josh Davis³, David Smith⁴, Alyssa Pyke⁵, Vicki Krause¹, Peter Markey^{1}*

¹Centre for Disease Control, Department of Health, Northern Territory, Australia, ²Royal Darwin Hospital, Department of Health, Northern Territory, Australia, ³Menzies School of Health Research, Darwin, Northern Territory, Australia, ⁴School of Pathology and Laboratory Medicine, University of Western Australia, Perth, Australia, ⁵Public Health Virology, Forensic and Scientific Services, Queensland Health, Queensland, Australia

PLoS Neglected Tropical Diseases Published: September 27, 2012.

This is the first recognised case of locally transmitted dengue in the Northern Territory since the 1950s. We consider the most likely source of dengue to be a mosquito which alighted from a C-130 military aircraft arriving from Bali in early July and that this may be a case of “airport dengue” equivalent to previous reported cases of airport malaria. The case reinforces the need to continue strict disinfection of overseas aircraft and in monitoring mosquito populations around ports of entry. Health authorities and clinicians should be aware of this possible mode of introduction and transmission of dengue.

A presentation of penile Mondor’s disease

Mark Rowe and Katrien Depraetere

Clinic 34, Alice Springs

Int J STD AIDS. September 2012;23(9):681-682.

Mondor's disease can manifest itself in the penile dorsal vein. It is a rare complaint with a quoted incidence of 1.39%. We report a case of a 41-year-old man who has sex with men (MSM), who presented with penile swelling and painful erections following intensive and vigorous sexual activity. He was found to have a thrombosis of the penile dorsal veins. He was

managed with non-steroidal anti-inflammatory drugs and sexual abstinence and his symptoms resolved in the following two weeks. Practitioners need to beware of Mondor's disease as a differential diagnosis in the presence of penile swelling and not underestimate the anxiety it can cause the patient.

Blood-borne viruses in the haemodialysis-dependent population attending Top End Northern Territory facilities 2000–2009

Jane Davies,¹ Zulfikar Jabbar,² Fizza Gagan³ and Robert W Baird³

Departments of Infectious Diseases¹, Nephrology² and Microbiology³, Royal Darwin Hospital, Darwin, Northern Territory, Australia

Nephrology 17 (2012) 501–507.

Aim: To describe the incidence and prevalence of blood-borne viruses (BBV) including: hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and human T-cell leukaemia virus type-1 (HTLV) in the haemodialysis-dependent population of the Top End of the Northern Territory (TENT).

Methods: We retrospectively reviewed the serology of BBV in a longitudinal fashion in the haemodialysis-dependent population treated in the TENT of Australia from 2000 to 2009 inclusive. HBV, HCV, HIV and HTLV serology on commencement of dialysis and at exit or January 2010, whichever was earlier, as well as demographic details were collected. Patients with a change in serological status had all serology reviewed.

Results: Four-hundred and forty patients were included in the analysis. Of these, 84.3% were Indigenous and 55.4% female, with a median age of 50 (IQR 43–59) years at the commencement of haemodialysis. Evidence of past HBV infection was documented in 42.7% and 8.9% were hepatitis B surface antigen-positive. Positive serology for HTLV was documented in 2.2%, 1.6% were hepatitis C antibody-positive and no individual was HIV-positive.

Three patients had a definite change in their HBV serology over time; this equates to an absolute seroconversion risk of 0.1 per 100 person years or 0.0006 per dialysis episode.

Conclusions: In this cohort, there was a high rate of past and current hepatitis B infection but low rates of seroconversion while on haemodialysis.

Anthropogenic ecological change and impacts on mosquito breeding and control strategies in salt-marshes, Northern Territory, Australia

Susan Jacups,^{1,2} Allan Warchot,³ and Peter Whelan³

¹*School of Public Health and Tropical Medicine, James Cook University, Cairns, QLD, Australia*

²*Research Institute for the Environment and Livelihoods, Charles Darwin University, Darwin, NT, Australia* ³*Department of Health, Medical Entomology, Communicable Diseases Centre, Casuarina, NT, Australia*

EcoHealth 9, 183–194, 2012.

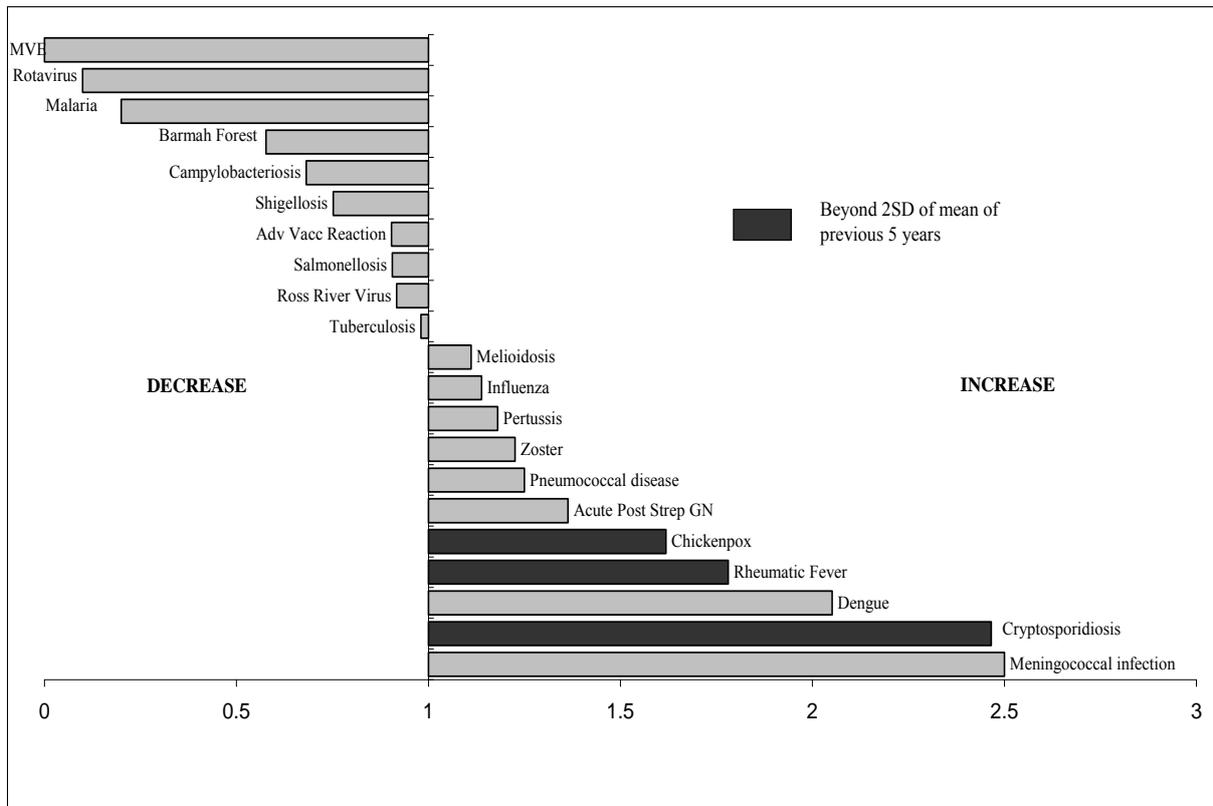
Darwin, in the tropical north of Australia, is subject to high numbers of mosquitoes and several mosquito-borne diseases. Many of Darwin's residential areas were built in close proximity to tidally influenced swamps, where long-term storm-water run-off from nearby

residences into these swamps has led to anthropogenic induced ecological change. When natural wet-dry cycles were disrupted, bare mud-flats and mangroves were transformed into perennial fresh to brackish-water reed swamps. Reed swamps provided year round breeding habitat for many mosquito species, such that mosquito abundance was less predictable and seasonally dependent, but constant and often occurring in plague proportions. Drainage channels were constructed throughout the wetlands to reduce pooled water during dry-season months. This study assesses the impact of drainage interventions on vegetation and mosquito ecology in three salt-marshes in the Darwin area. Findings revealed a universal decline in dry-season mosquito abundance in each wetland system. However, some mosquito species increased in abundance during wet-season months. Due to the high expense and potentially detrimental environmental impacts of ecosystem and non-target species disturbance, large-scale modifications such as these are sparingly undertaken. However, our results indicate that some large scale environmental modification can assist the process of wetland restoration, as appears to be the case for these salt marsh systems. Drainage in all three systems has been restored to closer to their original salt-marsh ecosystems, while reducing mosquito abundances, thereby potentially lowering the risk of vector-borne disease transmission and mosquito pest biting problems.

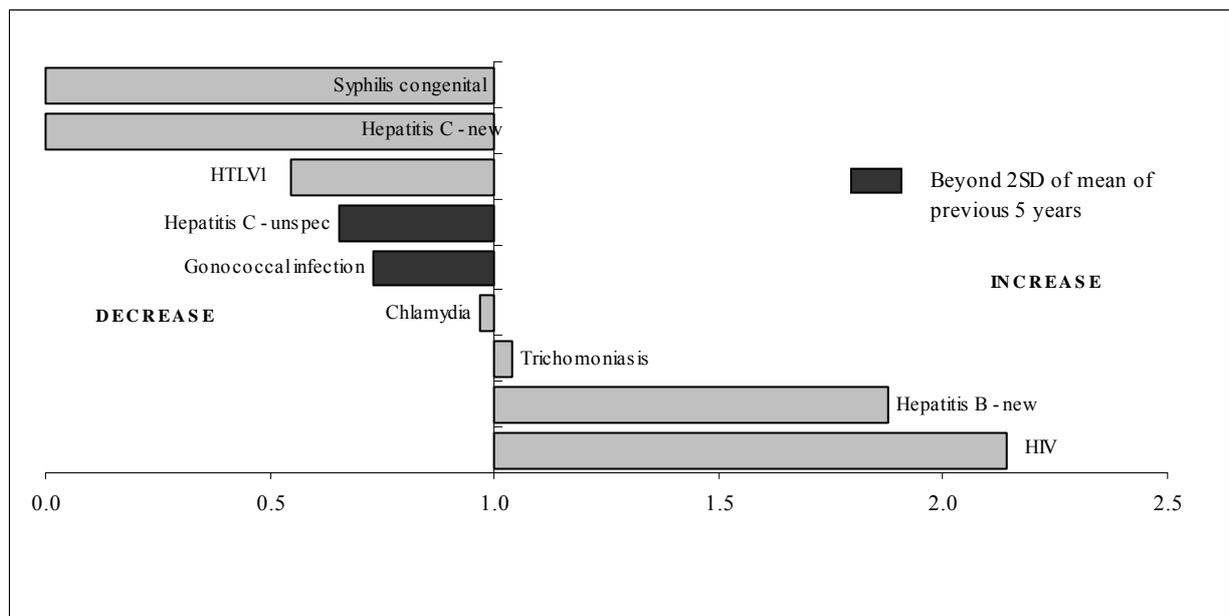
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
1 April – 30 June 2011 & 2012

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		Total	
	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	2011
Acute post-streptococcal GN	1	2	5	0	2	8	4	1	0	2	12	13
Adverse vaccine reaction	3	5	1	1	11	15	0	0	0	2	15	23
Barmah Forest virus disease	0	3	0	0	14	18	0	2	1	1	15	24
Campylobacteriosis	11	7	1	1	31	33	2	0	0	8	45	49
Chickenpox	4	1	0	4	14	10	5	0	11	6	34	21
Chlamydia	172	227	14	13	334	292	49	55	101	62	670	649
Chlamydial conjunctivitis	0	0	0	0	4	1	1	0	2	0	7	1
Cryptosporidiosis	5	4	1	0	60	2	3	1	3	1	72	8
Dengue fever	1	1	0	0	13	3	0	0	2	0	16	4
Diphtheria	0	0	0	0	0	1	0	0	0	0	0	1
Food/water borne disease	0	2	2	0	0	0	0	0	0	0	2	2
Gastro - related cases	0	21	0	0	0	0	0	0	0	0	0	21
Gonococcal infection	164	280	14	24	102	89	14	40	82	78	376	511
Group A streptococcus invasive	1	3	1	2	11	5	2	0	0	0	15	10
Hepatitis A	0	0	0	0	1	0	0	0	0	0	1	0
Hepatitis B - chronic	4	15	0	1	5	13	5	4	1	1	15	34
Hepatitis B - new	0	0	1	0	1	0	0	0	0	0	2	0
Hepatitis B - unspecified	7	18	1	3	34	24	0	0	1	2	43	47
Hepatitis C - unspecified	6	10	0	0	27	39	1	1	1	5	35	55
H Influenzae b	0	1	0	0	0	0	0	0	0	0	0	1
H Influenzae non-b	2	2	1	0	0	0	0	1	0	0	3	3
HIV	0	0	0	0	6	1	0	0	0	0	6	1
HTLV1 asymptomatic/unspecified	11	13	0	0	0	3	0	0	0	0	11	16
Influenza	67	3	10	0	48	11	12	16	15	5	152	35
Kunjin virus	0	0	0	1	0	0	0	0	0	0	0	1
Malaria	0	0	0	0	1	3	0	0	0	0	1	3
Measles	0	0	0	0	0	2	0	0	0	0	0	2
Melioidosis	0	2	0	0	9	4	0	0	1	0	10	6
Meningococcal infection	1	0	0	0	2	0	0	0	0	0	3	0
Murray Valley encephalitis	0	0	0	0	0	2	0	0	0	0	0	2
Non TB mycobacteria	1	0	0	0	0	3	0	0	0	0	1	3
Pertussis	2	7	0	0	55	76	11	1	21	3	89	87
Pneumococcal disease	16	21	3	1	5	12	1	1	1	1	26	36
Q Fever	0	1	0	0	0	0	0	0	1	0	1	1
Rheumatic Fever	7	2	2	0	7	5	6	6	4	3	26	16
Ross River Virus	2	9	0	1	50	26	1	1	9	8	62	45
Rotavirus	1	13	0	1	10	5	0	10	1	3	12	32
Salmonellosis	25	21	4	1	79	46	6	9	10	14	124	91
Shigellosis	12	4	3	2	4	4	0	1	1	1	20	12
STEC/VTEC	0	0	0	0	0	1	0	0	0	0	0	1
Syphilis < 2years	4	0	1	4	1	0	0	0	0	2	6	6
Syphilis > 2years or unknown	1	8	0	0	13	9	0	0	2	3	16	20
Trichomoniasis	168	271	23	19	182	202	120	96	146	128	639	716
Tuberculosis	0	1	0	0	9	4	0	2	1	0	10	7
Typhoid	0	1	0	0	1	0	0	0	0	0	1	1
Typhus	0	0	0	0	0	1	0	0	0	0	0	1
Varicella - unspecified	0	0	0	0	1	0	0	0	0	0	1	0
Vibrio food poisoning	0	0	0	0	0	4	0	0	0	0	0	4
Vibrio invasive	0	0	0	0	0	1	0	0	0	0	0	1
Yersiniosis	1	0	0	0	0	0	0	0	0	0	1	0
Zoster	7	14	0	2	21	25	2	6	8	3	38	50
Total	707	993	88	81	1,168	1,003	245	254	426	342	2634	2673

Ratio of the number of notifications (2nd quarter 2012 cases to the mean of 2nd quarter 2007-11): selected diseases



Ratio of the number of notifications (2nd quarter 2012 cases to the mean of 2nd quarter 2007-11): sexually transmitted diseases



Comments on notifications p38

Chickenpox

There were 34 cases of chickenpox notified in the 2nd quarter compared to the expected 21. It is likely that this is due to wider use of the PCR test for chickenpox leading to more laboratory confirmed diagnoses, which form 65% of notifications.

Rheumatic Fever

There were 26 cases of acute rheumatic fever notified in the 2nd quarter which is 1.8 times the expected 15. The increase is likely due to the increase in Group A streptococcal disease across the NT which has been noted in 2011 and 2012. An increase in the detection and notification rate may also be a contributing factor.

Cryptosporidiosis

There were 72 cases of cryptosporidiosis notified in the 2nd quarter which was 2.5 times the expected 29 based on the 5 year mean. This was a continuation of the increase noted mainly

in Darwin in the 1st quarter. Some cases were linked to public swimming pools while others were associated with child care or other cases in the family. Part of the increase may be due to better detection as one laboratory (Western's Diagnostic Pathology) introduced a more sensitive antigen test.

Hepatitis C

The reason for the decrease in this quarter is unclear.

Gonorrhoea

The decrease in notifications of gonorrhoea was recorded mainly in urban districts. An analysis of the testing data for NT remote districts showed that, compared with January-March 2012, in April-June 2012, the number of gonorrhoea tests decreased by 21.5% and the positivity rate decreased by 15.4%. Therefore, the decrease in notifications should be due to a decrease in both testing amount and positivity rate.

NT malaria notifications April – June 2012

Elizabeth Stephenson, CDC Darwin

There was 1 case of malaria notified in the 2nd quarter of 2012. The following table provides details about where the infection was thought to be acquired, the infecting agent and whether chemoprophylaxis was used.

Number of Cases	Origin of Infection	Reason Exposed	Agent	Chemoprophylaxis
1	Ghana	Work	<i>P. falciparum</i>	Nil

Immunisation Coverage

Compiled by Charles Strebor, CDC Darwin

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 41.

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 June 2012 were born between 1 January 2011 and 31 March 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 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) (latest doses due at 6 months of age). 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 June 2012 was born between 1 January 2010 and 31 March 2010 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 3 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) and 1 dose of measles, mumps, rubella vaccine (latest doses due at 12 months of age). 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 June 2012 was born between 1 January 2007 and 31 March 2007 inclusive. To be considered fully vaccinated, these children must have received 4 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of measles, mumps, rubella vaccine (latest doses due at 4 years of age). All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation

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

Immunisation coverage for children aged 12 to <15 months at 30 June 2012

	Number	%DTP	%Polio	%HIB	%HEP	% Fully
Darwin	299	93.6%	93.6%	94.0%	93.3%	93.3%
Winnellie PO Bag	96	94.8%	94.8%	94.8%	94.8%	94.8%
Palm/Rural	216	93.5%	93.5%	93.5%	93.5%	93.5%
Katherine	96	94.8%	94.8%	94.8%	94.8%	94.8%
Barkly	36	91.7%	91.7%	91.7%	91.7%	91.7%
Alice Springs	125	95.2%	95.2%	95.2%	95.2%	95.2%
Alice Springs PO Bag	46	97.8%	97.8%	97.8%	97.8%	97.8%
East Arnhem	40	97.5%	97.5%	97.5%	97.5%	97.5%
NT	954	94.3%	94.3%	94.4%	94.2%	94.2%
Australian total	75,155	92.4%	92.3%	92.2%	92.0%	91.9%

Immunisation coverage for children aged 24 to <27 months at 30 June 2012

	Number	%DTP	%Polio	%HIB	%HEP	%MMR	% Fully
Darwin	248	96.4%	96.4%	96.0%	96.0%	96.0%	95.2%
Winnellie PO Bag	87	98.9%	98.9%	98.9%	98.9%	97.7%	97.7%
Palm/Rural	221	98.6%	98.6%	99.1%	98.6%	96.8%	96.4%
Katherine	101	98.0%	98.0%	98.0%	98.0%	97.0%	97.0%
Barkly	27	92.6%	92.6%	92.6%	92.6%	96.3%	92.6%
Alice Springs	132	96.2%	96.2%	96.2%	96.2%	95.5%	94.7%
Alice Springs PO Bag	57	100.0%	100.0%	100.0%	100.0%	94.7%	94.7%
East Arnhem	54	92.6%	92.6%	85.2%	85.2%	92.6%	92.6%
NT	927	97.2%	97.2%	96.8%	96.7%	96.1%	95.6%
Australian total	75,737	94.5%	94.4%	94.7%	94.0%	93.9%	92.3%

Immunisation coverage for children aged 60 to <93 months at 30 June 2012

	Number	%DTP	%Polio	%HIB	%HEP	%MMR	% Fully
Darwin	250	84.8%	85.2%	0.0%	0.0%	84.4%	84.4%
Winnellie PO Bag	97	94.8%	94.8%	0.0%	0.0%	94.8%	94.8%
Palm/Rural	210	92.9%	92.9%	0.0%	0.0%	92.9%	92.9%
Katherine	103	94.2%	94.2%	0.0%	0.0%	94.2%	94.2%
Barkly	19	89.5%	89.5%	0.0%	0.0%	89.5%	89.5%
Alice Springs	110	86.4%	86.4%	0.0%	0.0%	86.4%	86.4%
Alice Springs PO Bag	63	92.1%	92.1%	0.0%	0.0%	92.1%	92.1%
East Arnhem	51	100.0%	100.0%	0.0%	0.0%	100.0%	100.0%
NT	903	90.5%	90.6%	0.0%	0.0%	90.4%	90.4%
Australian total	76,330	91.0%	90.9%	0.0%	0.0%	90.9%	90.5%

Centre for Disease Control staff updates

Darwin

In the SHBBV Program **James Broadfoot** has resigned as Program Head and **Nathan Ryder** is continuing in this role. **Stephen Rowling** has completed his contract and returns to Melbourne, **Natasha Tatipata**, joined the team as AHW for Urban Darwin in July.

Lida Curran and **Tatenda Muridzi** joined the SHBBV in July in the positions of Adolescent Sexual Health Promotion Officers East Arnhem Region – they will be based in Darwin.

Justine Glover has transferred to the Minister of Health Office for 6 months to act as the Department Liaison Officer. **Jennifer Fry**, Community Paediatric Project Officer will act in the Senior Policy and Coordination Officer position for 6 months.

Tracy Popple won the Merv Fairly award for “Services to TB care above and beyond the call of duty” (see article on Tuberculosis Workshop, page 31)

Helena White, Acting Head Immunisation commenced in August on a 12 month contract. She is an Infectious Diseases and General Medicine Registrar in the United Kingdom and previously worked at RDH between 2007-2008 and again in 2010.

Janelle Baker has finished her short term contact with CDC as an administrative officer.

Michelle Harlock has moved to Tasmania where she will continue to work as an OzFoodNet Epidemiologist and **Anthony Draper** commenced on 28 August in her

position. He has previously worked in in East Timor for 4 years and more recently in Tennant Creek pathology service. Anthony has a MPH and has worked on a melioidosis project.

Alice Springs

Teem Wing Yip returned in August as Co-ordinator CDC Alice Springs after 6 months as a DMO in Remote Health.

The trachoma team has new Public Health Nurses **Amy Peachey** and **Allina Matthews**. **Cate Coffey** has taken leave without pay.

Kaylene Prince has replaced **Rebecca Curr** as the Immunisation Nurse. Rebecca has left to take up a new position in School Health.

Meredith Henry has recently joined as an Administrative Support Officer to cover for **Alexandra Hodgson** who is on a temporary transfer.

Janet Forrester has joined as an Aboriginal Liaison Officer while **Karina Tsiamis** is on maternity leave.

In the SHBBV program **Belinda Davis** has returned from her extended leave. **Wendy Mactaggart** has returned to Clinic 34 part time for 3 months while **Eleanor Hooke** goes on long service leave from October.

Congratulations to **Kristy Sanderson**, our business manager, who is on maternity leave and gave birth to a baby boy earlier this year. **Helena Casseeram** has come from Alcohol and Other Drugs for a year to cover the maternity leave.