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Reporting of Ciguatera Food Poisoning

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Introduction

Ciguatera is a form of human poisoning that results from consuming certain marine fish. The fish accumulate the poison or toxin by eating smaller reef fish that feed on algae that have the toxin producing dinoflagellates attached. The disease is endemic along the tropical and sub-tropical reef areas. The clinical presentations of ciguatera are mainly of the central nervous (CNS), cardiovascular (CVS) and gastrointestinal systems (GIS). Other manifestations include disturbance of general regulatory functions of the human body. We are reporting 14 cases of ciguatera poisoning following the consumption of a big reef fish on Groote Eylandt in the East Arnhem region of the Northern Territory (NT).

The cases

The fish was caught around North East Island near Umbakumba by an Aboriginal elder on 3 September, 2006. It was kept in the fridge until distribution among the extended family and relatives of the chief for consumption on the evening of 7 September. The fish was described as a “big mother-in-law”, and reportedly was eaten in its entirety.

The first group of 6 casualties arrived at the Alyangula Health Centre at around 1:30 AM on 8

September. The main presenting complaint from the group was headache and/or abdominal upset. On examination the patients were found to be hypotensive

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and bradycardic. Two of the cases were flown to Royal Darwin Hospital (RDH) for observation and management.

The second group of 7 patients arrived around 5 AM that same day with complaints of tingling and numbness of the lips in the preceding hour. Two of these 7 were also referred to RDH for observation and management. The remaining patients, including 1 child who presented over the weekend with muscle and abdominal pains, were treated at the local health centre and sent back to their community when assessed to be recovering and well.

Interviews were conducted at around 2 PM on 8 September by the local health staff, Helen Lalara, AHW and Damian Goggin, RN. Pre-designed survey forms were used that were faxed over from Nhulunbuy Centre for Disease Control (CDC). All 14 cases were Indigenous Australians.

The demographic and clinical profiles of the ciguatera cases are shown in the Appendix.

The age range of the 4 admitted cases was 40-52 years. All 4 presented with gastrointestinal symptoms, hypotension and bradycardia.

Table 1. Summary of presenting symptoms

Symptom	Number of patients with symptoms (/14)	Percentage
Nausea	11	79%
Abdominal pain	10	71%
Vomiting	10	71%
Diarrhoea	10	71%
Numbness of: mouth	8	57%
Headache	7	50%
Sweating	5	36%
Difficult walking	4	29%
Weakness	4	29%
Muscle pains	4	29%
Chills	4	29%
Dizziness	3	21%
Numbness of feet	3	21%
Inability to move arms/legs	3	21%
Temperature inversion	3	21%
Fever	3	21%
Salivation	2	14%
Shortness of breath	2	14%
Numbness of hands	2	14%
Burning/pain with cold water	2	14%
Itchy skin	1	7%

Table 1 is an extract from the Appendix (p 5) summarising the presenting symptoms of all 14 cases.

The majority of the patients (9%) presented with nausea, followed by abdominal pain, vomiting and diarrhoea (71%). There were a range of symptoms but no cases complained of joint pains and neck stiffness.

Acute care services and outcome for hospitalised cases

The 4 cases transported to Darwin via Aerial Medical Services were appropriately resuscitated with intravenous saline and crystalloids before transfer.

Abdominal pain and diarrhoea were the first complaints in 2 of the patients, while a tingling mouth and headache were the first symptoms in the other 2 (see Appendix, where Y1=First symptom).

Neurological symptoms were predominantly numbness and inability to move the lower limbs. The main reason for referral of cases was cardiovascular signs of hypotension and bradycardia.

According to the medical officer in RDH, all cases were treated with normal saline to maintain blood pressure and cardiotropics (atropine) were administered as necessary. Patients reportedly responded well to atropine. They were discharged home after 2 days in hospital and none reported any new or persisting symptoms following discharge. The remaining patients in the community did not report any progress in severity of their symptoms.

Public health measures for the cases

Police were alerted to confiscate any remaining fish and all persons who consumed the fish were notified and ciguatera reporting forms were completed. The situation was released to the local media and a local memo was circulated to clinics along the East Arnhem coastlines. The memo also included pamphlets and educational materials. The Nhulunbuy environmental health officer (EHO) travelled to the island where he collected the bony remains of the fish and described the fish as Slate Sweetlips (*Diagramma labiosum* – see Figure).

Figure. Photo of *Diagramma labiosum*.

Source Australian Museum on line
<http://www.amonline.net.au/FISHES/fishfacts/fish/dlabiosum.htm>

The Slate Sweetlips (*Diagramma labiosum*) is a tropical fish species that belongs to the 'Sweetlips' family, *Haemulidae*. This species has been recorded from Perth in Western Australia around the north to Sydney in New South Wales. However, it is more commonly found in the warmer waters of Queensland, the NT and the northern region of Western Australia. Juveniles are yellow/white in color and have thick black stripes running along the ridge of the dorsal fin and along the lateral line. As they grow older the stripes fade and adults are a blue/grey color all over. Adults are generally found in small aggregations on deep tropical reefs or wrecks.

This species is also commonly referred to by fishers as 'Mother-in law fish' and is not considered to be a good eating species. The Slate Sweetlips (*Diagramma labiosum*) grows to a maximum length of approximately 1 metre. (information supplied by Bob Small, EHO-East Arnhem).

None of the patients reported any previous fish related food poisoning.

Discussion

Ciguatera is caused by toxins produced by dinoflagellates (*Gambierdiscus toxicus*) found growing on certain, usually blue-green, algae.^{1,2} Being photosynthetic the dinoflagellate grow along the tropical and subtropical reef areas. Smaller herbivorous fish ingest the algae

carrying the toxins, that are in turn eaten by subsequent prey along the food chain. The final reservoirs tend to be larger fish such as barracuda, amberjack, king mackerel and others weighing more than 2 kilograms.^{2,3,4}

Epidemiology

In the United States of America (USA) ciguatera has been reported in Miami, and other parts of Florida, Vermont and Texas.^{5,6,8,9} In Australia, and in the NT, ciguatera fish poisoning has been reported around Bremmer Island, Cape Arnhem, north of Borrooloola and Nhulunbuy. This is the second outbreak of ciguatera from North East Island near Groote Eylandt.⁴

Other reported ciguatera areas include the Caribbean and Indopacific regions, with an incidence of 100-300 cases per 100,000-population worldwide.¹⁰

Most of the ciguatera reported in the USA occurs in the period July to October and the 2 outbreaks at Groote Eylandt, though in the equatorial Southern Hemisphere, were also in this period. Ciguatera is generally sporadic and has been reported to occur in a variety of seasons and places and following a range of fish types being consumed.⁸

Diagnosis

All the admitted cases in this outbreak had predominantly cardiovascular symptoms including hypotension and bradycardia. The complaints also ranged from CNS features such as headache to gastrointestinal symptoms. This is comparable with other reported cases of ciguatera.^{4,5,6,8,9} The toxin, while being very potent is only present in minute amounts. This, together with ciguatera being a relatively recently described phenomenon, possibly explains why no commercial diagnostic tool has yet been developed. Bioassays are used in research laboratories only, and in Hawaii the "stick test" is used to test fish containing ciguatoxins.⁶

Clinical diagnosis is based primarily on symptoms and food history, with dysaesthesiae occurring commonly, however the symptoms are wide-ranging and non-specific.

Other fish poisoning can present similarly. Gastrointestinal symptoms in addition to headache and muscle pains can also be caused by food contaminated by *Salmonella* or other micro-pathogens. In a coastal Aboriginal community similar to this one, an outbreak of *Salmonella* with consumption of contaminated turtle meat has been reported.¹¹ In this *Salmonella* outbreak 71% (10) of patients reported abdominal pains or other gastrointestinal symptoms.

Histamine (scombroid) fish poisoning is a food-borne chemical intoxication caused by eating spoiled or bacterially contaminated fish.¹³ In July 1987, a case of scombroid fish poisoning was reported in New Mexico,⁷ where a family became ill after eating a frozen mahi mahi fish imported from Taiwan. Scombroid species include tuna, bonito and mackerel. In mahi mahi and certain other dark-meat fish, bacteria may convert the amino acid-histamine to heat-stable histamine when there is delay in appropriate chilling or refrigeration.

Another poisoning, tetrodotoxin fish poisoning, can be fatal within 6-24 hours.¹² The powerful neurotoxin is contained in the liver, intestines, skin and gonads of tropical and subtropical sunfishes, porcupines and fugu. It includes all symptoms of ciguatera poisoning, but has a rapid onset and is more commonly fatal. Most reports of such poisoning come from Japan, USA, United Kingdom but have also been reported in Australia and New Zealand.

The above is not an exhaustive list of marine toxicities associated with fish.

Biochemistry and pathophysiology of ciguatera toxicity

Ciguatoxin is a large, heat stable polyether toxin. Both the Pacific (P-TXC-1) and Caribbean (C-CTX-1) ciguatoxins are health risks at concentrations above 0.1ppb, and are primarily neurotoxic in more than 80% of cases.¹ The toxin binds to sodium channel receptor sites of all excitable tissues in both the somatic and autonomic nervous system. Both lipid solubility and the ability to open sodium channels close to their resting membrane potential gives rise to the sustained neurological and other somatic

symptoms. In severe intoxication, autonomic dysfunction can present as bradycardia and/or hypotension. These 2 symptoms can also be manifestations of massive fluid loss from severe diarrhoea and vomiting.

Management

Because of the complexity of the ciguatoxin and as mentioned, its relatively recent discovery and wide ranging symptoms, no definitive treatment has been developed. Acute treatment options remain supportive.

Fluid replacement and blood pressure stabilisation are essential during the acute phases of the toxicity. While mannitol has been administered in an attempt to minimise most of the neurological and cardiovascular signs of ciguatera,¹⁰ a randomised study of 50 patients in a Rarotonga Hospital¹⁴ showed that mannitol is not superior to normal saline in terms of symptomatic relief after 24 hours. In fact, those administered mannitol had more side effects such as pain at the site of administration. The relief of symptoms was attributed to the dilutional effects of both saline and mannitol. One would argue against the use of mannitol in a patient depleted with fluids from diarrhoea, vomiting and hypotension.

Public health measures

Public health preventative measures are basically to remove any remains of the catch to avoid any further cases and to track down any, as yet, unidentified persons who may have eaten the fish. Because cases of ciguatera have been reported in the NT, and specifically in the East Arnhem area, the staff of the local health centre were aware of the condition and dealt appropriately with the cases. Bacterial culture and microscopy may be worthwhile when there is doubt about the diagnosis. Even in clinically consistent cases it may be prudent to rule out other food borne diseases. When dealing with any person with suspected food poisoning an awareness of the possibility of ciguatera poisoning is invaluable and knowledge of the locations and an updated list of fish that are affected should be kept and made known to the public.

Appendix. Demographic & Clinical summary of Patients with ciguatera Food poisoning. Cases 1-4 were admitted to RDH

	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12	Case 13	Case 14	Total of symptoms
Sex/Age	F/40	M/46	F/54	F/52	F/47	F/17	F/39	F/7	F/11	F/18	F/49	F/23	F/10	F/13	
GIT symptoms	Y	Y	Y	Y	N	Y	Y1	N	Y	Y	N	N	Y	Y1	10
Abdominal pain	Y	Y	Y	Y1	N	Y	Y1	N	Y	Y	N	N	Y	Y1	11
Diarrhoea	N	Y1	Y	Y	Y1	Y	Y	N	Y	Y	Y	Y	N	N	10
Nausea	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	N	N	Y	Y	9
Vomiting	Y	Y	Y	Y	N	Y1	Y	N	Y1	Y1	N	N	Y1	Y	10
Salivation	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	2
CNS symptoms	N	N	Y1	N	Y	Y	Y	N	Y	Y	N	N	Y	Y	8
Numbness/tingling of: mouth															
Hands	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N	2
Feet	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	N	3
Dizziness	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	3
Burning/pain with cold	N	Y	N	N	N	Y	N	N	N	N	N	N	N	N	2
Inability to move arms/legs	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	3
Difficulty walking	N	Y	Y	Y	Y	N	N	N	N	N	N	N	N	N	4
Weakness	Y	N	Y	Y	N	N	N	N	N	Y	N	N	N	N	4
Temperature inversion	Y	Y	N	Y	N	N	N	N	N	N	N	N	N	N	3
Headache	Y1	N	Y	Y	Y	Y	N	N	Y	N	N	N	N	Y	7
Neck stiffness		N	N	N	N	N	N	N	N	N	N	N	N	N	0
General/Muscular skeletal symptoms															
Chills	N	Y	N	Y	Y	Y	N	N	N	N	N	N	N	N	4
Fever	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N	3
Joint aches	N	N	N	N	N	N	N	N	N	N	N	N	N	N	0
Sweating	Y	Y	Y	N	N	N	Y	N	N	N	Y	N	N	N	5
Itchy skin	N	N	Y	N	N	N	N	N	N	NN	N	N	N	N	1
Muscle pain	Y	N	N	N	N	N	N	Y1	N	N	N	Y1	N	Y	4
Skin rash	N	N	N	N	N	N	N	N	N	N	N	N	N	N	0
Eye irritation	N	N	N	N	N	N	N	N	N	N	N	N	N	N	0
Pain on urination	N	N	N	N	N	N	N	N	N	N	N	N	N	N	0
Dental pain	N	N	N	N	N	N	N	N	N	N	N	N	N	N	0
Shortness of breath	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	2
Amount consumed	L	S	S	S	S	M	M	S	M	M	S	S	M	S	

Y= Symptoms present, Y1=First symptom, N=Symptom not present, L=Large, M=Medium, S=small

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Editorial

The above article again brings to the forefront the argument for making ciguatera a notifiable condition, both locally (NT) and nationally¹. Public health actions can be taken when 1 or more cases of ciguatera poisonings occur. These actions may extend interstate or internationally as cases may arise in persons returning to non-ciguatera endemic areas after eating large, predatory fish in exotic places or eating fish shipped from endemic-prone locations². Actions from such notifications should avert further cases from occurring thereby preventing illness, possible hospitalisations and even deaths.

The capacity that notification also affords in the gathering of incidents and locations of ciguatera

poisonings allows the public, the departments of fisheries and medical services to become more informed.

General precautions to be followed to try to avoid poisoning from ciguatera in travellers or when living in known ciguatera endemic areas include:¹

1. Fish species that are locally implicated should be avoided.
2. Large warm-water reef fish should be treated with suspicion or avoided altogether (e.g. barracuda – or any such fish weighing more than 2.5 kg) and no more than 250 grams should be eaten at a first sitting.

3. Under no circumstances should the head, viscera or roe of reef fish be eaten.
4. People who develop symptoms of ciguatera poisoning should seek medical advice immediately.
5. Fishermen should avoid implicated areas and vendors should not sell fish from those areas.

It is also important to remember that while ciguatera is not affected by cooking, freezing or general handling of the fish—and it appears normal on eating, fish can cause other food poisoning if it has not been cleaned and stored properly. Fish should not be left lying on the bottom of the boat or on the bank. Fish should

be cleaned as soon as possible and placed on ice, gut cavity downward or removed.

A Fact Sheet and ciguatera reporting forms are available by calling CDC Darwin on 89228 044 or CDC Nhulunbuy on 89870 357.

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**Public Health Association of Australia Inc. held its
10th National Immunisation/2nd PHAA Asia Pacific
Vaccine Preventable Diseases Conference**

Successes in Immunisation

The PHAA has produced a CD of selected plenary presentations given at the 2006 PHAA Immunisation Conference held July 30 in Sydney.

Purchase price for the CD is \$AUD 95.00

Samples of the presentations are available at:

<http://www.phaa.net.au/conferences/Immunisation2006/index.htm>

Fireworks-related injury community survey report 2006

Justine Glover & Steven Skov CDC, Darwin, Alison Mustapha, CNC Burns Unit, Royal Darwin Hospital

Background

This report is the ninth in a series of fireworks injury surveillance reports conducted since 1998 by the Darwin Centre for Disease Control.¹ Initially the survey focused on Darwin and Palmerston, but from 2002 it was broadened to encompass all 5 major regional centres. The aim of the survey is to monitor the level of fireworks related injury on and around Territory Day (July 1).

The Northern Territory (NT) and the Australian Capital Territory (ACT) are the only jurisdictions in Australia where the public can buy and use fireworks without a permit. In the ACT, the Queen's Birthday long weekend is the only time of the year when members of the public are legally allowed to use fireworks. Fireworks can only be purchased in the ACT between 8:00AM on the first Monday in June and 5:00PM on the Monday of the Queen's Birthday long weekend. Fireworks can only be sold to people over the age of 18 years who can prove their identity and show they currently live in the ACT. In addition, people who buy fireworks must supply the ACT address where the fireworks will be discharged. Purchasers can only use fireworks between 5pm and 10pm on Saturday, Sunday and Monday of the Queen's Birthday long weekend.

In the Northern Territory members of the public aged over 16 years can buy approved fireworks from licensed retailers on 30 June and 1 July. The public can only use fireworks between the hours of 6PM and 11PM on July 1 (Territory Day).

Methods

Surveillance was targeted at persons seeking medical care for fireworks related injuries during the period midnight Wednesday 28 June – to midnight Tuesday 4 July 2006 in Darwin, Katherine, Nhulunbuy, Tennant Creek and Alice Springs.

A survey pack was sent out to 47 medical centres in the Top End and 8 medical centres in Central Australia. Medical centres included

Emergency Departments (ED) of major regional hospitals, General Practitioners (GP) surgeries, Aboriginal Medical Services (AMS), Community Health Centres and Defence Force Aid Posts (DFAP).

The pack contained:

- A letter to clinicians requesting participation in the survey
- Patient information sheets
- Consent forms for people presenting to Emergency Department
- Survey forms.

Patient consent was sought for information gathered to be forwarded to NT WorkSafe and for an officer from NT WorkSafe to contact the patient to discuss the circumstances of the injury in order to explore whether there may have been a fault with the fireworks.

Clinicians were asked to briefly describe the nature and cause of injuries and rate them according to the following severity scale:

- Severe - requiring admission to hospital
- Moderate - requiring 2 or more reviews by a health practitioner
- Mild - requiring only 1 visit to a health practitioner.

Results

A total of 35 firework-related injuries were recorded over the 2006 survey period. One ED client refused to participate leaving information on 34 injuries for this analysis. Hospitals provided information on 31 clients and GPs did so on 3 clients. Of the clients presenting to NT hospital EDs 23 gave consent for their information to be forwarded to NT WorkSafe.

The 2006 presentations and severity of injuries are recorded in Table 1.

The types of injuries recorded in 2006 included:

- an 18 year-old male spectator who required hospitalisation and skin grafts after he was

showered with sparks from a firework that ignited his shirt and caused second degree burns to his inner elbow;

- a 36 year old female who received third degree burns to 30% of her hands after lighting a sparkler;
- a 10 year old child playing with a large fire cracker that exploded in her hand resulting in severe compound fractures of her thumb, index finger and third finger; and
- 7 of 9 adult burns from sparklers that occurred when several sparklers were held together and ignited.

Table 1. Presentations and severity of injuries 2006

	Severe	Moderate	Minor	Total
Royal Darwin Hospital	4	20	2	26
Alice Springs Hospital	2	1	1	4
Katherine District Hospital	1	0	0	1
Tennant Creek District Hospital	0	0	0	0
Gove District Hospital	0	0	0	0
General Practice	0	2	1	3
Total	7	23	4	34

Table 2. 2002 - 2006 Injuries by Age Group

	02	03	04	05	06
0-9	2	1	5	5	
10-19	8	4	3	8	
20-29	11	4	2	9	
30-39	4	2	3	5	
40 +	6	0	1	6	
Unknown	0	0	4	1	
Total (108)	14	31	11	18	34

*Note: Prior to 2003 age groups were classified differently. In 2002 there were 14 recorded injuries. 5 cases aged 5-15

Table 3. 2002 - 2006 Injuries by Sex

	02	03	04	05	06
Male	8	18	5	8	24
Female	6	12	6	6	9
Unknown	0	1	0	4	1
Total (108)	14	31	11	18	34

Table 4. 2002 - 2006 Injuries by Site

	02	03	04	05	06
Face/Neck	NA	9	5	3	7
Torso	NA	3	1	3	1
Arms/Hands	NA	10	5	8	12
Legs/Feet	NA	7	0	1	5
Multiple	NA	-	-	-	9
Unknown	NA	2	-	3	0
Total (94)		31	11	18	34

*Note: The multiple classification has been included for the first time in 2006 in recognition that several clients received multiple site injuries, such as torso, hand and face.

Table 5. 2002 - 2006 Injuries by Severity

	02	03	04	05	06
Mild	4	10	3	6	4
Moderate	5	18	6	10	23
Severe	5	1	2	0	7
Unknown	0	2	0	2	0
Total (108)	14	31	11	18	34

Table 6. 2002 - 2006 Injuries by Attendance

	02	03	04	05	06
Hospital	10	17	8	13	31
GP	4	7	3	2	3
DFAP	0	2	0	0	0
AMS	0	1	0	1	0
Health Centre	0	3	0	0	0
Unknown	0	1	0	2	0
Total (108)	14	31	11	18	34

*Note: The 2003 Survey included injuries recorded at Jabiru Health Centre

Table 7. 2002 - 2006 Injuries to Spectators

	02	03	04	05	06
Spectator	8	9	3	5	12
Non-spectator	6	22	8	13	22
Total (108)	14	31	11	18	34

Discussion

A summary of injuries reported over the past 5 years is presented in Tables 2-7. The following are key aspects of the injury profile.

- 106 fireworks related injuries were reported
- 10-29 year old males are most at risk.
- the majority present to Emergency Departments
- hands and arms, followed by feet and legs are the most common injury sites
- injuries require more than 2 treatment episodes in the majority of cases
- a significant number of spectators are injured each year (i.e. persons not handling the fireworks themselves)
- no fatalities over the survey period have been recorded

The Royal Darwin Hospital (RDH) Burns Clinical Nurse Consultant (CNC) observed this year that, “this was the worst Territory Day in my experience for the number and severity of firework related injuries”. This year there were 9 clients with injuries to the hand. Sparklers were responsible for 7 of these burns. Burns to the hand are difficult to treat, often requiring regular dressings and medium to long term scar management. They can also cause significant impairment to activities of daily living. The RDH burns CNC also reported that many of her clients were unable to work for an extended period of time (up to 20 days) and were required to take sick leave.

Many of the clients with burns from sparklers commented that the “sparklers exploded” in their hands (See Figure 1). All but one of the sparkler burns this year apparently occurred from holding several sparklers together resulting in them all igniting at once in an uncontrolled fashion. Serious burns resulting from this practice have been noted in previous NT survey reports.² NT WorkSafe reports that this practice can be particularly dangerous as sparklers can heat up to 1000 degrees Celsius. WorkSafe NT has conducted tests on a brand of sparklers and purportedly found no fault. One client this year suffered burns when his clothing ignited. This has also been reported several times since

Figure 1. Sparkler burn to the hand



surveys have been conducted indicating a possible focus for future public education initiatives.

Burns management is very resource intensive. The average cost per hospital admission at RDH due to burns between 1998 and 2001 was \$7088 compared to only \$2966 for all non-burn injury related admissions.³ In 2002, the direct health care costs of the 14 reported fireworks injuries in the NT was estimated to be \$33,500.⁴ The RDH Burns clinic saw 16 clients with firework related burns in 2006 requiring a total of 86 appointments. Due to the increased demand on the clinic an extra staff member was rostered for 6 extra shifts.

The direct health care cost to the community is substantial. However, this survey does not reveal the full cost of fireworks to the community. There are substantial costs incurred by the police, ambulance and fire services in responding to injuries, complaints and fires as well as to councils for clean up of fireworks' debris.

There are also other “costs” to the community from fireworks. Territory Day results in substantial annoyance to many in the community. An analysis of 102 text messages and letters to the editor in the NT News this year revealed that 63 of them expressed dissatisfaction with various aspects of firework use.⁵ Of these, 35 clearly called for a ban or further restriction on their use. Only 30 expressed an opinion clearly in favour of the status quo.

Table 8. Total number of firework related injuries 1998-2006

1998	1999	2000	2001	2002	2003	2004	2005	2006
22	24	6	9	14	31	11	18	34

*Note that from 1998-2001 the survey was limited to Darwin and Palmerston. In 2002 it was extended to Darwin, Katherine, Gove, Tennant Creek and Alice Springs.

A common concern expressed in these messages was the negative effect on pets. This effect has been quantified in the ACT where the RSPCA reports that the Queen's Birthday weekend is the busiest time of the year for lost or stray dogs coming to their shelter, with the number of dogs presenting per day being nearly double that of other days.⁶ This results in both increased workload for staff and a significant increase in the number of dogs requiring euthanasia. The Darwin RSPCA also reports significant increases in lost or stray animals requiring shelter and each year is required (without extra funding) to devote extra resources for the Territory Day period.

In determining whether the private use of fireworks should continue, government needs to consider the balance between the cost to the community and the enjoyment the public (or at least a proportion of the public) derives from Territory Day fireworks. In recent years there have been some minor modifications to the regulatory framework concerning fireworks (eg the creation of a fireworks free zone at Mindil beach during the public display) in an attempt to increase safety. However, there appears to be no sign of any reduction in injuries over the years. Indeed this year the highest number of injuries and hospital admissions were recorded since the survey began in 1998, recognising that it has been NT wide only since 2002 (see Tables 5 & 8).

It may be that a more detailed and comprehensive analysis of the costs of fireworks to the community could assist Government in determining appropriate policy concerning fireworks.

Recommendations

- The Fireworks Safety Committee should consider conducting a comprehensive analysis of all costs incurred as a result of fireworks either for 2006 (retrospectively) or for 2007 (prospectively).
- That a public education initiative be developed concerning, the safe use of sparklers, and the wearing of non-flammable clothing for next year.

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“Cracking up about crackers”

An analysis of letter and text message discussion in the NT News of the personal use of fireworks surrounding Territory Day

Steven Skov & Justine Glover, Safety and Injury Unit, CDC, Darwin

The Northern Territory (NT) and the Australian Capital Territory (ACT) are the only 2 Australian jurisdictions to permit the personal use of fireworks. All other states banned their use by private individuals many years ago. In the NT the personal use of fireworks is permitted between 1800 and 2300 hours on July 1 for Territory Day celebrations. This is in addition to public fireworks displays on the evening of July 1. Fireworks may be sold to private individuals over 16 years of age on June 30 and July 1. Sale or use of personal fireworks outside these times is illegal.

For many years there has been considerable public discussion as to whether the personal use of fireworks should be banned or restricted or allowed to continue in the NT. Debate has focussed on the injury and nuisance caused by fireworks as against the enjoyment that people gain from using them. In determining policy for the use of fireworks, government needs to consider all aspects and effects of their use or mis-use. In order to contribute to this policy consideration, this paper examines and analyses the discussion conducted by members of the public via the letters to the editor page of the *NT News*.

Methods

All letters and text messages to the editor in the *NT News* during the month of July 2006 were scrutinised. Those that dealt with the issue of fireworks were analysed to identify common themes and were classified into a range of groups expressing varying shades of opinion. The initial classification was performed by JG. SS then reviewed all the messages and letters independently and a consensus opinion was derived for a final classification.

Results

During the month of July there were 102 text messages and 11 letters published in the editorial

pages of the *NT News* that addressed the issue of the personal use of fireworks.

There were 10 messages (ie either text messages or letters) that did not express a view that could clearly be considered to be either “for” or “against” the personal use of fireworks or contributing to the major themes which emerged.

There were 34 messages clearly in favour of an outright ban (22) or further restriction on their use (12). The types of restriction most commonly suggested were to only allow their use in designated areas or to introduce a licence for their use. The most common reasons advanced included the resultant injuries, negative impact on small children or pets, and the litter, noise and smoke pollution caused by fireworks.

The following are a sample of such messages:

If I wanted to live in Beirut I would. Darwin fireworks are madness. Ban all but public displays.

Public and fireworks = madness. Ban them – there’s more harm than good in recent years!

Hey Clare, I saw a girl get deafened by fireworks in the toilets at Lizards on Friday, it must be time to ban them?

... Most people I know have had enough of having to endure days of crackers being let off at all hours of the day and night in the days leading up to and after cracker night, waking up children and terrorising pets, having expensive public infrastructure blown up ...It is time for the Territory to move on and adopt a more responsible policy on cracker sales to the public ...

Fireworks won’t b banned in the NT until a small child is seriously injured, so us

whingers will keep on whinging. And to the d***heads of Woodroffe that r still letting them off, I have a 2 yr old who is 2 scared to play outside and wants all the windows kept shut. Grow up u idiots.

... Cracker night, when the air is unbreathable; the streets littered with debris, stinking of gunpowder; sleep deprived public; annihilated letterboxes; frightened small children; emergency service, hospitals, vets, wildlife services, council workers, RSPCA workers ... overworked and overwhelmed. ... Ah, but its fun and we are Territorians and, well its "our right" so that makes it all OK –doesn't it?

A further 39 messages expressed annoyance or dissatisfaction with the current situation but without specifically advocating a change. Several authors of these messages expressed the view that if people did not improve their behaviour then it might lead to personal use being banned. The main sources of annoyance concerned the use of fireworks outside the designated times (24) and the perceived irresponsible or unsafe behaviour of some users (15). A sample of these include:

2 the idiots letting off fireworks @ midday – aren't U wastin money? 2 stupid 2 realise – 2 retailers, sell them on the day n not weeks b4.

To the idiots that started the fire at Bakewell, sorry you didn't get charged – you are half wits!

Cracker nite: the half wits on the crn of Hibernia Crn and Trower Rd looked old enough to know better. I guess Intelligence doesn't always increase with age.

To the people in Jingili still letting off crackers – check your calendar. July 1 is long gone. If crackers get banned it will be because of people like you.

SHOULD ban idiots from buying fireworks, not ban the fireworks.

There were 30 messages that seemed in favour of the continued personal use of fireworks in the NT. The most common reasons advanced included the fun and enjoyment people derived from them and that the Territory is different as the following 3 messages demonstrate.

I still have more fun with \$100 bag of fireworks than I ever have watching a \$100 million display.

Clare, why bring NT to be like the rest of Aus that's y we live here cause it's different.

The kids love cracker night and there 'aint' much entertainment around Darwin for kids, so come on! Give them at least one night of fun.

A number of the messages classed as "in favour" seemed to express a certain disregard for the concerns of others or even of injuries caused. A sample of these include:

All you people who whinge and complain about firecracker night can dry your eyes and get over it.

I reckon mayor Killjoy can go and shove cracker bans. Let us have our fun! We pay enough rates and tax to pay for clean up! Send bloody inmates to clean up!

My mate got the worst burns on his hand in the NT from faulty sparklers, lost use of middle finger. But it ain't going to stop him from enjoying them next year.

Why don't all u whingers go home 4 a holiday on territory day 2007 then u wont have to whinge about crackers.

Discussion

The 2006 Territory Day fireworks debate generated an enormous number of texts and letters to the *NT News*. For those expressing a clear opinion either for or against banning or further restriction, the division was slightly in favour of restriction (34 to 30). There was also a large number of other people (39) who, while not explicitly "for" or "against", expressed dissatisfaction with the use of fireworks outside

of the regulated times and with the way that some people were using them. Many of these people seemed to infer that they were in favour of, or would be prepared to accept, banning or further restriction. Others seemed to imply that while not in favour of this at present, they could see that such measures might be introduced if people continued to mis-use fireworks. Whichever side of the argument people were on, their opinions were often expressed very bluntly and forcefully.

This paper presents the first analysis we are aware of in Australia (and possibly the world) of public discussion via the letters pages of newspapers concerning the personal use of fireworks. The analysis suggests that a great majority of people engaging in this public discussion were dissatisfied with the way fireworks are used surrounding Territory Day, with a small majority being clearly in favour of either a ban or further restriction on their private use.

Community Plans for Pandemic Flu

A response to the NT Pandemic Influenza article

Dr David Scrimgeour, a former resident of the Northern Territory (NT), wrote that he read with interest the article on "Pandemic Influenza Planning" in the June 2006 issue of the *NT Disease Control Bulletin*. Given the demography of the NT he noted that while planning for remote health services was mentioned in the article there was no specific mention of plans for NT Aboriginal communities. He pointed out that Aboriginal communities will potentially be significantly affected by a pandemic, and that communities or regions should ideally have their plans in place.

The NT Department of Health and Community Services is coordinating the development of the *Special Counter Disaster Plan for Human Pandemic Influenza* in the NT that incorporates a whole of government approach. The Remote Health Influenza Pandemic Subplan is part of that *Plan* and currently is in draft form for discussion and development.* David Scrimgeour's community plan (to follow) is therefore timely. Presently he works with the Tullawon Health Service at Yalata community in South Australia, a community-controlled health service employing nurses and Aboriginal Health Workers in a single remote community of about 300 people. Early this year and after discussion with the community health board and health staff, a Pandemic Flu Plan was produced for the

community. He noted that the process was useful in that it not only resulted in having a plan in place; it enabled an increased level of awareness of the issues around Pandemic Flu within the community. David points out that the plan will be reviewed early on 2007 (12 months after its initial development), so feedback would be appreciated. The article below is the Tullawon Health Service's Plan.

Pandemic Flu planning is a continuous process occurring in the NT and nationwide. The Territory with its remote communities and isolation requires special considerations. Although some of the points made in the Tullawon plan differ from those in the NT (and national**) plans e.g. regarding diagnostic testing and the use of antivirals, it does provide some very practical considerations for community planning.

Tullawon Health Service of Yalata, South Australia - Pandemic flu plan

Background

There are concerns that the avian influenza virus (commonly known as bird flu), which is currently spreading through the bird populations of Asia and Europe, may mutate into a virus which will be highly transmissible from human

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** Australian Health Management Plan for Pandemic Influenza (AHMPPI)

<http://www.health.gov.au/internet/wcms/publishing.nsf/Content/ohp-pandemic-ahmppt.htm>

to human, and which could result in a world-wide flu epidemic causing a high rate of deaths. If this happens, health services (and medical evacuation services) may well be overstretched to cope with people suffering from the effects of the flu. Despite its relative isolation, Yalata will almost certainly also be affected. For this reason, it is important that plans are in place to deal with the pandemic if and when it happens.

Actions to be taken before pandemic:

1. Ensure that an adequate stock of N95 face masks are available (suggest that ~ 200 masks to be kept in case of a pandemic);
2. All health staff should be reminded of the importance of hand-washing as one of the most important measures to prevent the spread of infection, and should be encouraged to improve their hand-washing practices if necessary;
3. People who may be able to assist as volunteers in case of a pandemic should be identified. As the school is likely to be closed, school staff may be a good source of volunteers;
4. Staff (and volunteers) should be trained in the correct procedures for donning and doffing personal protective equipment;
5. Everybody who smokes should be given extra encouragement to stop smoking;
6. Health staff should ensure that all people who are eligible for pneumococcal and flu vaccines have been vaccinated.

Actions to be taken if human-to-human transmission of bird flu starts to occur in Australia:

1. Inessential travel to and from Yalata should be discouraged.
2. An RN should be appointed as pandemic co-ordinator (probably the CNC unless he/she is away from the community).
3. A further 1000 N95 masks to be ordered, plus supplies of impermeable surgical gowns, gloves and goggles, and extra supplies of IV fluids. Supplies of alcohol hand gel, 10% bleach, tissues, and thermometers should also be replenished.

4. Extra stocks of Augmentin and paracetamol should be ordered. Augmentin is to be used for the treatment of presumed secondary bacterial pneumonia in patients with flu symptoms who develop signs of pneumonia;
5. On the assumption that cases of bird flu will start to occur in Yalata, the old clinic should be set up as a field hospital for managing cases of flu.
6. Foam mattresses and bedding should be ordered to use in the field hospital;
7. Arrangements should be made to ensure that meals can be prepared and supplied for inpatients of the field hospital.
8. All Tullawon Health Service (THS) staff who have contact with patients should wear masks while at work. Used masks should be discarded (for incineration) after each shift.

Actions to be taken if presumed cases of bird flu start to occur in Yalata:

1. An outdoor under-cover waiting area should be established, where an RN and/or AHW will be assigned to triage patients. All patients with a fever and cough should be referred to the field hospital; other patients can be further assessed by health staff within the new clinic.
2. A roster should be drawn up to ensure that there is 24-hour cover of the field hospital by health staff (and possibly other volunteer workers).
3. All THS staff and volunteers who have contact with patients should continue to wear masks while at work.
4. Carers of patients with access to the field hospital should be kept to a minimum, and generally limited to one parent of a sick child.
5. Staff, volunteers and carers looking after patients in the field hospital should wear gowns, gloves and goggles as well as masks, while attending to patients, and should be instructed in the correct procedures for donning and doffing personal protective equipment. Patients with presumed bird flu should be provided with standard surgical masks to reduce airborne transmission.

6. Plans will need to be made about the care of deceased bodies. A vehicle and driver should be available to transfer the deceased to Ceduna within 24 hours of death.

Diagnosis and management

1. Diagnostic laboratory testing will probably not be available (see below); diagnosis will be made on clinical grounds. The likely diagnostic criteria will be that anybody with a fever and cough in the context of pandemic bird flu will be presumed to have bird flu.
2. In general, treatment will be supportive (paracetamol and fluids).
3. If a tachypnoea develops (RR > 30/min if >12 months old; >40/min if <12 months old) it suggests pneumonia has developed; this is most likely to be viral pneumonia but could be secondary bacterial pneumonia so antibiotics could be given (probably Augmentin).

Notes

1. In many of the reports concerning bird flu, much emphasis is being placed on the use of anti-viral medications (Tamiflu and Relenza). While efforts will be made to obtain supplies of anti-viral medications, they may not be available when required, which means most cases of bird flu will be treated with

symptomatic and supportive treatment; and with antibiotics if there is evidence of a secondary pneumonia. If limited supplies of anti-virals are available, sufficient stocks should be kept aside (in a locked cupboard) to treat health care workers and volunteers if they develop flu symptoms.

2. A vaccine may be available prior to a pandemic (but probably not); this plan is based on the assumption that a flu pandemic is occurring before a vaccine is available and administered at Yalata.
3. A point-of-care diagnostic kit for influenza is available but due to its relative expense and short shelf-life it is not appropriate to keep stocks of these at Yalata, and the demand in the event of a pandemic will make it unlikely that stocks will be available for ordering into Yalata. Diagnostic testing should be available in Port Augusta, and possibly in Ceduna, which may be useful to confirm diagnosis (by sending a sputum sample or throat or nasal swab to the laboratory) in the early stages of the pandemic when possible cases are initially seen by THS staff. However, once the pandemic is established it is highly likely that diagnosis will need to be made on clinical grounds alone.
4. Ideally, staff and volunteers will have had the opportunity to have masks "fit-tested" using Portacount equipment prior to the occurrence of a pandemic.

Feedback regarding the Tullawon Health Service pandemic flu plan can be directed to
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East Timor AusAID Mosquito Project

Bill Pettit & Peter Whelan, MEB

In September 2006 the Northern Territory (NT) Department of Health and Community Services (DHCS) commenced an AusAID funded project in collaboration with the East Timor Ministry of Health (MoH) in the area of mosquito control and surveillance. The project will receive AusAID funding of \$1,032,000 over the next 3+ years. DHCS, through the Medical Entomology Branch (MEB) and Health Policy branch, will work with the MoH to increase the capacity of the MoH to carry out effective mosquito surveillance and control programs so that the incidence of mosquito-borne disease in East Timor can be reduced.

The DHCS staff directly involved in the project are Peter Whelan (Director MEB) and Sally Matthews (Senior Policy Officer Health Policy) as joint Project Managers, and Bill Pettit (MEB) as the full-time Medical Entomologist/Technical Advisor. The Director of Health Policy will be involved in the project as a member of the project Partnership Steering Committee.

The DHCS has had an involvement in the area of mosquito control in Timor during the past 15 years. This involvement has been in the form of brief visits to Timor to carry out baseline mosquito surveillance and to provide advice on mosquito control.

The key outputs of the 3 year project will be to:

- ensure that essential equipment and chemicals are available for training purposes;
- increase the skills of mosquito control and surveillance officers in East Timor;
- provide assistance to develop and implement effective operational protocols for mosquito surveillance and control;
- provide assistance to improve community education on prevention of mosquito borne disease; and
- provide assistance to improve the collection and analysis of data in relation to mosquito surveillance and mosquito borne disease.

During the first year the project activities will be centred on dengue surveillance and control in Dili, East Timor's capital. The project will:

- develop and trial protocols for mosquito

surveillance and control;

- train MoH staff; and
- assist in the development and delivery of community awareness programs.

As a first part of the program:

- 2 MoH officers from East Timor will attend the mosquito surveillance and control course in Perth, WA:
- NT MEB Officers will provide assistance at the Perth course.

The project will also involve MoH officers undertaking training in Darwin, and in East Timor and include:

- a dengue control pilot program to be undertaken in Dili;
- training and protocol implementation to extend to other mosquito vectors and include regional centres and health staff in East Timor's other 12 districts outside Dili in years 2 and 3.

Improved mosquito surveillance and control programs are desperately needed in East Timor. Approximately 20-25% of consultations in East Timor's health facilities are either directly related to, or are compounded by mosquito-borne disease (dengue, malaria, Japanese encephalitis, filariasis and chikungunya).¹ A dengue epidemic between January and April 2005 resulted in 933 reported cases of dengue fever or dengue haemorrhagic fever, and 37 deaths.

There is a clear need for the development and implementation of training programs for East Timor health staff on mosquito surveillance and control. A number of international non-government organisations are already present in East Timor addressing the issues of treatment and care of people suffering mosquito borne diseases. The DHCS will complement their work by focussing on the surveillance and control of the vector mosquitoes of these diseases.

Reference

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Gastroenteritis Outbreak at Workshop

Marianne Bookallil, CDC Darwin

Background

An outbreak of gastroenteritis was notified to Centre for Disease Control (CDC) via Environmental Health on Tuesday 21 February, 2006. Of 24 participants who attended a workshop in Darwin from 13 to 17 February, 9 complained of symptoms of gastroenteritis. During the workshop those attending had eaten lunch and snacks together provided by a catering company. Participants were also divided into small groups of 5-6 for group workshop participation.

Aim

The aim of the investigation was to determine if the outbreak of gastroenteritis was food borne and if so what food was responsible.

Methodology

Site Visit

An inspection was conducted of the catering premises and staff interviews were conducted by Environmental Health Officers. No food samples were collected.

Case Investigation

A case was defined as anyone who attended the training course and suffered either abdominal cramps or diarrhoea between 13 and 20 February. Participant details were obtained from the workshop convenor and interviews were conducted by telephone. A standard gastroenteritis outbreak questionnaire was used but modified in 2 ways:

1. to allow for inclusion of the specific foods on the menu; and
2. to ascertain which small group they were in.

Data was analysed using EpiInfo version 3.2.

Results

Site Inspection

The catering company's premises were inspected by Environmental Health staff, who gave them a glowing report, i.e. "I inspected the catering company this morning. Everything was really good - the manager's knowledge of food hygiene was by far the best I've encountered".

Investigation of Subjects

Interviews were conducted with 21 of the 24 participants with the results shown in Table 1. None had been unwell enough to visit a doctor, and therefore no stool samples were taken. As the illness duration was short, all had recovered by the time of notification and it was not possible to collect samples at the time of interviews.

Illness

Of the 21 participants interviewed, 9 reported illness. The initial case had a pre-existing gastrointestinal diagnosis. The symptoms were similar to his usual problems and slightly different to the illness of the other 8. His presenting symptoms were bloody diarrhoea without abdominal pain. However, he was included as the illness fitted the case definition of either diarrhoea or abdominal pain.

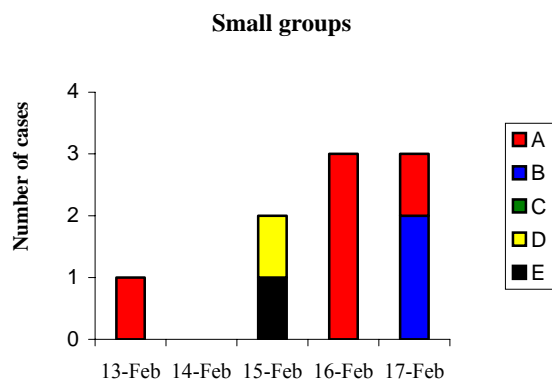
For those who were unwell, the disease duration varied between 2 and 48 hours with a median of 32 hours and a mean of 30 hours. Diarrhoea, cramps and fatigue were the most common symptoms. The diarrhoea had a median duration of 7 hours and the abdominal cramps had a median duration of 12 hours.

Group Analysis

The epidemiological curve (Figure 1) shows a point source pattern. During the workshop the

Table 1. Characteristics of Illness

Characteristic	Number of cases	Number of non cases	Total	Attack rate %	p value
Gender					
Male	4	9	13	31	0.17
Female	5	3	8	63	0.17
Indigenous status					
Aboriginal &/or Torres Strait Islander	1	3	4	25	0.34
Other	7	6	16	44	0.34
Small Groups at workshop					
A	5	0	5	100	0.006
B	2	3	5	40	0.64
C	0	5	5	0	0.03
D	1	4	5	20	0.26
Nil (facilitator)	1	0	1	100	0.43
All	9	12	21	43	

Figure 1. Number of cases by small group

cases were divided into small groups for group projects. The initial case was in small group A and this entire group became unwell. Being in group A compared with not being in group A was significantly associated with becoming ill, (risk ratio 4.0, $p=0.006$, Fisher exact). Working in group C was associated with staying healthy (risk ratio 0 $p=0.03$ Fisher exact). All other results, including differences in gender and Indigenous status were not significant.

Foods

The group ate food together for a week. There was no statistically significant association of any food source with illness. This study was small and therefore subject to type 2 error. The power of the study may have been too small to detect contaminated food. During the week 64 different foods were consumed and a summary of the foods with a risk ratio ≥ 2 are shown in Table 2.

Discussion

No stool or other specimens were collected and hence no microbiological diagnosis was made. The symptoms experienced were primarily lower gastrointestinal, with few systemic features and the illness was relatively short, with a median duration of 32 hours. These features are consistent with a viral cause. While *Bacillus cereus* and *Campylobacter spp* infections can produce predominantly lower GI symptoms, the duration of symptoms in these cases was probably too short for campylobacteriosis and too long for *Bacillus cereus* poisoning.^{1,2} A viral infection may have been the cause. Symptoms of rotavirus typically continue for 4-6 days³ and enteric adenoviruses for 7-10 days, which again

do not fit with this outbreak. Norovirus best matches the symptoms described in the outbreak. It is a common virus associated with outbreaks and can present with either upper or lower abdominal symptoms. The incubation period and the symptoms are both characteristically 24-48 hours in duration.⁴

The index case had a pre-existing chronic gastrointestinal illness and this complicated the analysis. If he is included, then the epidemiological curve looks like a point source with the first case as the source. The agent could have been spread via aerosol or faecal oral transmission or through contamination of a food product. The index case was in group A and it is plausible that he preferentially infected the people he spent most time with, his work group. The only statistically significant risk found was being in workgroup A. This does not rule out, however, food borne illness. It is possible that those in group A all ate something that the majority of the others didn't eat. Choc caramel slice, eaten on the Monday was the only food implicated, though not significantly. The study may not have had enough power to confirm an association.

The study was limited by the small numbers involved in the outbreak, which in turn limited the power of the study and may explain why no food was identified. This is often the case with this type of study which also relies on the differential distribution of food and a significant number of people remaining well. In the situation where nearly all of the cohort are unwell or where they have all eaten the same food, the sensitivity of a cohort analysis is low. Sometimes, high but non-significant relative risk estimates have to be interpreted in light of *a priori* evidence, such as whether the food is of a high risk nature for the given illness.

The workshop was over and the outbreak stopped before CDC was notified so control measures were unnecessary.

Recommendations

The outbreak was not reported until days after it occurred, inhibiting anymore full investigation, especially sample collection. Knowledge of the offending organism would not have proved the source of infection, though some organisms are associated with certain types of outbreaks and this may have given more evidence to the source of transmission. If an outbreak is reported early, it is more likely that food can be recovered and possibly tested to determine a possible source. Again in this situation, any possibly contaminated food was consumed early in the week and may not have been retrievable even if the outbreak were notified promptly. CDC and Environmental Health need to continually promote the importance of notifying outbreaks early.

Given the likely cause of the outbreak was person-to-person spread continued health promotion is required, aimed at the general public, emphasizing universal methods of prevention such as hand washing.

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Information for food handlers

Under Food Safety Standard 3.2.2 *Food Safety Practices and General Requirements*, food handlers have an overall responsibility for doing whatever is reasonable to make sure that they do not make food unsafe or unsuitable for people to eat. Food handlers also have specific responsibilities related to their health and hygiene.

Are you a food handler?

- A food handler is anyone who works in a food business and who either handles food or surfaces that are likely to be in contact with food such as cutlery, plates and bowls.
- A food handler may do many different things for a food business. Examples include making, cooking, preparing, serving, packing, displaying and storing food. Food handlers can also be involved in manufacturing, producing, collecting, extracting, processing, transporting, delivering, thawing or preserving food.

What must a food handler do if she or he is sick?

If a food handler has a food-borne illness

- Food handlers must tell their work supervisor if they have any of the following symptoms while they are at work - vomiting, diarrhoea, a fever or a sore throat with a fever. The only exception to this is if the food handler knows that he/she has these symptoms for a different reason. For example, a food handler may be vomiting at work because of pregnancy.
- Food handlers must also tell their supervisor if they have been diagnosed as having or carrying a food-borne illness.
- As well as reporting the food-borne illness, the food handler must not handle any food where there is a chance they might make the food unsafe or unsuitable because of their illness. Also, if a food handler stays on at work to do other work, he or she must do everything reasonable to make sure that they do not contaminate any food.

Note: Illnesses that can be passed on through food include Hepatitis A and those caused by giardia, salmonella and campylobacter.

If a food handler has skin injuries or sores or is otherwise unwell

- Food handlers must tell their supervisor about any infections such as skin sores or conditions like a cold or other problem that may result in discharges from their ears or nose or eyes if there is any chance that they might make food unsafe or unsuitable for people to eat as a result of their condition.
- Also, if they continue to handle food with such a condition, food handlers must do whatever is reasonable to make sure that they don't contaminate any food. For example, an infected sore could be completely covered by a bandage and clothing or by a waterproof covering if on an area of bare skin. Appropriate hand washing must always be possible.

If a food handler knows or suspects he or she might have contaminated some food

- Food handlers must tell their supervisor if they know or think they may have made any food unsafe or unsuitable to eat. For example, jewellery worn by a food handler may have fallen into food.

What about personal hygiene?

- Food handlers - personal hygiene practices and cleanliness must minimise the risk of food contamination.

The most important things a food handler must know are to:

- do whatever is reasonable to prevent their body, anything from their body or anything they are wearing, from coming into contact with food or food contact surfaces;
- do whatever is reasonable to stop unnecessary contact with ready-to-eat food;
- wear clean outer clothing, depending on the type of work they do;

- make sure bandages or dressings on any exposed parts of the body are covered with a waterproof covering;
- not eat over unprotected food or surfaces likely to come in contact with food;
- not sneeze blow or cough over unprotected food or surfaces likely to come into contact with food;
- not spit, smoke or use tobacco or similar preparations where food is handled; and
- not urinate or defecate except in a toilet followed by thorough handwashing.
- immediately after using the toilet;
- before they start handling food or go back to handling food after other work;
- immediately after smoking, coughing, sneezing, using a handkerchief or disposable tissue, eating, drinking or using tobacco or similar substances; and
- after touching their hair, scalp or a body opening.

Some special hand washing rules for food handlers

Food handlers are expected to wash their hands whenever their hands are likely to contaminate food.

These rules include washing their hands:

- immediately before working with ready-to-eat food after handling raw food;

How should food handlers wash their hands?

- Use the hand washing facilities provided by the business.
- Clean their hands thoroughly using soap or other effective means.
- Use warm running water.
- Dry their hands thoroughly on a single use towel or in another way that is not likely to transfer disease-causing organisms onto the hands.

Need more information?

Contact the Department of Health and Community Services (Environmental Health Program)

Darwin (Urban):	8922 7377
Darwin (Rural):	8922 7152
Katherine:	8973 8411
Tennant Creek:	8962 4302
Alice Springs (Rural):	8951 6920
Alice Springs Town Council:	8950 0533
Jabiru Town Council:	8979 2230
Katherine West Health Board:	8971 9315

Rotavirus Vaccine introduced in the NT

Christine Nagy & Christine Selvey, Immunisation Program, CDC Darwin

The Northern Territory (NT) commenced Australia's first vaccination program for rotavirus on October 1st 2006 following the NT Government's decision in August to fund the vaccine. The NT is using the 2 dose rotavirus vaccine, Rotarix[®], which will be administered orally at 2 and 4 months with other routine vaccinations. The NT Childhood Vaccination Schedule has changed to reflect the introduction of this new vaccine.

Rotavirus

Rotavirus infection is the most common cause of severe acute gastroenteritis in children and infants, with almost 100% of children being infected by the time they are 5 years of age.¹ The disease varies from mild gastroenteritis to severe vomiting, diarrhoea and fever resulting in life threatening dehydration. It is transmitted via the faecal-oral route. Outbreaks of the disease occur throughout the NT at unpredictable intervals and result in huge stress and cost to the health system.

Rotavirus vaccines

There are currently 2 rotavirus vaccines registered for use in Australia; Rotarix[®] (GSK) and RotaTeq[®] (CSL Limited/Merck and Co. Inc). Both vaccines have been shown to be about 70% effective in preventing any rotavirus gastroenteritis and 85-100% effective in preventing severe rotavirus gastroenteritis.² Both vaccines are administered orally and contain live attenuated rotavirus strain(s). The 2 vaccines differ in their vaccine strain composition and concentration, number and volume of doses required, and the age parameters for administration of each dose. Following consultation with key stakeholders, it was decided to use Rotarix[®] vaccine throughout the NT.

Because of the observed rare association of the first available rotavirus vaccine, RotaShield[®], with intussusception after its release in the United States in 1999, both of the new rotavirus vaccines have been evaluated in very large clinical trials involving over 60,000 infants in

each trial. The large number of infants in the double blinded randomised controlled trials were required to demonstrate that infants who received the vaccine did not have a higher incidence of intussusception than infants who were given placebo. Both Rotarix[®] and RotaTeq[®] were shown not to be associated with intussusception or any other major adverse event. Additionally, the incidence of minor adverse events in vaccinated infants was the same as, or only very slightly higher than in unvaccinated babies. It is a safe vaccine.

Rotarix[®]

All immunisation providers should now have stock of Rotarix[®] vaccine. Rotarix[®] vaccine requires reconstitution before administration. A pictorial step-by-step guide and a video/DVD have been made to instruct immunisation providers on the reconstitution process and these are available from each regional Centre for Disease Control. The vaccine is only available in bulky single packs and over-ordering is not advised. Administration of Rotarix[®] vaccine is not included in Centrelink or General Practice Immunisation Incentive payments however providers should document its administration and forward the details to the immunisation database as is done for other childhood vaccines. Important vaccine information is condensed in the table overpage.

Program guidelines

Age restrictions apply to the administration of this vaccine. The vaccine is only registered for use within the age restrictions as safety and efficacy data is not available for administration to older babies or children. Rotarix[®] must be given by 14 weeks of age for dose 1, and 24 weeks of age for dose 2. To assist providers with these age restrictions a "Dose Cut Off Guide" has been developed and distributed. It clearly identifies the last date that either vaccine dose can be administered in relation to the child's date of birth.

The minimum gap between administration of dose 1 and 2 of the vaccine is 4 weeks.

Table 1. Important vaccine information

Route	Oral. Do not repeat the dose if it is regurgitated or spat out.
Doses	2 oral doses of 1 ml each. The vaccine powder must be mixed with the solution in the syringe prior to oral administration.
Timing of doses	Do not administer dose 1 before 6 weeks of age. 1 st dose must be given by 14 weeks of age. 2 nd dose must be given by 24 weeks of age. Minimum interval between doses is 4 weeks.
Reconstitution	The vaccine must be reconstituted as per instructions prior to administration.
Side effects	Irritability, loss of appetite, fever, diarrhoea, flatulence, vomiting (each less than 5%).
Contra-indications	Allergy to any part of the vaccine. Children with chronic gastrointestinal disease or congenital malformation of the gut. Children with known or suspected severe immunodeficiencies.
Storage	Do not freeze. Store between 2 – 8°C. Use within 24 hours of reconstitution or discard in a sharps container.
Special considerations	Suitable for use in premature infants who are clinically stable and with a chronological age of at least 6 weeks. Infants who received hepatitis B immunoglobulin at birth should receive vaccine at the scheduled time (age 2 months). Postpone vaccine (within dosing guidelines) if suffering acute febrile illness, diarrhoea or vomiting.
Transmission of vaccine virus	Excretion of the vaccine virus occurs in the stools of about half of those receiving dose 1. As the risk of transmission of the vaccine virus is thought to be less than the risk of rotavirus infection in immunocompromised contacts it is safe to give the vaccine to infants who will be in contact with immunocompromised people. To minimise any potential virus transmission all carers should practice good hand washing techniques after nappy changes and other potential contact with faeces.

Children born on or after 1 August 2006 are eligible to receive the 2 dose vaccine schedule. Children born before this date are not eligible for a free dose of the scheduled rotavirus vaccine, even if they have previously received vaccine purchased privately.

This vaccine is funded by the NT government and is only available for children residing in the NT, Nganampa Homelands and Ngaanyatjarra communities.

The Pharmaceutical Benefits Advisory Committee is meeting in the first week of November 2006 to consider the funding of rotavirus vaccine under the National

Immunisation Program. In the meantime, the NT is the only jurisdiction in Australia offering this vaccine free as part of its childhood immunisation schedule.

For further information about this NT vaccine program please contact the CDC in your region or call 89228044 in Darwin.

References

1. Parashar U, Bresee J, Gentsch J et al. Rotavirus. *Emerging Infectious Diseases*:1998; 4:561-570.
2. Ruiz-Palacios G, Perez-Schael I, Velazquez F et al. Safety and Efficacy of an Attenuated Vaccine against Severe Rotavirus Gastroenteritis. *New England Journal of Medicine*: 2006; 354:11-22.

Evidence-based Review for ARF and RHD, an Australian first

Maureen Egan, Rheumatic Heart Disease, CDC, Darwin

The National Heart Foundation of Australia (NHFA) and the Cardiac Society of Australia and New Zealand (CSANZ) have released their guidelines, *Diagnosis and management of acute rheumatic fever and rheumatic heart disease in Australia. An evidence based review.*

The Review is available for download at http://www.heartfoundation.com.au/downloads/ARF_RHD_PP-590_Diag-Mgmt_Evidence-Review_0606.pdf. Printed copies have been ordered through NT Branch of the National Heart Foundation.

Rheumatic heart disease

Rheumatic heart disease (RHD) remains a significant cause of cardiac disability and death among Australian Aboriginal and Torres Strait Islander peoples with incidence rates among the highest in the world. Aboriginal and Torres Strait Islander peoples are up to 8 times more likely than non-Indigenous Australians to be hospitalised for acute rheumatic fever (ARF) and RHD and are nearly 20 times more likely to die from these conditions.

In the Top End an initial mini launch of the Guidelines was held and celebrated at Wadeye on Monday 17 July, 2006. This coincided with the regular Cardiology Outreach Clinic and included fun activities to round out a productive day.

Launch of the Guidelines in Darwin

This event will be at Danila Dilba on 1 November, 2006 from 1.00 - 2.00 pm.

The review

The new National Heart ARF/RHD Guidelines have been released with the aim to use them throughout the Northern Territory (NT). The Guidelines were launched in Sydney on 26 June. The NHFA and CSANZ have now jointly carried out this evidence-based review to assist policy makers and health professionals, including medical, nursing, allied health and Aboriginal Health Workers address the inadequate diagnosis and management of ARF and RHD in Australia. The purpose of the review was to:

The purpose is to:

- identify areas where current management strategies may not be in, line with available evidence; and
- ensure that high risk populations receive the same standard of care as that available to all other Australians.

- raise awareness about the first national guideline for the *Diagnosis and management of acute rheumatic fever and rheumatic heart disease*;
- present the Guidelines as an opportunity for a national approach to disease management of this condition and to the improvement of the health status of indigenous Australians;
- highlight the contributions of practitioners in the NT to the review and the writing of the guidelines (Dr Keith Edwards, Dr Jonathan Carapetis, Dr Bart Currie, Dr Malcolm McDonald, Dr Alex Brown and Dr Warren Walsh); and
- attract further public and policy maker attention to the preventable burden of ARF and RHD.

Many thanks to all the above mentioned participants for their valuable input to these ARF/RHD projects.

Syndromic surveillance of Emergency Department attendances in the Northern Territory

Peter Markey and Didier Palmer, September 2006

Background

Since the emergence of avian influenza in South East Asia in Jan 2004, the Centre of Disease Control (CDC) and the Department of Emergency Medicine have been exploring ways to monitor Emergency Department (ED) presentations for particular “syndromes” to enhance the ability to detect early phases of disease outbreaks, in particular, influenza. The risk of other emerging diseases together with the threat of bioterrorism has added to the importance of such surveillance.

Syndromic surveillance

The aim of syndromic surveillance is to monitor presentations to a health service, in real-time or close to real-time, and by analysing the frequency of specified presenting complaints or provisional diagnoses, detect outbreaks of disease. The rationale behind this approach is that such presentations will be the first sign of an outbreak occurring and will therefore predate systems which rely on laboratory diagnoses or strict clinical case definitions.

Syndromic surveillance relies on the regular statistical analysis of health data to allow detection of significant increases in the rate of presentation of cases with pre-determined groups of symptoms. Depending on the particular syndrome, once an increase or cluster has been detected it may then need to be investigated to determine if it is a “real” increase – with the probability of a common source - or whether the increase is just a chance combination of random events. What constitutes a trigger for action will depend on the analysis used and will be influenced by the amount of resources available. There are multiple analysis techniques that have been developed, varying from simple comparisons between observed and expected counts to sophisticated temporal and spatio-temporal modelling techniques.^{1,2}

Northern Territory Emergency Department syndromic surveillance

Current information systems form the basis for syndromic surveillance. The Cardinal Module of the CARESYS hospital information system provides a unified Emergency Department Information System (EDIS) across all Northern Territory (NT) public hospitals. There is standardised diagnostic coding and centralised data warehousing with regular extracts and the data integrity and reporting has recently been subject to an extensive review. There is access to several years of retrospective data that will facilitate the development of expected values and standard deviations against which we can compare observed values. The fact that these robust systems are already in place has meant that the development of the system has required minimal resources.

Initially, 2 syndromic groups of cases will be analysed;

1. influenza-like illness (ILI); and
2. acute gastro-intestinal illness.

In addition, the system will allow monitoring of notifiable diseases diagnosed in the ED and will provide another safety net in notifiable disease reporting.

A specified dataset from the EDIS will be loaded nightly into the data warehouse and analysed daily using Business Objects analysis software. A 4-6 week period is planned to trial various analysis techniques using historical data collected over the previous 5 years.

With cases of ILI, it is unlikely that a cluster will need to be investigated unless it is particularly unseasonal, associated with a particular event (eg Arafura Games), noted in health care workers or occurs at a time of increased threat of a pandemic or emerging respiratory virus (eg

SARS). Outside these scenarios the number of cases will simply be monitored as part of the routine influenza surveillance system. With cases of gastro-intestinal illness, cluster detection will be important, however it is unlikely "background" cases will need to be investigated unless they are suspected to be a part of an outbreak or cluster. With the notifiable disease cases, each will be followed up if there is a public health urgency about the case, should it be verified (eg measles). It will nevertheless be interesting to look at the historical trends of easily diagnosable conditions, such as varicella.

Investigating outbreaks or cases

Identifiable information will not be routinely available for syndromic cases. When an outbreak is detected and requires further analysis it is planned that the data owner (Director of Emergency Medicine) will be informed and the cases identified by modifying the Business Objects universe to allow access to the HRN. For the cases of notifiable diseases the HRN will be available if required.

Analysis

The primary statistic for syndromic surveillance is simply the number of cases presenting with the specified syndrome per day or per week which will be monitored by hospital as well as NT-wide. Analysis will include examination of subgroups based on sex, age and Indigenous status and the difference between observed and expected counts will be compared with a multiple of the standard deviation, derived from historical data. More sophisticated methods may be implemented at a later point and may include the use of geographical information systems and spatio-temporal methods.³

Future developments

In other jurisdictions, both in Australia and overseas, syndromic surveillance is used for early detection of potential bioterrorism incidents. In the NT, given that there is only one public hospital in each major town, it is unlikely that a system as basic as this one will be required to detect a bioterrorism incident. Nevertheless, there may be as yet unrecognised issues that may lend themselves to this type of surveillance and with the system in place, it will take minimal work to expand it to include other syndromes or illness patterns.

Acknowledgements

We would like to acknowledge Cherie Forbes' work and cooperation with this project together with Kristine Luke and Roseanne Muller. The advice of David Muscatello from the NSW Public Health Real-time Emergency Department Surveillance System (PHREDDS) was also invaluable.

References

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2. Heffernan R, Moshtashari F, Das D, Karpati A, Kulldorff M, Weiss D. Syndromic surveillance in public health practice, New York city. *Emerging Infectious Diseases*. 2004;10(5):858-864. (Available at: <http://www.cdc.gov/ncidod/eid/vol10no5/03-0646.htm> Accessed 4/10/2006)
3. Kulldorff M, Heffernan R, Hartman J, Assuncao R, Moshtashari F. A space-time permutation scan statistic for disease outbreak detection. *PLoS Medicine* 2005;2(3):216-224 (Available at: <http://medicine.plosjournals.org/perlserv/?request=get-document&doi=10.1371/journal.pmed.0020059> Accessed 4/10/2006)

Vibrio bacterial disease fact sheet

What are Vibrio bacteria?

Vibrio bacteria are a family of bacteria that live in warm sea water. They are found throughout the world but are particularly common in large gulfs in tropical areas such as the Bay of Bengal, the Gulf of Mexico and the Gulf of Carpentaria. There are several species of Vibrio that cause disease, one of which is *Vibrio cholerae* which causes cholera. Vibrio bacteria can live freely in sea water but can also contaminate seafood, particularly shellfish.

Who gets diseases caused by Vibrios?

People with poor immunity, particularly those with chronic liver disease, can get the infection through the skin, when cuts or abrasions are exposed to sea water, or through ingesting contaminated food or water. The infection can start as a wound infection and can quickly spread to cause overwhelming and life-threatening bloodstream infection. Once established, bloodstream infection with Vibrio bacteria has a 50% mortality even with the best treatment.

If healthy people eat food contaminated with Vibrios they can get gastro symptoms such as vomiting and diarrhoea. This is usually self-limiting although can be severe depending on the type of Vibrio and the person's immunity.

Where do people get infected?

The bacteria are found in tropical waters and so can potentially be acquired anywhere along the north Australian coast. However, the reported serious infections in the NT were all acquired in

the sea or rivers around the south-western shore of the Gulf of Carpentaria – near the Sir Edward Pellew Group and Limmen Bight. Fortunately, severe infections with Vibrio are rare. Since 2000 there have been only 4 serious infections of people in the Northern Territory.

How can you prevent disease from Vibrio bacteria?

Everyone who comes into contact with waters from rivers, estuaries or gulf should observe the following tips;

- Avoid exposure of open wounds or broken skin to sea or river water.
- Thoroughly cook all seafood caught in coastal and estuarine waters.
- Do not eat any raw oysters or other raw shellfish.
- Avoid contaminating other food when handling raw shellfish.

In addition to the above pre-cautions, anyone with compromised immune systems, particularly those with any form of liver disease should observe the following tips;

- Do not swim in the rivers estuaries or sea, particularly in and around the Gulf of Carpentaria.
- Minimise all contact with tropical coastal sea water, particularly in and around the Gulf of Carpentaria.
- Promptly treat any wound which becomes infected following exposure to tropical waters and seek medical advice if the infection is worsening.

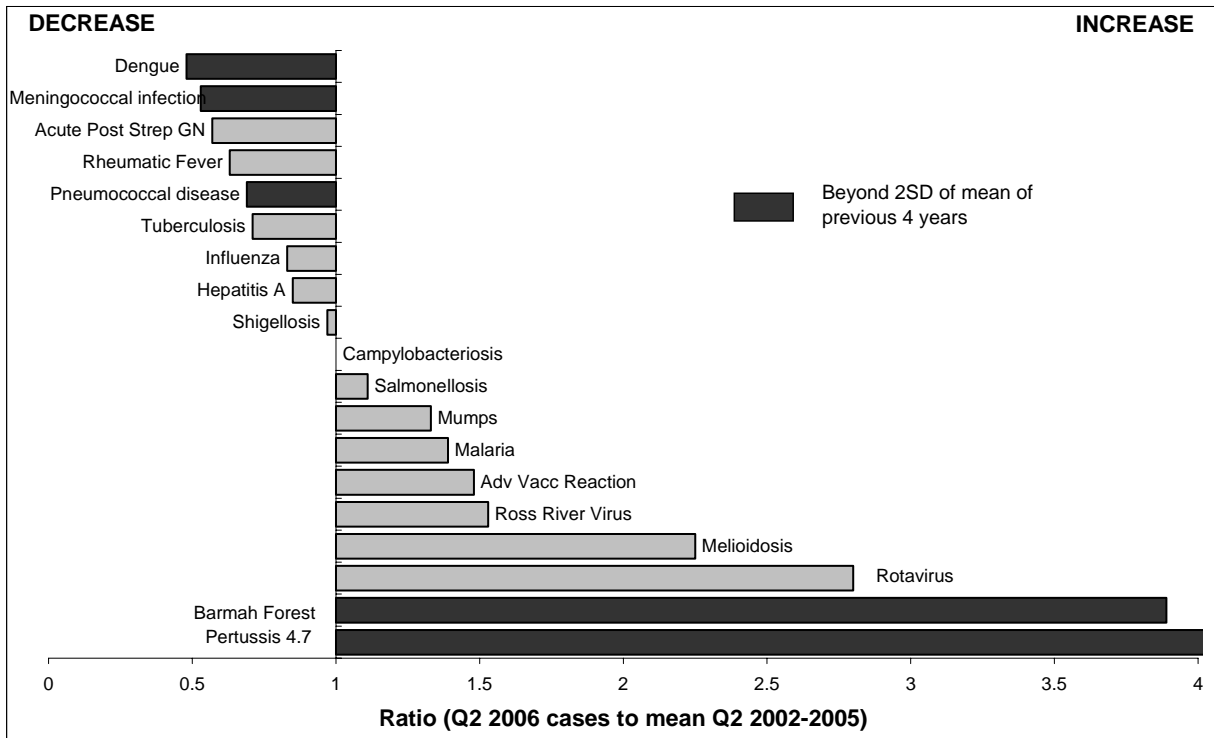
For more information, contact your nearest Centre for Disease Control (CDC)

Darwin	8922 8044
Katherine	8973 9049
Nhulunbuy	8987 0359
Tennant Creek	8962 4259
Alice Springs	8951 7549

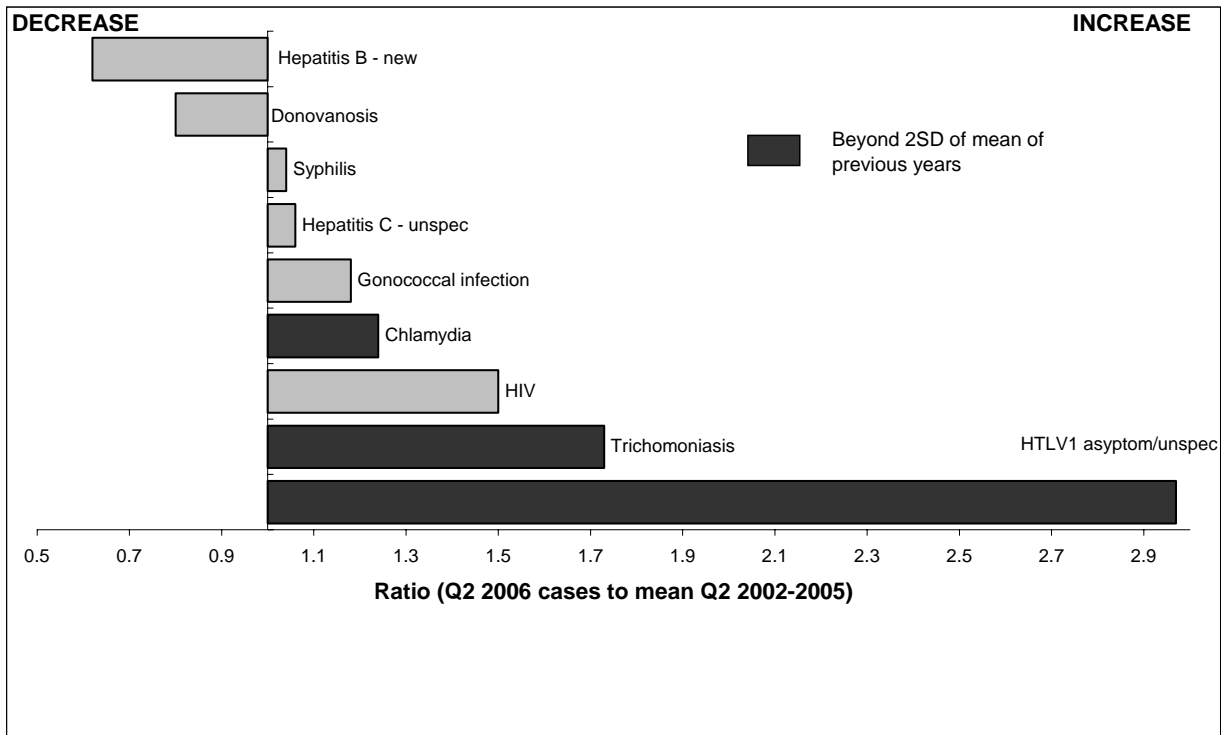
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
April - June 2006 and 2005

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		NT	
	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005	2006	2005
Acute Post Streptococcal GN	0	4	0	0	6	27	0	4	0	3	6	38
Adverse Vaccine Reaction	0	0	0	0	6	2	2	0	0	1	8	3
Amoebiasis	0	0	0	0	1	0	0	0	0	0	1	0
Barmah Forest	5	3	0	0	20	14	6	1	5	2	36	20
Campylobacteriosis	14	27	1	0	42	29	3	1	4	15	64	72
Chickenpox	2	1	0	0	15	0	1	0	5	0	23	1
Chlamydia	283	249	1	8	175	151	32	37	33	31	524	476
Chlamydial conjunctivitis	0	5	0	1	2	2	1	1	0	2	3	11
Cryptosporidiosis	3	9	0	1	3	4	4	0	2	5	12	19
Dengue	0	0	0	0	3	5	0	0	0	0	3	5
Donovanosis	1	1	0	1	0	0	0	0	0	0	1	2
Gonococcal conjunctivitis	0	0	0	0	0	2	1	0	0	0	1	2
Gonococcal infection	343	334	9	13	94	122	34	24	40	58	520	551
Hepatitis A	0	13	0	0	3	1	0	0	4	0	7	14
Hepatitis B - chronic	20	20	0	0	30	32	21	6	4	7	75	65
Hepatitis B - new	0	1	0	0	1	2	1	0	0	0	2	3
Hepatitis B - unspecified	29	15	0	1	16	19	11	4	5	3	61	42
Hepatitis C - chronic	1	1	0	0	0	1	0	1	0	0	1	3
Hepatitis C - new	1	0	0	0	0	0	0	0	0	0	1	0
Hepatitis C - unspecified	15	13	1	1	42	41	0	3	1	4	59	62
Hepatitis NOS	0	0	0	0	1	0	0	0	0	0	1	0
H Influenzae non-b	1	5	0	0	1	1	0	0	1	1	3	7
HIV	0	0	0	0	3	0	0	0	0	0	3	0
HTLV1 asymptomatic/unspecified	28	12	0	1	1	0	0	0	0	0	29	13
Influenza	0	0	0	0	3	15	0	3	2	0	5	18
Legionellosis	1	1	1	0	0	0	0	0	0	0	2	1
Leptospirosis	0	0	0	0	0	1	0	0	0	0	0	1
Malaria	0	0	0	0	16	16	0	1	1	1	17	18
Melioidosis	0	0	0	0	7	7	1	0	1	0	9	7
Meningococcal infection	1	1	0	1	1	1	0	0	0	0	2	3
Mumps	0	1	0	0	1	1	0	0	0	0	1	2
Non TB Mycobacteria	0	2	0	0	0	0	0	0	0	0	0	2
Pertussis	10	4	1	0	10	7	5	1	0	3	26	15
Pneumococcal disease	6	14	1	0	5	4	0	3	1	0	13	21
Q Fever	2	2	0	0	0	0	0	0	0	0	2	2
Rheumatic Fever	3	5	0	0	3	4	1	1	3	2	10	12
Ross River Virus	0	0	0	0	20	27	3	3	6	6	29	36
Rotavirus	69	2	2	0	179	1	11	0	27	0	288	3
Salmonellosis	20	13	3	2	65	50	5	6	15	29	108	100
Shigellosis	19	34	1	1	7	2	5	2	3	9	35	48
Syphilis	76	38	0	3	6	13	6	5	5	15	93	74
Syphilis congenital	3	1	0	0	0	0	0	0	0	0	3	1
Trichomoniasis	80	92	7	4	88	53	58	30	23	19	256	198
Tuberculosis	2	1	0	0	2	4	1	2	0	0	5	7
Typhoid	0	0	0	0	1	0	0	0	0	0	1	0
Vibrio food poisoning	0	0	0	0	1	0	0	0	0	0	1	0
Yersiniosis	0	0	0	0	1	0	0	0	0	0	1	0
Zoster	6	0	1	0	11	0	2	0	2	0	22	0
Total	1,044	924	29	38	892	661	215	139	193	216	2,373	1,978

Ratio of the number of notifications (Q2 2006 cases to mean Q2 2002-2005): selected diseases



Ratio of the number of notifications (Q2 2006 cases to mean Q2 2002-2005): sexually transmitted diseases



Comments on notifications p29

Chlamydia

The increase in chlamydia notifications in this quarter is consistent with an existing increasing trend in the past few years and was thought to be a true increase in incidence. Most of the increase came from Alice Springs District (both Rural and Urban areas), though the increase in Darwin Urban area was also significant.

HTLV 1

The prevalence of HTLV 1 in Central Australia region is believed to be high and the increase in notifications in this quarter was suspected to be due to fluctuation in testing numbers.

Trichomoniasis

Interpretation of trend analysis of trichomoniasis is difficult due to variations in the notification practice by the pathology laboratories. The recent implementation of standardised testing and reporting guidelines in 2006 is expected to improve the data quality.

Barmah Forest

There were 112 cases of Barmah Forest disease in the NT in 2006 which is the highest number of cases since records began in 1997, and is at least 3 times the 10 year average. The second highest number of cases was 41 last year, which indicates a recent change has occurred. The rise in numbers is due primarily to a rise in the Darwin environs (urban and rural Darwin) cases from 29 last year to 69 this year. However there were increases in most regions including East Arnhem, Katherine and Alice Springs environs. Most of the Darwin increase occurred in February and March, after salt marsh mosquitoes had decreased, but there were higher than average numbers of cases in later months from April to September. In the Darwin environs there was no large concentration of cases in any suburb, with the highest in the rural areas of Howard Springs (9) and Humpty Doo (6), while the urban area cases were highest in Winnellie

(5), Nightcliff (4), Karama (3) and Leanyer (3). The urban case information indicates the vector is not arising from mosquito breeding in the coastal freshwater and brackish swamps. There has been no unusual or unseasonal rises in the numbers of major mosquito species in Darwin over the last 3 years. Although this year there was an increase in the numbers of the salt marsh mosquitoes despite record spray applications, and a decrease in the common banded mosquitoes, compared with last year. The difference this year compared to most other years has been the extended wet season rainfall in March and April. The suburb figures and months of occurrence suggests an urban mosquito vector such as *Aedes notoscriptus*. However until we know more of the ecology of this virus, the reason for these increases in Barmah Forest cases is speculative.

Invasive Pneumococcal Disease (IPD)

The reduction in IPD is seen in the under 2 year olds, the age group effected by universal pneumococcal conjugate vaccine given at 2, 4 and 6 months of age that started in January 2005.

Meningococcal Disease

In the second quarter of 2006 there were only 2 cases of meningococcal disease notified compared with 4 year mean of 4. This is only a tiny reduction in absolute numbers and unlikely to be due to the introduction of the meningococcal C vaccination program because meningococcal C disease was uncommon in the NT in any case.

Pertussis

There were 26 pertussis cases in the second quarter which was almost 5 times the 4 year mean. This represents the continuing epidemic from 2005 but also may be contributed to by increased awareness and testing by health care providers.

Vaccination coverage for children aged 12 - <15 months as at 30 June 2006

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Fully vaccinated
Winnellie PO Bag	115	100.0	98.3	100.0	100.0	98.3
East Arnhem	38	97.4	97.4	97.4	97.4	97.4
Katherine	97	94.8	94.8	100.0	100.0	94.8
Palm/Rural Area	176	92.0	92.0	92.6	93.8	91.5
Darwin	228	89.5	89.5	93.0	93.0	89.5
Alice Springs PO Bag	76	84.2	84.2	93.4	93.4	84.2
Alice Springs	111	86.5	85.6	92.8	94.6	83.8
Barkly	22	86.4	86.4	95.5	100.0	81.8
Non-Indigenous	452	93.8	93.6	94.0	94.9	92.7
Indigenous	411	88.8	88.3	95.9	96.1	88.3
NT	863	91.4	91.1	94.9	95.5	90.6
Australia	65,609	92.2	92.1	94.2	94.7	90.7

Vaccination coverage for children aged 24 - <27 months as at 30 June 2006

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% MMR	% Fully vaccinated
Winnellie PO Bag	121	100.0	100.0	99.2	100.0	99.2	99.2
Katherine	103	99.0	99.0	98.1	99.0	98.1	98.1
Palm/Rural Area	168	98.2	98.2	97.0	98.2	96.4	95.2
Alice Springs PO Bag	79	98.7	98.7	94.9	100.0	96.2	94.9
Alice Springs	112	97.3	97.3	92.9	97.3	95.5	92.9
Barkly	25	92.0	92.0	92.0	96.0	96.0	92.0
East Arnhem	50	100.0	100.0	94.0	100.0	94.0	92.0
Darwin	242	94.2	94.2	91.7	95.0	92.6	91.3
NT Non-Indigenous	480	96.25	96.3	96.3	94.6	96.7	94.8
NT Indigenous	420	98.57	98.6	98.6	95.5	99.0	96.7
NT	900	97.3	97.3	95.0	97.8	95.7	94.4
Australia	65,419	95.2	95.2	93.8	95.9	94.0	92.4

Vaccination coverage for children aged 72-<75 months as at 30 June 2006

Region	Number in District	% DTP	% Polio	% MMR	% Fully vaccinated
Winnellie PO Bag	82	97.6	97.6	97.6	97.6
East Arnhem	62	91.9	95.2	95.2	91.9
Alice Springs PO Bag	59	91.5	93.2	93.2	91.5
Katherine	115	89.6	89.6	87.8	87.8
Alice Springs	120	86.7	85.8	86.7	85.0
Darwin	234	82.5	82.5	82.9	81.6
Barkly	26	88.5	88.5	84.6	80.8
Palm/Rural Area	181	80.1	79.6	79.0	77.3
NT Non-Indigenous	549	82.3	82.3	81.6	80.7
NT Indigenous	330	93.0	93.6	93.9	92.1
NT	879	86.3	86.6	86.2	85.0
Australia	67,431	85.0	85.1	85.0	83.9

Vaccination coverage 30 June 2006

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 32.

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-<15 months of age on 30 June 2006 were born between 01/01/2005 and 31/03/2005 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-<27 months of age on 30 June 2006 were born between 01/01/2004 and 31/03/2004 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 72-<75 months of age on 30 June 2006 were born between 01/01/2000 and 31/03/2000 inclusive. To be considered fully vaccinated, these children must have received 5 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 72 months (6 years) of age.

Interpretation

Immunisation coverage in NT children was above the national average for the 24-<27 and 72-<75 months cohorts and slightly below the national average for children aged 12-<15 months. Communities with a Winnellie PO Bag address had consistently very high coverage rates across all 3 age groups, and particularly for the oldest cohort. Immunisation coverage in Indigenous children was over 2% lower for the 12-<15 month cohort, but 2% higher for the 24-<27 month cohort and almost 12% higher for the 6 year olds.

Higher Indigenous immunisation coverage in the 24-<27 month cohort but lower in the 12-<15 month cohort compared to non-Indigenous children suggests poorer vaccination timeliness in Indigenous children although overall better coverage in the longer term.

Immunisation coverage for non-Indigenous NT children at 6 years of age (80.7%) remains lower than for the younger cohorts, and this is a concern across Australia. It is highly commendable that NT immunisation providers that serve Indigenous children have achieved an immunisation coverage of 92.1% for this older age group in this quarter.

Congratulations to all those involved in achieving increasingly high rates of vaccine coverage in Northern Territory children.

NT Malaria notifications April—June 2006

Merv Fairley, CDC, Darwin

Seventeen notifications of malaria were received for the second quarter of 2006. 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	Brazil	Holiday	<i>P. vivax</i>	Yes
2	Ghana	Migrant	<i>P. falciparum</i>	No
2	PNG	Holiday	<i>P. falciparum</i>	Yes/No
2	PNG	Holiday	<i>P. vivax</i>	No/Yes
1	East Timor	Holiday	<i>P. vivax</i>	No
4	Indonesia	Fisher	<i>P. falciparum</i>	No
1	Indonesia	Fisher	<i>P. vivax</i>	No
1	Indonesia	Resident	<i>P. vivax</i>	No
1	Indonesia	Holiday	<i>P. vivax</i>	No
2	Indonesia	Holiday	<i>P. falciparum</i>	No

Disease Control staff updates

Centre for Disease Control (CDC)

Alice Springs CDC has employed **Kelly Phillips** as part time administration support.

Immunisation

About Giving Vaccines Coordinator position has been advertised with the completion of **Lyn Barclay's** contract. Lyn has provided an excellent start to the position in CDC. We welcome the expertise of **Nan Miller** who is currently working for 6 weeks updating the About Giving Vaccines Handbook. **Charles Roberts** has been appointed as Immunisation Database Coordinator.

TB/Leprosy

Dr John Opa has commenced in July as medical officer in CDC Nhulunbuy. He will oversight screening for TB and malaria in illegal fisherpersons. John and his family have moved from Darwin where he was attached to RDH Division of Obstetrics & Gynaecology as trainee registrar. John was previously working in Port Moresby General Hospital as Post Graduate Masters candidate with the University of Papua

New Guinea. **Tracy Popple** has joined the TB unit in Darwin from Hospital in the Home and worked prior to that Casuarina Community Care, Child and Family team. Tracy replaces **Fiona Harkness**.

SH&BBV

We welcome **Malcolm Laughton** who has joined the Darwin Urban team as SH/BBV Male AHW. Malcolm has been a AHW for 8 years, and has just moved from Milingimbi CHC. He has held several different positions at Danila Dilba Health Service. **Dr Kath Fethers**, Sexual Health Medical Officer, has left us for a break, as has **Nicole McIntosh**, Clinic 34 Co-ordinator. The Rheumatic Heart Disease Nurses **Alison Males** and **Eleanor Hooke**, will both provide Clinic 34 support in Nicole's absence.

Surveillance

Dr Philippa Binns has resigned from the OzFoodNet Enteric Epidemiologist position and moved to Wollongong as Medical Epidemiologist in the Public Health Unit for South East Sydney Illawarra Area Health Service.