CDC
CENTRE FOR DISEASE CONTROL
NORTHERN TERRITORY

THE NORTHERN TERRITORY
DISEASE CONTROL
BULLETIN

Vol. 15, No. 3, September 2008 ISSN 1440-883X

Acute Post-Streptococcal Glomerulonephritis in the Northern Territory 2008

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Abstract

There has been a decline in the incidence of acute post-streptococcal glomerulonephritis (APSGN) over the past 20 years in many industrialised countries, however, the Northern Territory (NT) continues to have yearly sporadic cases with epidemics occurring every 5-7 years. We report a recent cluster of three APSGN cases in one Top End community and the resultant community screening that was undertaken. Children younger than 15 years old were targeted but less than 50% of children in the community were screened. Of the children that were screened no further cases of APSGN were detected. However, 36% of children had skin sores and 12.5% had scabies. In this context we discuss the importance of prevention of APSGN and the rationale for current outbreak management guidelines.

Introduction

Acute post–streptococcal glomerulonephritis (APSGN) is a non-suppurative complication that follows infection of either throat or the skin with *Streptococcus pyogenes* (Group A streptococcus, GAS).[1] In the Northern Territory (NT) the majority of cases are related to skin infection, often associated with scabies infestation.[2] Many industrialised countries have seen a decline in the incidence of APSGN over the past 20 years, especially related to skin infection,[3-5] however in the NT there continues to be yearly sporadic cases with larger epidemics occurring every 5-7 years.[2,6,7]

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Guidelines for control of APSGN in the NT have been developed and were most recently updated in 2002.[8] These guidelines define outbreaks of APSGN and guide community based interventions to prevent further transmission of nephritogenic streptococcus. APSGN is a notifiable condition in the NT and there have been more than 20 cases of APSGN notified so far this year.[9]

This report describes a recent cluster of APSGN cases in one Top End community and the resultant community screening that was undertaken.

Case Study

A 5 year old boy presented to his local community health clinic with a 1 day history of facial and abdominal swelling. He had also developed a moist cough and mild shortness of breath and wheeze but no fevers. One week prior he had been seen in the clinic with a skin sore on his inner thigh which had grown GAS and he had been treated with intramuscular benzathine penicillin. Two months prior he had a wound on his head and this had also grown GAS.

On examination in the clinic he was found to be hypertensive with BP 135/95 (greater than 99th centile for age). He was not distressed and was afebrile with a pulse rate of 90 beats per minute. He had mild facial oedema but no clinically detectable ascites. Urinalysis showed 3+ haematuria and 1+ protein. He was treated with intravenous penicillin and nifedipine and transferred to the Royal Darwin Hospital.

On admission to hospital further investigations revealed his C3 level was <0.40 (normal 0.83-1.81) but C4 remained normal. His urea and electrolytes, full blood count and chest x-ray were normal. A renal ultrasound showed evidence of acute, non-specific renal parenchymal disease. Anti-streptolysin-O and AntiDNAase B titres were both elevated. A diagnosis of APSGN was made on the basis of the history of oedema, hypertension and haematuria with low C3 level and confirmed evidence of previous streptococcal infection (see Figure 1).

While in hospital he was treated with fluid restriction, intermittent nifedipine for hypertension and benzyl-penicillin for skin sores

Figure 1. Case definition for notification of APSGN

Reporting

Only confirmed and probable cases should be notified.
Possible cases should be reported to CDC but not notified to NTNDS.[1]

Confirmed case

A confirmed case requires either:
1. Laboratory definitive evidence

OR

2. Laboratory suggestive evidence AND clinical evidence.

Probable case

A probable case requires laboratory suggestive evidence only.

Possible case

A possible case requires clinical evidence only.

Laboratory definitive evidence

Positive renal biopsy.

Laboratory* suggestive *evidence

2. Glomerular haematuria on microscopy (RBC >10/μl)[2]

AND

2. Evidence of recent streptococcal infection (positive Gp A Streptococcal culture from skin or throat, elevated ASO titre or AntiDNAase B)[3]

AND

3. Reduced C3 level.

***Clinical* evidence**

At least 2 of the following:
- Facial oedema,
- >=2+ dipstick haematuria,
- hypertension,
- peripheral oedema.

Notes:
1. A "possible case" is the same as a "clinical case" in the NT "Guidelines for the Control of APSGN". The guideline suggests that a community outbreak is defined as 2 unrelated clinical cases in one week (or 3 in a month). Hence it is important to receive notification of, record and respond to, "possible cases" but these should not be notified to NTNDS (unless confirmed by laboratory evidence).
2. If microscopy is not available then >=2+ dipstick haematuria fulfils this criteria.
3. If all other criteria have been fulfilled but the only evidence of recent streptococcal infection is isolation of Group C or Group G Streptococci from skin or throat, this could be notified as a confirmed case after discussion with CDC or an infectious disease physician.

and a possible co-existent respiratory infection. He did not require lasix. His symptoms resolved over a number of days and he was discharged home.

The Other Outbreak Cases

Two days prior, 2 other children from 1 family had presented to the community clinic with similar presentations. Both had facial oedema and haematuria and one had hypertension and mildly abnormal renal function. Both had a low C3 level and a recent history of skin sores with streptococcal serology that was positive. These children were also admitted to hospital and recovered without complication.

These 3 cases within 1 week (2 unrelated) meet the definition for a community outbreak according to the CDC guidelines (see Figure 2) and prompted a community intervention. In addition to these cases this community had also had 3 prior cases this year.[9]

Figure 2. APSGN Outbreak Definition[8]

2 unrelated clinical cases within one week (laboratory confirmation not required)
OR
3 clinical cases in one month that are not epidemiologically linked as a family, household or close contact.

Community Screening Program

In all cases of APSGN (sporadic or outbreak) all family and close contacts should be screened for signs of APSGN, skin sores and scabies, and if aged between 3-15 years should be given a dose of intra-muscular benzathine penicillin. Contacts not aged between 3-15 years should be treated with penicillin if skin sores are present and with permethrin 5% if scabies are identified.[8]

In the outbreak setting wider community screening is also performed. In this community, consultation was undertaken and consent was obtained for a screening program to be undertaken approximately 3 weeks after the cluster of cases occurred. Children under the age of 15 years were screened at school for the presence of scabies, skin sores and oedema. Lyclear was given to children with scabies and children with skin sores were referred to the clinic for IM benzathine penicillin.
Figure 3 shows the results from the community screening. A total of 144 children were screened over 3 days which unfortunately was less than half of the children of this age group in the community. In previous larger APSGN outbreaks over 95% of children have been successfully screened.[7] Of the children screened skin sores were present in 52 (36%) and scabies in 18 (12.5%). This rate was similar to what was seen during the APSGN outbreak in 2005[7], although during other outbreaks skin sore have been noted in up to 78% of children.[2] No further cases of APSGN were detected.

Unfortunately, the community screen coincided with a number of funerals in the community. This meant that the clinic was closed for some of the time and that community members were not at home, making screening logistically difficult and resulting in the low screening rate.

Since the community screen there has been a further case in the same community making a total of 7 cases to date this year and there are plans for further screening to take place.

Discussion

Importance of APSGN prevention

The cases of APSGN presented here were uncomplicated and the children recovered without immediate complication. The short term prognosis for children with APSGN is generally good with a mortality of less than 0.5% and fewer than 2% progressing to end-stage renal failure.[10] However, there is often significant associated morbidity as most children require admission to hospital. Other complications that have been reported to occur with APSGN include acute pulmonary oedema, and reversible posterior leukoencephalopathy syndrome that

Figure 3. Result of Community intervention

No.of children in community screened	No. screened with skin sores	No. screened with scabies	No. screened with oedema	No. screened with APSGN
144/350 (41%)	52/144 (36%)	18/144 (12.5%)	0/144	0/144

can be caused by either hypertension or an associated cerebral vasculitis.[11-14]

The long term implications of APSGN are less reassuring, especially in the Indigenous Australian population. White et al[15] followed-up a cohort of patients 6-18 years after an episode of APSGN and found overt albuminuria (albumin to creatinine ratio >34 mg/mmol) occurred in 13% of people with previous APSGN compared with 4% of controls. This is consistent with a previous study that had also found an association with albuminuria and a history of APSGN in Aboriginal Australians.[16] Albuminuria is thought to be a marker of early chronic kidney disease and its presence has also been found to be a predictor of mortality and cardiovascular disease.[17] Thus, prevention of APSGN may contribute to reducing the high rates of chronic renal failure seen in the Indigenous Australian population.

Rational for current strategies for Community outbreaks

There is limited evidence regarding the best way to manage an outbreak of APSGN. The aim of contact tracing, community screening and penicillin treatment is to reduce transmission of the nephritogenic *streptococcus*. Intramuscular benzathine penicillin has been shown to be effective at clearing streptococcal carriage[18] and can reduce transmission within a community.[19, 20]

There have been no randomized controlled trials assessing effectiveness of interventions with penicillin therapy in outbreaks of APSGN. However, an observational study in 1999[21] supported to the use of community interventions with prophylactic penicillin administration. It is unclear whether treatment of all children aged 3-15 in the community is more effective than targeted therapy of contacts of cases and just those children with skin sores or scabies. This targeted approach is the current practice in the NT presumably because the presence of skin sores is thought to be of greater epidemiological importance than colonization of intact skin in the outbreak setting.[21] Skin sores have also been shown to be associated with a 5 times increased risk of acquiring APSGN.[2] A targeted approach also has the advantage of being less resource intense and avoids well children undergoing painful benzathine penicillin injections.[21]

Conclusion

APSGN continues to occur regularly in the NT despite a decline in incidence in other parts of the world. It is condition that results in significant morbidity and potentially contributes to renal disease later in life. Medical staff working in the NT should be aware of the clinical presentation of APSGN and that it is a notifiable condition. The full guidelines for Management of APSGN are due for revision but are currently available at: http://www.health.nt.gov.au/Centre_for_Disease_Control/Publications/CDC_Protocols/index.aspx.

Acknowledgements

We would like to acknowledge the work of the community health staff in providing the community information and screening, which has been an ongoing process and has continued after the writing of this paper.

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Firework-Related Injury Community Survey Report 2008

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Introduction

Territory Day has traditionally been celebrated with fireworks since self-government was conferred on the Northern Territory (NT) on 1 July 1978. The 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.[1]

This report is the 10th in a series of fireworks injury surveillance reports conducted since 1998 by the Darwin Centre for Disease Control (CDC) (no survey was conducted in 1999).[2] 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 firework-related injury on and around Territory Day.

Methods

Surveillance was targeted at persons seeking medical care for firework-related injuries during the period midnight Sunday 29 June – midnight Friday 4 July from NT Emergency Departments (EDs) or Medical Centres.

A survey pack was sent out to 60 Medical Centres and to the 5 NT public hospital EDs. The survey methods have been previously described.[3]

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
- minor - requiring only 1 visit to a health practitioner

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

Results

In 2008 there were 14 firework related injuries recorded (see Table 1).

Table 1. Severity of injury

Severity scale	Cases
Severe	1*
Moderate	7
Mild	6
Total	14

* admitted to hospital overnight

On the night 9 people presented for treatment at an ED, with the remaining cases treated at GP clinics (2), by Defence Health Services (2) and 1 at a community care centre. Between Darwin and Palmerston there were 12 injury presentations with Katherine and Alice Springs each having 1 presentation.

There were 6 injuries to females, 5 to males and in 3 cases the sex was not identified. The head (5) was the most common site of injuries, followed by upper extremities (3), lower extremities (3), torso (1), neck (1) and in 1 case the site was not specified.

Of the injured people 8 were 'bystanders'. That is, they were injured by errant fireworks being used by others. There were 7 injuries sustained in private backyards, with 1 each occurring at Mindil and Lee Point Beaches, 1 in a public park and 1 in a street. In 3 instances the location was not identified.

'Multi shots'* were identified as the device in 6 cases, crackers in 5 cases, sparklers in 1 case with 1 report of a rocket causing the injury (rockets are no longer available as shop good fireworks). The device was not specified in 1 case.

Discussion

The number and severity of injuries recorded in 2008 were significantly down on the previous 2 years (Table 2). Over the past 10 years of firework injury surveys, the number of injured persons has varied between 11 and 35 with those requiring hospitalisation varying between 0 and 8 each year. One of the most noticeable differences in 2008 was that no one presented with burns to the hand attributed to lighting several sparklers at the same time. In 2006 and 2007 there were 5 and 7 people respectively who sustained serious hand burns in this way. With the exception of the sparkler injuries, there is no clear trend over time and it is not possible to say whether this year represents a real improvement, and if so, what such an improvement could be attributed to.

In 2008 there was a change in the regulatory framework for fireworks, and compared to previous years, several differences in events leading up to Territory Day. Changes to the legislation focused on the wholesale and retail industries as well as the public, and included:

- only permitting the sale of fireworks on Territory Day itself,
- increasing the legal age limit for buying fireworks from 16 to 18 years,
- prohibiting the sale of fireworks to people who are under the influence of drugs or alcohol, and
- increasing penalties up to $2000.

Table 2. Firework injuries and hospitalisation by year.

	2003	2004	2005	2006	2007	2008	Total
Injured persons	31	11	18	35	32	14	141
Hospital admissions	1	2	0	7	8	1	19

* Firework device consisting of many tubes joined together with a single ignition point. Each tube fires out a luminous projectile.

There was a reduction in the variety of shop good fireworks for sale in 2008 after a number of fireworks, including Sky Rockets, Roman Candles and Reloadable Artillery Type Shells, failed to pass NT WorkSafe standards and were banned for sale in the NT.[4]

The Department of Health and Families (DHF), for the first time, developed a Fireworks Safety Awareness communication strategy. An information sheet was produced that provided detail on the new regulations as well as tips on the safe use of fireworks and treatment of common related injuries. Key safety messages focused on the dangers of lighting more than one sparkler at a time, how to deal with a "dud" firework and advice not to wear synthetic clothing. These messages were derived from an analysis of the nature of fireworks injuries in past years. The information sheets were distributed to all NT schools, health centres and police stations and were available at all points of sale to people purchasing fireworks. The information sheet was also placed as a full-page advertisement in all NT newspapers in the week leading up to Territory Day. In addition, the authors of this paper participated in a range of television and radio interviews.

There was substantial media interest in fireworks in the weeks leading up to Territory Day. This began when some of the legislative changes were made. There were a number of stories focusing on injuries in past years, particularly on one person who was seriously injured in 2007. The media captured a thread of discussion that implied that the freedom to use fireworks on Territory Day was at risk if they were misused in 2008. This was particularly fuelled by reports that Darwin City Council intended to introduce a permit system and restrict fireworks on Council land in 2009.

The protocol unit in the Department of Chief Minister convened a new Multi Agency Observation Team with representatives from Police Fire and Emergency Services, Darwin City Council, WorkSafe NT and the Department of Health and Families. This team was present at the Mindil Beach Government sponsored fireworks display to make observations on the use and misuse of fireworks in order to inform future community risk mitigation and harm reduction strategies. For the first time, a video camera was used to record behaviour of members of the public. In addition, there was increased police presence at Mindil Beach with 6 uniformed members assigned operating from a mobile Police Station.

Despite the 2008 injury numbers being lower than the previous 2 years, they are not insignificant, as the financial and personal costs associated with treatment of firework injuries burns are substantial. Burns are a particularly expensive and debilitating injury.[5] In 2006, the cost of firework injuries for NT ED in-patient and outpatient care was $120 000 while in 2007 it was $293 000.

There has been significant reductions in the ACT to the period of time when fireworks can be purchased and used. The ACT Government intends to review the effectiveness of these changes.[6] Likewise there were significant changes this year in the regulation and monitoring of fireworks in the NT. While there were fewer Territorians injured this year, fireworks as they are currently used remain a significant cause of serious injury. It is anticipated that the Observation Team coordinated by the Department of Chief Minister will be able to provide useful information leading to a safer environment at large public fireworks displays. The DHF Fireworks Safety Public Awareness Campaign was an important initiative this year and should be continued. The CDC will continue monitoring fireworks injuries and continue to work towards a safer fireworks environment in the NT.

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A multi jurisdictional response to a sporadic case of meningococcal disease in an overseas tourist

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** the Master of Applied Epidemiology is funded by the Commonwealth Dept of Health and Ageing*

Introduction

This report describes the public health response to a case of invasive meningococcal disease in a overseas tourist. The case is noteworthy due to the multiple jurisdictions involved in the response and the use of email to alert travel contacts.

Case

The case was a 19 year old European tourist who presented to the Emergency Department of the Royal Darwin Hospital, Northern Territory (NT) on 16 June with a 2 day history of fever, vomiting and sore throat. On examination she was febrile, tachycardic and hypotensive. She had no signs of meningism or altered consciousness but had a petechial, non blanching rash over both upper and lower limbs and a maculopapular rash over her trunk. There were 2 sets of blood cultures taken and a provisional diagnosis of meningococcal sepsis was made. Antibiotics were commenced and the patient was transferred to the High Dependency Unit.

Laboratory Results

On Wednesday 18 June laboratory staff alerted the Darwin Centre for Disease Control (CDC) to the identification of Gram-negative diplococci in a set of blood cultures. The medical team responsible for the patient were contacted and the above history was ascertained. Contact tracing was immediately initiated by CDC and later the same day the laboratory confirmed the presence of *Neisseria meningitidis* in 2 sets of blood cultures.

An extract from the blood cultures was sent to the reference laboratory (in Perth) for serogroup typing via PCR. This was confirmed to be type C on 23 June 2008.

Public Health Response

An interview with the case was conducted to establish close contacts within the 7 days prior to symptom onset. This revealed that the case had arrived in Darwin on Sunday 8 June on a small tour bus on which she had been travelling through the Eastern Kimberley for 3 days. Passengers on the tour had spent around 8 hours per day on the bus. There was no designated seating on the bus and passengers had swapped seats frequently. They had slept in swags separated by at least 1 metre at night. Sharing of drinks, cigarettes or cutlery was not reported.

After arriving in Darwin the case had stayed with her boyfriend in a private house. There were 3 other house mates in the house and the partner of one of these had slept at the house for 2-3 nights during the week. On 14 June the case and her boyfriend had gone camping in Litchfield National Park. The case had become unwell while camping.

Household Contacts

All 4 people who lived in the shared house in Darwin where the case had stayed plus the partner who had slept overnight at the house were defined as household contacts. All received clearance antibiotics (a stat dose of 500mg of ciprofloxacin) within 48 hours of the case being notified. Of these, 4 were treated by Darwin CDC; while the remaining contact who had travelled to a work site in a remote part of the NT was treated by the nearest health centre (Table 1).

All contacts also received written and verbal communication about meningococcal disease and the reason for the provision of clearance antibiotics. Contacts were also advised that when the serogroup of the meningococcus was determined they may be offered vaccination.

Travel Contacts

Communicable Diseases Network Australia (CDNA) guidelines define travel contacts requiring clearance antibiotics for meningococcal disease as 'those passengers seated immediately adjacent to the case (not

across an aisle) on any flight/journey of more than 8 hours'.[1] As passengers had swapped seats frequently it was not possible to determine which members of the tour group met this definition. Instead a decision was made to offer clearance antibiotics to all members of the tour group.

The tour company was contacted and supplied a list of people on the tour (n=7, including the guide). Mobile telephone numbers were available for 4 contacts on the list. For the remaining 3, the case was able to supply an email address for 1 and a Perth based travel agency who had booked the tour was able to supply email addresses for the other 2.

Table 1 shows where contacts were treated. The 4 travel contacts who were contactable by telephone were all still in Australia and received clearance antibiotics (stat dose of 500mg ciprofloxacin) within 48 hours. The remaining 3 tour group members were contacted by email and asked to call CDC. All replied via email stating that they had left Australia and so a further email containing information on meningococcal disease and clearance antibiotics was sent. This email was designed both to inform the contacts and to be able to be printed and read by a health professional the contact might consult. The 2 contacts who had returned to their countries of origin in Western Europe received antibiotics (type unknown) from health care centres within 5 days. The other contact was travelling in SE Asia and obtained a stat dose of 500mg ciprofloxacin from a pharmacy in Vietnam 14 days after the case was diagnosed.

Meningococcal fact sheets were also provided to the tour company for dissemination among their staff.

Vaccination

When the meningococcus was confirmed as serogroup type C, vaccination with MenCCV was offered to all household and travel contacts. All 5 household contacts received vaccination by Darwin CDC. Only 1 travel contact was still in Australia; he declined vaccination.

Outcome

The case was discharged home after a 5 day admission and suffered no ongoing effects. There were no further reported cases of meningococcal disease.

Discussion

Asymptomatic nasopharyngeal carriage of *Neisseria meningitidis* occurs in around 5-10% of the population.[2] The organism is spread by direct contact with respiratory droplets from the nose and throat of infected people.[2,3] Invasive meningococcal disease (manifested as meningitis, sepsis or pneumonia) results from systemic invasion of the bacteria and has an overall mortality rate of around 10%.[3]

Invasive meningococcal disease is a relatively rare disease in Australia. During the most recent year figures are available (2006) there were 318 notifications giving a national notification rate of 1.5 cases per 100,000 population. The NT had the highest rate of any jurisdiction with 2.9 cases per 100,000 population. Overall the most common serogroup was serogroup type B (83.8%) followed by serogroup C (10%). The remaining cases were serogroup types W135 (5%) and Y (1.2%).[4,5]

The public health response to a sporadic case of meningococcal disease includes the provision of clearance antibiotics, information on meningococcal disease and vaccination to selected contacts of the case.[1] Clearance antibiotics are not primarily intended to prevent disease in those who have been in contact with the index case, rather they are intended to eliminate meningococci from any carrier who may be in the network of close contacts of an

Table 1. Locality of treatment

Clearance antibiotics provided by	Household	Travel
Darwin CDC	4	2
Elsewhere in the NT	1	0
Another Australian Jurisdiction	0	2*
Overseas	0	3
Total	**5**	**7**

*(1 in Sydney, 1 in Broome)

index case (and who, in fact, is likely to have infected the index case). Most patients with meningococcal disease acquire the invading meningococcus in the 7 days preceding the onset of illness and so contact tracing includes only this time period. Clearance antibiotics are ideally given within 24 hours of the diagnosis of the index case but retain some benefit up to 4 weeks after the most recent contact with the case.[1]

This case of invasive meningococcal disease had a relatively small number of contacts however arranging follow up for travel contacts was difficult due to the fact that most were no longer in the NT and several no longer in Australia. For 3 contacts email was our only method of direct communication. There were no problems with the acceptability of this approach to the contacts, and it is easy to see that contact tracing via email is particularly useful when tracing travellers. This is particularly the case for young, international travellers as many will not have a contact phone number or pre-booked itinerary but most will have an email address which they access regularly. Drawbacks to using email as the primary method of contact are relying on the contact having good written English comprehension, and possible delay in the provision of clearance antibiotic should the contacts not check their email for several days. In this case, the timeliness of antibiotic administration was not as good for those contacted via email compared to those contacted by phone however all received antibiotics within the recommended time frame.

The literature reports other methods of electronic communication used in contact tracing. These include tracing a syphilis outbreak through an internet chatroom and using internet facilities in a backpackers hostel to advise travellers of a case of meningococcal disease.[6,7] There are no reports of the use of social networking sites (such as Facebook) although these sites, which have the ability to send instant messages to an entire network of friends could be of great use in public health responses where a large number of people need to be contacted quickly. It is interesting that a couple of the contacts offered to advise other members of the tour group via Facebook if we wanted them to do so.

Conclusion

All close contacts of the index case received clearance antibiotics and information on meningococcal disease. This was only possible through the cooperation of several public health jurisdictions and using email to alert contacts who had already left Australia.

Acknowledgements: Lesley Scott, Peter Markey, Wadeye Community Health Centre, NSW Department of Health and the Kimberley Population Health Unit for their assistance with contact tracing.

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Update on the HPV program and National HPV register

Sharron Murray, CDC Darwin

The National Human Papillomavirus (HPV) Vaccination Program commenced in April 2007. In the Northern Territory (NT) girls in years 10, 11, and 12 were vaccinated through a school-based program. From July 2007 women aged 18-26 years were offered the vaccine through General Practitioners (GPs). In remote areas the HPV Vaccine was offered to all females aged 10-26 years.

In 2008, girls in years 7, 8, 9 and 10 are being vaccinated through school-based immunisation programs. Health Promoting School Nurses and HPV program nurses employed by the Centre for Disease Control (CDC) are delivering the school-based programs. Women aged between 18-26 years are eligible to receive the free HPV vaccine through general practice until 30 June 2009. In remote communities females aged 10-26 years are being offered the HPV vaccine, however from January 2009 this will change to reflect the Childhood Vaccination Schedule 1 July 2008, which recommends HPV vaccine be administered to females at 12 years of age.

The NT Immunisation Database has entered a total of 32,574 HPV vaccine encounters between April 2007 and July 2008. This includes 14,622 first dose encounters, 11,716 second and 6,236 third and final encounters.

The recommended schedule for Gardasil® is 0, 2 and 6 months. The accelerated dosing schedule utilised in the school based and remote program in 2007 is no longer used.

Urban 2007 school–based coverage

Coverage across all schools in 2007 for years 10, 11 and 12 showed 80% (2260) of girls received the first dose of Gardasil®, 71% (2000) dose 2 and 64% (1795) dose 3. Currently catch-up of missed doses is ongoing through specifically arranged clinics at urban and regional community care centres and through GPs.

Urban 2008 school–based coverage

In 2008 girls in years 7,8, 9 and 10 (ages 12–16) were offered HPV vaccine. Dose 1 and Dose 2 have been administered in 30 urban schools across the NT between March and July 2008. Initial data indicates approximately 75 % of female students in years 7, 8, 9 and 10 received the first dose, and approximately 65% have received the second dose. Delivery of the first 2 doses of HPV Vaccine is encouraging and overall vaccination coverage for school students is expected to be higher, given that some students are completing missed doses via catch-up clinics, follow up school visits and through their GP.

Vaccine uptake has been significantly lower in schools with a high proportion of Indigenous boarding students due to difficulties returning consent forms. HPV program nurses have met with school officials and discussed strategies to improve current and future consent returns and vaccine uptake. HPV program nurses have been promoting immunisation awareness and actively seeking consents from parents of boarding students when visiting remote communities.

Remote coverage

Between April 2007 and July 2008 females living in remote communities aged 10–17 years have been prioritised for HPV vaccine administration to ensure high vaccine coverage before exposure to HPV infection. HPV program nurses and remote health workers are now

Table 1. HPV vaccine coverage in NT remote areas, April 2007-July 2008 by age group

	10-17 years* (% and number)	18-26years* (% and number)
Dose 1	80.2% (3527)	45.4% (2475)
Dose 2	75.1% (3303)	36.3% (1977)
Dose 3	49.9% (2195)	21.6% (1174)

*Population data is based on the NT Health Gains Planning population estimates for 2006 based on ABS census data.

concentrating on improving the coverage and delivery of the vaccine to remote women aged 18-26 years.

Vaccine coverage for eligible females aged between 10–17 years and 18–26 years by dose number is given in Table 1. Data in Table 1 is based on vaccines given in remote communities and does not include vaccines given in urban schools to remote girls, therefore these figures will under estimate coverage for remote girls. Future data should provide a more accurate reflection of the entire cohort of women targeted for the program.

Education

Community announcements about the HPV vaccine have commenced on the 2 main Indigenous radio broadcasters, Radio Larrakia (94.5 FM) and the Central Australian Aboriginal Media Association (CAAMA) Radio (100.5 FM) and will run until June 2009. The CAAMA announcement has been translated into 3 Indigenous languages – Pytjantjatjara, Warlpiri and Arrernte. Indigenous specific posters, pamphlets, educational flip charts and quick reference summary cards developed earlier in the program have been modified to reflect program changes.

HPV program nurses continue to incorporate education sessions into community and regional visits. The HPV program has worked with Maternal, Child and Youth Health to deliver Women's Health Workshops in remote communities. The workshops incorporate health promotion activities provided through culturally appropriate education strategies to community women.

Adverse events

In the NT, immunisation providers are required to report all adverse events following vaccination to the CDC in their region. A total of 11 adverse events following HPV vaccination have been reported in the NT from April 2007–July 2008. The reported adverse events were mild and have included dermatological reactions related to the injection site such as soreness, swelling and redness. Other reactions reported have included gastrointestinal symptoms – nausea, vomiting and abdominal pain, and vasovagal episodes. No cases of anaphylaxis have been reported in the NT.

National HPV register

The National HPV Register is being established and will maintain a record of all HPV vaccinations given in Australia including those administered in general practice. Victorian Cytology Services are building the register and data from all states and territories will be incorporated onto the register. The objective of the register is to support the HPV Vaccination Program, provide national HPV vaccine coverage and in the future enable linkage to cervical screening and cancer registers to monitor the impact of the vaccine on cervical abnormalities and cancer. Recording of vaccine data on the National HPV Register is encouraged but not compulsory and women can elect to opt off the register.

NT Immunisation providers including GPs should continue to send all HPV data to the NT Immunisation Database. This information will then be transferred to the National HPV Register. It is important to ensure that women have consented for their information to be sent to both the NT immunisation register and the National HPV Register.

The National HPV Register can be contacted on 1800 478 734 (1800 HPV REG) from 8am-6pm Monday-Friday and 9am-2pm Saturday. The website is www.hpvregister.org.au.

The NT Immunisation database can be contacted on (08) 8922 6781 from 8am – 4 21 pm Monday – Friday for all HPV enquiries.

Summary

Coverage in the school based and remote program to date is encouraging but can be improved. HPV support nurses will be working with school and remote nurses to maintain and improve vaccine coverage in 2008-09. The national HPV register will provide a useful resource to monitor national coverage and the impact of the program. Vaccine safety monitoring is essential to the success of any new vaccine program and immunisation providers must report any possible adverse events associated with immunisation to their local CDC.

An investigation into an outbreak of *Salmonella* Typhimurium phage Type 9 associated with a Darwin restaurant

Stephanie Davis, MAE scholar*, Michelle Harlock, Peter Markey, CDC Darwin
**** NCEPH, ANU, Master of Applied Epidemiology***

Introduction

On Friday 21 March 2008 the Darwin Centre for Disease Control (CDC) received notification from a hospital medical officer of 3 cases of *Salmonella* gastroenteritis linked to one restaurant. Over the following days CDC was alerted to a further 7 people with gastroenteritis who had eaten at the same restaurant during March. An outbreak investigation was undertaken with the aim of discovering the source of the outbreak and implementing necessary public health interventions.

Initial investigation and case finding

Methods

An investigation team was formed consisting of the Head of Surveillance, the OzFoodNet Epidemiologist, Environmental Health Officers and the Master of Applied Epidemiology student.

An initial outbreak case definition was established. A probable case was defined as anyone who had experienced diarrhoea with onset within 72 hours of eating at the restaurant during March. A confirmed case was defined as anyone who had experienced diarrhoea within 72 hours of eating at the restaurant during March and who had a subsequent stool sample positive for *Salmonella* species. All cases were interviewed using a standard gastroenteritis outbreak questionnaire detailing the duration and severity of symptoms and a food history relevant to the exposure of interest. A list of buffet choices available at the restaurant was used as a memory prompt.

Cases had eaten at the restaurant on 2 separate nights, March 17 and 20, raising the possibility that the outbreak was continuous and might have started before these dates or was still continuing. To determine whether this was the case, data from the Emergency Department Syndromic Surveillance System (EDSSS) were examined using the CuSum method. This method calculates daily the cumulative sum of the differences between the current daily count and the expected count (based on a mean).

Table 1. Included and excluded codes used for case finding via ED surveillance data

Presentation	
Included	**Excluded**
Diarrhoea	Vomiting/Nausea
Vomiting/Diarrhoea	Nausea
Diagnosis	
Included	**Excluded**
Diarrhoea	Abdominal cramps
Diarrhoea, infectious	Colitis, unspecified
Dysentery	Dehydration
Enteritis, presumed infectious	Gastritis
Enteritis Infectious	Gastritis Acute
Food Poisoning	Gastroenteritis, Non infectious
Gastroenteritis, infectious	Hyperemesis
Gastroenteritis, presumed infectious	Vomiting, not blood
Gastroenteritis viral	Vomiting, persistent
Gastrointestinal infection	

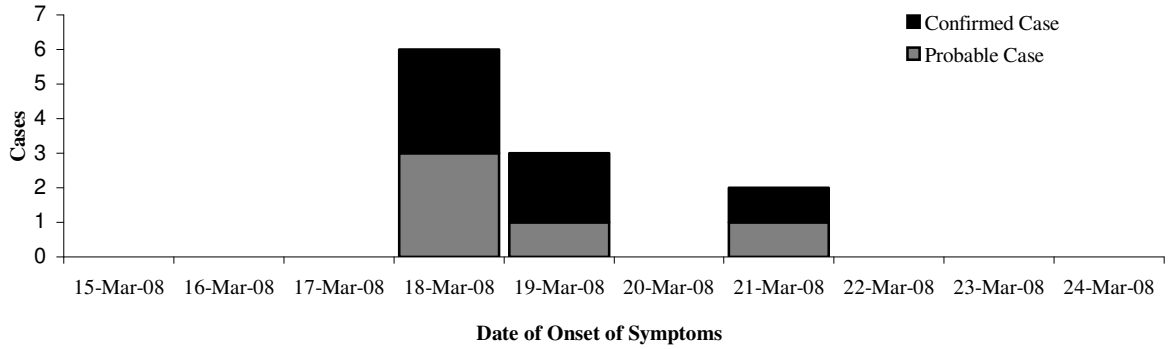
Cases presenting to the Emergency Department (ED) are coded for both presenting illness and discharge diagnosis. To increase specificity, the codes chosen for analysis were based on the symptomatology of the cases (Table 1) and demographic filters of 'Non-Indigenous' and 'Age greater than 14 years' were also used based on the restaurant's expected clientele.

Active case finding was undertaken via 2 methods. Firstly, cases who had attended the Royal Darwin Hospital (RDH) ED with gastro-like illness (as defined by the codes chosen for analysis above), over a period based on the CuSum analysis were contacted. If their symptoms were compatible with acute infectious gastroenteritis, they were asked whether they eaten at the restaurant during the likely period of acquisition. Secondly, other diners booked at the restaurant on March 17 and 20 were contacted to see if they had symptoms.

Results

The causative organism was identified as *Salmonella* Typhimurium phage type 9 (STM 9). The case definition was refined to reflect this,

Figure 1. Epidemic curve with cases reported by date of onset of symptoms



with a confirmed case defined as anyone who had experienced diarrhoea within 72 hours of eating at the restaurant during March and who had a subsequent stool sample positive for *Salmonella* Typhimurium phage type 9. An epidemic curve of cases is detailed in Figure 1.

The initial questionnaire revealed several foods common to the cases; 100% had eaten steak, 70% had eaten cheesecake and 60% had eaten Chinese pork.

The CuSum for both presentation and diagnosis of gastro-like illness at the RDH ED increased from 10 March onwards, peaking at 21 March for diagnoses and 27 March for presentations then decreasing steadily for both after these dates (Figures 2 and 3). The actual number of ED presentations of gastro-like illness during this time period was 36. Of these, 5 were already known to be cases. Of the remaining 31, 19 were interviewed, but none reported eating at the restaurant.

Due to a delay from the restaurant, booking sheets of consumers were not available until 5 April. From the nights of interest there were only 3 tables booked (all on Thursday 17 March) and all were contacted. No additional cases were identified using this method.

Cohort study

Methods

On 31 March the investigation team commenced a cohort study. The cohort consisted of cases and their dining companions from Monday 17 March and Thursday 20 March.

A specific questionnaire was designed and administered over the phone. Questions asked included demographic details, symptoms of gastrointestinal illness, foods eaten at the restaurant and contact details for other people who had dined at the restaurant.

Data was entered into MS Excel and analysed using Intercooled Stata 9.0. Because the cohort represented only a small percentage of total diners exposed, odds ratios (ORs) rather than relative risks were used to measure the strength of association between exposure to specific food and illness. The Wilcoxon rank-sum test was used to test for differences in age. Fischer's exact test was used to calculate p-values.

Results

The cohort consisted of 21 people: 19 from 17 March and 2 from 20 March. The diners from 17 March were seated at 4 different tables and represented around 20% of the total number of diners at the restaurant on that night (based on the restaurant manager's estimate of between 80-100 patrons per night). The diners from 20 March were both cases and had had no one else at their table. One further case was identified through the study making 11 cases in the cohort.

The cohort ranged in age between 20 to 70 years. The median age of cases was younger than that of non-cases (24 vs 47.5 years) but this difference was not statistically significant (p=0.07). There were a majority of males in the cohort (66%) and the odds ratio for a case being male was 1.78 (95% CI 0.2—16.75) however this was not statistically significant (p=0.65).

Figure 2. Diagnoses of Gastro-like illness from the RDH ED during March

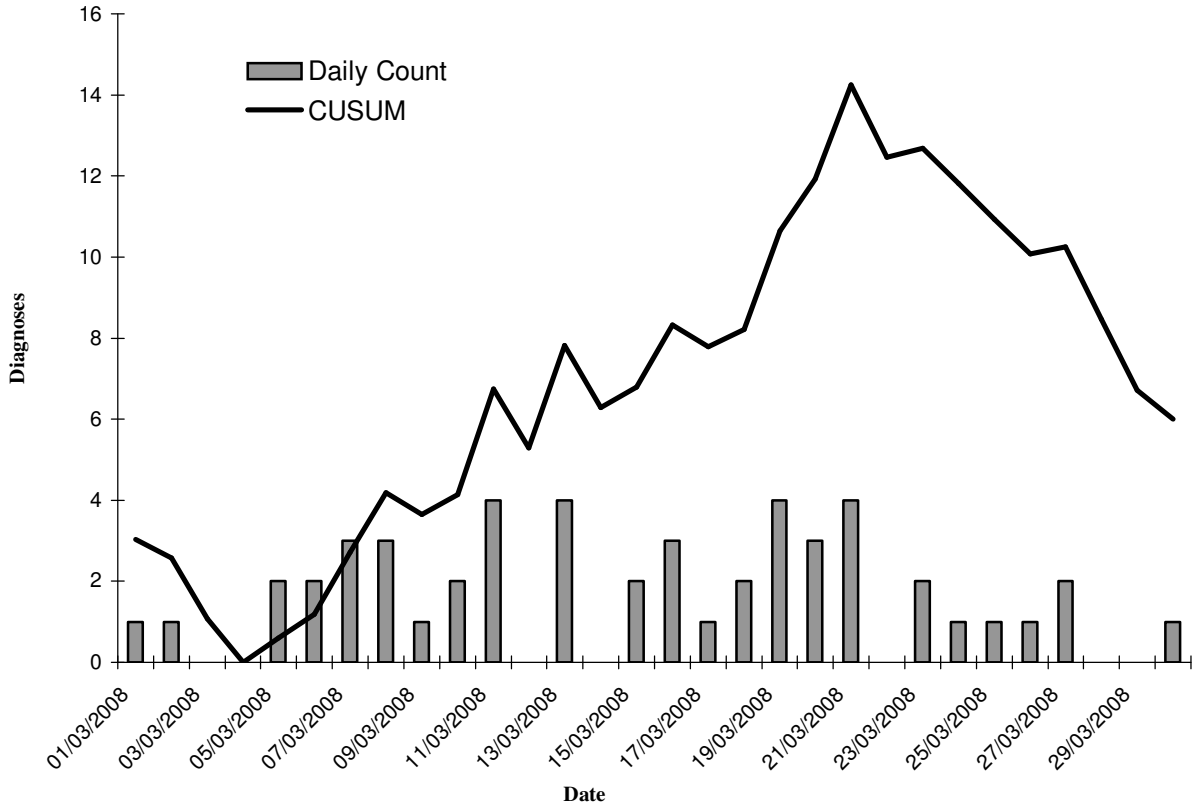
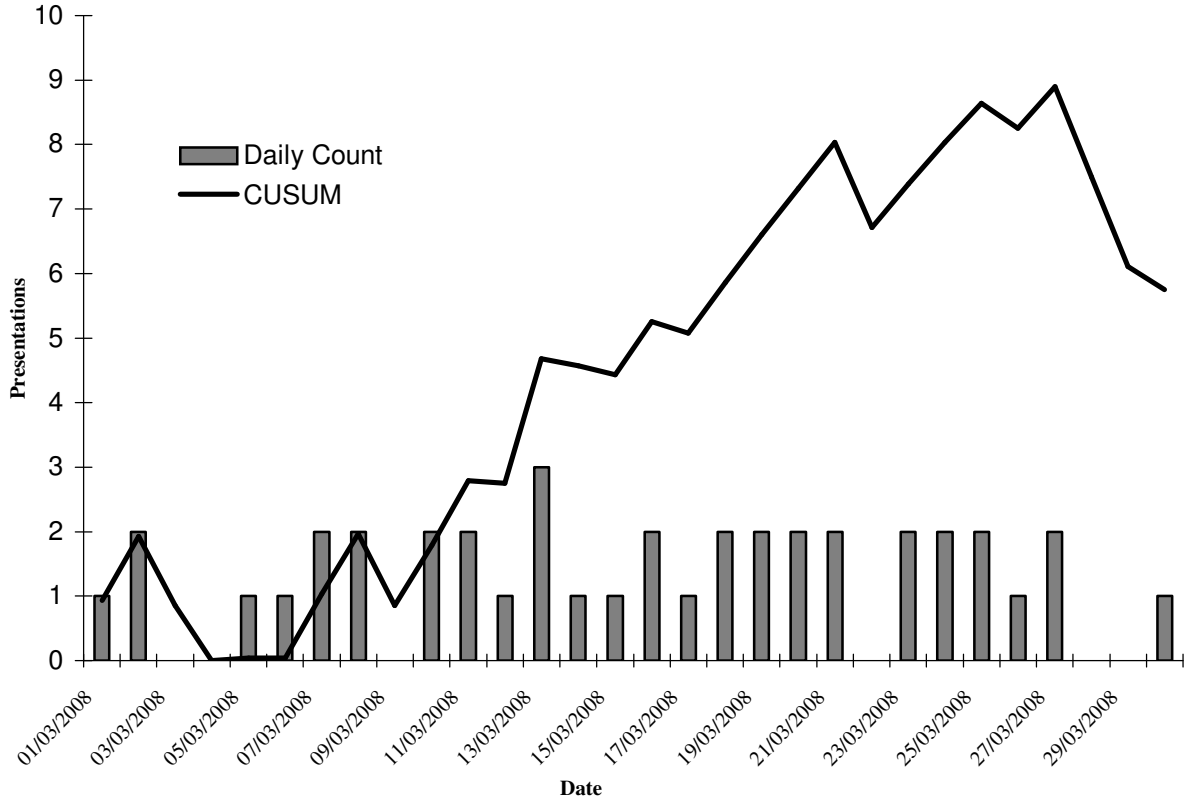


Figure 3. Presentations of Gastro-like illness to the RDH ED during March



Onset date of illness ranged between 18 to 21 March (see Figure 1) with a median incubation time of 26 hours. All cases suffered from abdominal pain and profuse diarrhoea with 7 cases having greater than 30 episodes of diarrhoea in 24 hours. Of the 5 cases that presented to hospital, 3 required admission and the remaining 2 required intravenous fluids in the ED. There were 6 cases who had stool samples taken, all were positive for STM 9.

Odds ratios for selected exposures are shown in Table 2. The scotch fillet steak was the food most strongly associated with illness (OR very high but incalculable, as eaten by all 11 cases) followed by the fried rice (OR = 15.75). Using a statistical technique that compensates for zero cells by adding 0.5 to each cell, the OR for scotch fillet steak can be approximated to 23.[1] Of note, the lower end of the confidence interval for the scotch fillet steak was 2.25.

Environmental investigations

Methods

Environmental Health Officers conducted site visits on 22 and 25 March. Environmental swabs were taken and samples of cheesecake, raw steak and 2 sauces were collected and sent for microbiological analysis to the Institute of Medical and Veterinary Sciences (IMVS) in Adelaide. Suspect foodstuffs were seized and detained on-site pending sampling results. A further site visit was made on 9 April 2008 to help inform the epidemiological findings. Of particular interest was the potential for contamination of the steak post cooking and the process of cooking the fried rice.

Results

The premises were generally satisfactory with no unsafe food handling practices or ill food handlers identified. The results from food sampling were all accessible within 1 week and all were negative for *Salmonella* species.

Restaurant staff indicated that the steak was sliced each afternoon prior to the restaurant opening and then grilled on an open grill in the dining area. A dab of butter was placed on each steak post cooking (using a designated butter brush) and then steak was either served directly to customers at the buffet or placed in a bain marie. The butter dabbed onto the steaks was stored in a large container in the cool room next to stacked egg trays and a scoop of butter would be placed in a china bowl and transferred to the grill area on a daily basis. The fried rice was prepared daily. Several dozen eggs would be mixed in a bowl then fried in a pan. Rice and other ingredients were added after the eggs were fried thoroughly. Customers self served from a bain marie in the main dining area. Restaurant staff could not recall any breaches of standard operating procedures occurring on either the Monday or Thursday nights and denied any spillages of raw eggs or use of raw egg containing foods that may have led to cross contamination in the kitchen.

Discussion

Salmonella Typhimurium phage type 9 was the fourth most frequently notified phage type in Australia in 2006 making up 4% of total Salmonella notifications.[2] It is infrequently notified in the Northern Territory however, with an average of 1-2 notifications per year. (M Harlock, personal communication March 2008) It is a phage type with a strong predilection for eggs; in 2007 it was isolated 11 times from eggs, egg containing products and environmental swabs from egg farms (National Enteric Pathogen Surveillance Scheme, personal communication August 2008.). Additionally, raw or undercooked egg products have been the most commonly implicated food in STM 9 outbreaks in Australia over the past 18 months.[3-6]

This outbreak investigation did not identify a definite vehicle of transmission. The epidemiological investigation found the food

Table 2. Odds ratios for selected exposures

Food	Ill (n=11)	Not ill (n=10)	Odds ratio	Confidence interval	p-value
Scotch fillet steak	11	5	Very high*	2.25 – Very high	0.02
Fried rice	7	1	15.75	1.14-786	0.02
Any kind of pork	6	2	4.80	0.51-62.3	0.183
Cheesecake	8	5	2.67	0.32-24.4	0.387

*Approximated to 23 by adding 0.5 to each cell

most strongly associated with illness was grilled steak, however STM 9 was not isolated from raw steak samples taken from the restaurant and grilled steak is an unlikely vehicle for Salmonella transmission. While raw beef is a known source for *Salmonella*[7], in the case of an intact (i.e. non tenderised) steak it is only the exterior surface which is contaminated, and this is exposed to high enough temperatures during grilling to kill *Salmonella*. Environmental health investigations did not identify any inappropriate food handling techniques however post-cooking contamination of the steak could have occurred. The storage proximity of butter and eggs in the cool room could have possibly resulted in (for example) an egg falling into the butter container resulting in discrete contamination of the surface area of the butter. This could account for there being cases only on 17 and 20 March; ie. the majority of the contaminated butter may have been in the portion that was transferred to the grill area on 17 March and, due to chance, the remainder of the contaminated butter was not transferred to the grill area until 20 March.

The fried rice was also associated with illness. Restaurant staff reported the use of bulk egg in the fried rice and this has been associated with *Salmonella* contamination.[7] However thoroughly frying the egg, as reported by restaurant staff, should expose *Salmonella* to high enough temperatures to kill the organism. There is no evidence that the egg in the fried rice was cooked less thoroughly than usual on the nights when cases occurred.

We considered the same exposure was almost certain to account for all cases making it acceptable to consider both Monday and Thursday night as a single cohort. However our cohort was one of convenience and represented only a small percentage of the diners from both nights. In this situation it is not possible to calculate attack rates and the odds ratio is the most valid measure of the strength of association rather than the relative risk which is used in most cohort studies.[8]

The fact that the cohort was small and was a convenience sample are major limitations of the cohort study and make it important to consider the statistical results with caution. For example, while all 11 cases ate the steak, so did 5 (half) of the non cases making this the most commonly eaten item on the menu. Hence the statistically significant association may just be a result of this being a popular food item. The small numbers in this investigation can potentially make the statistical analysis prone to misleading results as a single instance of exposure misclassification can lead to very large changes in the calculated odds ratio.

This is the first time that CDC has used the ED Syndromic Surveillance System for case finding. Although no additional cases were identified, the CuSuM method was a useful tool for determining the time frame for excess gastrointestinal disease. The increase was likely due to this time period coinciding with the Easter weekend and decreased access to General Practitioners rather than an actual increase in disease. The decrease in the CuSuM towards the end of March was a reassurance that the outbreak was not continuing. This method may be of use in future investigations to determine the beginning and end of outbreaks where the time frame is not definitely known.

Conclusion

This outbreak investigation did not identify the vehicle of transmission for *Salmonella* Typhimurium phage type 9. There was a significant association between salmonellosis and eating grilled steak although microbiological evidence for this was lacking and grilled steak alone is not a likely transmitter. Post cooking contamination of the steak remains a possibility but evidence of this was not clearly identified from this investigation. The fried rice dish also remains a possible vehicle of transmission.

Acknowledgements

Staff from CDC and the Environmental Health Branch made significant contributions to this investigation. The RDH Laboratory, the IMVS Salmonella Reference Laboratory and IMVS Food and Environmental Laboratory processed specimens and informed the investigation team of the results promptly. Scott Cameron reviewed this manuscript and gave valuable feedback.

The Master of Applied Epidemiology program is funded by the Australian Government's Department of Health and Ageing.

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Convening of the Northern Territory Notifiable Diseases Committee

Peter Markey, CDC Darwin

The Centre for Disease Control (CDC) collects information about notifiable diseases on behalf of the Chief Health Officer under the Notifiable Diseases Act. Notifiable diseases appear in 'schedules' pertaining to the Act and these can be updated from time to time by the Minister and are official once published in the Government Gazette.

Updates to the schedules happen infrequently and usually in response to local, national or international events of public health significance. These events might include the emergence of a new disease (eg SARS), demands for new surveillance requirements (eg collection of risk factor information for blood-borne viruses) or a new policy (eg routine childhood vaccination against varicella). Decisions about updating the schedules have usually been made by senior CDC staff in consultation with the Chief Health Officer.

In 2007, the Australian parliament enacted the National Health Security Bill which allows for the establishment of a National Notifiable Diseases List. Subsequently, the Communicable Diseases Network Australia has sought to formalise the process by which diseases can be added to this list. Likewise in the NT, it was thought that the process by which diseases are added to or taken off the schedule should also be formalised to ensure that standardised criteria are met and adequate consultation is undertaken.

In January 2008, the NT Notifiable Diseases Committee was convened and has since met on two further occasions. The function of the committee will be to decide on changes to the schedules relating to the Notifiable Diseases Act. This will include additions, subtractions, changing of nomenclature and changing of status (urgent or non-urgent). It may also relate to the information collected for each notification. The committee will base decision-making on established criteria and the precedents used for the current schedule (see Table). The membership is the following:

- Head of Surveillance (Chair)
- Director CDC
- Chief Health Officer
- Infection Control representative
- Infectious Diseases Physician
- DMO representative
- GP representative
- Central Australian representative
- Laboratory representative

The committee will meet annually or more frequently as demand dictates.

Table. Criteria for making a disease notifiable

Feasibility of collection	The data for the disease must be relatively simple to collect. The disease should be definable
Immediacy of an intervention	The disease requires an immediate response to prevent transmission through the community
Outbreak potential of the disease	The disease is prone to outbreaks that have a substantial burden on the community
Potential for disease control programs	The disease should be preventable through the implementation of control programs; that is, there should be an effective public health response
High-case fatality rate	There is a high proportion of deaths from this disease relative to the number of cases of the disease
Community or political concerns	Some diseases may be of high concern to the community or the occurrence of the disease may have political implications
International concern	Diseases spread across international boundaries and it is important to recognise diseases that are a concern in the region
Evaluation of programs	Surveillance data can be used as a tool to evaluate existing and future communicable disease control programs
Importance to Indigenous health	Diseases that have an impact on the Indigenous communities throughout Australia should be under surveillance
Vaccine preventability	Surveillance systems should be in place for all diseases on the vaccine schedule. However, this may not necessarily be through the Notifiable Diseases System.
Significant incidence or significant cause of morbidity	A measure of control programs.
Emerging or re-emerging disease	Monitoring of disease which may be increasing due to climate change, environmental or demographic change, human movement, the emergence of antibiotic resistance etc
Alternative data source currently in place	Other data sources may be better. Duplicate systems are inefficient.

Northern Territory Government
DEPARTMENT OF HEALTH AND FAMILIES

Chickenpox and shingles
(varicella and herpes zoster)

What is chickenpox?

Chickenpox is an acute and highly contagious viral infection caused by the varicella-zoster virus.

How is it spread?

The virus may be transmitted by direct person to person contact, via droplet or airborne spread of respiratory secretions, or by contact with articles infected with the respiratory secretions or blister fluid of an infected case.

What are the symptoms?

The symptoms generally develop between 2 to 3 weeks, with the average being 14 to 16 days, after the person is exposed.

Chickenpox begins with fever, fatigue and loss of appetite followed by a generalised rash a day or so later.

The rash is more concentrated over the trunk, face and scalp and starts as itchy red spots but rapidly progresses to blisters. The blisters last 3 to 4 days before turning into scabs and drying out. Several crops of blisters will appear over a period of days, resulting in various stages of development present at any one time.

Healthy adults and children generally recover within 10 days.

How serious is chickenpox?

Chickenpox is usually a disease of childhood, with about 90% of cases occurring in the under 15 year age group. For most children, chickenpox is a mild illness of short duration with complete recovery.

The rash may be very itchy and scratching can result in secondary bacterial skin infection.

Children with weakened immune systems are at risk of developing more serious, and potentially life threatening complications such as pneumonia or encephalitis (inflammation of the brain).

Although usually a childhood illness, previously uninfected adults can develop the disease and are at greater risk of severe disease and complications such as pneumonia or encephalitis.

There is a small chance of damage to the unborn baby if women develop chickenpox during pregnancy, particularly between 13 and 20 weeks. Previously uninfected pregnant women who have been in contact with a person with chickenpox should see their doctor.

Babies are particularly at risk if their mother develops chickenpox 5 days before or within 2 days after delivery.

What is the infectious period?

A person is infectious from 2 days prior to onset of the rash until the blisters have all crusted into scabs, usually about 5 days after they appear.

What is the treatment?

Specific antiviral treatment for both chickenpox and shingles is available, however it is reserved for those with severe disease or at risk for severe disease.

The risk of further infection through scratching can be reduced by use of anti-itch soaps and lotions and by keeping fingernails short. Paracetamol can be used to reduce fever, and the child should be encouraged to drink plenty of fluids.

Aspirin must not be given to young children and adolescents due to the risk of developing Reyes

Syndrome, a severe condition associated with aspirin use for viral infections.

How can chickenpox be prevented?

Free varicella vaccine was introduced in November 2005 for all infants at 18 months of age (born on or after 1 May 2004). The vaccine is also delivered as part of a school vaccination program to all adolescents in Year 8 who have no history or prior vaccination or chickenpox disease. Parents of children born before 1 May 2004 who are not yet eligible for free vaccine as part of this program can purchase the vaccine privately with a doctor's prescription.

Vaccination is also recommended for non-immune adults, particularly those in high-risk occupations (such as health care workers, teachers and workers in child-care services); for non-immune women prior to pregnancy; for non-immune parents of young children and for non-immune household contacts of immunosuppressed persons. If the person receiving the vaccine is over 14 years of age, 2 doses of vaccine administered 1 month apart are required. Pregnancy is a contraindication to vaccination and should be avoided for 1 month after vaccination.

It is safe to immunise people who may have previously had chickenpox disease or vaccination.

People not previously infected with chickenpox can be administered varicella vaccine if given, preferably within 3 days, and up to 5 days after exposure to chicken pox. Those at high risk of complications from the infection eg. people with leukaemia, young babies or pregnant women, should seek medical advice if they have been exposed to a case of chickenpox or shingles. Administering Zoster Immunoglobulin (ZIG) to this group is effective in preventing or reducing the severity of chickenpox if given within 96 hours of exposure to the infection.

How can it be controlled?

People with chickenpox should not attend child care, preschool, school or work until fully recovered or for at least 5 days after the rash first appears or longer if blisters are still present.

Note: once all remaining blisters have become scabs exclusion is no longer required.

Hands should be thoroughly washed after contact with an infected person or soiled articles such as linen, toys or utensils. Hand-washing after blowing or wiping the noses of affected children is also required. Immediate disposal of tissues is recommended.

Food, drinks and utensils should not be shared.

Shingles

The chickenpox virus also causes shingles (herpes zoster). Shingles occurs when the virus, which may have been present but inactive in a person's body for some time, becomes activated. Shingles occurs more frequently in the elderly. It is characterised by a blistering rash, usually associated with severe pain, localised to one site on one side of the body.

The virus is present in the shingles blister fluid. Direct contact with this fluid can cause chickenpox in a non immune person. There is no airborne droplet spread from cases of shingles.

For more information contact your nearest Centre for Disease Control.

Further information on immunisation in the NT including the Childhood Vaccination Schedule is available from:

http://www.nt.gov.au/health/cdc

Darwin	8922 8044
Katherine	8973 9049
Nhulunbuy	8987 0359
Tennant Creek	8962 4259
Alice Springs	8951 7907

Disease Control fact sheets on various topics are available by contacting your nearest centre or from our web site at http://www nt.gov.au/health/publications

No Germs on Me - Hand Washing Campaign

Natasha Clements, Environmental Health Program, Darwin

Hand Washing Project Description

This is an exploratory project to determine the most appropriate interventions to reduce the person to person and environment to person transmission of pathogenic organisms that cause diarrhoea, skin sores and respiratory disease on Indigenous communities in the NT.

The project is divided into 3 stages each to be run over approximately a year. The focus of stage 1 is on identifying effective means of promoting hygiene on Indigenous communities. Research indicates that simply teaching people about the health benefits of hand washing does not usually result in substantial behavioural change. Internationally there is an increasing awareness that in order to change handwashing behaviour on a large scale, the principles of industrial marketing need to be applied. The second stage of the project involves the development and implementation of a repair and a maintenance strategy for essential plumbing and the third stage will reinforce key health messages.

The principle strategies that will be undertaken in stage 1 of the project are as follows:

1. The development and implementation of a social marketing strategy to promote the benefits of routinely washing hands with soap after key junctures and safely disposing of children's faeces. Formative research will be an integral part of the development of the social marketing strategy. Focus groups will be used to identify those factors that are likely to motivate the target audience to adopt better hygiene practices and barriers to their adoption.
2. At the trial communities a community development approach will be used to involve community members in developing and implementing their own initiatives to promote handwashing and the safe disposal of children's faeces.
3. Preliminary investigation into housing maintenance issues at the trial communities will also be undertaken to inform the development and implementation of a comprehensive strategy to improve housing maintenance outcomes in stage 2 of the project.

Further information on the project can be found at: www.nogermsonme.nt.gov.au

Updated publications from centre for Disease Control

Available at: http://www.nt.gov.au/health/cdc/cdc.shtml

Timeout	Minimum periods of exclusion from school, preschool and childcare facilities for children or staff with, or exposed to, infectious diseases.
Guidelines for the Control of Tuberculosis	June 2008
NT Guidelines for the Management of Sexually Transmitted Infections in the Primary Health Care setting	May 2008
Adult Immunisation Schedule	July 2008
Childhood Vaccination Schedule	July 2008

DEPARTMENT OF HEALTH AND FAMILIES

Adult Immunisation Schedule 1 July 2008

	Pneumovax 23® 0.5ml IMI	Fluvax® 0.5ml IMI EVERY YEAR
15 years	■ ✓	◀ ✓
50 years*	■ ✓	■ ✓
65 years (Non-Indigenous)	✓	✓

Vaccine notes:

* All 50 year olds who have not received a tetanus containg vaccine in the previous 10 years should receive a dT or dTpa vaccine (provider or self funded).

■ = Indigenous only. ◀ = Indigenous with chronic medical conditions.

See table below for pneumococcal revaccination guidelines

Revaccination guidelines for Pneumovax23®

DOSE 1	DOSE 2 (FIRST REVACCINATION)	DOSE 3 (SECOND REVACCINATION)	FUNDED
Indigenous ≥ 50 years	5 years after dose 1	None	YES
Indigenous ≥ 15 years and < 50 years	5 years after dose 1	Either 5 years after the first revaccination or at 50 years (whichever is later)	YES
Non Indigenous ≥ 65 years	5 years after dose 1	None	YES
Non Indigenous < 65 years with underlying chronic medical condition, CSF leak or a smoker	5 years after dose 1	Either 5 years after the first revaccination or at 65 years (whichever is later)	Self funded

Groups with special vaccination requirements

These vaccines are provider or self funded

Refer to the 9th Edition Immunisation Handbook p 75-102 for the vaccination guidelines for the following groups of people:

- Anatomical or functional asplenia
- Blood transfusion or blood product recipients
- HIV infected persons
- Immunosuppressed people (due to disease or treatment)
- Injecting drug users
- Men who have sex with men
- Occupational risk groups
- Overseas travellers
- Pregnant women, new and prospective parents
- Stem cell and solid organ transplant recipients

Information:

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

Darwin **8922 8044**
Katherine **8973 9049**
Barkly **8962 4259**

Alice Springs **8951 6907**
East Arnhem **8987 0357**

www.nt.gov.au/health/vaccination

Northern Territory Government

NORTHERN TERRITORY DEPARTMENT OF **HEALTH AND FAMILIES**

Childhood **Vaccination** Schedule

Effective from 1 July 2008

	Hepatitis B	Rotavirus	Diphtheria Tetanus Pertussis Hepatitis B Poliomyelitis	Haemophilus Influenzae type b	Conjugate Pneumococcal	Measles Mumps Rubella	Meningococcal C	Hepatitis A	Polysaccharide Pneumococcal	Varicella	Diphtheria Tetanus Pertussis Poliomyelitis	Human Papillomavirus	Adult Diphtheria Tetanus Pertussis
	Engerix B™ 0.5ml IMI	Rotarix® 1ml Oral	Infanrix®Penta 0.5ml IMI	PedvaxHIB™ 0.5ml IMI	Prevenar® 0.5ml IMI	Priorix™ 0.5ml IMI	NeisvacC® 0.5ml IMI	VAQTA® 0.5ml IMI	Pneumovax23® 0.5ml IMI	Varilrix® 0.5ml SC	Infanrix®IPV 0.5ml IMI	Gardasil® 0.5ml IMI	Boostrix® 0.5ml IMI
● Birth	✓												
2 months		✓	✓	✓	✓								
4 months		✓	✓	✓	✓								
6 months			✓		✓								
12 months				✓		✓	✓	■ ✓					
18 months								■ ✓	■ ✓	✓			
4 years						✓					✓		
12 years												♀ ✓	
13 years										❖ ✓			✓
15 years									■ ✓				

Vaccine notes:

- ● = BCG for all Indigenous neonates, neonates who will live in Aboriginal communities, neonates of overseas born parents from high TB prevalence countries who will be going back for extended visits and neonates of families who have been treated for leprosy.
- ● = Hepatitis B Immunoglobulin for all infants of Hepatitis B surface antigen positive mothers.
- = ORAL VACCINE: first dose must be given by 14 weeks of age; second dose must be given by 24 weeks of age.
- ❖ = If no history of disease or vaccination.
- ■ = Indigenous only.
- ♀ = Females only. Requires 3 doses given at 0, 2 and 6 months.

www.nt.gov.au/health/vaccination

Information:

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

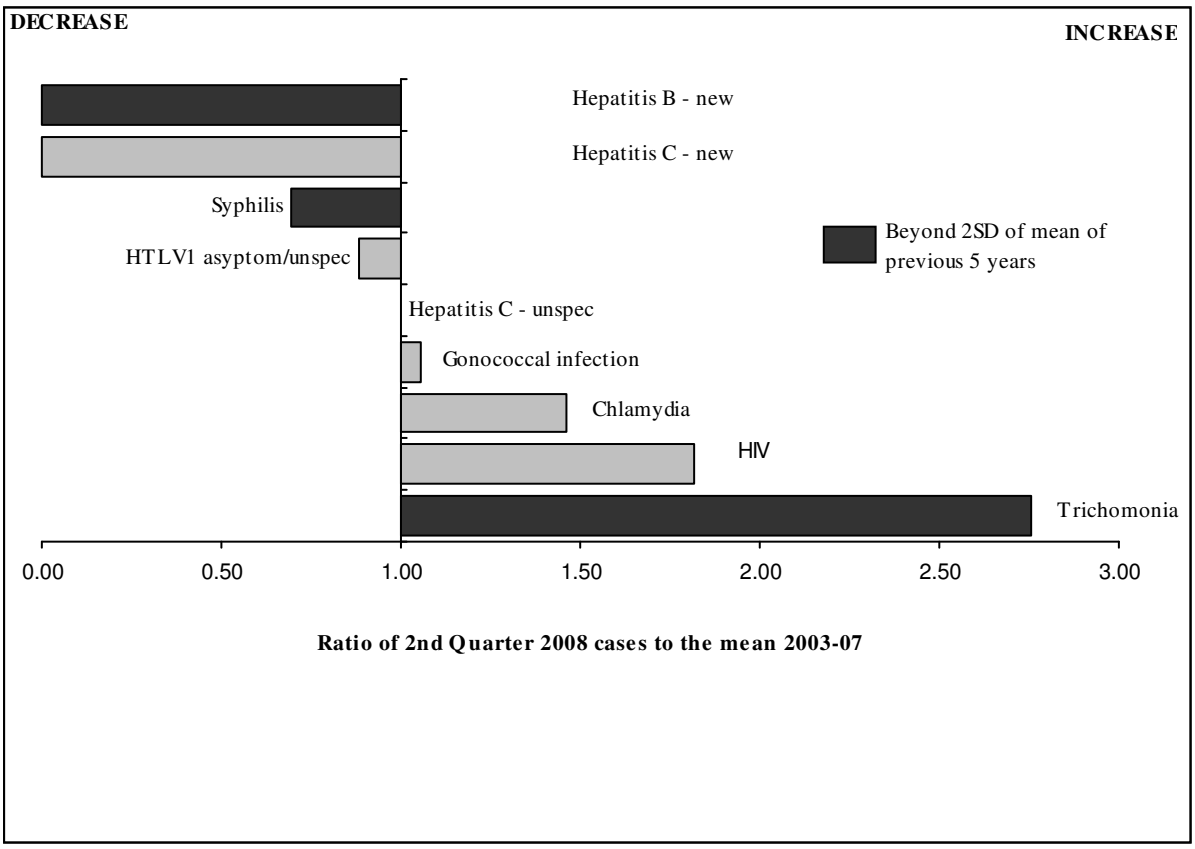
Darwin	**8922 8044**
Katherine	**8973 9049**
Barkly	**8962 4259**
Alice Springs	**8951 6907**
East Arnhem	**8987 0357**

Northern Territory Government

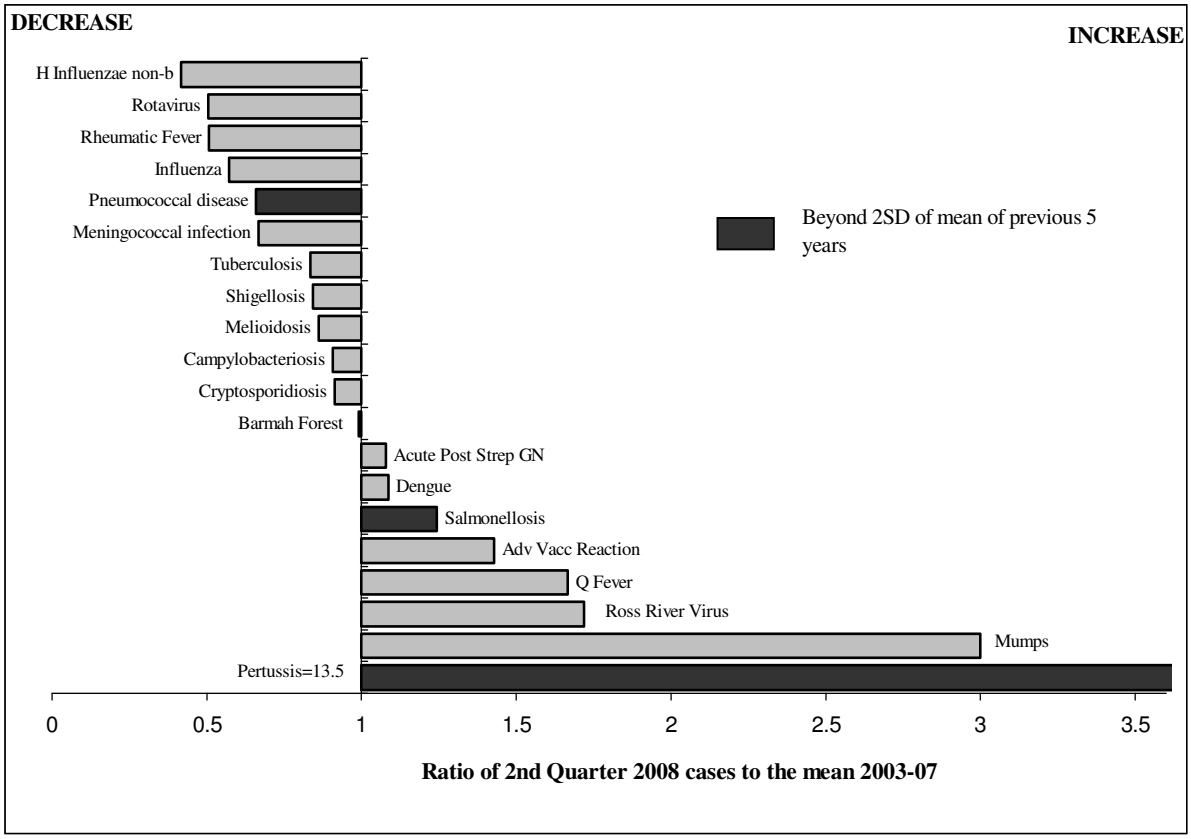
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
1 April to 30 June 2008 & 2007

	Alice Springs		Barkly		Darwin		Eat Arnhem		Katherine		NT	
	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
Acute Post Streptococcal GN	2	3	2	0	7	0	0	0	0	1	11	4
Adverse Vaccine Reaction	2	2	1	0	10	17	1	0	0	0	14	19
Barmah Forest	2	3	0	0	16	23	1	2	1	4	20	32
Campylobacteriosis	21	24	3	3	37	62	2	2	3	7	66	98
Chickenpox	6	3	0	0	4	13	8	1	0	4	18	21
Chlamydia	399	391	8	7	236	210	54	48	49	45	746	701
Chlamydial conjuctivitis	3	6	0	1	3	2	0	0	2	1	8	10
Cryptosporidiosis	13	14	1	4	2	11	4	3	1	3	21	35
Dengue	0	0	0	0	5	3	0	0	0	0	5	3
Donovanosis	1	0	0	0	0	0	0	0	0	0	1	0
Food/water borne disease	0	2	0	0	0	2	0	0	0	0	0	4
Gonococcal conjunctivitis	0	1	0	0	0	0	0	0	0	0	0	1
Gonococcal infection	314	380	16	12	88	59	33	21	66	64	517	536
Hepatitis A	1	0	0	0	1	2	0	0	0	0	2	2
Hepatitis B - chronic	13	13	1	1	3	20	17	36	4	0	38	70
Hepatitis B - new	0	0	0	0	0	0	0	2	0	2	0	4
Hepatitis B - unspecified	10	18	0	2	7	24	0	2	6	10	23	56
Hepatitis C - unspecified	3	8	0	1	53	41	1	1	2	6	59	57
Hepatitis D	1	0	0	0	0	0	0	0	0	0	1	0
Hepatitis E	0	0	0	0	3	0	0	0	0	0	3	0
***H Influenzae* non-b**	0	0	1	0	0	1	0	0	0	0	1	1
HIV	1	0	0	0	3	3	0	0	0	0	4	3
HTLV1 asyptomatic/unspecified	15	30	0	3	2	3	0	0	0	0	17	36
HUS	0	0	0	0	1	0	0	0	0	0	1	0
Hydatid	0	0	0	1	0	0	0	0	0	0	0	1
Influenza	0	0	0	0	4	7	0	0	0	0	4	7
Legionellosis	0	0	0	1	0	1	0	0	0	0	0	2
Malaria	0	0	0	0	4	9	0	0	0	0	4	9
Melioidosis	0	0	0	0	5	5	0	0	0	1	5	6
Meningococcal infection	0	0	0	0	2	1	0	1	0	0	2	2
Mumps	8	0	0	0	0	12	0	0	1	0	9	12
MVE	0	0	0	0	1	0	0	0	0	0	1	0
Pertussis	12	4	0	0	109	3	2	0	9	0	132	7
Pneumococcal disease	5	11	2	1	4	5	0	0	1	0	12	17
Q Fever	2	0	0	1	0	0	0	0	0	0	2	1
Rheumatic Fever	4	5	0	1	4	7	0	2	0	6	8	21
Ross River Virus	5	6	0	0	45	54	1	2	4	5	55	67
Rotavirus	24	100	3	10	16	20	1	2	15	16	59	148
Salmonellosis	20	37	3	8	83	60	9	2	16	15	131	122
Shigellosis	20	22	0	2	6	8	6	4	1	3	33	39
Syphilis	32	78	2	3	18	7	2	5	8	9	62	102
Syphilis congenital	0	2	0	0	0	0	0	0	0	0	0	2
Trichomoniasis	394	372	15	12	162	102	70	63	93	76	734	625
Tuberculosis	0	1	0	0	4	8	0	0	1	0	5	9
Typhoid	0	0	0	0	1	0	0	0	0	0	1	0
Typhus	0	0	0	0	0	1	0	0	0	0	0	1
Varicella unspecified	0	2	0	0	0	0	0	0	0	0	0	2
Vibrio food poisoning	0	0	0	0	1	0	0	0	0	0	1	0
Zoster	3	3	1	0	13	11	1	2	0	0	18	16
Total	**1,336**	**1,541**	**59**	**74**	**963**	**817**	**213**	**201**	**283**	**278**	**2854**	**2911**

Ratio of 2nd quarter 2008 cases to the mean of 2003-2007: sexually transmitted diseases



Ratio of 2nd quarter 2008 cases to the mean of 2003-2007: selected diseases



Comments on notifications pp 24 & 25

Hepatitis B—new

In the second quarter of 2003-2007 there were 1-4 new cases of hepatitis B compared to 0 cases in the second quarter 2008. This could reflect less testing or be a result of improved population immunity following vaccination.

Pertussis

There were 132 case of pertussis notified in the second quarter which is more than 13 times the 5 year mean. This reflects the current epidemic of pertussis which has affected the Top End since the beginning of the year. The numbers are nevertheless much higher than previous epidemics (2001 and 2005-06); this is likely to be due to increased testing and improved diagnosis. Cases peaked in July and are expected to continue to fall.

Pneumococcal

In the 2nd quarter of 2008 there were 12 cases of invasive pneumococcal disease compared to a mean over the last 5 years of 18 cases for the same quarter. This reduction is seen mainly in Indigenous adults and may reflect improvements in the adult immunisation program, herd effect from the childhood conjugate vaccine or natural fluctuation of disease.

Salmonella

There were 131 cases of Salmonellosis in the second quarter compared to the 5 yearly mean of 105 cases. These notifications have been a mixture of different serotypes. Salmonellosis notifications have increased nationally this year.

Syphilis

There was a significant decrease in notifications in the last 2 quarters, which mainly occurred in the Alice Springs district. The number of notifications for this year is now roughly consistent with the decreasing trend noted in 2002-2005. However, there was a nearly 2-fold increase in Darwin Urban area, which was due in part to an increase in newly diagnosed cases in men who have sex with men.

Trichomoniasis

An investigation into the increasing trend of trichomoniasis notifications in the last 2 years was conducted and found that the most probable reasons for this trend were a switch to a new nucleic acid test in mid-2006 and increased testing with this new test. A quality assurance study is currently being conducted to assess the performance of this new test.

NT malaria notifications April – June 2008

Merv Fairley, CDC, Darwin

Five notifications of malaria were received for the second quarter of 2008. 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	East Timor	Holiday	*P falciparum*	No
1	Indonesia	Fisher	*P vivax*	No
1	PNG	Holiday	*P vivax*	Yes
1	PNG	Holiday	*P vivax*	No
1	West Papua	Holiday	*P vivax*	Yes

Vaccination coverage for children aged 12 <15 months at 30 June 2008

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Fully vaccinated
Darwin	273	92.7%	92.7%	94.9%	95.2%	91.6%
Winnellie PO Bag	101	92.1%	92.1%	97.0%	97.0%	92.1%
Palm/Rural	217	94.5%	94.5%	96.8%	97.7%	93.5%
Katherine	111	97.3%	97.3%	99.1%	99.1%	97.3%
Barkly	24	83.3%	83.3%	87.5%	87.5%	83.3%
Alice Springs	116	87.1%	86.2%	92.2%	92.2%	86.2%
Alice Springs PO Bag	65	89.2%	89.2%	96.9%	98.5%	87.7%
East Arnhem	53	92.5%	92.5%	94.3%	96.2%	90.6%
NT	960	92.4%	92.3%	95.6%	96.1%	91.6%
Indigenous	431	88.4%	88.4%	94.7%	95.1%	87.9%
Non-Indigenous	529	95.7%	95.5%	96.4%	97.0%	94.5%
Australia Indigneous	3,396	85.2%	85.2%	93.4%	93.6%	84.7%
Australia Non Indigenous	69,691	92.2%	92.1%	94.6%	94.5%	91.5%
Australian Total	73,087	91.8%	91.8%	94.5%	94.4%	91.2%

Vaccination coverage for children aged 24 <27 months at 30 June 2008

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% MMR	% Fully vaccinated
Darwin	236	94.1%	94.1%	92.8%	95.3%	94.9%	92.4%
Winnellie PO Bag	100	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
Palm/Rural	227	97.4%	97.4%	96.0%	97.8%	96.5%	96.0%
Katherine	91	98.9%	98.9%	97.8%	100.0%	98.9%	97.8%
Barkly	28	92.9%	92.9%	96.4%	96.4%	96.4%	92.9%
Alice Springs	152	93.4%	93.4%	93.4%	96.1%	94.7%	90.8%
Alice Springs PO Bag	48	95.8%	95.8%	95.8%	97.9%	95.8%	95.8%
East Arnhem	50	100.0%	100.0%	98.0%	100.0%	98.0%	98.0%
NT	932	96.1%	96.1%	95.4%	97.3%	96.4%	94.7%
Indigenous	413	97.1%	97.1%	95.9%	98.5%	97.3%	95.6%
Non-Indigenous	519	95.4%	95.4%	95.0%	96.3%	95.6%	94.0%
Australia Indigenous	3,227	95.3%	95.3%	93.9%	97.6%	93.9%	91.8%
Australia Non Indigenous	66,526	95.1%	95.0%	94.7%	95.8%	94.2%	92.8%
Australian Total	69,753	95.1%	95.0%	94.6%	95.9%	94.2%	92.8%

Vaccination coverage for children aged 60 <63 months at 30 June 2008

Region	Number in District	% DTP	% Polio	% MMR	% Fully vaccinated
Darwin	240	78.8%	78.8%	78.8%	77.9%
Winnellie PO Bag	112	95.5%	95.5%	95.5%	95.5%
Palm/Rural	206	87.9%	87.9%	87.9%	87.4%
Katherine	99	92.9%	92.9%	92.9%	92.9%
Barkly	26	92.3%	92.3%	92.3%	92.3%
Alice Springs	137	89.1%	89.1%	89.1%	88.3%
Alice Springs PO Bag	55	96.4%	96.4%	96.4%	96.4%
East Arnhem	67	98.5%	98.5%	95.5%	95.5%
NT	942	88.5%	88.5%	88.3%	87.9%
Indigenous	431	93.7%	93.7%	94.0%	93.5%
Non-Indigenous	511	84.1%	84.1%	83.6%	83.2%
Australia Indigenous	2,759	85.1%	84.8%	85.2%	84.3%
Australia Non Indigenous	62,060	88.3%	88.1%	87.9%	87.5%
Australian Total	64,819	88.1%	87.9%	87.8%	87.3%

Immunisation Coverage 30 June 2008

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 27.

Background information to interpret coverage

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

The cohort of children assessed at 12 to 15 months of age on 30 June 2008 were born between 01 April 2007 and 30 June 2007 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 2 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) (latest doses due at 6 months of age). All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to 27 months of age on 30 June 2008 were born between 01 April 2006 and 30 June 2006 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 3 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) and 1 dose of measles, mumps, rubella vaccine (latest doses due at 12 months of age). All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to 63 months of age on 30 June 2008 were born between 01 April 2002 and 30 June 2002 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 60 months (5 years) of age.

Interpretation

Immunisation coverage in NT children was above the national average in all 3 cohorts. Immunisation coverage in Indigenous children in NT was higher across all age groups compared to the national coverage of Indigenous children. Indigenous NT children had lower coverage than non-Indigenous NT children in the younger cohort (ie 12 to 15 months) but higher in the other 2 cohorts.

Immunisation coverage for NT children as a whole at 60 to 63 months of age (87.9%) remains lower than the younger cohorts, and this is a concern across Australia, with the national average for this cohort being 87.3%, compared to 91.2% (12 to 15 months) and 92.8% (24 to 27 months). For Indigenous NT children, immunisation coverage is lower at a younger age (ie 87.9% at 12 to 15 months cohorts) but higher for the older age group (ie 93.5% at 60 to 63 months), reflecting a concern that Indigenous children are not immunised in a timely manner in early childhood.

Disease Control staff updates

CDC

Tracy Ward has returned to Environmental Health having worked in the Senior Project Officer position providing excellent support for CDC Directorate.

SH&BBV

Belinda Davis joined SHBBV as Clinic 34 and Urban Team Manager. **Anne Davis** has moved over to maternity services. **Gerri Grady** is providing a **s**coping study for behavioural research until October.

Meaghan Kennedy (CDC Nhulunbuy) and her partner Rodney had a baby girl born in GDH on the 14th July, weight 7 pound 10 (3470g), her name is Kate Eileen Mottram.

Tuberculosis

Elliot Coates has moved to General Practice. Both **Ed Raby** and **Krispin Hajkowicz** have become fathers.

Medical Entomology

Ruth Peek is currently working as a T2 until March 2009 (until return of **Jane Carter** who is currently on long service leave). **Darren Bowbridge** is a T2 filling in for **Nadine Copley** who is on maternity leave until May 2009.

Community Paediatrician

The change over in Paediatric Registrars brings **Chandima De Alwis** and sees the departure of **Gurmeet Singh**.

Surveillance

Shellee Williams is working from home completing the Salmonella study. **Krista McCarron** has resigned as the public health nurse in Alice Springs.

Immunisation

Chris Sutton moves back to Community Health after her stint with the HPV team and **Chris Chamberlain** has joined the data entry team.

Rheumatic Heart Disease

Recruitment to a new position is in progress as well as replacement for **Dale Thompson** who is moving to CDC Nhulunbuy.