



CENTRE FOR DISEASE CONTROL
NORTHERN TERRITORY

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Centre for Disease Control Guidelines for management of trachoma in the Northern Territory

Cate Coffey, CDC Alice Springs

Introduction

Australia remains the only developed country where hyperendemic (>20%) active trachoma can be found in remote Indigenous communities.¹ In 2006 the National Trachoma Surveillance and Reporting Unit confirmed the presence of hyperendemic trachoma in many remote communities in the Northern Territory (NT).

Trachoma control activities vary throughout the NT at a community and regional level. At times these activities have been affected by differing implementation of guidelines, competing priorities of communities as well as staff turn over.

The role of the trachoma project coordinator is to support and assist remote communities and families to effectively manage trachoma in their area. The NT Trachoma Working Party provides advice to the trachoma project coordinator on all aspects of trachoma control in the Northern Territory.

Guidelines

The *Guidelines for trachoma management in the Northern Territory, 2008*² are based on the Communicable Disease Network Australia (CDNA) National *Guidelines for the public health*

management of trachoma in Australia 2006.¹ The CDNA guidelines provide a minimum best practice framework for the management of trachoma. The NT Trachoma Working Party adapted the national guidelines to reflect the unique needs of the NT.

Contents

Centre for Disease Control Guidelines for management of trachoma in the Northern Territory.....	1
Dengue Mosquito eradicated on Groote Eylandt.....	4
Making Territory Day Safer.....	5
The epidemiology of laboratory confirmed influenza in the NT 2001-2007	6
Information about pertussis for GPs	10
World Youth Day surveillance.....	12
Investigation of Meningococcal Vaccine Failure.....	14
New childhood immunisation internet site.....	18
Central Australian STI risk factor study	19
The emerging problem of community-associated MRSA; Necrotising pneumonia in a 19 month old Aboriginal boy.....	22
Acute intussusception in infants and children in the Northern Territory. Report for the study period 1 June 2006 - 31 May 2008.....	25
Views of a volunteer doctor in East Timor.....	29
NT notifications of diseases by onset date & district	31
Comments on notifications	33
Malaria notifications	33
Vaccination coverage for children	34
Disease Control staff updates.....	36

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Australia is a signatory to the World Health Organisation's (WHO) VISION 2020 campaign that is a global initiative for the elimination of avoidable blindness. WHO recommends the SAFE Strategy for the effective control of trachoma.

S = Surgery – surgical correction for trichiasis

A = Antibiotics - Antibiotic treatment of cases and contacts of active trachoma

F = Facial Cleanliness – Promote face and hand washing to reduce spread of infection.

E = Environmental Health – Improve water access, toilet hygiene and sanitation, waste and fly control and promote activities that reduce overcrowding.

What's new?

Prevalence

- Trachoma is endemic if the prevalence rate is $\geq 10\%$ (previously it was 15%).

Prevalence $\geq 10\%$ with no obvious clustering

- These communities should be targeted for treatment with single dose azithromycin.
- The aim is to decrease the reservoir of active trachoma by treating all children up to 14 years of age and all household contacts in the community.
- Health promotion activities must be included in the public health response.

Prevalence $\geq 10\%$ with strong obvious household clustering

- Cases are obviously clustered within one or more households.
- Health staff can easily identify all household contacts of cases.
- Household treatment with single dose azithromycin for all people living in house.
- Health promotion activities should be included in the public health response, but community-wide treatment not indicated.

Prevalence $< 10\%$

- Treat all cases and all household contacts with single dose azithromycin.
- Health promotion activities should be included in the public health response.

A household contact is defined as *anyone* who is sleeping in the house

Prevalence $> 50\%$

- In communities where trachoma prevalence is $> 50\%$ re-treatment with azithromycin at a 6 month interval is strongly encouraged.

There is evidence supporting repeat antibiotic treatment at a 6 month interval. It is thought to reduce the reservoir of trachoma and the chance of reinfection. In highly mobile communities, retreatment will have a greater impact on prevalence.

Communities that have the capacity to do so may choose this option. Contact your regional Centre for Disease Control (CDC) for assistance.

Training and surveillance

- CDC recommends that all health professionals involved in trachoma control should be assessed as competent in the diagnosis and management of trachoma. CDC conducted training in all aspects of trachoma control in Alice Springs, Darwin and Katherine in early 2008.
- Trachoma screening is conducted annually in all remote communities as part of the Healthy School Age Kids Program. All children of school age should be checked for trachoma, whether or not they attend school.
- Each eye is examined and signs of trachoma noted as being present or absent. Each sign of trachoma is individually graded. One or more signs can and usually do occur together.
- Observe and record facial cleanliness. It has been observed that children with clean faces are less likely to have active trachoma than those with ocular or nasal discharge or flies on their face. Clean face is defined as the absence of dirt or crusting on the cheeks and forehead.

Management

Trachoma control, where possible, should be conducted on a regional level.

Surgery

- In areas where trachoma or trichiasis is endemic, adults aged 40-54 years should be screened every 2 years and those > 55 years

should be screened annually for trichiasis as part of a healthy adult check. Health services need to ensure that a process is in place for timely surgical referral and treatment of people with trichiasis.

Antibiotics

- Single dose azithromycin is still the preferred treatment for trachoma.
- Permission to use azithromycin in children under 6 months of age and under 6 kg has been granted in the NT. Active follow up of these children will occur at 1 and 4 weeks post administration of azithromycin to monitor for side effects.
- The National Trachoma Surveillance and Reporting Unit monitor prevalence of resistance to azithromycin.

Face washing

- Many suggest that facial cleanliness is the single most important factor in preventing the transmission of trachoma. Facial cleanliness in children should be promoted by including regular face washing as part of a holistic personal hygiene program. Children should also be encouraged to brush flies away from their face and eyes to reduce the spread of infection.
- Face and hand washing may be incorporated into health promotion activities in schools and childcare centres.
- If possible and safe, children should be encouraged to swim in pools, waterholes, rivers and the ocean.

Environmental Health and Health Promotion

Improved environmental health and socio-economic conditions are acknowledged as the most important factors in preventing trachoma. Environmental health interventions recommended by WHO include:

- Reduce flies through improving waste management activities in the community.
- Instigate appropriate health education and promotion activities, including hand and face washing activities and other associated hygiene training in appropriate community settings eg. schools, women's centres, clinic, store and council office.

- Avoiding overcrowding.
- Seek assistance from Environmental Health, Health Promotion and CDC for a coordinated approach to trachoma management.

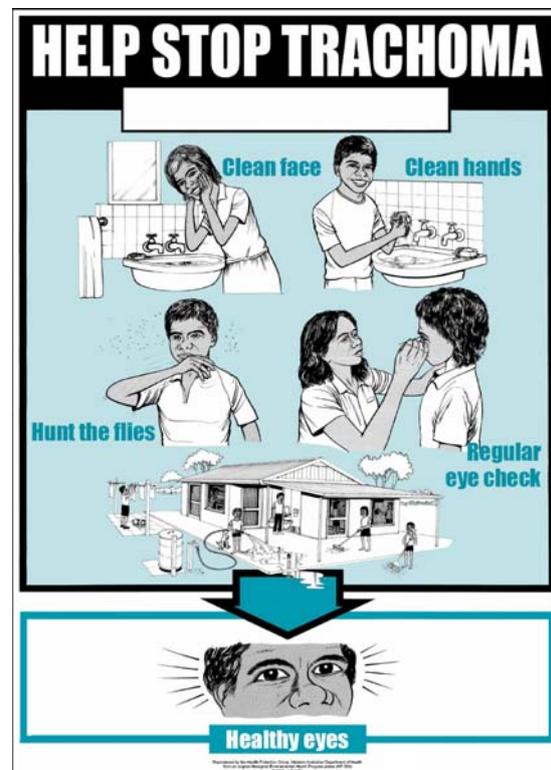
Data Collection

CDNA National Trachoma Guidelines recommend regional population health units collect trachoma data in accordance with the minimum national trachoma dataset. These should be reported to the national trachoma database.

CDC is required to collect and maintain a minimum dataset for trachoma in the NT. This data represents public health surveillance and assists in the evaluation of trachoma control programs. The data does not contain personal identifying information.

Resources

1. Help stop trachoma poster developed by Western Australian Department of Health.



2. Trachoma Kit.

In preparation for Healthy School Age Kids screening, trachoma kits were distributed in February 2008. These kits are available for all communities where active trachoma is identified.

The kit consists of a sturdy plastic carry case with the following contents:

- Binocular loupes, x 2.5 magnification
 - Penlight torches
 - Orange stick or applicator stick
 - Alcohol based hand wash
 - Rubbish disposal bags
 - Data Collection forms
 - Pens
 - WHO simplified trachoma grading chart
 - CDNA Guidelines
 - Guidelines for the management of trachoma in the NT
 - Azithromycin dose for weight chart
 - Trachoma eye sickness flip chart
 - Clipboards
 - Gloves
 - Help stop trachoma posters
 - Community Information poster
 - Trachoma Grading – self directed learning CD
 - Azithromycin treatment stickers – Adult and child – where paper based medical records are used.
3. Trachoma Grading – Self Directed Learning CD produced by the Centre for Eye Research Australia.

4. Trachoma eye sickness flip chart provides simple basic information on trachoma control.



All resources are available from the trachoma project coordinator, CDC.

References

1. Communicable Disease Network Australia. Guidelines for the public health management of trachoma in Australia. Canberra: Commonwealth of Australia, 2006. <http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda-cdna-pubs-trachoma.htm> accessed 30/12/2007.
2. Centre for Disease Control, NT. Guidelines for Management of Trachoma in the Northern Territory. Forthcoming. Copies available in August 2008 from Centre for Disease Control.

Dengue Mosquito eradicated on Groote Eylandt

Media release, Friday, 9 May 2008

On 9 May 2008, Dr Vicki Krause of The Department of Health and Community Services (DHCS) Centre for Disease Control (CDC) officially announced the successful eradication of the dengue mosquito on Groote Eylandt.

The dengue mosquito was found on Groote Eylandt first in October 2006 from an egg trap collected by a routine mosquito surveillance program.

A subsequent DHCS eradication program led by Medical Entomology (ME) and Groote Eylandt Mining Company (GEMCO) reduced the number of infested properties in Alyangula from

50 properties infested (11.7%) in December 2006 to no properties (0.0%) by September 2007.

Eradication of all dengue mosquitoes required a very meticulous process as the dengue mosquito can carry the virus that causes the debilitating and sometimes fatal dengue disease.

The eradication program required 5 rounds of inspection and treatment of every potential receptacle on every commercial and residential property in Alyangula and other communities on Groote to achieve this success. There were 3 inspection and treatment rounds in Alyangula

over the wet season between September 2007 and March 2008 to confirm the eradication of the dengue mosquito.

Inspections in Angurugu and other communities on Groote Eylandt and other nearby island and mainland communities indicated that the infestation had not spread.

Director of Medical Entomology and project director, Peter Whelan, wishes to acknowledge the efforts of the team in achieving these results under the supervision of Myron Kulbac and Darren Bowbridge.

This project has been achieved with funding assistance from the Commonwealth Department

of Health and Aging, the very appreciable assistance from the GEMCO mining company, the team at Medical Entomology, the leadership, support and infrastructure of DHCS and, in particular the people of Groote Eylandt.

Exotic mosquitoes have become a greater threat to the NT in recent years with dengue and dengue haemorrhagic fever increasing dramatically in nearby Southeast Asian countries and dengue disease outbreaks in Queensland – caused by the dengue mosquito *Aedes aegypti*.

DHCS Medical Entomology continues to perform surveys around the coast and between Queensland and the major NT towns to keep the Territory dengue vector free.

Making Territory Day Safer

New Rules for Fireworks

The Northern Territory Government has introduced some changes to make this year's Territory Day celebrations safer for everyone. The changes also aim to stop people letting off fireworks illegally at other times of the year.

Fireworks will only be sold on Territory Day, 1 July.

- You cannot possess fireworks before or after Territory Day and if you are found in possession of fireworks you will be fined up to \$2000.
- You must be at least 18 years old to buy fireworks.
- Fireworks will not be sold to anyone who is intoxicated.

To find out more about the new regulations go to www.worksafe.nt.gov.au or phone 1800019115.

Using Fireworks Safely

If you use fireworks you should follow these safety tips to avoid causing serious injury to yourself or others:

- Stabilise fireworks on a flat surface or use sand to stand them upright to avoid them falling over when firing.
- Never give fireworks to small children and supervise them at all times.

- Don't hold lit fireworks.
- Read the instructions on each firework.
- Have a hose on hand to wet down the area after your celebration.

Never aim fireworks at other people as they can cause serious and permanent injury.

Eye injury - What to do

Specks in the Eye 'if small and loose'

DO NOT rub the eye.

Try to let tears wash the speck out or use eyewash.

Try lifting the upper eyelid outward and down over the lower lid.

If still unsuccessful, remove loose object using the corner of clean, moist cloth, gauze, cotton bud or eye spear.

DO NOT remove from coloured part of the eye.

If still unsuccessful, wash eye with gentle stream of saline or clean water. **DO NOT** flush object into the other eye.

If unsuccessful, cover injured eye with eye pad/light dressing and seek medical aid.

Cuts and Punctures of the Eye or Eyelid

DO NOT wash out the eye with water or any other liquid.

DO NOT try to remove an object that is stuck in the eye.

Lie casualty on their back, pad around the object (or improvise by using a foam cup to protect area), ensuring no pressure is placed on the object, with bandage in place.

DO NOT give anything to eat or drink.

Seek medical aid.

Sparklers

- Sparklers can be very dangerous and should never be given to children under 5 years.
- Never hold multiple lit sparklers as the extreme heat (more than 1000°C) can cause severe and deep burns to the hands. A 'super ignition' can also occur and shower the hand with flame and embers.
- Always supervise children with sparklers and ensure sparklers are held at arm's length.
- Dispose of used sparklers in a bucket of sand or water.

DUD fireworks

- Never inspect or re-light a dud firework – it still may go off and cause serious injury. A dud firework is not worth a serious injury.

Clothing

- Do not wear synthetic clothing if you are around fireworks. Stray sparks can ignite flammable clothing and cause serious burns.

Burn injury - What to do

REMOVE person safely from heat source.

REMOVE clothing to help heat escape. If clothes are stuck to the skin leave them on.

COOL IT by immediately submerging or gently pouring cold tap water over the scald for at least 15-20 minutes. Eg. stand in shower.

NEVER USE ICE, OIL, BUTTER OR OINTMENT.

COVER IT with cling wrap. Keep the person warm.

GET HELP. A burn larger than a postage stamp requires medical attention. All deep burns of any size require urgent hospital treatment.

Seek medical advice by telephoning Health Direct on 1800186026.

In an Emergency phone 000.

The epidemiology of laboratory confirmed influenza in the NT 2001-2007

Peter Markey, CDC Darwin

Introduction

The size and severity of the 2007 annual influenza epidemic in Australia has focused the attention of communicable disease and public health professionals on improving preventative measures at the population level. In particular, to inform best policy strategies, national surveillance measures are to be enhanced, and the possibility of broadening recommendations about vaccination to include infants and children has been raised.

Influenza has been a notifiable disease in the Northern Territory (NT) since 1999, with all laboratories obliged to notify Centre for Disease Control (CDC) of any positive laboratory test. Given this interest in influenza following the 2007 epidemic, an analysis of laboratory-confirmed influenza data in the Northern Territory Notifiable Diseases System (NTNDS) was made.

Methods

The notifiable disease data in the NTNDS was analysed using Business Objects software. Population data was derived from estimates of the NT population 2001-2006 using Australian Bureau of Statistics (ABS) projections. The 2007 population was derived by extrapolation of the 2005 and 2006 data. Where the Indigenous status of cases in a particular stratum (eg. age-group) was unknown, the cases were distributed within the stratum according to the Indigenous/non-Indigenous ratio of known cases. Analysis was confined to those cases who were residents of the NT at the time of diagnosis.

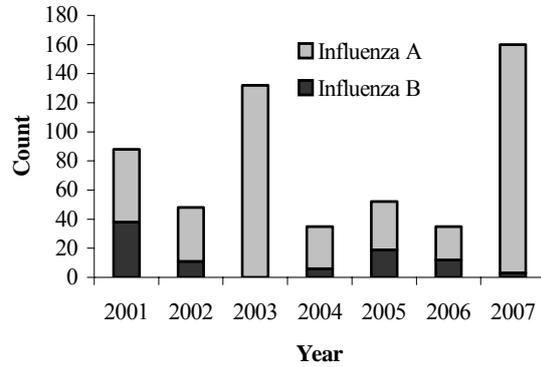
Cases were defined according to the national case definition of laboratory confirmed influenza, viz;

1. Isolation of influenza virus by culture from appropriate respiratory tract specimen

OR

2. Detection of influenza virus by nucleic acid testing (NAT) from appropriate respiratory tract specimen
- OR
3. Detection of influenza virus antigen from appropriate respiratory tract specimen
- OR
4. IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to influenza virus
- OR
5. Single high titre to influenza virus.

Figure 1. Influenza notifications by year and type; 2001-2007



Results

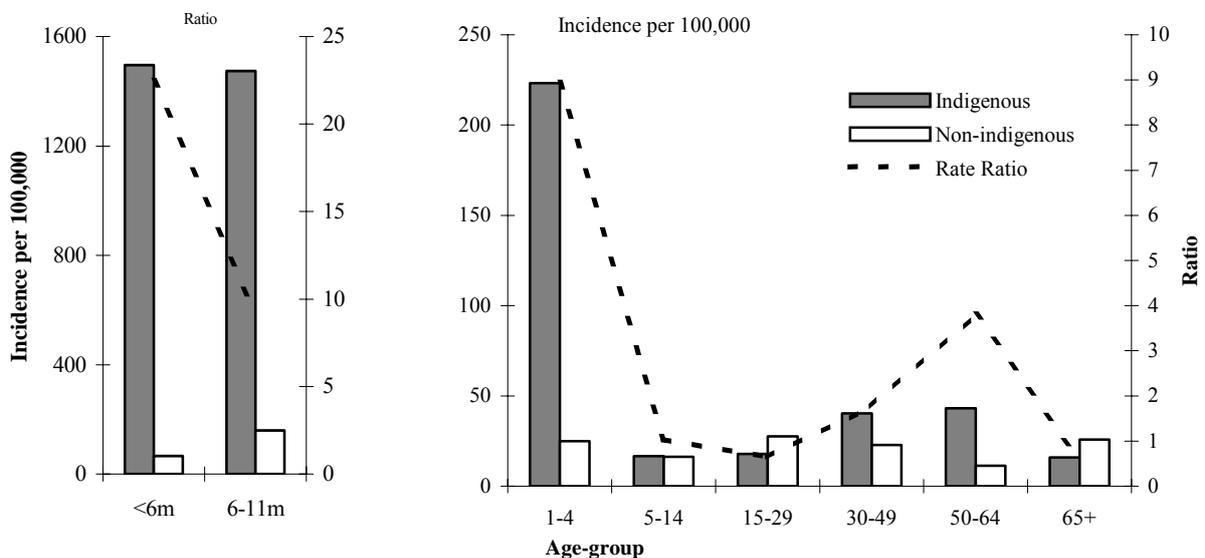
There were 552 cases of influenza notified from 2001 to 2007 in residents of the NT. Overall, the incidence of influenza in the NT population was 39.0 per 100,000 person-years (p-yrs). This varied from 16.9 in 2006 to 77.6 in 2007. In all years the majority of cases have been influenza type A (Figure 1). Interestingly, in the 2 years when there was a significant epidemic, 2003 and 2007, there were very few type B cases confirmed. Indigenous status was identified in all but 33 cases (6.0%).

In both Indigenous and non-Indigenous populations, the highest rates were in the <1 age-group (Figure 2). Just over 40% of all cases (229; 41.1%) were in Indigenous children aged

0-4 years. In the Indigenous population rates were lowest in children and young adults (5-14 and 15-29 year age-groups) while in the non-Indigenous population the lowest rates were in the 50-64 year age-group. The rates of disease in Indigenous infants <6 months of age were similar to those aged 6-11 months. In non-Indigenous infants the rates under 6 months were less than those 6-11 months although the difference did not reach statistical significance (rate ratio 2.4; 95%CI 0.79-8.7).

Age-specific rates were higher in the Indigenous population in all age-groups except 15-29 years and in the 5-14 year age-group rates were similar (Figure 2). In the <1 age-group the Indigenous rate was 1,495 per 100,000 p-yrs or 13.2 times

Figure 2. Age-specific rates of influenza by Indigenous status with Indigenous/non-Indigenous rate ratio; NT 2001-07*



*Note: change of scale for those <12 months of age.

the non-Indigenous rate. Other rate ratios are illustrated in Figure 2. Interestingly, in the non-Indigenous population, the rate in the group aged 65 years and over was not significantly different from the 15-29 or 30-49 year old age-groups (rate ratios 0.93 (95%CI; 0.51-1.7) and 1.13 (95%CI; 0.63-2.0) respectively). Likewise the rate in the Indigenous population aged 50 years or more was 35.1/100,000 p-yrs, which is not significantly different from the rate in the 15-29 and 30-49 year categories combined (28.3/100,000 p-yrs; rate ratio 1.24; 95%CI 0.65-2.2).

The Centre (Alice Spring and Barkly regions) had higher rates of influenza compared with the Top End, but these high rates were mainly in the 0-4 age-group in both Indigenous and non-Indigenous populations (Table 1). Indigenous children 0-4 years of age in Central Australia had over 3 times the rate of influenza than Indigenous children in the Top End. Likewise non-Indigenous children had twice the rate of their Top End counterparts (Table 2).

The epidemic of 2007 was the biggest since influenza was made notifiable in 1997. However, age-specific analysis revealed that while the 2003 epidemic was mainly in the 0-4 year old age-group the 2007 epidemic was mainly in the adult population (15 years and over, Figure 3). As previously reported,¹ the

Table 1. Rates of influenza by district of residence; 2001-07

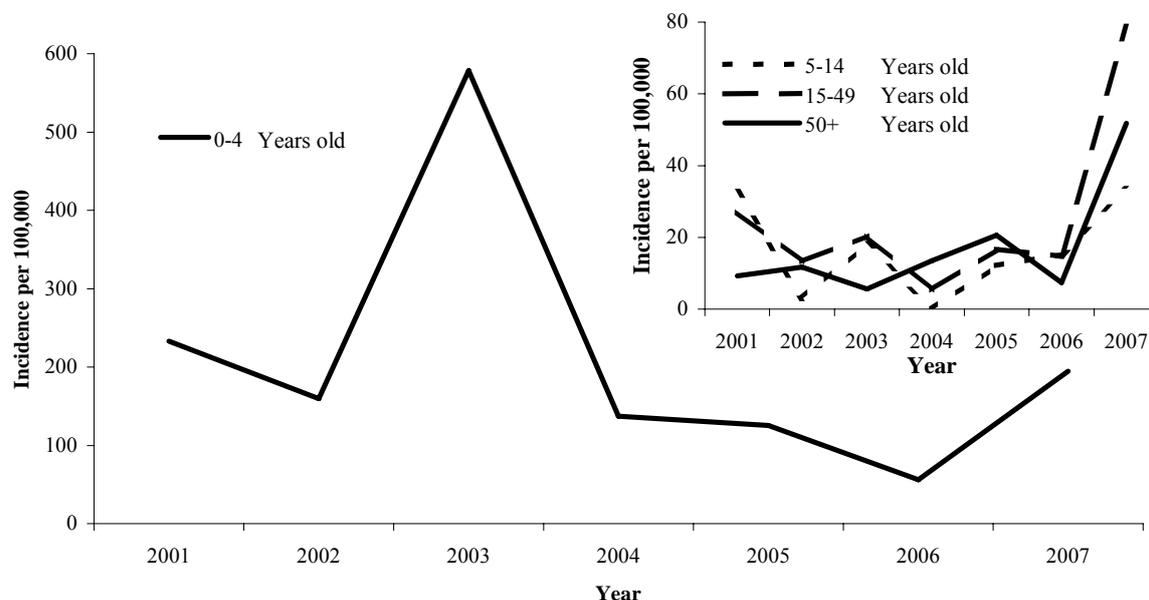
	Indigenous	Non-Indigenous	All
Alice Springs	137.7	13.8	60.0
Barkly	22.0	12.4	18.0
Katherine	32.4	30.6	31.5
Darwin	84.2	22.5	32.8
East Arnhem	82.8	37.5	51.7
Total	82.8	21.9	38.9

Table 2. Rates of influenza by age-group and region of residence; 2001-07

	Centre		Top End	
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous
0-4	918.9	72.6	289.6	36.1
5-14	14.0	19.4	18.6	15.1
15-49	13.3	5.4	35.8	29.1
50+	18.8	12.7	45.4	15.0
Total	116.9	13.6	64.5	24.7

increase in 2007 was mainly in non-Indigenous adults living in the Darwin urban region while the age-specific rates in regions outside Darwin in 2007 were higher than the intervening years but less than those of 2003.

Figure 3. Age-specific rates of influenza by year; 2001-2007; 0-4 year olds and in the inset other age-groups. Note the scale difference. The increase in 2007 was mainly due to increase in adults



Hospitalisation status was not well recorded for 2001-2006 but in 2007 more deliberate attempts were made to record this field and it was completed in 76% of cases. In those cases with information available 52% were hospitalised including 24 out of 28 children under 5 (86%).

Prior to 2004 the data concerning diagnostic method was considered unreliable, however looking at the data since 2004, 42% of notifications were based on NAT, 19% on culture, 17% on serology and 16% on antigen testing. In 2007, 62% were based on nucleic acid testing and 14% on serology and 14% on antigen testing.

Discussion

Analysis of laboratory-confirmed influenza notifications is always fraught with issues of bias due to the wide variations in testing patterns. Children <5 years of age with influenza and in particular infants <1 year of age are more likely to be admitted to hospital than those in the older age-groups, and if admitted are more likely to get tested for influenza. Hence, a case of influenza in an infant is much more likely to be notified than a case in an adult. It is also possible that testing patterns vary between hospitals, so regional differences should be interpreted taking this into account.

Nevertheless, this analysis has shown that rates in children are high, with the incidence in Indigenous infants <1 year almost 1,500 per 100,000 person-years (p-ys), in children aged 1-4 years over 200 per 100,000 p-ys and in non-Indigenous infants in the 6-11 month age-group over 150 per 100,000 p-ys. These figures are significant in light of the current discussion about influenza immunisation in children at the national level.

It is interesting to note the relatively low rate of influenza notification in the categories for which influenza vaccine is recommended and funded. Rates in the Indigenous 50+ age-group and non-Indigenous 65+ were similar to those in the

younger age-groups. This may reflect the success of the immunisation program or may reflect low testing rates in these age-groups. The 'healthy survivor effect' may also have an influence; this is the bias which occurs when, in a cohort of older people, those most at risk of a disease die at a greater rate than those not at risk, leaving the 'healthier' ones behind.

In 2007, many factors may have contributed to the increased rates of laboratory-confirmed influenza in adults. It is likely that some of the increase was real, but increased testing also may have played a role. Over a third of the adult notifications were from the defence forces and may have been tested as part of an increase in participation in sentinel surveillance by defence force medical officers.¹ The media coverage of the influenza-related deaths, both in children and adults, in other parts of the country, together with continued coverage of the risk of an influenza pandemic might have also contributed to increased testing.

Given the severity of the 2007 influenza season and the heightened awareness for an influenza pandemic following the world-wide outbreak of avian influenza, improved surveillance measures for seasonal influenza are being implemented at the national level. This might include better information about laboratory testing and more complete data and testing from GP sentinel surveillance.

The NTNDS, which receives laboratory-confirmed notifications of influenza, constitutes just one arm of the influenza surveillance in the NT. The Territory Influenza Surveillance System (TISS) a GP based surveillance system run through CDC, and the Emergency Department Syndromic Surveillance System (EDSSS) also monitor influenza patterns in the community through the use of clinical, rather than laboratory, information.

Reference

1. Markey P. Influenza season 2007; bad, but not that bad. *NT Dis Control Bull* 2007;14(4):14.

Information about pertussis for GPs

Testing for pertussis

Testing for pertussis is best done by PCR on nasopharyngeal swab/aspirate in the first 2-3 weeks of the cough and by serology (IgA) thereafter.

Treatment for pertussis

Antibiotics are useful to reduce the patient's infectiousness and may reduce symptoms if given early. Antibiotics will not reduce transmission if more than 3 weeks has elapsed since the onset of coughing.

Table 1. Recommended treatment for pertussis*

Table 3.14.1: Recommended antimicrobial therapy and chemoprophylaxis regimens for pertussis in infants, children and adults⁴⁷⁻⁵⁴

Age group	Azithromycin	Clarithromycin	Erythromycin	TMP-SMX*
<1 month	10mg/kg single dose for 5 days†	Not recommended	If azithromycin is unavailable; ≤7 days old: 10mg/kg/ dose 12-hourly for 7 days; ‡ 8–28 days old: 10mg/kg/ dose 8-hourly for 7 days	Not recommended in infants <2 months of age unless macrolides cannot be used
1–5 months	10mg/kg single dose for 5 days	7.5mg/kg/ dose twice daily for 7 days	10mg/kg/ dose 6-hourly for 7 days	≥2 months of age; TMP: 4mg/kg twice daily, SMX: 20mg/kg twice daily for 7 days
Infants (≥6 months) and children	10mg/kg single dose on day 1, then 5mg/kg single dose for days 2–5 (maximum 250mg/day)	7.5mg/kg/ dose (up to a maximum dose of 500mg) twice daily for 7 days (maximum 1g/day)	10mg/kg/ dose (up to a maximum dose of 250mg) 6-hourly for 7 days (maximum 1 g/day)	TMP: 4mg/kg, SMX: 20mg/kg twice daily for 7 days (maximum 160mg TMP and 800mg SMX 12-hourly)
Adults	500mg single dose on day 1, then 250mg single dose for days 2–5	500mg twice daily for 7 days	Erythromycin: 250mg 6-hourly for 7 days; Erythromycin ethyl succinate (EES): 400mg 6-hourly for 7 days	TMP: 160mg twice daily, SMX: 800mg twice daily for 7 days

* Trimethoprim-sulfamethoxazole

† Preferred for this age; refer to '(a) Pertussis in pregnancy' and '(b) Use in infants and infantile hypertrophic pyloric stenosis' below.

‡ Please refer to '(b) Use in infants and infantile hypertrophic pyloric stenosis' below. (see Australian Immunisation Handbook p236)

(a) Pertussis in pregnancy

Treatment of pregnant women with pertussis onset within a month of delivery is important for the prevention of neonatal pertussis and, if the onset is within 3 weeks of delivery, their newborn babies should also be given antibiotic therapy (Table 3.14.1). Erythromycin use earlier in pregnancy has well documented safety (Category A). There are only limited data on the use of azithromycin in pregnancy (Category B1).

(b) Use in infants and infantile hypertrophic pyloric stenosis

Several studies have shown an increased risk of infantile hypertrophic pyloric stenosis (IHPS) when erythromycin is given for prophylaxis following exposure to pertussis, especially in the first 2 weeks of life.^{56,57} While there are, as yet, no data available on the effectiveness of azithromycin use in infants <1 month of age, published case series report fewer adverse events following azithromycin use when compared with erythromycin and, to date, there have been no reports of IHPS in infants following use of azithromycin, although the size and number of these studies is limited.^{58,59} Therefore, on currently available evidence, and because of the risks of severe pertussis in this age group, azithromycin is preferred to erythromycin for treatment and prophylaxis in infants aged <1 month by US authorities. Azithromycin is available as a suspension and approved for use in Australia, but treatment and prophylaxis of pertussis are not currently referred to in the product information. Parents of newborns prescribed either erythromycin or azithromycin should be informed about the possible risks for IHPS and counseled about signs of developing IHPS.

* Extract from *The Australian Immunisation Handbook* 9th Edition p236 for antimicrobial therapy and chemoprophylaxis regimens for pertussis in infants, children and adults.

Exclusion

Cases should be excluded from childcare facilities and school until they have taken 5 days of antibiotic treatment. If cases do not take antibiotics they need to be excluded for 21 days after the onset of the cough.

Notification

Please notify the Centre For Disease Control of all confirmed and suspected pertussis cases (numbers below).

Contact tracing

The Centre for Disease Control will trace the contacts of all pertussis cases.

Antibiotic prophylaxis may be recommended for close contacts including:

- Children under the age of 2 years (for example if the case attended child care).
- Women in the last month of pregnancy.
- People who work in a health care or child care.

Close contact is defined a household contact or contact of <1 metre for >1 hour during the infectious period (until 3 weeks after onset).

CDC will be happy to follow up contacts and arrange appropriate prophylaxis.

Vaccination

Immunisation is the mainstay of pertussis control. Please ensure that children have been vaccinated according to the NT childhood vaccination schedule. School aged children should receive a booster at age 13 years (Year 8).

Immunity following vaccination is not life-long and the following groups should be offered the adult diphtheria, tetanus and pertussis vaccine; adults planning a pregnancy, new parents, grandparents and those working with children especially childcare and healthcare workers.

Please consider offering pertussis vaccination to new parents in your practice eg. this can be done during an ante-natal check or at the 6 week post-natal check.

Centre for Disease Control

Darwin	89228044
Katherine	89739041
Tennant Creek	89324259
Alice Springs	89517540
Nhulunbuy	89870357

World Youth Day

Stephanie Davis, CDC Darwin

Introduction

World Youth Day (WYD) is a biannual international Catholic youth gathering aimed at people between the ages of 16-35 years. In 2008 it will take place in Sydney between 15-20 July and up to 225,000 participants ('Pilgrims') from 42 countries are expected to attend. In the 4 days immediately preceding the Sydney gathering there is a 'Days in the Diocese' program whereby Pilgrims stay in various locations around Australia and take part in events with local Catholic communities.

Mass gatherings can be associated with outbreaks of infectious diseases. In the year 2000 the largest recorded outbreak of meningococcal serogroup W-135 disease was recorded in religious pilgrims attending the haji in Mecca.¹ In the months following this outbreak, cases of W-135 meningococcal disease were reported in multiple countries amongst pilgrim's household contacts.^{1,2} More recently, a multi-state outbreak of measles occurred at an international sporting event in the United States in 2007 where the index case was an athlete from Japan who had unknown vaccination status.³ This latter situation highlights the potential for outbreaks of diseases that are no longer endemic in Australia due to vaccination.

The potential for outbreaks of foodborne or waterborne disease also exists due to mass catering, as does the potential for temperature related illness and other injuries due to unsatisfactory accommodation and lack of familiarity with Australian weather and conditions.

New South Wales (NSW) health have created a comprehensive public health surveillance system for WYD activities in Sydney. To provide 'early warning' for the NSW system, to minimise outbreaks in the Northern Territory (NT) and to inform future mass gatherings the Centre for Disease Control (CDC) has developed a surveillance system to monitor health events during the NT, Days in the Diocese.

The Situation

Between 8-13 July the NT is expecting around 450 international Pilgrims from the following countries: Germany, Peru, the Philippines, Cameroon, Canada, Uganda, Italy, Nigeria, France and East Timor. A further 85 Pilgrims may be coming from remote Aboriginal communities in the Top End. Darwin will be hosting 80% of Pilgrims with the remainder visiting Alice Springs. All international Pilgrims will be billeted in local homes, parish halls or schools. Mass catering is planned for all lunches and a barbecue dinner.

WYD volunteers will provide first aid at large events. All Pilgrims who require formal medical care or who become unwell when not attending an event will have transport to the nearest appropriate medical service organised by a WYD representative. This could include any suburban General Practice or the hospital Emergency Department in Alice Springs or Darwin.

System Operation and Data Sources

The NT WYD surveillance system will consist of 3 arms.

1. Syndromic Surveillance
2. The NT Notifiable Diseases Database
3. Environmental Surveillance

Syndromic Surveillance

The system will rely predominantly on syndromic surveillance data. A list of 'Syndromes of Public Health Importance' (Box 1) has been compiled by NSW Health and this will guide data collection. However given the small number of Pilgrims in the NT and the comprehensiveness of the syndrome list it is reasonable to aim for complete ascertainment of every Pilgrim presentation to the health system. Keeping this in mind the main data sources will be WYD representatives and medical practitioners.

Box 1.**Syndromes of Public Health Importance in World Youth Day Pilgrims (as defined by NSW Health)**

- Gastrointestinal illness (bloody stool)
- Gastrointestinal illness (non-bloody stool)
- Acute febrile illness with rash
- Meningitis/encephalitis
- Respiratory distress without fever
- Acute respiratory infection with fever
- Temperature related illness (eg. hypothermia)
- Suspected acute viral hepatitis
- Botulism like syndrome
- Unexplained death
- Alcohol ingestion related presentation
- Presentation relating to the use/misuse of medications (prescribed or illicit)
- Mental health related presentation
- Sexual health related presentation
- Mass presentations with similar symptoms, especially in a single Pilgrim group

Information on WYD surveillance is being provided to General Practitioners, Emergency Department staff and NT WYD representatives. All are encouraged to report any attendance of WYD Pilgrims at a health service. CDC staff can then determine whether the Pilgrim fulfils the criteria for one of the syndromes of interest. WYD first aid providers are also being supplied with information; predominantly advising them to report disease clusters. Any information collected will not be identified and will be used to identify trends or clusters of disease where public health action may be required.

A direct report will be compiled using computer generated Emergency Department data. Syndromic data on presentations with gastrointestinal symptoms and flu like illness will be analysed using cumulative counts and the CUSUM method. Additionally the ICD10 diagnoses entered for patients seen in ED will be monitored for important conditions such as encephalitis and measles.

Notifiable Diseases Database

Any notifiable diseases that occur in Pilgrims will be entered in the Northern Territory Notifiable Diseases Database with a code identifying the notification as occurring in a WYD participant. Given the short time frame of the event, the database is unlikely to be helpful in detecting outbreaks amongst Pilgrims

however it will be a useful tool for data collation should any outbreaks occur.

Environmental Surveillance

Information on infection control and safe food handling is being distributed to WYD organisers. The Environmental Health Unit will also be involved in their usual role in the event of any food or waterborne disease outbreak.

System Analysis and Evaluation

Information from all data sources will be analysed daily during the event and appropriate public health responses will be activated where necessary. Relevant information will be distributed on a daily basis to primary health care providers in Darwin and Alice Springs, NT WYD representatives and NSW Health.

Post event, the outcomes of the surveillance system will be examined including number of events detected, and any public health responses initiated. The validity of the system ie. its success in picking up events requiring a public health response will also be assessed.

Conclusion

This is an event specific surveillance system designed for the NT. Although the numbers of Pilgrims expected in the NT are small, the early detection and containment of an outbreak or even a single case of measles could have an impact on the larger WYD celebrations in Sydney. This system will also provide information on what the most feasible and useful activities are for public health surveillance in mass gatherings in the Territory.

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Investigation of Meningococcal Vaccine Failure

Julie Graham, Chris Nagy, CDC Darwin

Abstract

In May 2007 a 16 year old girl from a remote Indigenous community who had previously been vaccinated with Meningococcal C vaccine was diagnosed with meningococcal C meningitis. An investigation to determine the cause of this vaccine failure found the most likely cause to be incorrect preparation or administration of the vaccine.

Background

The national Meningococcal C Vaccination Program commenced and was implemented in the Northern Territory (NT) in 2003. Vaccine was provided free to all children between the ages of 1-19 years over the 3 year period 2003-2006. Meningococcal C conjugate vaccine (MenCCV) was also added to the NT Childhood Vaccination Schedule for administration to all infants at 12 months of age as an ongoing policy.¹

The catch up components of the program included opportunistic immunisation for children between 1-5 years at health clinics and for those aged 5-19 years vaccine was administered via schools and through general practitioners. To reduce the impact on schools from outside vaccine providers, where possible vaccines were administered at the same time routine school screening was being conducted.

Two meningococcal vaccines were tendered for use in the program. To reduce time and workload a prefilled syringe, the Baxter produced NeisVac-C[®], was distributed for use in the urban catch up/school based program. The more heat tolerant Menjugate[®], (manufactured by CSL) was utilised in the remote program as longer transportation times can occur in remote settings. This vaccine required mixing of 2 vials 1 each of powder and diluent prior to administration. There were reports of vaccine administration errors Australia wide as a result of providers failing to mix the powder with the diluent and injecting diluent only (personal communication C Nagy). In response to vaccine

errors and calls from providers including the NT Centre for Disease Control (CDC), the distributor changed the packaging of the product in late 2003 to include clearer reconstitution advice and the presentation of the diluent in a glass syringe.

Vaccine failure, case report and investigation

In May 2007 a 16-year-old girl from a remote community (Community A) was diagnosed with meningococcal C meningitis. According to her client file and the NT Immunisation Database (NTID) she had been vaccinated in November 2004 with Menjugate[®], as part of a 3 day school screening and vaccination program.

As part of a preliminary investigation, serum was taken from 2 other students residing in the same community and vaccinated on the same day as the case. Both students had received Menjugate[®], however they had received a different batch from that used to vaccinate the original case. Both these students were negative for *Neisseria meningitidis* IgM/IgG and also for *Neisseria meningitidis* C capsule IgM. Therefore there were 3 potential vaccine failures that required investigation.

Aim

The aim of this project was to investigate the causes of these apparent vaccine failures, assess the extent of the failures and to plan an appropriate intervention if required.

The potential causes for the failure in this instance were:

- Primary vaccine failure due to:
 - Failure to administer an effective vaccine due to incorrect vaccine storage, error in reconstituting or administering the vaccine, faulty batch/batches of vaccine; or
 - Failure to seroconvert following vaccination.

- Secondary vaccine failure due to waning immunity.

Methods

The Northern Territory Immunisation Database (NTID) and MenCCV databases were used to identify all children in Community A who had received MenCCV and to identify where possible the brand and batch number of vaccine used. In addition the databases were used to search for other communities in the NT that had used the same batches of Menjugate[®] throughout the national immunisation program and identify the recipients of these vaccines.

A chart audit was performed at Community A of all people given MenCCV as part of the 3 day school screening and vaccination program from 24/11/04-26/11/04. Data recorded were date of administration, vaccine brand name, batch number and immunisation provider. A total of 27 records were reviewed.

Due to anomalies in the initial database search a second chart review identified other eligible children who had received MenCCV at Community A but had failed to have the data recorded centrally. The same fields were recorded. A total of a further 60 children were identified as having received Meningococcal C vaccine throughout 2004. Of these, 4 vaccines were administered in November 2004 but outside of the 3 day school screening and vaccination program time.

As a control, several children from a neighboring community (Community B) who had received the same batches of vaccine and several children from Community A who had received vaccine outside the school screening dates were identified and bled to assess seroconversion.

Attempts were made to contact the vaccine providers to determine their knowledge or memory of the vaccine preparation of Menjugate[®], and their participation in the program at Community A.

Cold chain graphs and vaccine wastage reports for October and November 2004 at communities A and B were reviewed in an effort to identify any cold chain breaches that may have affected vaccine viability.

Results

NT and MenCCV Database Review

The population lists for Community A revealed that there were many more eligible children who should have received the vaccine than were recorded on the database. A chart review highlighted a large number of MenCCV vaccines had been administered throughout 2004 and that data had not been transmitted to the central database. The number of vaccine recipients at Community A in 2004 was finally determined to be 87.

Further review revealed that the 2 batches involved in the reported vaccine failures had been used extensively throughout the NT. A total of 47 communities or Community Health Centres had used either 1 or both of the batches. A total of 1740 doses of the involved batches had been recorded on the database.

Chart Review

The charts of all clients recorded on the database as having received MenCCV in November 2004 from Community A were examined. The results are included in Table 1.

Table 1. Clients receiving MenCCV in the school screening and vaccination program from Community A

Date	Number vaccinated	Batch numbers used
24/11/04 (school screening)	4	1 (X)
25/11/04 (school screening)	21**	3*(X) (Y), (Z*),
26/11/04 (school screening)	2	1 (X)
TOTAL	27	3*

* NeisVac-C[®] administered to 1 child

** 2 children immunized at the clinic and not as part of school screening

Two immunisation providers had signed the MenCCV file entries, a Registered Nurse (RN) and an Aboriginal Health Worker (AHW). The RNs name appeared on records of 2 of the identified vaccine failures and the AHW the other.

Cold Chain

Menjugate[®], should be stored between 2° – 8°C and not frozen.² A review of the vaccine cold chain graphs at Clinic A for October and November 2004 showed that no cold chain breaches or vaccine loss occurred. Menjugate[®] maintains its integrity when exposed to high temperatures³ and there was no evidence to reflect that any vaccine used during school screening was subjected to extreme and extended periods of heat.

Seroconversion Testing

In the control group from Community B, 8 students who had received the same batches of Menjugate[®] used during school screening were tested for *Neisseria meningitidis* IgM/IgG and *Neisseria meningitidis* C capsule IgM. Despite intensive prior arrangements with South Eastern Area Laboratory Services (SEALS) only 3 of the 8 samples were correctly forwarded, processed and results received. Of these 3 samples 2 returned a positive result (*Neisseria meningitidis* IgG antibody –ve, *Neisseria meningitidis* C Capsule IgM antibody +ve) with 1 being negative (*Neisseria meningitidis* IgG antibody –ve, *Neisseria meningitidis* C Capsule IgM antibody -ve). A positive seroconversion was noted for each of the batches involved in the vaccine failures at Community A. Of several children targeted for testing in Community A only 2 other children who had received the identified batches of vaccine but on alternative dates were bled. Both of these returned a positive seroconversion result.

One child who received a dose of the same batch of NeisVac-C[®] vaccine as that used during school screening on 25/11/04 was bled and returned a positive seroconversion result.

Discussion

Primary vaccine failure occurs when a person's immune system does not produce enough antibodies when first vaccinated. This can be related to the vaccine itself being ineffective or to an individual's immune system not mounting an appropriate response. Secondary vaccine failure occurs when an adequate amount of antibody is produced immediately after the vaccination, but the level falls over time.

In previous studies 1 dose of MenCCV in the 14-17 year old age group resulted in a 98% seroconversion.⁴ A high number of vaccine failures 3/21 (14%) on one day is unlikely to be due a lack of seroconversion or secondary vaccine failure. Studies have also shown that waning immunity is more likely in children receiving vaccine under 12 months of age and is not expected in the teenage population.^{5,6} Data on teenage vaccination show that immunity is unlikely to wane in the first 3 years after immunisation.⁶

In reviewing the possible causes of primary vaccine failure, cold chain breach and batch failure both appear unlikely. Although cold chain problems are impossible to completely rule out, records reflect maintenance of the vaccine at recommended temperatures. Vaccines are dispensed from Royal Darwin Hospital with both heat and freeze monitors. Staff in clinics are educated to review these monitors and report any breaches in cold chain to the Immunisation Project Officer. No reports were received during this time.

The batches indicated in the vaccine failures at Community A were widely used throughout the NT. Testing of students from an alternative location has shown that seroconversion following vaccination with both batches of Menjugate[®] has occurred. Seroconversion had also occurred with all batches used in the original community at other stages during the catch up program. This therefore rules out a batch failure and provides some reassurance that the problem was not widespread involving other communities and did not involve all children immunised in Community A.

The most likely cause therefore of the vaccine failure at Community A is a failure to either reconstitute or administer the vaccine according to instructions. In May 2003, the Head of Immunisation in the NT wrote to all vaccine providers in direct response to an alarming increase in the number of vaccine errors associated with the administration of Menjugate[®]. The recurrent errors that were reported to the local CDC unit included the administration of diluent only and the mixing of the powder with an alternative diluent such as sterile water or normal saline. In August 2003, the Australian distributor of the vaccine advised

vaccine users that it planned to change the packaging of the vaccine in an effort to reduce widespread reconstitution errors. Discussions with the RN involved in the November school screening program at Community A failed to elucidate whether this had occurred although they did remember a problem with the packaging of the vaccine.

Limitations

Many logistical issues have hampered this investigation. Despite initial consultation with the local laboratory several specimens were not forwarded to the appropriate reference laboratory for testing. Despite several targeted attempts, it was difficult to locate children and consenting parents in Community A and B and hence only small numbers of children could be investigated for seroconversion.

Outcome

A decision was made to revaccinate all students at Community A who had received Menjugate[®], during the 3-day school screening and vaccination program. 12 of the 27 vaccine recipients were revaccinated over a 3-week period as part of this investigation. The remaining children were unable to be located on several attempts and will be vaccinated opportunistically when they present to the clinic.

Conclusions

Although this is a limited study, the most likely cause for the vaccine failures are errors in

vaccine administration or reconstitution. There were reported vaccine errors Australia wide due to confusion with the packaging of Menjugate[®].

Menjugate[®], is no longer routinely used throughout the NT.

All vaccine providers are now encouraged to participate in a vaccine provider course⁷ prior to giving vaccines throughout the NT and processes are in place to record and evaluate vaccine errors and adverse events including vaccine failures.

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New childhood immunisation internet site

What is it?

From mid July, the Department of Health and Families (Department of Health and Community Services) will launch a new childhood immunisation internet site. This site will contain immunisation histories for children in the Northern Territory (NT) under 15 years of age, although records for children over 12 years of age may not be complete. This is the information that is currently obtained from the Immunisation Help Desk. The Immunisation Help Desk will still function as normal but the internet site will allow immunisation providers to access immunisation histories for children after hours and on weekends.

Who Can Access this Information?

Only immunisation providers can access this information, the general public will not have access to this site. Immunisation providers will need to complete a registration form and obtain a username and password to access this secure site.

How can I obtain access to the site?

To gain access the site, contact the Immunisation Help Desk on 8922 8315. A registration form can then be faxed or emailed to you. Once you have filled in the form and it is authorised by your manager, fax it back to the Immunisation Help Desk on 8922 8897.

Once your registration form is received, it will be processed and you will be notified by email of the web address for the site along with your username and password.

How current is the information on the site?

The information on the site is extracted from Community Care Information Services (CCIS), which is the Territory's main repository for Immunisation data. This occurs on a weekly basis and the Immunisation Record that is displayed on the site informs the user of the date that the information was extracted from CCIS.

For further information please contact the Immunisation Help Desk on 8922 8315.

The Northern Territory Centre for Disease Control Conference

The annual Centre for Disease Control Conference dates have changed. The proposed dates are now during the week commencing November 10, 2008 to coincide with a sexual health meeting. Any staff wishing to offer presentations please contact Tracy Ward, the coordinator on 89228044.

Central Australian STI risk factor study

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Abstract

This brief report outlines a research project currently being undertaken in central Australia which aims to investigate the behavioural risk factors for sexually transmitted infections (STIs) among young Aboriginal people in remote and urban communities.

The aims of the study are to: determine the behavioural and situational risk factors for STIs in young Aboriginal people across central Australia and their prevalence; determine the association, if any, of these risk factors and STIs; explore the feasibility and acceptability of systematic inquiry into sexual behaviour and associated risk factors in community clinic settings; and develop practice guidelines for individualised risk assessment and the offering of immediate, presumptive STI treatment for asymptomatic persons who present to central Australian community clinics.

Gender specific consultations were conducted in a number of remote communities and in Alice Springs. This information and a review of the literature on STI risk factors formed the basis for the questionnaire design. The questionnaire will be administered to 250 men and 250 women between the ages of 16 and 35 years from remote and urban communities. The questionnaire will be administered in conjunction with an adult health check which routinely includes an STI check.

The results of this analysis will be presented to participating communities and health services. It is important that the risk behaviours identified in the study are discussed and ways to address these issues explored with both communities and health services.

Background

This brief report outlines a research project currently being undertaken in central Australia. The project is investigating the behavioural risk factors for sexually transmitted infections (STIs) among young Aboriginal people in remote and

urban communities. This group is known to experience disproportionately high rates of bacterial STIs and poor use of sexual health services.

Untreated infections cause significant long term health consequences including pelvic inflammatory disease, tubal infertility, ectopic pregnancy, neonatal infection and increased risk of exposure to human immunodeficiency virus (HIV). Decreasing the incidence of STIs is a major public health priority. Identifying and addressing the risk factors associated with disease transmission is a valid point for intervention. However our poor understanding of the behavioural and situational contexts in which exposure can occur, limits such interventions. This research project will attempt to address this imbalance.

In the past 15 years there have been a number of improvements in STI control activities. The advent of Nucleic Acid Amplification Tests (NAAT) has made testing for several STIs more sensitive, less invasive, more convenient and more accessible. Highly effective, single dose treatments for the most common STIs are now widely available. Syndromic management of symptomatic persons is the norm and coordinated community screening programs occur regularly. There has also been a greater degree of coordination of effort and cooperation between health services across the region. However, in spite of these changes, prevalence rates of chlamydial and gonococcal infection have continued to rise in this region.¹

Exposure to STIs is the result of complex and interrelated socio-demographic and behavioural risk factors. There have been many studies internationally which have attempted to identify either behavioural or clinical risk indicators for infection. Unfortunately, the risk indicators identified have varied between studies to such an extent as to preclude a standard set of indicators being broadly used. The most commonly identified factors include age less than 25 years, female gender, recent change in sexual partner, higher number of recent sexual partners and

inconsistent use of condoms with sex.^{2,3} In the only central Australian study of its type, Miller et al (2001)⁴ identified young age, female sex, volatile substance abuse, alcohol use and previous infection as indicators of increased risk of infection. However, studies of this type are conspicuously lacking in Aboriginal health as is any routine practice of inquiry about sexual behaviours in central Australian clinical settings.

In addition, the great majority of STIs diagnosed in the region are in persons who have not presented to a clinic with symptoms. That is, they are diagnosed as a result of being opportunistically tested when they are at the clinic for another reason or during community screening programs. The reasons for this are unclear. It is known that bacterial STIs are frequently asymptomatic, especially in females. It is also known that STIs are associated with significant shame and many people are reluctant to admit to or present with symptoms. This is thought to be the case amongst adolescents who tend to delay treatment for sexual and reproductive health problems⁵ and also for Aboriginal males where lack of a male practitioner may be a barrier to presentation.

When an asymptomatic person is diagnosed with a STI additional follow-up is required in order to treat the patient and their contact. This can be extremely time consuming for clinic staff that are already under resourced. Treatment is further complicated by the high mobility of persons in the region. The result is that a significant proportion of people do not receive treatment and there are often delays of several weeks before treatment is given. The negative implications for STI control are obvious. Despite considerable international effort, no reliable point of care tests are available for the common STIs. As immediate diagnosis of asymptomatic persons is currently not possible, it is important to identify those persons at risk of exposure. Combining opportunistic testing with presumptive treatment based on risk assessment could make a positive contribution to STI control in central Australia.

Aims of the Study

This study aims to:

- Determine the behavioural and situational risk factors for STIs in young Aboriginal people across central Australia.

- Gather prevalence information about these particular risk factors.
- Determine the association, if any, of these risk factors and STIs.
- Explore the feasibility and acceptability of systematic inquiry into sexual behaviour and associated risk factors in community clinic settings.
- Develop practice guidelines for individualised risk assessment and the offering of immediate, presumptive STI treatment for asymptomatic persons who present to central Australian community clinics.

Progress to Date

The project was endorsed by the NT Sexual Health Advisory Group and has ethical approval from the Central Australian Human Research Ethics Committee. Health service managers and staff, Health Boards and Community councils have been approached regarding participation in the study. The project has received broad support from both communities and health services.

Gender specific consultations were conducted in a number of remote communities and in Alice Springs. These consultations took the form of individual interviews and group discussions. The areas of inquiry included the perceived risk factors for STIs, local terminology for key words and concepts and methods for the administration of the questionnaire. The community consultations yielded considerable information on a range of risk factors. This information and a review of the literature on STI risk factors formed the basis for the questionnaire design.

The questionnaire addresses both demographic and behavioural characteristics. Inquiries will be made about age, sex, marital status; behavioural characteristics such as multiple partners, new partners, condom use, substance use and symptomatology.

A pictorial resource has been developed to facilitate administration of the questionnaire. The pictorial resource was designed specifically to desensitise the interview process. Both the questionnaire and the pictorial resource have been pilot tested. On the basis of this testing, some refinements have been made to the questionnaire.

Proposed methods

The questionnaire will be administered to 250 men and 250 women between the ages of 16 and 35 years from remote and urban communities. Only persons agreeing to participate will be enrolled. The questionnaire will be administered in conjunction with an adult health check which routinely includes an STI check. No additional tests over and above those included in the standard adult health check will be collected for the purpose of this study.

The questionnaire will be administered by experienced male and female clinicians. Respondents will be interviewed by a person of their own gender. Clinicians will receive training in cross cultural interviewing, the use of the pictorial aid and the questionnaire format. During community consultations considerable variation in terminology was revealed. This suggests that a standardised format may not be appropriate to all communities. Therefore prior to commencing data collection, interviewers will need to determine the terminology and phrasing of questions that is appropriate to each community.

Data will be analysed using univariate statistics and frequency distributions. Chi-square statistics will be used to establish associations between potential risk factors and test results. T-tests will be used to assess differences in baseline characteristics (age, education, relationship duration).

Multivariate analysis will be carried out to determine factors independently associated with having an infection. A logistic regression model will be developed using the infection status as a dependent outcome and all other variables found significant in univariate analysis as independent variables. Deidentified data will be entered and analysed using SPSS.

In men a first pass urine sample will be collected for testing for chlamydial and gonococcal infection and trichomoniasis by NAAT. In women self collected lower vaginal swabs will

be collected for testing for chlamydial and gonococcal infection and trichomoniasis by NAAT, or if a Pap smear is due, endocervical and high vaginal swabs for NAAT chlamydia, gonorrhoea and trichomoniasis will be collected. In both men and women a sample of venous blood will be collected and tested for syphilis by EIA and RPR if necessary. Standard regional STI management protocols will be utilised for management of symptoms or signs of STIs that are revealed in the course of the adult health check.

The results of this analysis will be presented to participating communities and health services. It is important that the risk behaviours identified in the study are discussed and ways to address these issues explored with both communities and health services.

For more information about the study please contact Kirsty Smith at CDC Alice Springs on 08 89517553.

This study is funded by the NT Sexual Health and BBV Program.

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The emerging problem of community-associated MRSA; Necrotising pneumonia in a 19 month old Aboriginal boy

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Abstract

Community-associated methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infection in children is increasingly common in northern Australia and can be associated with severe infection. An infant with severe CA-MRSA infection causing necrotising pneumonia and rib osteomyelitis is described. Recent literature is reviewed and recommendations for management are provided. In order to restrict the spread of CA-MRSA it is necessary to address the broad issues of socioeconomic disadvantage as well as to implement practical public health measures.

Case report

A 19 month old boy from a remote Aboriginal community in the Northern Territory (NT) presented to Katherine District Hospital (KDH) with a 1 week history of fever and cough and a 24 hour history of shortness of breath.

The past medical history was unremarkable. He was born by normal vaginal delivery at term with a birth weight of 4160 grams. He had had no previous admissions to hospital. Immunisations were up to date and he was developmentally normal.

Examination revealed a miserable, febrile (40° C), tachycardic (heart rate 188 beats per minute) and tachypnoeic (respiratory rate 64 breaths per minute) child. There were decreased breath sounds at the left base of the chest. Investigations revealed a leukocytosis (31.2 X 10⁹/L with 77% neutrophils), and a C-reactive protein of 292mg/L. Chest X-ray showed extensive left sided opacification centred in the lower zone with features consistent with pneumonia.

He was commenced on intravenous ceftriaxone. Gram-positive cocci were grown in blood cultures 2 days following admission. Ceftriaxone was changed to flucloxacillin. On day 3 identification and susceptibility testing revealed the isolate to be a non-multi-resistant methicillin-resistant *Staphylococcus aureus* (nmMRSA) and intravenous vancomycin (10mg/kg qid) was started.

The patient improved on vancomycin but spiked high temperatures on days 4 and 5. On day 6, a tender swelling was noticed in the mid-axillary area of the left chest wall. Ultrasound showed a 49mm x 33mm x 39mm hypoechoic collection connecting with the chest wall.

Oral cotrimoxazole (8/40mg/kg BD) was added after infectious diseases consultation and he was transferred to the Royal Darwin Hospital (RDH). Computed tomography of the chest showed consolidation and collapse of the left lower lobe with a loculated pleural collection in the left hemithorax extending through the chest wall, findings consistent with an empyema necessitans complicating lobar pneumonia. There was evidence of osteomyelitis of the sixth rib. Surgical drainage and partial decortication was performed 2 days later, after which the patient made an excellent recovery. Typing of the empyema isolate showed it to be multilocus sequence type 93 (ST93) MRSA, the Queensland clone, and Panton-Valentine leukocidin (PVL) positive.

The patient received a 2 week course of intravenous vancomycin and was transferred back to KDH to complete a total of 6 weeks of oral cotrimoxazole.

CA-MRSA – the emerging problem

CA-MRSA infection in children has been an emerging problem in Australia and overseas with rates of methicillin resistance as high as 76% in some paediatric centres in the USA.¹ The first reports of CA-MRSA in Australia came from the Kimberley region of Western Australia in the 1980s.² Subsequently, independent emergence of diverse CA-MRSA strains in geographically distinct regions of Australia has been documented, including strains unique to the NT, NT-MRSA (clonal complex 75).^{3,4,5,6}

CA-MRSA typically causes skin and soft tissue infections, however there have been many case reports of severe disseminated infection in children including bacteraemia, necrotising pneumonia, osteomyelitis, and septic venous thrombosis.^{7,8}

In a recent longitudinal study of pyoderma in remote Top End Aboriginal communities, *S aureus* was recovered from 58% of skin sores. Methicillin-resistance was detected in 23% of *S aureus* isolates. Of these, 71% were the NT-MRSA clonal complex and 14% were the Queensland clone (ST 93). The next most prevalent isolates were WA-MRSA strains and the Oceania clone (ST 30).³ CA-MRSA accounts for 15% of *S aureus* isolates recovered from patients presenting to hospitals in the Top End (Steven Tong, personal communication).

This case report illustrates the potential virulence of CA-MRSA and the potential for severe and life threatening infection. An important virulence factor is Panton-Valentine leukocidin (PVL), a bacterial toxin that can mediate leukocyte and tissue destruction. This is expressed by the Queensland and Oceania clones while NT-MRSA and WA-MRSA strains are PVL negative.³ Most cases of severe CA-MRSA disease in Australia have been due to PVL positive ST93 isolates. Clones positive for PVL have been associated with necrotising pneumonia and death. Of RDH isolates, approximately 50% are PVL positive.⁹

What clinicians need to do

The emergence of methicillin-resistant *S aureus* in NT communities coupled with its potential to cause severe disease poses an emerging public health threat. The following are important points for community clinicians to note:

- There needs to be a low threshold for taking swabs to obtain culture and antimicrobial susceptibility results for skin sores and abscesses that are failing to respond to standard β -lactam therapy.
- Whenever possible, abscesses should be incised and drained.
- CA-MRSA characteristically is susceptible to cotrimoxazole and sometimes to clindamycin. However, we have concerns regarding the empiric use of clindamycin as inducible resistance to clindamycin is present in 22% of RDH isolates (Tong, personal communication), and up to 47% of community isolates. Additionally, clindamycin is not available in Australia in a liquid formulation suitable for children.^{7,8}
- The current recommendation is to use oral cotrimoxazole (8/40mg/kg bd) for

uncomplicated skin and soft tissue infections caused by CA-MRSA.¹⁰ Cotrimoxazole is widely available, inexpensive, well tolerated in children, and importantly comes as a palatable oral formulation.

- In the setting of suspected severe invasive staphylococcal infection, empirical treatment should include vancomycin until culture and antimicrobial susceptibility results are available. Molecular detection of methicillin-resistance in blood culture isolates may help inform early antimicrobial selection for staphylococcal bacteraemia at the RDH in the near future.

What is needed at the community level

In the United States, the Centres for Disease Control guidelines for clinical management of CA-MRSA emphasise the importance of personal and household hygiene. Wounds should be covered, hands regularly washed with soap and water, and regular bathing maintained. Potentially contaminated items should not be shared, contaminated clothing should be laundered after each use, and environmental surfaces where multiple individuals have bare skin contact cleaned.¹¹ Unfortunately such recommendations are not currently realistic in Aboriginal communities.

Therefore, in order to restrict the spread and emergence of CA-MRSA in Aboriginal communities, it is necessary to address the broader issues of socioeconomic disadvantage. Overcrowding, poor sanitation, inadequate water supply, poor hygiene, low levels of education and young maternal age have all been shown to be risk factors for skin disease^{12,13,14} and are likely to be risk factors for CA-MRSA skin infection. There is no current data to support the use of oral or topical agents to decolonize patients with CA-MRSA. Furthermore, such attempts will almost certainly fail if the personal and household hygiene issues are not addressed first.

Practical public health interventions such as introduction of swimming pools¹⁵ and interventional programs for scabies^{16,17,18} have been proven to be effective at decreasing prevalence of pyoderma and should impact on CA-MRSA skin infection if coordinated across communities. A commitment to improve basic living conditions with improved housing, sanitation facilities, and water supply are

fundamental to improving basic hygiene and health.

It is postulated that high rates of antibiotic use in these disadvantaged communities may be promoting the emergence and spread of microbial resistance and the amplification of disease.¹⁹ This threat extends well beyond individual communities as demonstrated by the spread of CA-MRSA clones across Australia and the Pacific. Unless issues of disadvantage are addressed in Aboriginal communities we are likely to see continuing increased rates of microbial resistance.

Acknowledgements

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Acute intussusception in infants and children in the Northern Territory. Report for the study period 1 June 2006 - 31 May 2008

Heather Cook, CDC Darwin

Abstract

The Northern Territory (NT) established a surveillance system for intussusception (IS) in 2003 in anticipation of new rotavirus vaccines becoming available in Australia. The rotavirus vaccine *Rotashield*[®] had been withdrawn from use in the United States due to a reported association with IS.

The rotavirus vaccine *Rotarix*[®], was introduced into the NT Childhood Immunisation Schedule in October 2006 and IS surveillance has continued throughout this time along with case ascertainment quality assurance (QA) measures. An additional QA tool using NT hospital emergency department data has been implemented in late 2007.

The numbers and incidence of IS have remained low since vaccine introduction with 1 suspected but no confirmed cases following recent rotavirus vaccination. The 2 cases occurring in vaccinated children occurred more than 8 weeks after *Rotarix*[®] vaccination. No viral pathogens were detected in stool samples however not all cases had samples collected or tested.

Maintenance of quality assurance measures to maximise data capture, particularly stool collection is an important aspect of this study.

Background

Surveillance for IS in children has become important due to a reported association of IS with the *Rotashield*[®] rotavirus vaccine in 1998-1999 in the US. This led to its withdrawal from the market and had a major impact on the design of clinical trials and licensing requirements for other rotavirus vaccine candidates.

In May 2006 2 new oral rotavirus vaccines were licensed for use in Australia and in October 2006 the NT introduced the *Rotarix*[®] vaccine into the NT Childhood Immunisation Schedule as a routine funded vaccine for all infants at 2 and 4 months of age.

The hospital-based surveillance system at Royal Darwin Hospital (RDH) and Alice Springs Hospital (ASH) that commenced in June 2003, has provided baseline information on the epidemiology of IS in the NT recording demographic, clinical and management information about children admitted with intussusception. Continued surveillance has enabled monitoring of the epidemiology of IS since vaccine introduction.

This report describes the study cases for the period June 2006-May 2008 and includes additional information on suspected or probable cases since vaccine introduction.

Study Aims

The primary aims of this study are to:

1. Monitor for changes to the baseline incidence and clinical pattern of acute IS in infants and children in the NT.
2. Continue IS surveillance in the NT.
3. Investigate any correlation between the development of IS and rotavirus infection including changes in predominant serotypes in the NT.
4. Identify risk factors for acute IS in infants and children in the NT.

Methods

The study was conducted at the RDH and the ASH where suitable radiological and surgical facilities for the diagnosis and management of IS were available. Ethical approval for the study to continue until 2009 was granted by the Human Research Ethics Committees of the NT Department of Health & Community Services (DHCS) and Menzies School of Health Research, and the Central Australian Human Ethics Research Committee.

All patients less than 2 years of age diagnosed with IS were eligible for the study. As soon as possible after the diagnosis the study coordinator obtained consent and collected information

including basic patient data (age, sex, ethnic background), clinical symptoms and signs, month of presentation and region of domicile. A parent questionnaire was used to identify possible risk factors and immunisation records were obtained to determine the time interval between the most recent immunisation and the development of IS. Stool samples were requested and tested for stool microscopy and bacterial culture, rotavirus and adenovirus antigen were performed in the NT with samples sent to Royal Children's Hospital (RCH) laboratory in Melbourne for further analysis (rotavirus, adenovirus, calicivirus and astrovirus) where possible. A summary of the investigations performed, treatment and the final patient outcome was recorded for each patient. De-identified information was entered and recorded on a secure Microsoft Access database.

To enable ascertainment of cases missed during admission at RDH or ASH, previously established quality assurance measures including review of the ICD-10 codes every 6-12 months and monthly checking of the RDH radiology procedures and paediatric ward admission books continued. In addition, since December 2007, a report is produced from the Emergency Department Syndromic Surveillance System signalling if there have been any cases discharged from an emergency department with a diagnosis of IS. In-service education to new rotating paediatric medical staff to inform them of the study and their involvement occurred 6 monthly.

Estimated resident population data for the year 2005, obtained from the DHCS Epidemiology Branch,¹ were used to calculate the incidence of IS for the post vaccine period. Analysis of the data was undertaken using Microsoft Excel and STATA, Version 9.

Results

Between 1 June 2006 and 31 May 2008, there were 5 confirmed cases of IS in children <2 years of age in the NT, an incidence of 0.35 per 1000 child-years. Three cases occurred in 2007 (the first complete year since vaccine introduction) giving an annual incidence rate of 0.84 per 1000 in children <1 year of age. This compares to previously reported rates of between 0 to 1.64 per 1000 live births (with case numbers ranging from 0-6 per year).^{2,3} One child represented 3 months after the initial diagnosis with a repeat IS, which was successfully reduced by barium enema without complication. In addition there was 1 suspected case in a 4.5 month old female in September 2007. This child had received her second dose of *Rotarix*® vaccine 9 days prior to onset. Initial abdominal X-ray showed dilated loops of bowel however no IS was demonstrated on barium enema. An ultrasound was not performed.

The repeat episode and the suspect case do not meet the case definition for definite IS and are not included in the study.⁴ The demographic details of the 5 confirmed cases are outlined in Table 1. All children were aged <18 months (age range 2-15 months, mean 7 months); 4 cases (80%) were male and 2 (40%) were Indigenous.

Clinical Summary of confirmed cases:

Average duration of symptoms at diagnosis:

- 13.4 hours (range 6-23 hours)

Investigations

- Diagnosis was made by ultrasound in 4 cases with the other case confirmed following ultrasound and enema. Two cases had an abdominal X-ray prior to treatment.

Table 1. Demographic summary of confirmed cases of intussusception June 2006 – May 2008

	Case 1	Case 2	Case 3	Case 4	Case 5
Reporting hospital	RDH	RDH	RDH	ASH	RDH
Date of enrolment	20/10/2006	11/12/2006	15/01/07	16/04/07	01/11/2007
Sex	M	M	M	M	F
Age	2 months	15 months	6 months	6 months	10 months
Indigenous status	non-Indigenous	non-Indigenous	Indigenous	Indigenous	non-Indigenous

Procedures

- Two cases were successfully reduced via barium enema, requiring 1 and 3 attempts while a further 2 cases proceeded to surgery after 1 unsuccessful attempt at enema reduction. One child did not have an enema prior to surgical reduction. The 3 surgical cases had laparotomy and manual reduction with 2 cases also having appendectomies.

Site

- In all cases the IS were located in the transverse colon with 2 cases having ileocaecal involvement confirmed.

Signs and Symptoms either reported by parent or evident on examination

- | | |
|-------------------------------|---------------|
| • Pain | 60% |
| • Lethargy | 100% |
| • Vomiting (not bile stained) | 20% |
| • Bile stained vomiting | 80% |
| • Pallor | 60% |
| • Abdominal mass | 60% (all RUQ) |
| • Shock | 50% |
| • Abdominal distension | 20% |
| • Rectal mass | 20% |

Outcome

- No mortality occurred. One child represented with probable IS 3 months later.

Immunisation Status

- All children were up to date with immunisations however the child aged 2 months, had not yet received any 2 month vaccines.
- 2 children had received rotavirus vaccine prior to diagnosis. One case was diagnosed 58 days following dose 2 of *Rotarix*[®] vaccine and the second case was diagnosed 6 months following dose 2 of *Rotarix*[®].

Stool studies

Of the 5 cases, 3(60%) had sufficient stool samples collected for testing. None of these tested positive for rotavirus. No other viral pathogens have been reported as present. Of the

results available 2 were tested for adenovirus, 1 for calicivirus and 1 for enterovirus. A stool sample from 1 child tested positive for *Salmonella*.

Length of admission

For the 5 cases, the average stay was 4 days with a range from 2-7 days.

Discussion

The incidence rate of IS in children reported in the NT has not increased since the introduction of rotavirus vaccine with the number of cases per year remaining low. Published post-licensure surveillance studies from the United States have shown similar results with the overall number of cases not exceeding the expected background disease numbers.^{5,6} These studies were conducted following the use of *RotaTeq*[™] (a 3 dose rotavirus vaccine) whereas in the NT the 2 dose vaccine (*Rotarix*[®]) is the scheduled vaccine currently in use. A literature search did not yield any post-licensure studies specifically on *Rotarix*[®]. Additionally, in the pre-licensure trials for both *Rotarix*[®] and *RotaTeq*[™] no significant difference in the risk of IS between vaccine and placebo was shown. An editorial by Glass and Parashar, 2006, suggests the complication of IS may have been a characteristic specific to *RotaShield*[®] rather than a problem intrinsic to all live oral rotavirus vaccines.⁷

Baseline data from previous studies^{2,3} are useful in providing comparison and evidence of fluctuations in case numbers of IS from year to year in the NT population. Complete case ascertainment is important when monitoring diseases and conditions such as IS that occur infrequently. Efforts to continue this level of ascertainment through ongoing contact with the reporting clinicians to emphasise the detail and requirements of IS surveillance, along with other quality assurance measures, are important aspects of the study, and need to be maintained.

The development of the Emergency Department Syndromic Surveillance System and associated reporting has enabled simple, frequent and timely review of hospital data identifying new cases of IS. This provides an alternative mechanism for enabling data collection in the acute phase of the illness, however as a passive

surveillance system it is reliant on NT Emergency Department clinicians entering the diagnosis into the Cardinal Module of the *CareSys NT Production Hospital Management Information System*, the unified 'Emergency Department Information System'. It is anticipated use of this surveillance tool will increase the likelihood of obtaining the appropriate stool samples, an aspect of the study that has been difficult in the past. No cases of confirmed IS have been reported or detected however since introduction to fully assess its usefulness.

Conclusion

While there has been no increase in cases of IS since the rotavirus vaccine was introduced into the childhood immunisation schedule in the NT, ongoing surveillance is important to monitor disease and inform current policy. Simple and effective systems to facilitate complete case ascertainment are required for surveillance of conditions such as IS where case numbers are small. Although no cases have occurred since the implementation of the Emergency Department syndromic surveillance system for intussusception it is anticipated this will provide a simple, timely method of case ascertainment and subsequent comprehensive data collection.

Acknowledgements

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A volunteer doctor in East Timor

Rosalie Schultz, CDC Alice Springs

Background

East Timor is Australia's nearest neighbour, and this new nation has been in our news regularly. A guerilla force campaigned for independence from Indonesia throughout the last decades of the 20th Century. A referendum for independence was held in 1999 and was followed by a break down of law and order. The departing Indonesians were in bitter dispute and left devastation and ruin in much of East Timor. The period after the referendum was followed by preparations for independence, which was granted by the United Nations in 2002. Crisis and blood shed re-emerged in 2006 when people complained of discrimination within the military. Most recently there was a coup attempt in February 2008.

The country adjoins valuable undersea petroleum and gas resources in the Timor Sea. However the majority of the people are farmers, growing subsistence foods and coffee as a cash crop. The level of poverty is high with 41 % of the population living below the national poverty line of US 55 cents per day.¹

Health status

Health information on Timor reflects the striking poverty and malnutrition. Childhood malnutrition in Timor however affects both wealthy and poor families, suggesting that there is population-wide need for education and support for nutritional programs.²

I tried to understand the health situation in Timor prior to going but found huge variation in estimates in important health indicators. Table 1 shows the most recent estimates – all of which have improved when comparing them to the

previous estimates so I believe the country's health status is improving.

Primary health care

I was employed by Australian Aid International (AAI), a small NGO based in Melbourne with experience in emergency relief, however, in this setting I was to contribute to their primary health care program in Timor. This program is AAI's first experience in assisting in primary care.

AAI is involved in a number of programs in Timor, including providing water filters to the camps of Internally Displaced People in Dili; health promotion; and mobile primary health care clinics.

My position was as a volunteer doctor providing primary health care outreach clinics on Atauro Island 30km north of Dili. I found that primary health care was fragmented, with different teams of midwives and nurses employed by the Ministry of Health to provide antenatal care and immunisations. AAI's role was limited to 'curative' primary health care, but we were in regular contact with the Director of Medical Services on Atauro Island so there was potential for cooperation with other services.

The most common problems presented were non-specific pain, particularly back pain and headache. As people had no access to simple analgesics, they attended clinics with conditions most people would manage themselves in Australia. This was likely, however, to be used as a last resort after local remedies had failed.

People presenting with these simple problems were interspersed with life-threatening malaria, tuberculosis (TB) and pneumonia.

Table 1. Estimates of Health Indicators for 2006, East Timor, Australia, and Aboriginal and Torres Strait Islanders^{3,4}

	East Timor	Australia	Aboriginal and Torres Strait Islander
Life expectancy at birth in years	66	82	62
Infant mortality per 1000 live births	47	5	13
Under 5 mortality per 1000 live births	55	6	21.5
Maternal mortality per 100 000 live births	380	4	8

Tuberculosis (TB)

Timor Leste has among the highest rates of TB in the world. The World Health Organisation (WHO) publishes incidence and prevalence data annually, as shown in the Table below, with some comparable data from our other neighbours.⁵ TB is recognised as the most important cause of adult mortality in Timor.⁶

The significant difference between incidence and prevalence of TB in Timor (and PNG) suggests a large amount of untreated disease.

Table 2. TB annual incidence and prevalence, per 100,000

	TB incidence	TB prevalence
Australia	6	7
New Zealand	9	9
Papua New Guinea	250	513
Indonesia	234	253
Timor Leste	556	789

Community based work and regional published data suggests that the prevalence is higher again, with reports that 5% of people have suggestive symptoms including cough for 3 months, haemoptysis or weight loss.⁷

Timor has a National Tuberculosis Program (NTP), following WHO recommendations, boasting impressive data on implementation of DOTS.⁸ Reports of the program have been published.⁹

However access to the NTP requires presentation at a Community Health Centre (CHC). My efforts to provide primary care for TB in Timor were made difficult by inability to access the NTP. While AAI provided outreach primary care, we were barred from providing any TB services, which required attendance at the CHC. There was limited motorised transport, except the vehicle and boat which enabled us to run the outreach clinics. Many clients whom I urged to attend the CHC for TB work ups were unable or unwilling to walk, understandably, for up to 7 hours across the island to reach the CHC. I also saw people previously diagnosed with TB who carried their treatment in their pockets to show to me. While it is important that those providing TB treatment are well trained and know the NTP system, the need for accessible treatment was obvious.

Insights gained

A 2 month placement can provide only a glimpse of health status and health services. However my interest in health issues in our region has intensified. I have new perspectives on Timor Leste as a people and a nation, and its striking mass of service providers with hundreds of NGOs, United Nations programs including volunteers and its systems of organisations, and unilateral and multilateral aid arrangements, all seeking to support an under-resourced government.

The administrative officer working for AAI spoke memorably of her intense love of the country and its people, and her disenchantment at the prolonged difficulties in all walking together ('la'ō hamutuk'). Coordination and unified support of primary care services are vital if the health of the East Timorese is to benefit from outside assistance.

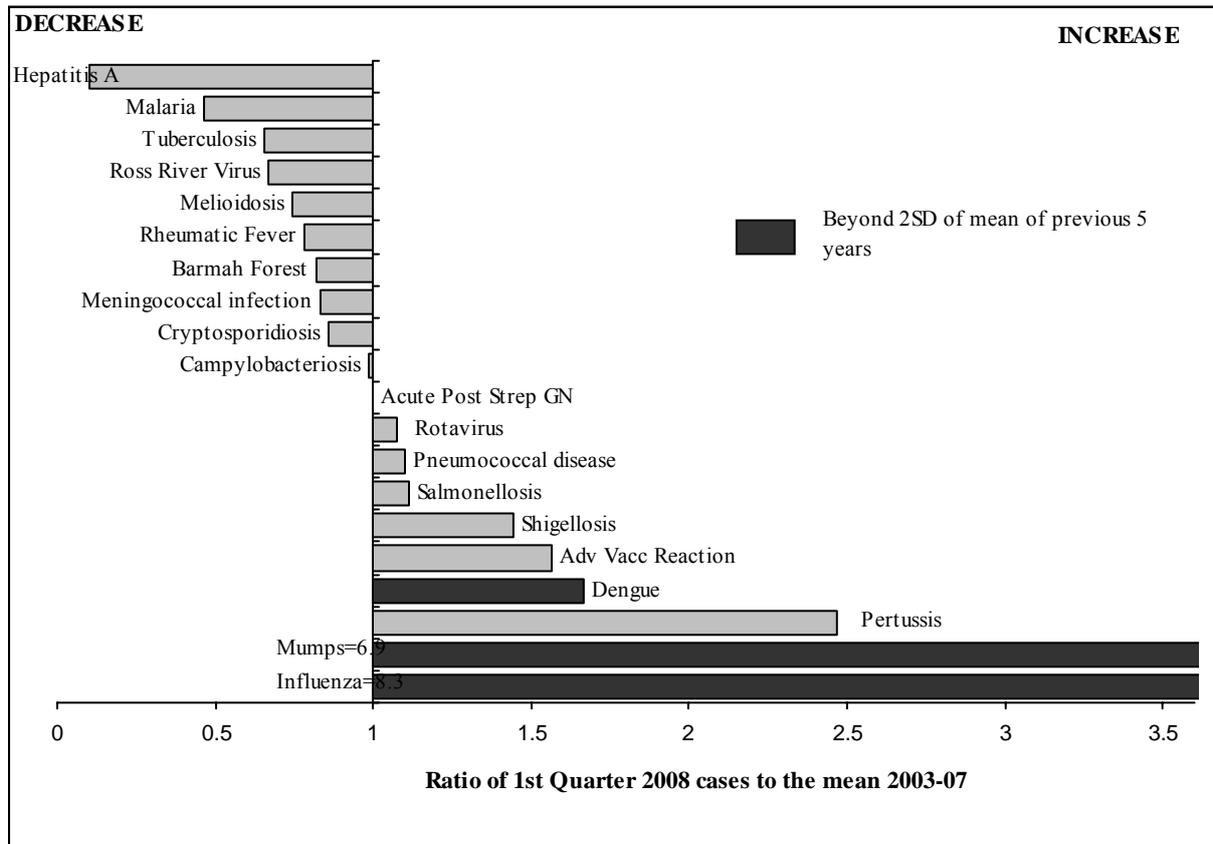
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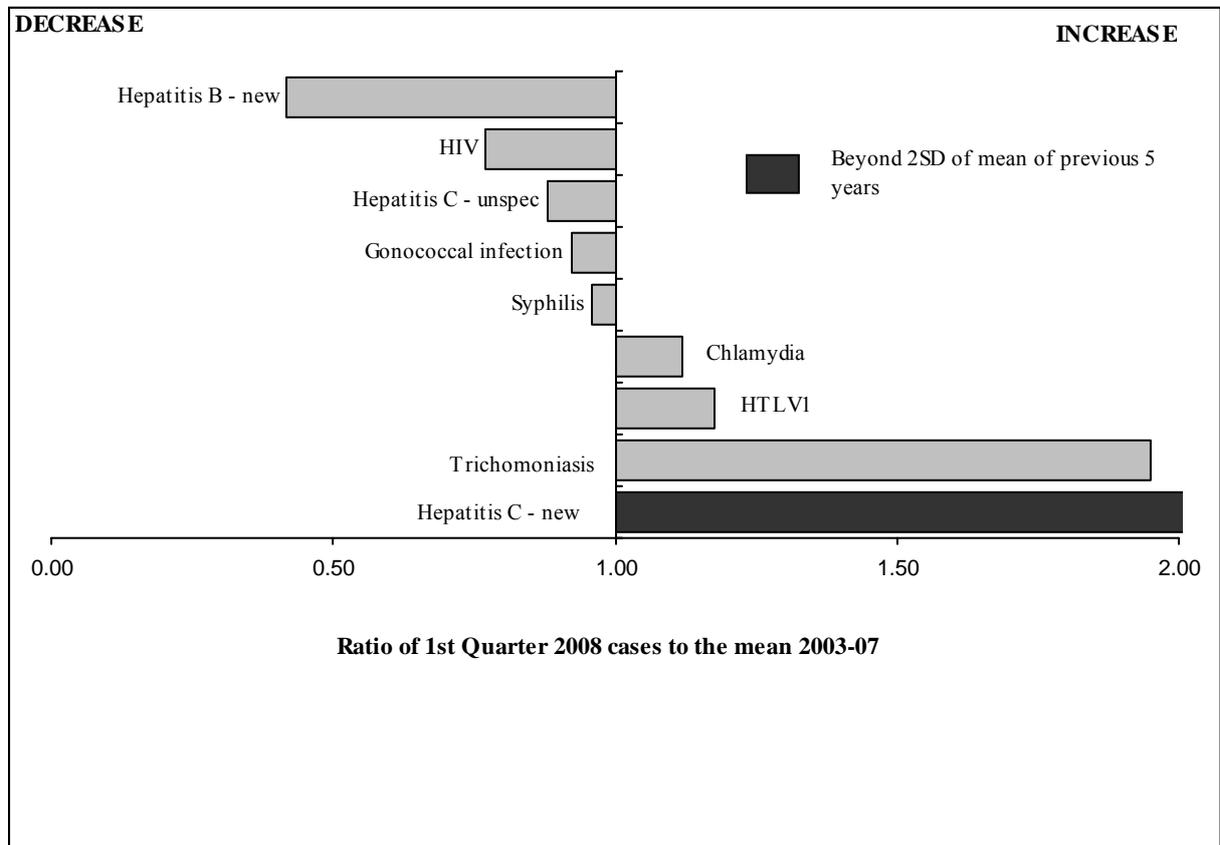
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
01 January to 31 March 2007 & 2008

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		NT	
	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007
Acute Post Streptococcal GN	4	0	0	1	4	0	0	0	1	0	9	1
Adverse Vaccine Reaction	1	2	1	1	12	7	0	1	1	0	15	11
Barmah Forest	2	6	0	0	15	18	0	6	1	3	18	33
Campylobacteriosis	18	16	2	2	43	51	2	1	6	0	71	70
Chickenpox	14	4	1	1	3	13	9	3	0	0	27	21
Chlamydia	189	212	14	9	203	212	45	51	60	54	511	538
Chlamydial conjunctivitis	2	1	0	2	0	1	0	1	0	0	2	5
Cryptosporidiosis	23	21	1	2	8	13	0	2	5	6	37	44
Dengue	1	0	0	0	12	5	0	0	0	0	13	5
Gonococcal conjunctivitis	0	2	0	0	1	0	0	0	0	1	1	3
Gonococcal infection	164	198	25	14	82	84	27	25	81	59	379	380
Gonococcal neonatal ophthalmia	0	0	0	0	0	1	0	0	0	0	0	1
Hepatitis A	0	0	0	0	1	2	0	0	0	0	1	2
Hepatitis B - chronic	21	14	0	1	7	17	19	22	1	5	48	59
Hepatitis B - new	0	0	0	1	0	0	0	0	1	0	1	1
Hepatitis B - unspecified	8	39	0	1	13	19	0	9	8	4	29	72
Hepatitis C - new	1	1	0	0	3	1	1	0	0	0	5	2
Hepatitis C - unspecified	9	13	0	1	39	44	1	2	6	3	55	63
H Influenzae b	0	0	0	0	1	0	0	0	0	0	1	0
H Influenzae non-b	0	3	0	0	0	0	0	0	0	0	0	3
HIV	0	0	0	0	2	2	0	0	0	0	2	2
HTLV1 asyptomatic/unspecified	16	27	0	0	0	0	0	0	0	0	16	27
Hydatid	0	1	0	0	0	0	0	0	0	0	0	1
Influenza	2	0	1	0	24	7	1	0	2	0	30	7
Leptospirosis	0	0	0	0	0	1	0	0	0	0	0	1
Malaria	0	1	0	0	5	5	0	0	0	0	5	6
Measles	0	0	0	0	0	0	0	0	3	0	3	0
Melioidosis	0	0	0	0	7	19	0	1	4	0	11	20
Meningococcal infection	0	1	0	0	2	1	0	0	0	1	2	3
Mumps	7	0	2	0	0	2	1	0	1	0	11	2
Pertussis	3	3	1	0	41	4	0	0	2	1	47	8
Pneumococcal disease	6	4	2	1	6	6	1	1	0	0	15	12
Q Fever	0	1	0	0	0	0	0	0	0	0	0	1
Rheumatic Fever	3	4	0	0	9	10	0	4	1	3	13	21
Ross River Virus	6	4	1	1	69	80	4	14	13	28	93	127
Rotavirus	5	15	2	1	31	10	5	0	4	3	47	29
Salmonellosis	25	44	11	4	87	110	7	14	13	12	143	184
Shigellosis	39	22	9	6	15	12	1	4	1	5	65	49
STEC/VTEC	0	2	0	0	0	0	0	0	0	0	0	2
Syphilis	27	16	1	4	17	8	8	3	6	21	59	52
Trichomoniasis	159	159	9	20	138	139	77	80	101	72	484	470
Tuberculosis	2	1	0	0	4	9	0	1	0	1	6	12
Typhus	0	0	0	0	1	0	0	0	0	0	1	0
Varicella unspecified	0	0	0	0	1	0	0	0	0	0	1	0
Yersiniosis	0	0	0	0	0	1	0	0	0	0	0	1
Zoster	0	5	1	0	17	24	1	0	1	0	20	29
Total	757	842	84	73	923	938	210	245	323	282	2297	2380

Ratio of 1st quarter 2008 cases to the mean of 2003-2007: selected diseases



Ratio of 1st quarter 2008 cases to the mean of 2003-2007: sexually transmitted diseases



Comments on notifications p 32

Hepatitis C

The NT commenced enhanced surveillance from July 2006. Before that, only rarely did clinicians notify newly acquired hepatitis C cases to the Centre for Disease Control. Therefore, it is unclear whether the 5 newly acquired cases notified in the first quarter represented an increase in incidence or enhanced awareness among the public leading to more testing, as there are not much data to compare with. However, an investigation into each of these 5 cases showed no evidence of point source of infection, and 4 out of the 5 were current or previous injecting drug users.

Influenza

In the first quarter of 2008 there were 30 cases of influenza notified compared with an expected 3.6 cases for this timeframe based on the 5 year mean. The NT often has a rise in influenza notifications in March and April but this year it was earlier and greater than expected. Cases

were mainly in urban Darwin and on the Tiwi islands. Interestingly, 24 of the cases were influenza B in contrast to last year's epidemic when over 95% were type A.

Mumps

The outbreak of mumps which commenced in 2007 continued for the first quarter of 2008 with 11 cases being notified compared with the 5 year mean of 1.6. The outbreak has spread into WA and is being investigated in conjunction with WA colleagues.

Dengue

There were 13 cases of dengue notified in the first quarter compared with a 5 year mean of 8 cases. The increase was mainly in cases from Indonesia with most of the remainder coming from East Timor. The increase has been noticed at the national level and is consistent with reports of dengue outbreaks in these countries.

NT Malaria notifications January – March 2008

Merv Fairley, CDC, Darwin

There were 5 notifications of malaria received for the first 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	<i>P falciparum</i>	No
1	Samoa	Holiday	<i>P vivax</i>	No
1	Papua New Guinea	Holiday	<i>P vivax</i>	No
1	Uganda	Refugee	<i>P falciparum</i>	No
1	Sierra Leone	Refugee	<i>P falciparum</i>	No

Vaccination coverage for children aged 12 <15 months

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Fully vaccinated
Darwin	280	90.4	90.4	92.9	93.9	89.3
Winnellie PO Bag	88	90.9	90.9	93.2	94.3	89.8
Palm/Rural	200	93.5	93.5	96.0	96.5	93.0
Katherine	102	89.2	89.2	95.1	96.1	88.2
Barkly	31	90.3	90.3	93.5	93.5	90.3
Alice Springs	122	89.3	89.3	95.1	95.1	89.3
Alice Springs PO Bag	45	91.1	91.1	97.8	97.8	91.1
East Arnhem	38	92.1	92.1	92.1	97.4	86.8
NT	906	90.9	90.9	94.4	95.3	90.1
Indigenous	386	87.0	87.0	93.5	94.3	86.5
Non-Indigenous	520	93.8	93.8	95.0	96.0	92.7
Australia Indigenous	3,096	84.5	84.5	92.2	92.7	83.7
Australia Non Indigenous	66,917	92.3	92.2	94.6	94.5	91.6
Australia Total	70,013	91.9	91.9	94.5	94.4	91.3

Vaccination coverage for children aged 24 <27 months

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% MMR	% Fully vaccinated
Darwin	256	93.4	93.4	91.4	94.9	93.8	91.4
Winnellie PO Bag	101	99.0	99.0	97.0	99.0	97.0	97.0
Palm/Rural	84	97.6	97.6	96.4	98.8	96.4	95.2
Katherine	84	97.6	97.6	96.4	98.8	96.4	95.2
Barkly	14	92.9	92.9	78.6	92.9	85.7	78.6
Alice Springs	122	95.1	95.1	95.9	95.9	96.7	95.1
Alice Springs PO Bag	38	97.4	97.4	97.4	97.4	97.4	97.4
East Arnhem	47	100.0	100.0	95.7	100.0	97.9	95.7
NT	746	96.0	96.0	94.4	96.9	95.6	94.0
NT Indigenous	359	96.1	96.1	93.3	97.5	95.3	93.3
NT Non-Indigenous	387	95.9	95.9	95.3	96.4	95.9	94.6
Australia Indigenous	2,870	94.4	94.4	92.6	97.0	94.0	90.8
Australia Non Indigenous	64,995	95.1	95.0	94.6	95.7	94.2	92.9
Australia Total	67,865	95.0	95.0	94.5	95.7	94.2	92.8

Vaccination coverage for children aged 60 <63 months

Region	Number in District	% DTP	% Polio	% MMR	% Fully vaccinated
Darwin	257	83.3	83.3	84.8	82.9
Winnellie PO Bag	82	93.9	93.9	93.9	93.9
Palmerston/Rural	198	89.4	88.9	89.9	88.4
Katherine	88	94.3	94.3	94.3	94.3
Barkly	26	84.6	88.5	88.5	84.6
Alice Springs	108	84.3	84.3	84.3	84.3
Alice Springs PO Bag	49	95.9	95.9	95.9	95.9
East Arnhem	64	98.4	98.4	96.9	96.9
NT	872	88.8	88.8	89.3	88.3
NT Indigenous	349	91.1	91.4	91.4	91.1
NT Non-Indigenous	523	87.2	87.0	88.0	86.4
Australia Indigenous	2,567	85.4	85.2	85.4	84.3
Australia Non Indigenous	62,984	89.2	88.9	88.9	88.3
Australia Total	65,551	89.0	88.8	88.8	88.2

Immunisation Coverage 31 Mar 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 34.

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 31 Mar 2008 were born between 01 Jan 2007 and 31 Mar 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 31 Mar 2008 were born between 01 Jan 2006 and 31 Mar 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 31 Mar 2008 were born

between 01 Jan 2002 and 31 Mar 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.

Previous immunisation coverage reports have assessed coverage of the 4 years old immunisations at 6 years of age. This has now been changed to 5 years of age nationally and will continue to be assessed at 5 years of age into the future.

Interpretation

Immunisation coverage in NT children was below the national average in the 12 to 15 month cohort and above the national average in the 24 to 27 month and 60 to 63 month cohorts. This increase in coverage rates between 12 and 24 months reflects in part, a lack of timeliness in vaccination for children under 12 months with these vaccines being caught up over the next year. These markers are a continuing reminder that the timeliness of vaccinations needs to be improved. Immunisation coverage in Indigenous children in NT was higher across all age groups compared to the national coverage of Indigenous children.

Immunisation coverage for NT children as a whole at 60 to 63 months of age (88.3%) remains slightly lower than the younger cohorts, and this is a concern across Australia, with the national average for this cohort being 88.2%, compared to 91.3% (12 to 15 months) and 92.8% (24 to 27 months). For Indigenous NT children, immunisation coverage is lower at a younger age (ie. 86.5% at 12 to 15 months cohorts) but higher for the older age group (ie 91.1% at 60 to 63 months), reflecting a concern that Indigenous children are not as well covered in early childhood.

Disease Control staff updates

Surveillance

Julie Goggin joined the surveillance section in March on a part-time basis as a research officer on the OzFoodNet environmental *Salmonella* project. She will be finishing at the end of June after a very successful few months recruiting case and control households for the project. **Shellee Williams** will be returning to this position on a part time basis.

Immunisation

Amy Ryan has left for Queensland after providing a successful start to the HPV vaccination project. Amy's replacement is **Sharron Murray** a child health nurse from Casuarina Community Care Centre. Changes with the immunisation support nurses HPV program include **Jenine Gunn** commencing maternity leave, being replaced by **Rosemary Day** (previously worked on the Meningococcal C Immunisation Project). Data entry staff changes include completion of contract for **Janelle Winter** (Adult Immunisation Database) and commencement of **Jo Langham**.

SH&BBV

New staff for Darwin include **Gerri Grady** Research Project Officer, **Astrid Stark** Youth Health Policy Officer, **Robyn Williams** Tristate, Specialist Physician **Catherine Pell**, **Kristen Elms** Clinic 34 Receptionist, **Sandra Noblet** Hepatitis C Nurse Clinic 34 and **Belinda Davis**, N5 Manager, Clinic 34 and urban team. **Sarah Skorupa** Clinic 34 Receptionist commenced maternity leave and **Adrian Coulthard**, Remote AHW has resigned.

Alice Springs CDC

Robyn Puls is supporting the trachoma program staff and **Gina Lillica** is providing support for the HPV roll out. **Tanya Taylor** is backfilling for **Coleen Doherty** as HR/ Business manager. **Elisa Brownhill** has left the Administration position and been replaced by **Alexandra Hodgson**.

Alice Springs SH&BBV

New staff include, **Robyn Williams** Tristate, **Alice Ishwar** CNC Syphilis Data Base Coordinator from 12 May, **Nicky Macintosh** CNC N4 will support Clinic 34 activities until

September, **Amanda Barry** MO support for Clinic 34 on a casual contract 8 hours per week, **Richard Melville** Remote Men's Educator/Zone Coordinator from 6th May, **Dianne Lewis** Remote women's educator for 10 weeks from 7th July, **Josephine Appo** commenced as AHW supernumerary appointment for 6 months to assist the remote team with regional STI screen activities and **Mairead Hetherington** Clinic Nurse Coordinator will commence from 7 July. **Mairead** is currently Remote Women's Educator/Zone coordinator. **Ruth Primrose** has transferred to Remote Maternal and Child Health.

Medical Entomology

Nadine Copley commenced maternity leave for 12 months, **Darren Bowbridge** completes his contract as Groote Eradication Project Officer in June as does **George Singh** (technical officer). **Jane Carter** is on long service leave until February 2009.

Environmental Health

Nicola Slavin, Senior Policy Officer, is on 12 months Maternity Leave. Nicola and husband Colvin welcomed baby Matilda into the world on 8 May 2008. **Natasha Clements** EHO, Darwin Urban is acting in her position. **Mimi Tomic**, Administration Officer Central Australia resigned to take up a full time study in psychology. **Kylie Wilkshire** has moved from Corporate Support to work as the program's database administrator for a 6 month period. Kylie has replaced **Maureen Kerr**, who has left the NT to run a B&B in Tasmania. **Andrew Brown**, EHO Darwin Urban has resigned to travel overseas for an extended period of time. Administration Officer for Poisons Control, **Kris Boyce** is backfilling the position vacated by **Jody Rasheed**, who has replaced **Christine Chamberlain** as the Policy Administration Officer. **Alex Mullins**, EHO Darwin Rural resigned to take up a position with Outback Stores. **Josh Cufley** (EHO Katherine) will be relocating to Darwin to take up the vacant position.

Gove

Suzanne Peel will be starting in Gove in the Sexual Health /BBV position on July 3 covering **Meaghan Kennedy's** maternity leave.