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Tuberculosis transmission within a single household –a report of a cluster of 11 cases

Rosalie Schultz, Alice Springs CDC

Background

This paper aims to describe a series of 11 cases of tuberculosis (TB) notified from a single household in a town camp in Alice Springs. These cases occurred over a period of 25 years, and include 1 death from TB. This series includes an outbreak of 8 cases within a 5-year period, all of whom were likely infected by the same index case (Case 4).

Methods

Active TB

TB is a notifiable disease in the Northern Territory (NT) and in Australia and contact tracing is managed in the NT by the Centre for Disease Control (CDC). Contact tracing is performed in accordance with local guidelines.[1] In general terms a list of contacts is obtained and classified according to risk, with household contacts considered high risk. Contacts are offered a brief clinical review and a Mantoux test (unless previously tested positive or there is a history of past active TB disease) with further investigations as indicated. Case notes and contact tracing lists from the index case (Case 4) were reviewed, together with case notes of those diagnosed and notified with active TB disease.

Results

The 11 cases of active TB are summarised in Table 1, spanning a 25-year period from 1983 to 2008. All 11 cases resided in a single household at different time-points. Because of the perceived risk of spread of TB around the camp, all residents were screened for TB in May 2004, through chest X-ray and clinical review. No cases of TB disease were found outside the household during the screen. The screen did promote the early diagnosis of Case 8, who was diagnosed in June 2004, 3 months prior to scheduled review in September 2004.

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Table. Active TB cases

Case number/ Diagnosis date	Age at diagnosis in years	Gender	Form of TB	Positive Mantoux date known positive* new positive† conversion‡ NA§	Comments
Case 1 24/11/1983	61	M	Pulmonary - smear positive	NA§	Presumed source case for Case 4; Deceased July 2006 - pneumonia
Case 2 24/12/1993	26	F	Pulmonary - culture positive	NA§	Deceased 7 days after commenced treatment
Case 3 7/6/1999	24	M	Pulmonary - culture positive	1/1/1994 known positive*	Also had positive nodal disease
Case 4 23/9/2003 Index Case	**26**	**F**	**Pulmonary - smear/culture positive**	6/12/1983 **known positive***	**Index case for majority of outbreak Offered isoniazid for LTBI in 1994-not commenced**
Case 5 11/3/2004	32	M	Pleural - culture negative	3/10/2003 new positive†	Completed treatment 2004. Deceased July 2006 hepatic failure.
Case 6 15/3/2004	53	F	Pulmonary - culture negative	6/2/2004 conversion‡	
Case 7 11/6/2004	25	M	Pulmonary - culture positive	1/1/1989 known positive*	Suggestive of re-infection
Case 8 23/6/2004	63	F	Pulmonary - culture positive	30/9/2003 new positive†	
Case 9 19/11/2004	25	M	Pleural - no culture submitted	27/3/1995 known positive*	**Suggestive of re-infection**
Case 10 23/8/2005	17	M	Pulmonary - culture positive	13/12/2004 conversion‡	
Case 11 20/2/2008	27	M	Pulmonary - smear/ culture positive	30/9/2003 new positive†	

* Known positive = documented positive Mantoux test in the past.
† New positive= Contact with no record of previous Mantoux test result who on initial testing at time of contact tracing was found to be Mantoux positive.
‡ Conversion=Contact that went from Mantoux negative to positive during contact tracing follow –up.
§ NA = not applicable.

Active case finding ceased in September 2007, 4 years after diagnosis of the index case, and 2 years after the last culture positive case. Case 11 was diagnosed in 2008 after he presented with a history of 7 days of symptoms. Contact tracing around this case revealed no evidence of further Mantoux conversions (ie no presumed spread of TB infection or disease) although he was heavily smear positive.

TB molecular analysis

All 6 cases for which typing is available (culture positive Cases 3, 4, 7, 8, 10 and 11) had identical mycobacterial interspersed repetitive unit (MIRU) DNA fragment analysis, supporting the presumed spread of disease through the household.

LTBI in contacts of TB cases

As at February 2009, 4 people with latent TB infection (LTBI) remain without disease development. Mantoux conversion was demonstrated in 1 of those during the outbreak in 2004, while the others had an initial positive Mantoux when screened in September 2003.

Following the diagnosis of Case 4 in September 2003, 3 people had documented Mantoux conversion during contact tracing, of whom 2 developed active disease between September 2003 and February 2008. Of 5 contacts with no record of previous Mantoux testing who on initial testing at time of contact tracing were found to be Mantoux positive, 3 also developed active disease between September 2003 and February 2008. This rate of progression to active TB disease, 5 of 8, is many times higher than the expected rate of 0.2% per year, or 10% to age 80 years.[2] Two contacts with known previous positive Mantoux tests both developed active TB between September 2003 and February 2008 (with the MIRU DNA fragment analysis consistent with the TB in others who lived in the

same household), supporting the hypothesis that disease resulted from spread through the household.

Development of disease in these 2 cases within 2 years of exposure supports possible re-infection rather than re-activation. This is consistent with what is known about highest risk time period for progression to active disease and disease spread through living in the household with the index case. Therefore, including these 2 would give a rate of progression to active TB of 7 of 10.

Of the outbreak cases, 9 of 11 had pulmonary disease only; Cases 5 and 9 had pleural culture negative disease only, with negative sputum cultures and no infiltrates on chest X-ray. No disease was diagnosed in other organ systems.

Contact tracing revealed 19 contacts did not convert their Mantoux test to positive, including all 4 children under 15 years of age. Of the known Mantoux negative adult contacts 5 are now deceased; the children all survive. Of the 11 TB cases, 2 individuals have deceased from diseases other than TB (Cases 1 and 5) and only Case 2 died of TB, presenting with extensive severe pulmonary disease and hypoxia. She died within 1 week of commencing treatment.

The high mortality in the contacts and cases in this group outbreak from causes other than TB is notable.

Age and gender distribution of cases of active TB

Age distribution of the cases (Figures 1 & 2) peaks in young adulthood, similar to the age distribution among overseas born adult cases in Australia.[3] However, no cases were diagnosed in children under 15 years. Four children were household contacts but none were diagnosed as LTBI as all had 0mm Mantoux skin tests.

Active TB was diagnosed in 7 men and 4 women.

Time of development of active TB

An epidemic curve (Figure 3) was created for the cases likely to have been infected by Case 4, who was infectious in the third quarter of 2003. The peak of cases of active disease is in the second and third quarters of 2004.

Figure 1. Age of TB cases from household

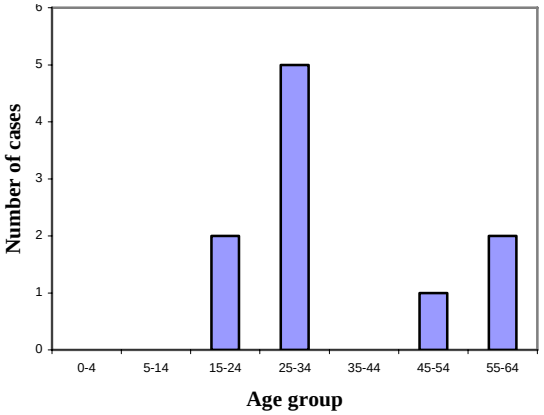


Figure 2. Age distribution of TB cases in Australia, by Indigenous and overseas born status.[3]

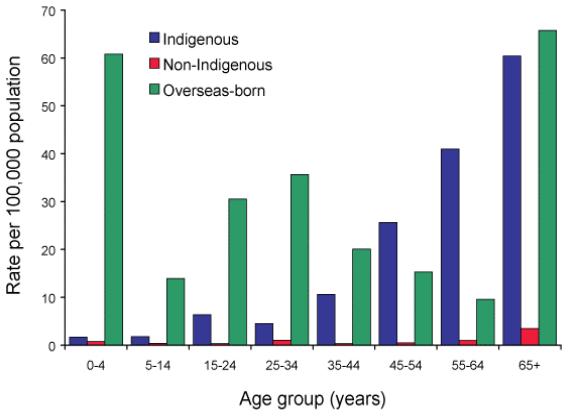
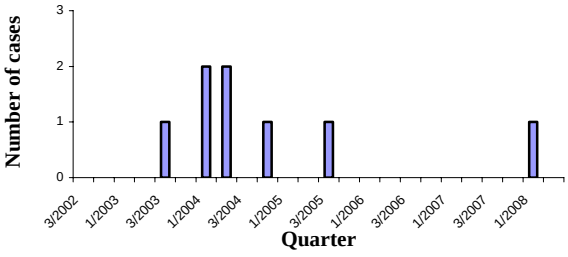


Figure 3. Outbreak curve of TB cases 2003-2008



Conclusion

This outbreak demonstrates high rates of infection and active TB, with peaks in young adults and in the first 12 months after infection. Identified risk factors among household contacts for the development of active TB include poverty, overcrowding, heavy alcohol consumption and high rates of tobacco use.[4,5,6]

No adult household members were offered treatment for latent TB infection, because of

heavy alcohol use, mobility and chaotic circumstances making the risks and costs likely to outweigh benefits. Attention to these issues is required to control TB in this population.[4]

References

1. Department of Health and Families, Centre for Disease Control. Guidelines for the Control of Tuberculosis in the Northern Territory. 4th ed. 2008.
2. Farhat M, Greenaway C, Menzies D. 2006 Thinking in three dimensions: An algorithm to aid interpretation of the tuberculin skin test [internet]. http://meakins.mcgill.ca/meakins/NEWTSTCalculator/homeE.htm.
3. Roche PW, Krause V, Konstantinos A, Bastian I. Tuberculosis notifications in Australia. 2006. *Commun Dis Intell* 2008:32 :1-11.
4. Plant A, Krause V, Condon J, Kerr C. Aborigines and tuberculosis. *Aust J Public Health* 1995; 19: 487-491.
5. Bates MN, Khalakdina A, Pai M, Chang L, Lessa F, Smith KR. Risk of Tuberculosis from exposure to tobacco smoke: A systematic review and meta-analysis. *Arch Intern Med*. 2007;167:335-342.
6. Lönnroth K, Williams BG, Stadlin S, Jaramillo E, Dye C. Alcohol use as a risk factor for tuberculosis – a systematic review. *BMC Public Health* 2008; 8:289 doi: 10.1186.1471-2458-8-289.

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Top End TB Outbreak Update—A Household Connection

Liz Stephenson, Gove CDC

Abstract

In 2008 an outbreak of tuberculosis (TB) in a Northern Territory Indigenous community occurred, where over a 10 month period 9 cases were notified, 8 cases from 1 house. The 2 main public health actions taken in response to this outbreak were;

1. contact tracing, where over 150 contacts were identified and initial screening revealed 5 TB cases and 13 individuals were diagnosed with latent TB infection (LTBI) and started on treatment and
2. community/camp screens where over 300 individuals have received a Mantoux test and/ or a chest X-ray (CXR) and clinical review and 1 TB case was identified.

Directly observed therapy to assure cure is given for those on TB treatment as well as for those being treated for LTBI to prevent progression to disease. Follow up will be ongoing in the community for the next 2 years.

Introduction

A tuberculosis (TB) outbreak in 2008 in a Northern Territory (NT) Top End community has required a co-ordinated and ongoing response. In the 10 years from 1998 to 2007, this community of approximately 1000 Aboriginal people had 3 cases of TB diagnosed, with the most recent case in 2005.[1] In 2008, a total of 9 cases were notified in this particular Top End community, 8 cases from 1 house, with the last case not from this household but resident in a separate camp.

Background

The 2 main public health actions taken in response to this TB outbreak were:

1. Contact tracing for the 3 initial cases

   This action resulted in:

   - 22 additional household members identified as contacts
   - 5 of the 22 members identified as further cases of TB
   - 13 of the 22 members identified as Mantoux positive and diagnosed with latent TB infection (LTBI) and all being commenced on LTBI treatment

2. A community screen (as recommended in the *Guidelines for the Control of Tuberculosis in the Northern Territory*[2] when secondary cases are detected in routine contact tracing or when 2 or more cases of active TB are diagnosed within 1 year in a community)

   This action resulted in:

   - an initial community screen being undertaken in June 2008
   - 207 of the 276 individuals identified for follow up being screened with a Mantoux test, or CXR and clinical review[1]
   - no further cases of TB identified
   - TB and germ theory education in Yolngu language provided by Aboriginal Resource Development (ARDS) Staff to the community

- follow up screenings being planned as per *Guidelines for the Control of Tuberculosis in the Northern Territory.*[2]

Follow up Community Screening

The first follow-up community screen was carried out from 11 to 17 November 2008, by visiting Centre for Disease Control (CDC) staff in collaboration with the community.

The number in the community to be screened, according to the Camp/Community List was 286, as a further 10 were found that were not on the previous June 2008 list.

The outcomes of this November 2008 screening included:

- A total of 101 people seen by the CDC Medical Officer
- 85 individuals having CXRs and clinical reviews which included:
  - 2 individuals found to have been previously diagnosed with pulmonary TB in the distant past who had been fully treated were given screening CXRs; and
  - 39 (46%) individuals who had their second contact tracing follow up CXR and clinical review plus
- 9 staff had CXRs and clinical reviews, 5 of these were previously seen in the June screening
- 5 of the known TB cases were clinically reviewed with CXRs
- 2 further individuals responded to the TB information given out over the community announcement system and had clinical reviews and CXRs.
  - One of these individuals was found to have active pulmonary TB and was evacuated to Royal Darwin Hospital (RDH) for isolation and initiation of TB medications. Isolation was required for 4 months, until 3 sputum samples were smear negative for *M tuberculosis*, indicating a high load of mycobacterium and high degree of infectiousness.

TB and germ theory education in Yolngu language was again provided by Aboriginal Resource Development (ARDS) Staff for the community.

The next visit from CDC staff and a radiographer for further TB follow up is planned for April 2009, when more CXRs and reviews will be carried out. This will include reviews of those individuals who have completed TB treatment via Directly Observed Therapy (DOT); currently 7 of the 9 cases have completed their TB treatment with completion rates ranging from 100% over 6 months to 82% over 9 months.

Contact tracing for the ninth diagnosed case continues. There were 40 contacts identified, 9 (22.5%) were previously Mantoux positive, 3 (7.5%) were newly Mantoux positive and 19 (47.5%) Mantoux negative. Further follow up including Mantoux testing on the outstanding 9 (22.5%) contacts, and CXR and clinical review on Mantoux positive contacts will be done in April 2009.

Another community in the Top End of the NT where the fourth diagnosed TB stayed for several months has also been receiving regular CDC visits for contact tracing.

Contact tracing results from this second community include:

- 84 contacts were identified by Community Health Centre (CHC) staff and the patient's family.
  - 6 (7%) contacts were found to be Mantoux positive (3 previous positives and 3 positive on contact tracing) are being assessed for LTBI treatment,
  - 5 have had follow up with CXR and clinical review in CDC Nhulunbuy.
  - 62 (74%) were Mantoux negative
  - 16 (19%) still require Mantoux testing. CHC and CDC staff are currently trying to locate them for contact tracing follow up.

A further visit is planned to the community of the index case for November 2009 to complete the yearly community screen follow-up and this visit will also include reviews of the 15 LTBI individuals currently on 9 months of DOT LTBI treatment. Those people currently on treatment for LTBI have medication completion rates

ranging from 77% (a non-household contact) to 99% (a household contact).

Acknowledgements

Many thanks to community members, CHC staff, the Radiology Department at RDH, ARDS and CDC for their help in managing this TB outbreak.

References

1. Coleman K, Stephenson E, Krause V. Top End TB Outbreak. *NT Dis Control Bull* 2008;15(4):8-10.
2. Department of Health and Families, Centre for Disease Control. Guidelines for the Control of Tuberculosis in the Northern Territory. 4th ed. 2008. http://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/25/05.pdf&siteID=1&str_title=Tuberculosis%20Control%20Guidelines.pdf accessed 30/03/2009.

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The NT Sexual Health Advisory Group – Two years on

Wendy Armstrong, SHBBV Unit, CDC Darwin

The June 2007 *Bulletin* reported on the establishment and role of the Northern Territory (NT) Sexual Health Advisory Group (SHAG). This group was first convened in October 2006 in order to "*actively support the implementation of a quality and comprehensive Sexual Health and Blood Borne Virus Unit within the Primary Health Care (PHC) sector throughout the Territory"*.

SHAG members come together in Darwin or Alice Springs twice a year for a full day of meetings, presentations and discussions, with issue specific teleconferences in between. To date the SHAG has met face to face 6 times with the next meeting planned for the end of July in Darwin.

Membership remains unchanged, although we now invite observers to meetings where appropriate. The Chair of the SHAG is Jenny Cleary, Executive Director, Health Services Division, Department of Health and Families (DHF). Members are from key stakeholder groups that provide sexual health services across the NT including:

- DHF Centre for Disease Control (CDC)/ Sexual Health and Blood Borne Virus (SHBBV) Unit (3)
- Aboriginal Medical Services Alliance NT (AMSANT) (4)
- Tri-state Centre for Sexual Health (formerly the Tri-state HIV/STI project) (1)
- Office of Aboriginal and Torres Strait Islander Health (OATSIH) (1)
- Northern Territory AIDS and Hepatitis Council (NTAHC) (1)
- General Practice Network NT (GPNNT) - (formerly the Division of GP) (1)
- NT Family Planning and Welfare Association (FPWNT) (1)
- DHF Remote Health, Top End and Central Australia (1 each)

A review in July 2008 of the first Business Plan for SHAG and 'new directions' for the NT DHF SHBBV Program indicated that progress was well ahead of schedule. Much has been achieved since the birth of the Advisory Group and it was clearly time to set new goals via a revised business plan. Achievements to date are summarised below, under headings described previously as the key focus for the program and within the context of the governance of the SHAG.

Investment in a new PHC approach-Sexual Health Coordinators

The roll out of the comprehensive approach to sexually transmitted infection/blood borne virus (STI/BBV) programs via grant funding to PHC services for dedicated Sexual Health Coordinators is progressing.

The first of these grants, provided to the Central Australia Aboriginal Congress (CAAC) in 2007,

is about to be reviewed prior to entering into a new funding agreement. The partnership between CAAC and the Alice Springs Sexual Health Unit (SHU) is well established and productive. The coordinator works closely with the manager, Men's Health Clinic. There have been some innovative approaches to STI screening of Aboriginal men via a regular barbecue night at the local pub – a sausage 'sanger' in return for a screen appears to have been well received!

A second grant has been provided to support 2 Sexual Health coordinators (1 male/1 female) to work across the 3 PHC organisations in the Katherine region. This program has been established for 1 year and the coordinators have been warmly welcomed by all 3 organisations. The coordinators 'sit' with other regional public health staff at Wurli Wurlinjang Aboriginal Medical Service and are well engaged across the region, as well as working in close collaboration with the Katherine CDC Sexual Health Nurse.

Re-focus of existing services

In line with the commitment to the comprehensive approach, or '8-ways', as it is known, the majority of Remote Sexual Health positions within the SHBBV Program have been redesigned to reflect this approach.

What is the 8-ways model?

The '8-ways' is a comprehensive model for STI control devised by a previous Sexual Health Coordinator for the South Australian (SA) Nganampa Health Service. The model describes eight essential elements:

1. Health promotion and education
2. Training
3. Health hardware
4. Clinical services
5. Monitoring and evaluation
6. Research
7. Surveillance
8. Policy, planning and management

In early 2008 additional funding was made available to support the employment of a regional coordinator in Alice Springs to lead the remote team and coordinate activities across the allocated zones.

The Darwin, Top End remote team positions have also been redesigned and consultations will be undertaken with Top End health service managers to identify zones for the new approach. This is an ideal time to introduce the '8-ways' into new PHC remote health services structure

Staged approach

The new program directions and in particular the introduction of the coordinator role, is being gradually introduced over a period of 3 years and will then be reviewed. Progress to date is ahead of the planned time frame.

Responding to increasing Hepatitis C/HIV clinical demand

In 2008, a sexual health physician was recruited to the Darwin team. Dr Cathy Pell provides services to clients at Clinic 34 Darwin 3 days per week and provides NT wide public health support on the remaining 2 days. There are now also 2 doctors enrolled in the training program to become sexual health physicians, and support has been provided for the Alice Springs SHU doctor to undertake further training in HIV management and prescribing of S100 medications.

Clinics 34 in Darwin and Alice Springs manage and support patients with Hepatitis C undergoing treatment. This service is provided in Darwin by Doctors Josh Davis and Steven Tong and in Alice Springs by Professor Bob Batey on a fly in, fly out basis. Scholarships are available for GPs who would like to further their education in either HIV or Hepatitis C (or both) clinical care. This information has been made available through the GPNNT, but as yet has not been taken up.

Health Promotion informed by research

The Health Promotion Advisory Group (HPAG) was formed in early 2008. Chaired by the SHBBVU Health Promotion Officer, the HPAG meets monthly to discuss emerging issues and develop responses. The Group has NT wide representation from government and non-government sectors.

The 'Safe Sex No Regrets' campaign is a health promotion activity informed by research. The

campaign was developed in response to the high rates of chlamydia in young people. The campaign involves a range of strategies, such as television and radio advertisements, posters, a screen saver and 'gimmicks' aimed at encouraging young people to use condoms and get tested. Prior to the campaign launch, a range of education and information activities were undertaken by the SHBBVU team so as to engage with other service providers and gain support for the campaign. Services involved included Community Care Centres, Defence Force Clinics, GPNNT, Youth Organisations and Health Promoting Schools. An evaluation framework is in place and will be developed and applied towards the end of the 12 month life of the campaign.

Partnerships with non-government organisations

Partnerships between the DHF SHBBVU and non-government organisations (NGOs) are well developed and productive. The collaborative approach to sexual health service delivery with PHC NGO partners has already been described. Relationships are well established with the NT AIDS and Hepatitis Council and Family Planning NT. Other new partnerships with NGOs providing youth services include Anglicare and Mission Australia and Research Institutions such as Menzies School of Health Research and the Centre for Remote Health.

Other key areas of activity

Research and surveillance

The SHAG has a role in supporting and monitoring sexual health research activities across the NT and for generating research questions. Research proposals that have been presented to the Group include:

- *STI Remote Community Trial*, National Centre in HIV Epidemiology Clinical Research (NCHECR) funded by the National Health and Medical Research Council (NHMRC), in the early stages of implementation
- *Key Performance Indicators* for Remote Sexual Health Services, Menzies School of Health Research, in progress
- *Culture, context & risk*: Socio-cultural influences on the sexual health of Indigenous youth, DHF/Menzies/Aboriginal Medical Service Alliance Northern Territory (AMSANT), awaiting funding by the Australian Research Council Linkage Program or NHMRC

The NT wide Syphilis Information System has been launched. This web-based system will enable tracking of syphilis information across the NT and promote consistency in provision of syphilis treatment information and patient advice.

Policy

The SHAG has a key role in policy development. A media policy has been endorsed, aimed at discouraging negative reporting around STI rates by highlighting 'good news' outcomes from surveillance reports. A project is in progress to develop guidelines for the provision of contraception to those under the age of 16 years and will be presented to the next SHAG meeting. As a result of an *STI Risk Factor* Study undertaken in Central Australia, a working group has been formed to consider development of guidelines for presumptive STI treatment.

New project

The Centre for Sexual Health (CSH) has been established in Alice Springs as a regional 'centre of excellence' to provide leadership, coordination and technical support in STI/HIV control, including surveillance and research in the Tri-State Region of Central Australia.

Funded by the NT, Western Australia (WA), SA Health Departments and the Commonwealth Office of Aboriginal and Torres Strait Islander Health, the Centre is co-located with the Centre for Remote Health.

In summary, the SHAG is now well established as a dynamic and cohesive body that is providing support and oversight for the new directions of sexual health service delivery in the NT. Progress and outcomes to date are very positive. While it is too soon to measure the impact this 'whole of Territory' approach on STI and BBV rates, the commitment to work towards reducing rates is strong. A review of the program in 2010 will consider this question.

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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 of 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.

Of note, roxithromycin is **not** an antibiotic recommended for treatment or prevention of pertussis.

The following table and notes are an extract from *The Australian Immunisation Handbook* 9th Edition p236 for antimicrobial therapy and chemoprophylaxis regimens for pertussis in infants, children and adults.

Cases should be treated with

Table 3.14.1: Recommended antimicrobial therapy and chemoprophylaxis regimens for pertussis in infants, children and adults[47-54]

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' p 10.
‡ 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.

Again note, roxithromycin is **not** an antibiotic recommended for treatment or prevention of pertussis.

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 e.g. 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

The Northern Territory OzFoodNet Site – A Summary of 2008

Michelle Harlock, OzFoodNet Epidemiologist, CDC Darwin

Abstract

There was an increase in foodborne disease notifications in the Northern Territory (NT) in 2008. The majority of foodborne notifications consisted of cases of Salmonellosis and Campylobacteriosis. Most cases of Salmonellosis were sporadic in nature, but there were outbreaks of foodborne disease investigated that were caused by a number of different *Salmonella* serovars.

Introduction

In 2008 there was a slight increase in the number of notifications of foodborne disease in the NT compared to previous years. There were 939 notifications of diseases that are commonly transmitted via food. This is 12 % greater than expected compared to the 5-year mean (823 cases). Salmonellosis notifications accounted for 52% of the foodborne disease notifications in the NT.

Most Salmonellosis cases were sporadic in nature. However there were 6 outbreaks and 3 cluster investigations connected to *Salmonella* species. Of these outbreaks/clusters, *Salmonella* Typhimurium 9 and *S*. Typhimurium 182 featured, along with the 'environmental' serovars such as *S*. Weltevreden and *S*. Thompson.

Of the 6 foodborne outbreaks investigated in 2008, half occurred in restaurants. The NT OzFoodNet site has not investigated many point source outbreaks linked to restaurants in the past. Whilst the number of outbreaks is small compared to what other jurisdictions might investigate, it is still of interest to the NT.

The Incidence of Foodborne Disease in the Northern Territory

In 2008 there was a slight increase in the number of notifications of foodborne disease compared to previous years. There were 939 notifications of cases of potentially foodborne disease this year. This is 12% greater than expected compared to the five-year mean (823 cases) but 6% less than the previous year (995 cases). Salmonellosis notifications accounted for 52% of the foodborne disease notifications in the NT, followed by Campylobacteriosis notifications (27%) and Shigellosis (19%).

Of note, in 2008 the number of Salmonellosis cases was 17% greater than the 5-year mean (495 vs. 412 expected). The rate of Salmonellosis in 2008 was 230 cases per 100,000 population. Campylobacteriosis case numbers in 2008 were identical to the 5-year mean (258 cases) and the rate of Campylobacteriosis was 120 cases per 100,000 population. The combined total of Salmonellosis and Campylobacteriosis notifications (n=753) in the NT make up 80% of the total number of foodborne disease notifications received.

In 2008, 98% of Salmonellosis cases notified were identified to the serovar level (485 cases of 495 reported). The serovar with the highest number of notifications was *Salmonella* Typhimurium (n=60) followed by *Salmonella* Ball (n=42), *Salmonella* Saintpaul (n=39) and S. Virchow (n=33) In the past, *S*. Ball and *S*. Saintpaul were the most commonly reported serovars in the NT, with these 2 serovars thought to have established an ecological niche. However, over the past 2 years, these environmental serovars have been replaced as the most commonly reported serovar in the NT. A summary of the top 10 Salmonella serovars reported in 2008 is included in Table 1.

Table 1. The top 10 Salmonella serovars reported in the NT, 2008

Serovar	Count	Serovar	Count
S. Typhimurium	60	*S*. Lansing	26
S. Ball	42	*S*. subsp I ser 16:l,v:-	22
S. Saintpaul	39	*S*. Anatum	18
S. Virchow	33	*S*. Chester	17
S. Weltevreden	31	*S*. Infantis	12

There were 60 cases of *S*. Typhimurium reported in 2008, 39% higher than the 5-year mean of 37 cases and 32% higher than the number of cases

in 2007 (41 cases). There were a variety of different phage types of *S.* Typhimurium reported in 2008; These included *S*. Typhimurium 9 (13 cases) *S*. Typhimurium 135a (10 cases) *S*. Typhimurium 22 (7 cases) along with several other different phage types. There were a number of small outbreaks or clusters of *S.* Typhimurium investigated. There has been an increasing incidence of *S*. Typhimurium in the NT in the last few years,[1] and this may possibly provide an insight into the changing food supply of the NT.

Shigellosis case numbers were higher than expected, with 180 cases in 2008 compared to the 5-year mean of 148 cases. The rate of disease was 84 cases per 100,000 population. Of note, the biotype *Shigella flexneri* 4 a mannitol negative continued to be widely reported in the NT, accounting for almost 64% of all Shigellosis notifications received. *Shigella flexneri* 4a mannitol negative was first reported in the NT as a single case in October 2004. Prior to this case there were no isolates of this serovar reported in the NT. In the following years, this biotype has been increasingly reported throughout the NT, initially being reported in the Central Australian region and later being found northwards in the Top End.

Outbreaks and Cluster Investigations.

In 2008 there were 18 outbreak investigations performed. Of these, 6 were foodborne or suspected to be foodborne in nature, 6 were non foodborne and 6 were pathogen cluster investigations.

In 2008 there were 6 foodborne or suspected foodborne outbreaks investigated. Of these, 3 were connected to restaurants, 2 were in the general community and 1 in a remotely located camp. There were 5 outbreaks due to *Salmonella* species – *S*. Typhimurium 9 (2); *S*. Typhimurium 182 (1); *S.* Thompson (1) and *S*. Weltevreden (1). The remaining outbreak was suspected to be due to a bacterial toxin.

The 2 *S*. Typhimurium 9 outbreaks were linked to the same egg supplier but further trace back was not possible. Raw egg mayonnaise was the suspected vehicle for a *S*. Typhimurium 9 outbreak. When investigating outbreaks suspected to be due to raw eggs or mishandling of eggs, information has been given to restaurant owners and cooks of the high risk of illness associated with raw egg consumption and the recommendation to use pasteurised egg products as a substitute. However, there are no legal requirements to abide by these recommendations.

The *S*. Weltevreden outbreak was reminiscent of the 2007 *S*. Oslo outbreak[2] in the epidemiology and case histories. The outbreak of *S*. Weltevreden was suspected to be due to a locally grown produce item. Contamination of fresh produce is potentially a problem in the NT. When food sampling was performed in 2007 a number of different environmental *Salmonella* species were found on locally grown and sold produce items.[2]

There were 6 non foodborne outbreaks investigated in the NT in 2008. Of these, 3 were associated with child care, one with a tour bus, another with an international cruise ship, and one with a private residence. There were 2 outbreaks attributed to norovirus, one to *Salmonella* Chester and another to Cryptosporidium. The

Table 2. A summary of foodborne outbreaks investigated in the NT, 2008.

Onset Month	Aetiology (no. lab. confirmed cases)	No. Exposed	Cases	Transmission / Vehicle	Setting Exposed
January	*S*. Typhimurium 182 (5)	Unknown	5	Suspected foodborne/ unknown	Community
March	*S*. Typhimurium 9 (6)	Unknown	11	Foodborne/ Unknown	Restaurant
June	*S*. Weltevreden (14)	Unknown	14	Suspect foodborne/ unknown	Community
November	Suspect bacterial toxin (0)	Unknown	3	Suspect foodborne/ suspect pizza	Restaurant
December	*S*. Thompson (3)	35-40	11	Suspect foodborne/ unknown	Camp
December	*S*. Typhimurium 9 (2)	Unknown	2	Foodborne/Suspect raw egg mayonnaise	Restaurant

Table 3. Summary of non foodborne outbreaks investigated in the Northern Territory, 2008.

Onset Month	Aetiology (no. lab. confirmed cases)	No. Exposed	Cases	Transmission / Vehicle	Setting Exposed
January	Norovirus (2)	3800	122	Person to person	Cruise Ship
February	Unknown	~30	9	Person to person	Childcare
February	Norovirus (1)	8	8	Person to person	Private residence
May	Unknown	25	8	Person to person	Tour bus
October	Salmonella Chester (2)	40	2	Suspect Person to person	Childcare
December	Cryptosporidium (2)	30-35	6	Person to person	Childcare

etiological agents in 2 outbreaks were unknown but both were suspected to be viral.

There were 6 cluster investigations carried out in 2008. No apparent links or source of infection were identified in clusters of *Salmonella* Saintpaul (13 cases) and *S*. Weltevreden (7 cases) that were investigated. A cluster of *S*. Lansing (6 cases) was possibly due to a laboratory error. The epidemiology of a cluster of *Shigella sonnei biotype a* (4 cases) was suggestive of a point source outbreak but the source could not be identified. A family cluster of *Campylobacter* species (4 cases) was investigated but the transmission and source of infection were not clearly identified. The family used untreated well water as drinking water which was a possible risk factor. An investigation of a *Shigella sonnei* biotype g cluster (2 cases) found that the 2 cases were likely not linked. The investigation was initially carried out as this biotype is not often reported in the NT.

References

1. Harlock M 2009 OzFoodNet – Enhancing Foodborne Surveillance Across Australia: Northern Territory Annual Report 2008. Forthcoming.
2. Harlock M, Roper K, Markey P, Fearnley E, Clements N, Le P, Schmitt D, Schobben X 2007 An investigation into a cluster of *Salmonella* Oslo cases. *NT Dis Control Bull* Vol 14 (3): 16-20.

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Groote Eylandt remains dengue vector free

Huy Nguyen, Nina Kurucz, and Peter Whelan, CDC Darwin

Abstract

Following the detection of the dengue mosquito, *Aedes aegypti,* on Groote Eylandt in October 2006 and the subsequent implementation of an eradication program in November 2006,[1] *Ae. aegypti* was declared eradicated in May 2008.[2,3] To verify the absence of *Ae. aegypti* on Groote Eylandt, Medical Entomology (ME) of the Centre for Disease Control, Northern Territory (NT) Department of Health and Families conducted a post eradication survey of Alyangula and surrounding communities in January 2009. This article presents the results of the surveys conducted during and post-eradication, noting in particular the absence of *Ae. aegypti* and *Aedes albopictus* in the most recent survey.

Introduction

The most frequent intercepted exotic mosquitoes in the NT are the dengue mosquito, *Ae. aegypti,* and the Asian tiger mosquito, *Ae albopictus.* These dengue vectors can be transported in water filled receptacles on ships and cargo arriving from foreign ports, or as eggs on receptacles relocated from *Ae. aegypti* endemic areas in Queensland (Qld).

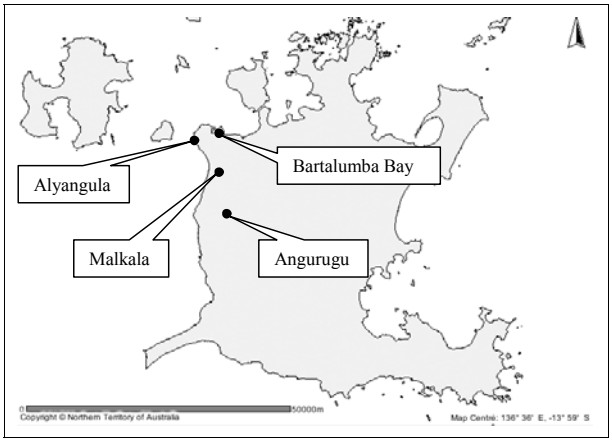
At present, local transmission of dengue in Australia is restricted to Qld.[4] Transmission occurs when the virus is introduced periodically by infected overseas travellers. *Ae. aegypti* is geographically widespread in Qld, and the Qld Department of Health focuses on breaking dengue transmission cycles through peri-focal vector control around dengue cases that have been detected[5] rather than attempting widespread vector control or eradication of this species from towns where it is established.

The NT has an appreciable public health and economic benefit by preventing these vectors and other exotic vectors of disease from becoming established in the NT. In the NT, ME have routine exotic mosquito monitoring and exclusion programs around all major towns and entry points to prevent the introduction or establishment of dengue vectors.[6]

Detection of Aedes aegypti on Groote Eylandt

On Groote Eylandt (Figure 1), adult mosquito and ovitrap (egg-trap) monitoring programs have been established since 1981 and 1998 respectively. No interceptions of exotic mosquitoes were made on Groote Eylandt prior to 2006. On 31 October 2006, ME identified *Ae. aegypti* larvae that had been recovered from an ovitrap set at the Alyangula seaport.[1] An immediate receptacle breeding survey was conducted by ME and the Groote Eylandt Mining Company's (GEMCO) Environmental Safety Officer who routinely services the ovitraps. The initial survey of the port area did not detect *Ae. aegypti*. Subsequent surveys were extended to Alyangula town, approximately 1 km north of the port facilities, where the establishment of the dengue vector in Alyangula was confirmed. DNA analysis, illegal vessel sightings and the scarcity of receptacles on commercial overseas vessels arriving in Alyangula suggested that *Ae. aegypti* establishment was most likely the result of desiccant resistant eggs in water-holding receptacles imported via illegal fishing vessels.[1,3]

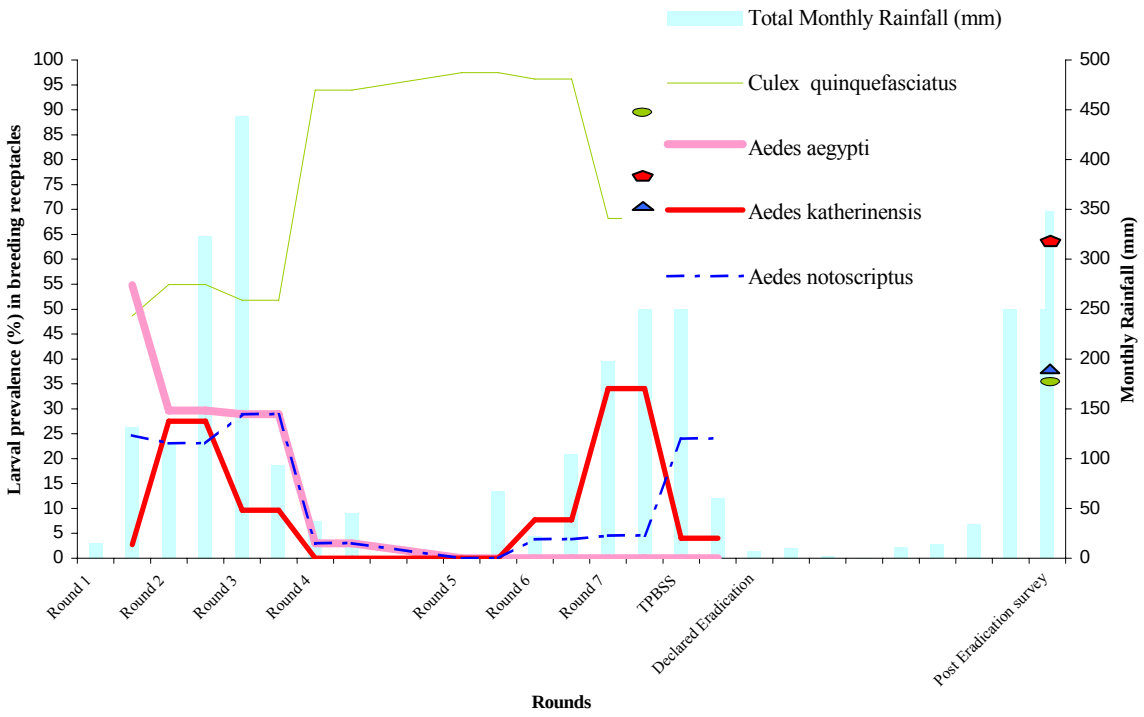
Figure 1. Groote Eylandt – Survey Locations January 2009



Eradication

Eradication activities focused on larval breeding site reduction and residual insecticide spraying of all receptacles to reduce both egg laying adults and larvae. Simultaneously, a large public education campaign was undertaken. All of the

Figure 2. Larval Mosquito Prevalence (%) in Receptacles Positive for Breeding November 2006 – January 2009



communities on Groote were surveyed and treated repeatedly during the program. All were free of *Ae. aegypti* except for Alyangula and 1 dwelling in Angurugu where *Ae. aegypti* was identified in a receptacle on a boat that had been relocated from Alyangula. The last *Ae. aegypti* larvae on Groote was collected in Alyangula on 4 June 2007[1,3] as part of the fourth inspection and treatment round. After one complete wet season with no further detections, *Ae. aegypti* was declared eradicated publicly on Groote on 8 May 2008.

Summary of larval species prevalence during eradication rounds

During the eradication program between November 2006 and March 2008, the number of receptacles breeding all species of mosquitoes in Alyangula decreased dramatically from 146 to 25 over 8 treatment and surveillance rounds (Table 1). A relatively low incidence of receptacle breeding was found over the 2007/08 wet season with a maximum of 44 receptacles recorded in a single round (round 7).

Aedes aegypti breeding declined as a result of the eradication efforts, with an initial prevalence in breeding receptacles of 55% in November 2006 (round 1), compared with 0% in September 2007 (round 5), with the latter survey occurring in the late dry season (Table 1, Figure 2). *Aedes katherinensis* had a prevalence of 2.7% and 27% in survey round 1 and round 2 respectively and *Aedes notoscriptus* had an initial prevalence of 25%. Both these species showed a parallel pattern of decline to *Ae. aegypti* in the dry season, but they demonstrated a resurgence during the latter part of the eradication program in the following wet season. The prevalence of *Culex quinquefasciatus* in breeding receptacles was initially 49%, but rather than following the decline in prevalence of *Ae. katherinensis* and *Ae. notoscriptus* during the low rainfall months of May – September, *Cx. quinquefasciatus* prevalence increased to >90% over that period (rounds 4, 5 and 6). Thus, *Cx. quinquefasciatus* breeding was largely responsible for the relatively high numbers of positive receptacles present in Alyangula in the middle of the dry season (Table 1, Figure 2).

Table 1. Alyangula receptacle breeding summary, November 2006 to January 2009 – by inspection round

Control & surveillance rounds	Date started	Date finished	Number of days in period	Number of properties surveyed for *Ae. aegypti*	Number of properties with mosquito larvae (All species)	Number of receptacles with mosquito larvae (All species)	**Number of receptacles positive for select mosquito species**					**Larval prevalence (%) in breeding receptacles for select species**				
							Aedes (Stg) aegypti	*Aedes (Stg) katherinensis*	*Aedes (Mac) tremulus*	*Aedes (Fin) notoscriptus*	*Culex (Cux) quinquefasciatus*	*Aedes (Stg) aegypti*	*Aedes (Stg) katherinensis*	*Aedes (Mac) tremulus*	*Aedes (Fin) notoscriptus*	*Culex (Cux) quinquefasciatus*
Round 1*	07/11/06	11/12/06	34	386	97	146	80	4	0	36	71	54.8	2.7	0.0	24.7	48.6
Round 2	18/12/06	19/01/07	32	382	70	91	27	25	0	21	50	29.7	27.5	0.0	23.1	54.9
Round 3	03/03/07	14/04/07	42	406	64	83	24	8	0	24	43	28.9	9.6	0.0	28.9	51.8
Round 4	06/05/07	25/06/07	50	421	31	33	1	0	0	1	31	3.0	0.0	0.0	3.0	93.9
Round 5	03/09/07	27/09/07	24	445	31	39	0	0	0	0	38	0.0	0.0	0.0	0.0	97.4
Round 6	08/11/07	03/12/07	25	438	24	26	0	2	0	1	25	0.0	7.7	0.0	3.8	96.2
Round 7	07/01/08	06/02/08	30	445	37	44	0	15	0	2	30	0.0	34.1	0.0	4.5	68.2
TPBSS†	26/02/08	17/03/08	20	188	20	25	0	1	1	6	16	0.0	4.0	4.0	24.0	64.0
Post Eradication	19/01/09	22/01/09	3	42	24	52	0	33	0	19	18	0.0	63.5	0.0	36.5	34.6
Totals			**260**	**3153**	**398**	**539**	**132**	**88**	**1**	**110**	**322**					

* Data includes collection obtained during initial detection and response activities

TPBSS = Targeted Potential Breeding Site Survey

† Field activities of the *Aedes aegypti* Eradication Project concluded on 20/03/08

Table 2. Groote Eylandt receptacle breeding summary, January 2009 – by location

							Number of Receptacles Positive for Select Species				
Location	**Suburb name**	No. of Properties Surveyed	No. of Properties Breeding	Total No. of receptacles with water	Total No. of receptacles breeding	% of receptacles with water breeding	*Ae. (Stg) katherinensis*	*Ae. (Fin) notoscriptus*	*Ae. (Mac) tremulus*	*Cx. (Cux) quinquefasciatus*	*Other Species*
Alyangula	Alyangula	42	24	81	52	64	33	19	0	18	6
	Port / Commercial	4	4	65	8	12	5	1	0	0	1
Angurugu	Angurugu	16	13	24	24	100	12	7	0	16	7
	Mine site	2	1	30	3	10	0	0	0	3	0
Bartalumba	Unknown-Bartalumba	4	1	1	1	100	1	0	1	0	1
Malkala	Unknown-Malkala	10	6	9	9	100	4	2	1	3	3
	Totals	**78**	**49**	**210**	**97**		**55**	**29**	**2**	**40**	**18**
	% of Totals		**63**		**46**		**57**	**30**	**2**	**41**	**19**

Methods

Since the end of the eradication program, routine ovitrap and adult monitoring programs have continued in Alyangula port, residential areas, the mine and airport areas, with no further *Ae. aegypti* or other exotic mosquitoes collected. Between 19 – 22 January 2009, ME conducted a wet season receptacle breeding survey to confirm the eradication of *Ae. aegypti* from Groote. The survey focused on Alyangula and the nearby communities of Angurugu, Malkala, and Bartalumba Bay (Figure 1).

Receptacle surveys and adult collections

During the present post-eradication survey, premises with previous *Ae. aegypti* detections and those with a high potential to harbour *Ae. aegypti*[7] were targeted. All receptacles or containers at each dwelling were inspected for evidence of mosquito breeding, and larvae, pupae, and their skins were collected. This was complemented by adult collections using a mechanical aspirator and hand collections wherever adult mosquitoes were observed. Larvae were preserved in 50% vinegar for transport to Darwin for identification, and the pupae were reared until adult emergence on damp tissue paper in sealed sample vials.

Adult mosquito trap collections utilised the BioGents (BG) sentinel trap,[8] which is specifically designed to attract *Ae. aegypti*. All adult specimens were frozen for later identification. The keys of Huang (1972)[9] and Lee et al. (1987)[10] were used for larval and adult specimen identification respectively.

Extended surveillance

An additional survey was conducted within the sandstone escarpment area that extends to the east and north of Alyangula. These included sampling for larvae from rock holes and depressions with rainwater present on the sandstone, and mechanical aspirations for adult mosquitoes around dusk.

Results

Receptacle surveys

Seventy-eight properties on Groote Eylandt were surveyed between 19 – 22 January for *Ae. aegypti* after a significant rain event (134.3mm) occurring between 10 – 11 January 2009. Of these, 49 (63%) were positive for mosquito breeding. A total of 210 receptacles were found holding water, with 97 containing mosquito larvae (46%) (Table 2).

Most of the surveillance effort was aimed at Alyangula residential areas where *Ae. aegypti* were found during the eradication project. Of the 42 residential properties surveyed in Alyangula, 24 (64%) were positive for mosquito larvae (Table 2). The numbers of properties surveyed and number of receptacles positive for larvae for the other surveyed locations are listed in Table 2.

Aedes katherinensis and *Ae. notoscriptus* recorded a high prevalence of 63% and 37% respectively during the January survey (Table 1, Figure 2). *Culex quinquefasciatus* had a prevalence of 35%. All other species were collected in low numbers and pooled as 'other species' in Table 2. No *Ae. aegypti* larvae were detected during this limited but focused survey.

Table 3. Alyangula receptacle breeding summary, January 2009 – by receptacle description

Receptacle Description	Buckets	Vehicle Tyres (car, tractor)	Pet drinking water receptacles	Bath Tub/pool (plastic)	Toys	Grass catcher	Bromeliad	Bin (lid)	Tray (metal)	Trailer	Tarpaulin	Sink (kitchen)	Pot (gardening)	Plant cutting container	Machinery	Fish pond	Chair (plastic)	Car part (unspecified)	**Totals**
No. Positive for Larvae	13	9	6	4	3	3	2	2	1	1	1	1	1	1	1	1	1	1	**52**

Table 4. Alyangula receptacle breeding summary, January 2009 – by receptacle category

Receptacle category	No. of receptacles Breeding
Discarded household items	21
Rubbish	11
Domestic commercial usage	8
Garden Accoutrements	6
Recreation items	4
Natural habitats	2
Totals	**52**

In Alyangula, the most productive receptacles by description were buckets (13), vehicle tyres (9), pet drinking water receptacles (6), bathtub/pool (4), toys (3), and grass catchers (3) (Table 3). The most productive receptacles by category were discarded household items (21), rubbish (11), domestic and commercial usage containers (8), and garden accoutrements (6) (Table 4).

Adult collections

An adult *Ae. katherinensis* was caught by hand (person biting catch) under a house in Alyangula that was adjacent to *Eucalyptus* woodland. An immediate search of the area found this species breeding in a partially water-filled plastic traffic barrier. Opportunistic aspirations of landing/ resting adult mosquitoes from receptacles and adjacent harbourage areas on Groote collected *Ae. katherinensis*, *Aedes vigilax* and *Ae. notoscriptus*. The BG-sentinel trap was set twice for ~ 17hrs from the late afternoon to late morning in Alyangula and collected one *Ae. vigilax* adult.

Extended surveillance

Larval collections along the sandstone escarpment north east of Alyangula revealed the presence of *Anopheles novaguinensis*, *Culex crinicauda* and *Ae. katherinensis*. The 2 former species were breeding in rain-filled shallow sandstone holes, and the latter in a sandstone depression that was lined with decaying Eucalyptus leaves. An adult male *Ae. katherinensis* was aspirated at a potential breeding site (water pooling under an over-hanging boulder).

Discussion

Both *Ae. katherinensis* and *Ae. notoscriptus* are considered endemic to Groote Eylandt.[10] These 2 species readily utilise tree holes and rock holes,[3] as well as artificial receptacles, and breeding is not confined to areas close to human habitation like *Ae. aegypti.*[11] Eggs from receptacle breeding mosquitoes such as those from the *Aedes* genus are generally reliant on a rain event in order to hatch because the eggs are deposited just above the water level in natural or artificial receptacles and hatch after inundation.

On Groote during the dry season, the natural flooding of *Aedes* eggs in natural receptacles would be intermittent, if at all, and coincides with infrequent rain events, while hatchings in artificial receptacles would be common with the irrigation of lawns and gardens, and the purpose filling of receptacles like pot plant holders, plant striking buckets and pet water drinking receptacles.

Culex quinquefasciatus does not need a water level rise to initiate hatching, as eggs are laid as a raft on the surface of the water, and this species tends to breed in stagnant water in receptacles and drains that contain organic material. Therefore, *Cx. quinquefasciatus* tends to breed continuously near residential areas that provide purpose filled receptacles or storm drains with dry season water inputs.

The first 4 treatment rounds of the eradication project, which occurred between November 2006 – June 2007, before, during and after the rainy season, were the most important in the reduction of *Ae. aegypti.*[3] There were no detections of *Ae. aegypti* in the following 2007/08 wet season. The present survey at the height of the wet season was designed to detect any possible remaining or recent importations of *Ae. aegypti* on Groote Eylandt.

The most recent receptacle survey began 8 – 10 days after a significant rainfall event, which provided the opportunity for *Ae. aegypti* eggs, if present, to be inundated and hatch. Although *Ae. katherinensis* and *Ae. notoscriptus* larvae were collected from a large number of receptacles, no *Ae. aegypti* were found.

Aedes aegypti has now been absent from Alyangula over 2 wet seasons since its detection in October 2006, and reaffirms that Groote Eylandt is free of *Ae. aegypti* and other exotic receptacle breeding mosquito species.

Acknowledgements

Medical Entomology wishes to thank the GEMCO environmental staff for their cooperation and assistance with the current survey on Groote Eylandt. We would like to also thank the traditional owners for permission to enter some of the areas that were surveyed. Darren Bowbridge of ME assisted greatly with collections, identifications and data entry, and William Pettit for his suggestions.

References

1. Kulbac M, Whelan PI. Dengue mosquito incursion and the eradication program on Groote Eylandt NT. *NT Dis Control Bull* 2007 14(3):30-34.
2. Northern Territory Government. 2008. Media archive 2008. Dengue mosquito eradication on Groote Eylandt [online] [cited March 2, 2009] Available from URL: *http://www.health.nt.gov.au/Agency/News_Archive/Dengue_Mosquito_eradicated_on_Groote_Eylandt/indexdl_1305.aspx.*
3. Whelan PI, Kulbac M, Bowbridge D, Krause V. The eradication of *Aedes aegypti* from Groote Eylandt NT Australia 2006-2008. *Arbovirus Research in Australia*. In press 2009.
4. Russell RC, Williams RC, Sutherst RW, Ritchie SA. *Aedes (Stegomyia) albopictus* – a dengue threat for southern Australia? *Commun Dis Intell* 2005 29:296-298.
5. Ritchie SA, Hanna JN, Hills SL, Piispanen JP, John W, McBride H, Pyke A, Spark RL. Dengue control in north Queensland, Australia: Case recognition and selective indoor residual spraying. *Dengue Bull* 2002 26:7-13.
6. Whelan PI. 'Mosquito Vector Control in the Northern Territory'. *NT Dis Control Bull* 2007 14 (2):12-18.
7. Tun-Lin W, Kay B. H. Barnes A. The Premise Condition Index: A Tool for Streamlining Surveys of *Aedes aegypti. Am J Trop Med Hyg* 1995 53 (6):591-594.
8. BioGents Pty Ltd. [online] [cited March 9, 2009]. Available from URL:*http://www.bg-sentinel.com/en/bg-sentinel.html.*
9. Huang YM. The subgenus *Stegomyia* of *Aedes* in Southeast Asia. I – The *Scutellaris* group of species. *Contrib Am Entomol Inst* 1972 9:1-109.
10. Lee DJ, Hicks MM, Griffiths M, Debenham ML, Brian JH, Russell RC, Geary M, Marks EN. The Culicidae of the Australasian Region In: *Entomology Monograph 2*. Canberra: Australian Government Publishing Service Press. Debenham ML, ed. 7 1987 4:6-9, 128.
11. Ponlawat A, Harrington L. Blood feeding patterns of *Aedes aegypti* and *Aedes albopictus* in Thailand. *J Med Entomol* 2005 42(5):844-849.

Letter to the editor NT news

In an article on dengue in Australia in the *Weekend Australian 31 January 2009* a major error was reflected in a map included in the article. The map erroneously showed the current distribution of dengue mosquitoes to include the north of the Northern Territory (NT). In fact, *Aedes aegypti* mosquitoes are not present in the NT, nor have they been there since the 1950s and people are currently not at risk of acquiring dengue in the NT.

The following is a letter sent to the editor of the *Weekend Australian* to address this misinformation-and an edited version of this letter was then printed. Maps distinguishing past and current distribution depicted are shown P 20.

To the editor

While wishing to commend Professor Curzon for drawing attention to the important public health issue of dengue in Australia (*Weekend Australian 31 January)*, we feel it important to correct an error in the map of the distribution of dengue mosquitoes. In fact, *Aedes aegypti* mosquitoes are not present in the Northern Territory, nor have they been established there since the 1950s. People are currently not at risk of acquiring dengue in the NT.

That the NT is free of these mosquitoes is the result of a great deal of hard work in the past and continuing surveillance by the entomology section of the Department of Health and Families. In conjunction with the Australian Quarantine and Inspection Service, they maintain extensive surveillance systems for such mosquitoes in incoming ships and planes and throughout the community. In the past decade *Ae. aegypti* mosquitoes have been detected twice in NT communities. Fortunately, on both occasions they were detected early by DHF entomologists and quickly eradicated.

However, *Ae aegypti* is widespread in Queensland, and there is another mosquito species *Aedes albopictus,* which can also

transmit dengue, that is currently restricted to certain islands in the Torres Strait. There is the immediate potential that these species could rapidly spread to other parts of Australia. Dengue is a debilitating and potentially life threatening disease, but it can be eradicated or its arrival prevented if sufficient effort and resources are applied in a timely fashion.

Dr. Steven Skov, Acting Chief Health Officer
A/Professor Vicki Krause, Director Centre for Disease Control
Dr. Peter Markey, Head of Surveillance
Peter Whelan, Medical Entomology
A/Professor Bart Currie, Royal Darwin Hospital.

Dengue historic distribution (prior to 1956)

Current dengue distribution

Probably now absent from Mt Isa and Camooweal but probably present on Mornington Island in the gulf

NT assists with leprosy survey in Timor

Lesley Scott, CDC Darwin

Several doctors and nurses from Centre for Disease Control traveled to a town in East Timor in November 2008 to screen the local population for leprosy.

The team traveled to the town of Oe-cusse, East Timor to participate in a leprosy workshop sponsored by The Leprosy Mission International, World Health Organization (WHO) and East Timor Ministry of Health.

This included a half day workshop to provide refresher training on the diagnosis of leprosy followed by single day community screening/ active case finding in each of the sub districts of Oecusse where the incidence of leprosy is still high despite the existing leprosy program.

The workshop afforded a unique opportunity for upskilling in leprosy diagnosis and control as well as providing an opportunity to assist near neighbours in finding and treating disease.

The screening was a large, well organised community based event that produced results through population based screening of the district.

The East Timorese Ministry of Health has provided 4 motorcycles to the Oe-cusse district to help with future screening and case management in this large, disperse, hilly and very poor district.

Along with the 2 doctors and 3 public health nurses from the Northern Territory were 2 nurses from the Queensland Tropical Public Health Unit.

The Northern Territory has 1-4 new cases of leprosy each year and during 2008 Queensland had their first case of leprosy in over 5 years. Staff in the Northern Territory need to be aware of leprosy. Both our teams are benefiting from this workshop.

During the week in East Timor the screening process found 4 new cases and 14 suspect cases of leprosy in the district – including 1 at the school.

The screening team, members from The Leprosy Mission International, The WHO Leprosy program, East Timor Ministry of Health, Northern Territory Department of Health and Families and Queensland Tropical public health Unit

Informatics! – it should be contagious.

Nilva Egana, CDC Darwin

Like other professions within health, public health professionals are dependent on access to robust data from which to make decisions. Information systems facilitate decision making in a range of health settings from the clinical to the managerial to the strategic. However, the Institute of Medicine (IOM) warns that *'the growing complexity of science and technology, the increase in chronic conditions, a poorly organized delivery system, and constraints on exploiting the revolution in information technology'* are fundamental reasons for the quality chasm in healthcare.[1] The quality chasm refers to findings in the 'To Err Is Human: Building a Safer Health System' report which concluded that "*tens of thousands of Americans die each year from errors in their care, and hundreds of thousands suffer or barely escape from nonfatal injuries that a truly high-quality care system would largely prevent".*[2]

A way of 'making the most' of the lack of exploitation of the revolution in information technology (IT) may be found in the discipline of informatics. A generic definition of informatics is '*the study of information, information systems, and the use of processing, storage, retrieval, and analytic methods used to deal with information, including the use of computers, machine intelligence, and all other aspects of information management'.*[3] Informatics has many guises such as: medical informatics; community informatics; public health informatics; bio-informatics, health informatics and consumer informatics.[4]

The IOM recommended informatics as one of the 8 core competencies for public health professionals in order to keep the public healthy.[5] In Australia, the most appropriate way of introducing public health informatics would be to add it as a core subject in the Masters of Public Health (MPH) program. Current MPH programs are most likely to include a data management subject but an informatics subject would provide the setting or environment for the practical management of that data against the broader eHealth agenda such as the use of standardised data dictionaries or exploring how technology may augment public health practice.

For instance, data management would enable the public health professional to analyse data, informatics would have him/her thinking about tools such as the use of computers as an alternative to the traditional methods of service provision in order to do something about what the data elucidates. Another example could be exploring alternatives to the landline dependent population health based surveys in the age of increased mobile phone use. It could be argued that one does not need an informatics education in order to consider the alternatives, such as the use of telemedicine versus face-to-face consultations or Voice of the Internet Protocol (VOIP) for population health surveys. However, the counter argument is that the alternatives are not being investigated or implemented at a level where it has become part of everyday work practice.

Therefore, the solution partly rests on the public health professional having some exposure to informatics through a course such as the MPH. Education is only one aspect, but without it the public health professional risks continuing to type with two fingers rather than touch type at a much faster and accurate speed.

References

1. Committee on Quality of Health Care in America. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, D.C.: Institute of Medicine; 2001.
2. Linda T. Kohn, Janet M. Corrigan, Molla S. Donaldson, Editors; Committee on Quality of Health Care in America. *To Err Is Human: Building a Safer Health System*. Washington, D. C.: Institute of Medicine; 2000.
3. "informatics". In: John M. Last, ed. *A Dictionary of Public Health*. Oxford: Oxford University Press Oxford Reference Online 2007.
4. Layman E. Health informatics: ethical issues. *Health Care Manager*. 2003 Jan-Mar;22(1):2-15.
5. Committee on Educating Public Health Professionals for the 21st Century. *Who Will Keep The Public Healthy? Educating Public Health Professionals for the 21st Century*. Washington DC: Institute of Medicine; 2003.

Alcohol taxation policy in Australia: public health imperatives for action

A statement by the Royal Australasian College of Physicians

Steven J Skov, for the Royal Australasian College of Physicians Alcohol Advisory Group

Abstract

- The Australian Government's "alcopops" tax legislation will soon be voted on by the Senate. This is the first time in memory that an alcohol taxation measure has been informed principally by public health concerns.
- Much debate surrounds the utility of alcohol taxation as a measure to reduce alcohol-related harm. However, the harms resulting from alcohol misuse in Australia are at unacceptable levels and action to reduce them is overdue.
- There is good evidence from Australia and internationally that taxation and price measures are among the most effective and cost-effective in reducing alcohol consumption and related harms. Recent alcohol sales data give an early indication that the alcopops tax is being effective in reducing consumption.
- Current alcohol tax policy is unwieldy and not well directed towards improving public health. A proportion of tax revenues dedicated to alcohol programs would assist public acceptance of the measures.

MJA 2009; 190: 000-000

The Australian Government's "alcopops" tax legislation will soon be voted on by the Senate. This is the first time in memory that an alcohol taxation measure has been informed principally by public health concerns, even though it has not been universally seen as such. Regardless of the outcome of the Senate vote, the Royal Australasian College of Physicians (RACP) argues that a broader review of alcohol taxation policy is needed as part of a comprehensive approach to alcohol-related problems in Australia.

Alcohol harm is at an unacceptable level

The absolute levels of harm due to alcohol in Australia today are unacceptable, particularly among young people:

- An estimated 3494 Australians died in the 2004–05 financial year because of their alcohol consumption.[1]
- The estimated cost to Australian society of alcohol-related health harms, lost productivity, and crime in 2004–05 was $15.3 billion.[1]
- In 2003, an estimated 3.2% of the total burden of disease and injury in Australia was attributable to alcohol.[2]
- In 2007, 37.4% of males and 41.2% of females aged 14–19 years reported consuming alcohol at a level that placed them at risk of short-term harm (eg, being involved in a fight or a car crash, or engaging in risky sexual behaviour) in the past year. Just under one in 10 in this age group (8.8% of males, 9.4% of females) did so *every week*.[3]
- In the 10 years to 2002, an estimated five people aged 15–24 years died and 216 were admitted to hospital *every week* as a result of drinking alcohol.[4] People of this age account for about 52% of all alcohol-related serious road injuries.[5]

Reducing this level of harm should be a major focus of research and policy.

Price is the most effective

There is an indisputably strong link between price, consumption of alcohol, and harms.[6] Price is an effective measure in controlling consumption and consequent harms. A recent review of alcohol policy measures found that:

> An increase in the price of alcohol reduces alcohol consumption, hazardous and harmful alcohol consumption, alcohol dependence, the harm done by alcohol, and the harm done by alcohol to others than the drinker … There is very strong evidence for the effectiveness of alcohol taxes in targeting young people and the harms done by alcohol.[7]

A 2009 review of 112 studies found that higher taxes and prices led to reduced consumption of alcohol, both for overall consumption and for measures of heavy drinking.[8] In particular, young people's drinking was very sensitive to

price because their discretionary income is relatively small. A recent World Health Organization expert committee report concluded:

> Policies that increase alcohol prices have been shown to reduce the proportion of young people who are heavy drinkers, to reduce underage drinking, and to reduce per occasion binge drinking. Higher prices also delay intentions among younger teenagers to start drinking and slow progression towards drinking larger amounts.[9]

There is good Australian evidence of the effectiveness of public health-focused alcohol taxes

The Northern Territory's "Living With Alcohol" (LWA) program, which ran from 1991 to 2000, was a comprehensive, whole-of-government program that included levies on alcoholic beverages. It was followed by substantial benefits, in terms of reduced alcohol consumption and consequent harms (alcohol-related road crash deaths and hospitalisations, other alcohol-related hospitalisations and alcohol-related prison receptions), as well as economic savings.[10]

The LWA program included a levy of 5 cents per standard drink for products containing more than 3% alcohol, and a 35 cent per litre levy on cask wines. This was followed by a reduction in quarterly consumption of cask wines from 0.73 litres of pure alcohol per person over the age of 15 years to 0.49 litres. There was no accompanying increase in consumption of other alcohol products, such as full-strength beer. In the period immediately after removal of the levy, per capita consumption of cask wine increased to 0.58 litres of pure alcohol per quarter.[11]

Alcohol tax policies are cost-effective

Beyond being effective in reducing alcohol consumption and related harms, controlling price through taxation measures is also considered to be highly cost-beneficial. Collins and Lapsley recently examined the potential cost savings for Australia of a range of interventions aimed at reducing alcohol-related harm.[12] They found strong evidence from a variety of settings for the effectiveness of taxation measures in reducing consumption and subsequent harms. Based on the experience of three other broadly similar countries (Norway, the United States and Italy), they estimated that taxation measures could reduce the social costs of alcohol in Australia by between 14% and 39% (or between $2.19 and $5.94 billion in 2004–05 dollars). Another study also examined the cost-effectiveness of a range of interventions and found that volumetric taxation of alcohol (ie, according to the alcohol content) had the lowest intervention costs and provided the greatest benefits in terms of disability-adjusted life years. [13]

A public health-centred alcohol tax policy

The current alcohol tax system is complex, unwieldy and mainly reflects economic and commercial factors (with the exception of the recent "alcopops" tax). Alcohol tax policy should be strongly informed by public health considerations. Several important measures could be considered:

- a minimum price per standard drink (as has been adopted in the recent revision of alcohol taxation in Scotland[14]);
- an underlying volumetric-based system; and
- hypothecation of a proportion of revenue raised for alcohol harm-prevention and treatment programs.

The Australian Government's alcopops legislation has been criticised as a "tax grab" by some politicians and the alcohol industry. Any future changes to tax policy likely to benefit public health would also be in the nature of tax increases and would probably suffer the same criticism. This criticism could perhaps be mitigated if the generally large disparity between government revenue from alcohol taxes and government expenditure on alcohol harm-prevention and treatment programs was reduced. The government's announcement of substantial funding for a range of preventive health measures — apparently using alcopops tax revenue — is a welcome step, especially if the two are formally linked.[15]

A large proportion of Australians would probably support increases in alcohol taxes if they were confident that at least some of the funds went into alcohol programs. The 2007 National Drug Strategy Household Survey found that 24% of respondents supported an increase in the price of alcohol per se, but over 40% were in favour of increased alcohol taxes to pay for

alcohol harm-prevention and treatment programs.[3] During the LWA program in the NT, revenues from the alcohol levies were hypothecated to the program, which contributed greatly to the quantum and sustainability of funding[16] and was considered to have been particularly important in public support for the program (Dr Shirley Hendy, former Director, LWA program, personal communication).

Concerns are sometimes raised that alcohol price increases discriminate against those on low incomes or would not be effective in reducing consumption for particular groups such as Aboriginal people. However, low-income groups and Aboriginal people suffer disproportionately from alcohol-related harms.[17,18] Cheap cask wine was, along with beer, the drink of choice in most NT Aboriginal communities at the time of the LWA program, and the levy was effective in reducing consumption. Indeed, the recommendations in this article are entirely consistent with those of the Aboriginal Medical Services Alliance NT in their proposal to address alcohol-related harm.[19]

Has the alcopops tax worked?

There is not yet much evidence to judge the effect of the tax. The Distilled Spirits Industry Council of Australia commissioned Access Economics to study the impact of the tax on alcohol-related emergency department presentations.[20] Their report concluded that there was no evidence that such events had declined since the introduction of the alcopops tax, and suggested there may even have been an increase. However, an independent review of the Access Economics report noted the inappropriate study design and statistical analysis, and re-examination of the data showed that any increase in presentations after the tax was consistent with an increasing trend over some years before the tax.[21]

On the other hand, alcohol sales data from the Nielsen Liquor Services Group, reported by Chikritzhs and colleagues, show a substantial fall in the sales of ready-to-drink beverages in the 3 months following the introduction of the tax, with a smaller shift to other beverages (beer and spirits) and a net reduction in overall sales.[22] Although not conclusive, these observations are consistent with what would be predicted on the basis of international research evidence,[8] and suggest that the tax is a move in the right direction.

Conclusion

Controlling price should be part of a comprehensive suite of actions to reduce alcohol-related harm, including reducing access (eg, trading hours, number of outlets), enforcement of liquor laws, random breath testing of drivers, and national, well funded and ongoing social marketing campaigns. Governments have been reluctant to raise prices and restrict access and have instead preferred to support voluntary industry measures and isolated, individually focused education, in spite of the overwhelming body of evidence and expert opinion that the former measures are effective and the latter measures much less so, if at all.[6]

The RACP considers that the Australian Government's increase in excise on ready-to-drink products has a sound evidence base and was a step in the right direction. The preliminary evidence suggests that its effect has been positive. The RACP urges the Australian Government to persist with this measure and to undertake a comprehensive review of alcohol tax policy, founded on public health concerns, with hypothecation of a proportion of the revenues for expanded alcohol harm-prevention and treatment programs.

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Competing interests

None identified.

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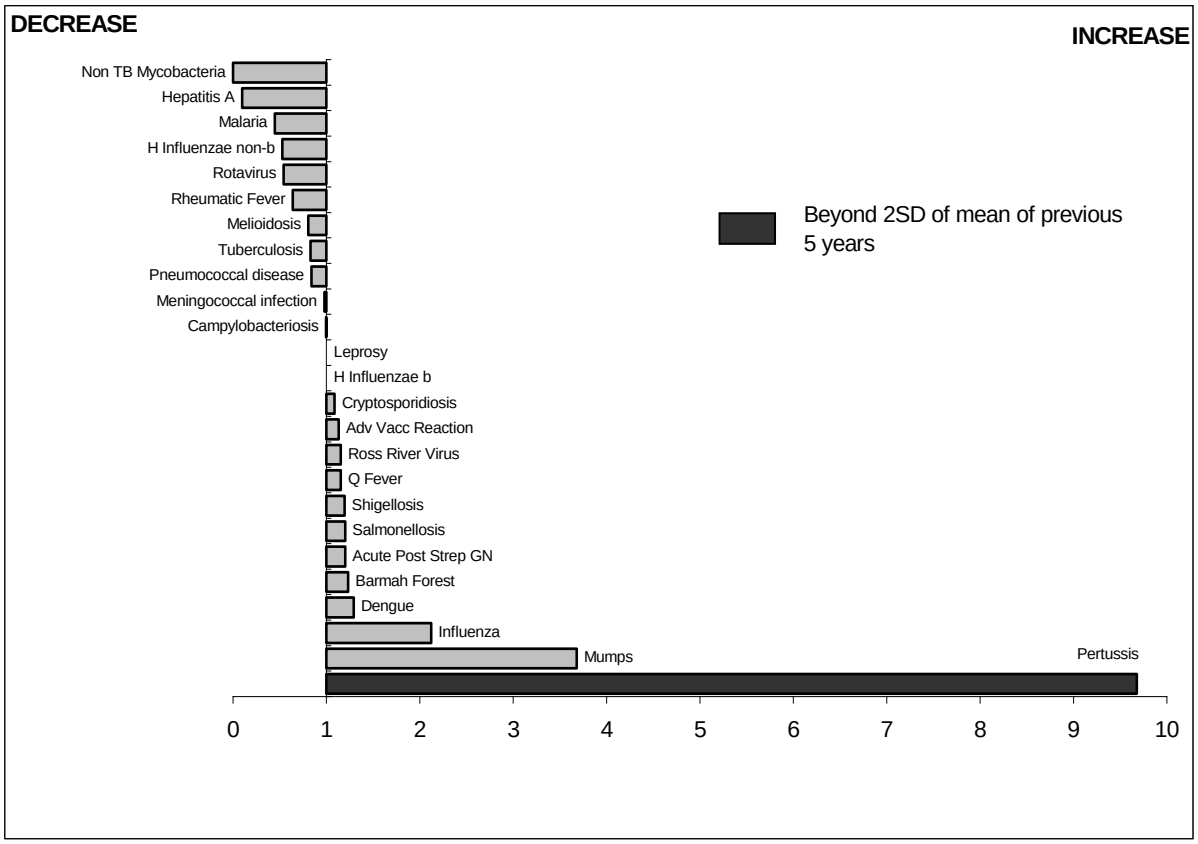
References

1. Collins DJ, Lapsley HM. The costs of tobacco, alcohol and illicit drug abuse to Australian society in 2004/05. Monograph Series No. 64. Canberra: Australian Government Department of Health and Ageing, 2008.
2. Begg S, Voss T, Barker B, et al. The burden of disease and injury in Australia 2003. Canberra: Australian Institute of Health and Welfare, 2007. (AIHW Cat. No. PHE 82.) http://www.aihw.gov.au/publications/index.cfm/title/10317 (accessed Mar 2009).
3. Australian Institute of Health and Welfare. 2007 National Drug Strategy Household Survey: first results. (Drug Statistics Series No. 20. AIHW Cat. No. PHE 98.) Canberra: AIHW, 2008.
4. Chikritzhs T, Pascal R. National Alcohol Indicators Bulletin 6: Trends in youth alcohol consumption and related harms in Australian jurisdictions, 1990–2002. Perth: National Drug Research Institute, Curtin University of Technology, 2004. http://www.ndri.curtin.edu.au/publications/naip.html (accessed Mar 2009).
5. Chikritzhs T, Stockwell T, Heale P, et al. National Alcohol Indicators Bulletin 2: Trends in alcohol-related road injury in Australia 1990–1997. Perth: National Drug Research Institute, Curtin University of Technology, 2000. http://www.ndri.curtin.edu.au/publications/naip.html (accessed Mar 2009).
6. Babor T, Caetano R, Casswell S, et al. Alcohol: no ordinary commodity — research and public policy. Oxford: Oxford University Press, 2003.
7. Anderson P, Baumberg B. Alcohol in Europe: a public health perspective. A report for the European Commission. London: Institute of Alcohol Studies, 2006.
8. Wagenaar AC, Salois MJ, Komro KA. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. *Addiction* 2009; 104: 179-190.
9. World Health Organization. WHO Expert Committee on Problems Related to Alcohol Consumption: second report [provisional version]. WHO Technical Report Series No. 944. Geneva: WHO, 2007. http://www.who.int/substance_abuse/activities/expert_comm_alcohol_2nd_report.pdf (accessed Mar 2009).
10. Chikritzhs T, Stockwell TR, Hendrie D, et al. The public health, safety and economic benefits of the Northern Territory's Living With Alcohol Program 1992/3 to 1995/6. Monograph No. 2. Perth: National Drug Research Institute, Curtin University of Technology, 1999.
11. Gray D, Chikritzhs T, Stockwell T. The Northern Territory's cask wine levy: health and taxation policy implications. *Aust N Z J Public Health* 1999; 23: 651-653.
12. Collins DJ, Lapsley HM. The avoidable costs of alcohol abuse in Australia and the potential benefits of effective policies to reduce the social costs of alcohol. National Drug Strategy Monograph Series No. 70. Canberra: Australian Government Department of Health and Ageing, 2008.
13. Doran C, Vos T, Cobiac L, et al. Identifying cost effective interventions to reduce the burden of harm associated with alcohol misuse in Australia. Canberra: Alcohol Education and Rehabilitation Foundation, 2008. http://www.aerf.com.au/showcase/MediaReleases/2008/Doran%20AERF%20report.pdf (accessed Mar 2009).
14. Scottish Government. Changing Scotland's relationship with alcohol: a framework for action. Edinburgh: The Scottish Government, 2009. http://www.scotland.gov.uk/Publications/2009/03/04144703/0 (accessed Mar 2009).
15. Roxon N. Preventative health to benefit from alcopops revenue [media release]. 11 Mar 2009. Canberra: Minister for Health and Ageing, 2009. http://www.health.gov.au/internet/ministers/publishing.nsf/Content/mr-yr09-nr-nr029.htm (accessed Mar 2009).
16. D'Abbs P. Alignment of the policy planets: behind the implementation of the Northern Territory (Australia) Living With Alcohol programme. *Drug Alcohol Rev* 2004; 23: 55-66.
17. Mäkelä P. Alcohol-related mortality as a function of socio-economic status. *Addiction* 1999; 94: 867-886.
18. Chikritzhs T, Pascal R, Gray D, et al. National Alcohol Indicators Bulletin 11: Trends in alcohol-attributable deaths among Indigenous Australians, 1998–2004. Perth: National Drug Research Institute, Curtin University of Technology, 2007. http://www.ndri.curtin.edu.au/publications/naip.html (accessed Mar 2009).
19. Aboriginal Medical Services Alliance Northern Territory. Options for alcohol control in the Northern Territory. Darwin: AMSANT, 2008.
20. Access Economics. Trends in alcohol related hospital use by young people. Report by Access Economics Pty Limited for Distilled Spirits Industry Council of Australia. Canberra: Access Economics, 2009.
21. Chikritzhs T, Allsop S. Review: Trends in alcohol-related hospital use by young people by Access Economics. Perth: National Drug Research Institute, Curtin University of Technology, 2009.
22. Chikritzhs TN, Dietze PM, Allsop SJ, et al. The "alcopops" tax: heading in the right direction [editorial]. [Published online ahead of print, *Med J Aust* 2 March 2009]. http://www.mja.com.au/public/issues/190_06_160309/chi11362_fm.html.

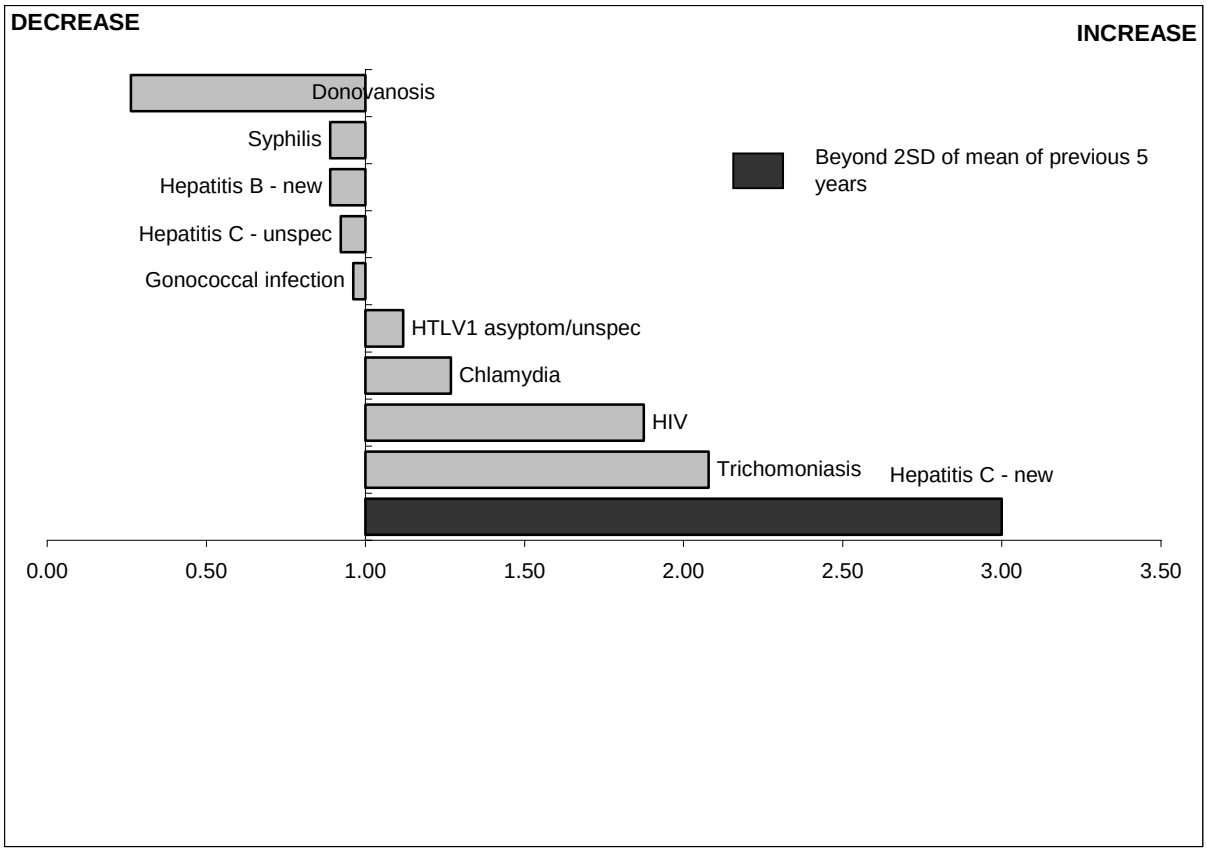
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICT 2008 & 2007

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		NT	
	2008	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**	**2008**	**2007**
Acute Post Strep Glomerulonephritis	9	9	4	1	20	8	3	2	2	3	38	23
Adverse Vaccine Reactions	8	8	4	1	27	33	3	3	1	3	43	48
Amoebiasis	0	0	0	0	2	0	0	0	0	0	2	0
Arbovirus not otherwise specified	0	0	0	0	0	1	0	0	0	0	0	1
Barmah Forest	12	11	0	1	57	62	4	9	3	8	76	91
Campylobacteriosis	62	56	8	6	161	203	8	5	18	19	257	289
Chickenpox	26	35	7	1	42	96	37	21	2	45	114	198
Chlamydia	909	912	56	35	922	869	185	178	231	183	2303	2177
Chlamydial conjunctivitis	17	8	0	3	3	5	0	2	5	2	25	20
Cryptosporidiosis	47	46	4	8	37	42	7	5	7	10	102	111
Dengue	2	0	0	0	20	15	1	0	0	0	23	15
Donovanosis	1	1	0	0	0	0	0	0	0	0	1	1
Food/water borne disease	0	2	0	11	0	2	0	2	0	0	0	17
Gonococcal conjunctivitis	0	3	0	0	2	0	0	0	0	1	2	4
Gonococcal infection	790	868	78	66	322	330	111	95	265	235	1566	1594
Gonococcal neonatal ophthalmia	0	0	0	0	0	3	0	0	0	0	0	3
Hepatitis A	1	0	0	0	2	4	0	0	0	1	3	5
Hepatitis B - chronic	65	76	1	6	68	83	76	131	20	9	230	305
Hepatitis B - new	1	1	1	1	4	3	0	2	2	2	8	9
Hepatitis B - unspecified	49	73	2	5	97	94	4	14	31	27	183	213
Hepatitis C - chronic	0	0	0	0	0	1	2	0	0	0	2	1
Hepatitis C - new	2	2	0	0	5	1	1	1	0	0	8	4
Hepatitis C - unspecified	33	43	3	2	166	158	8	4	11	16	221	223
Hepatitis D	1	0	0	0	0	0	0	0	0	0	1	0
Hepatitis E	0	0	0	0	3	0	0	0	0	0	3	0
H Influenzae b	0	1	0	0	2	1	0	0	0	0	2	2
H Influenzae non-b	2	5	1	1	1	2	0	0	0	0	4	8
HIV	1	1	0	0	13	6	0	0	1	0	15	7
HTLV1 asyptomatic/unspecified	79	98	0	5	2	3	1	0	1	0	83	106
HUS	0	0	0	0	1	0	0	0	0	0	1	0
Hydatid	0	1	0	1	0	0	0	0	0	0	0	2
Influenza	65	32	24	3	100	125	4	8	8	15	201	183
Legionellosis	0	1	0	1	1	1	0	0	0	0	1	3
Leprosy	0	0	0	0	1	0	0	0	0	0	1	0
Leptospirosis	0	0	0	0	0	1	0	0	1	0	1	1
Malaria	0	2	0	0	17	28	3	0	0	0	20	30
Measles	0	0	0	0	0	0	0	0	3	0	3	0
Melioidosis	0	0	0	0	17	32	1	1	5	1	23	34
Meningococcal infection	1	1	1	0	6	3	1	1	0	1	9	6
Mumps	35	1	13	0	2	46	1	1	2	10	53	58
MVE	0	0	0	0	1	0	0	0	0	0	1	0
Pertussis	35	8	14	0	372	15	2	1	54	3	477	27
Pneumococcal disease	28	32	4	2	24	29	3	1	1	2	60	66
Q Fever	3	1	0	1	0	0	0	0	0	0	3	2
Rheumatic Fever	10	20	2	6	23	31	2	11	4	13	41	81
Ross River Virus	31	17	4	5	195	218	13	22	19	37	262	299
Rotavirus	41	165	14	18	96	71	19	8	25	29	195	291
Salmonellosis	79	119	23	25	310	298	28	25	57	58	497	525
Shigellosis	89	90	14	9	46	44	13	16	15	14	177	173
STEC/VTEC	0	3	0	0	0	0	0	0	0	0	0	3
Syphilis	93	138	6	12	88	63	14	16	47	65	248	294
Syphilis congenital	1	2	0	0	0	0	0	0	0	0	1	2
Trichomoniasis	859	787	62	61	607	531	305	257	385	319	2218	1955
Tuberculosis	2	5	0	0	15	45	11	1	1	4	29	55
Typhoid	0	0	0	0	1	3	0	0	0	0	1	3
Typhus	0	0	0	0	1	2	0	0	0	0	1	2
Varicella unspecified	0	3	0	0	2	1	0	0	0	0	2	4
Vibrio food poisoning	0	0	0	0	1	1	0	0	0	0	1	1
Yersiniosis	0	0	0	0	1	1	0	0	0	0	1	1
Zoster	13	16	4	0	80	64	2	9	6	1	105	90
Total	**3,502**	**3,703**	**354**	**297**	**3,986**	**3,678**	**873**	**852**	**1,233**	**1,136**	**9948**	**9666**

Ratio of 2008 cases of selected diseases to the mean 2003-07



Ratio of 2008 sexually transmitted diseases cases to the mean 2003-07



NT Malaria notifications October - December 2008

Merv Fairley, CDC, Darwin

Six notifications of malaria were received for the fourth 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	PNG	Holiday	*P. vivax*	Yes
1	PNG	Holiday	*P. vivax & P falciparum*	No
1	PNG	Holiday	*P. vivax*	No
1	Indonesia	Holiday	*P. falciparum*	No
1	Indonesia	Fisher	*P. vivax & P. falciparum*	No
1	Indonesia	Student	*P. vivax*	No

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Comments on notifications P 28

Pertussis

There were 477 cases of pertussis reported in 2008, this was greater than 9 times the 5 year mean. The current pertussis epidemic has affected the NT since the beginning of 2008 and is part of a national outbreak (See article in the December 2008 *NT Disease Control Bulletin*).

Hepatitis C new

There were 6 newly acquired cases notified in 2008. The majority of them were injecting drug users (5/6). No suspicious point sources of infection were identified.

Immunisation coverage for children aged 12-<15 months at 31 December 2008

	Number in district	%DTP	%Polio	%HIB	%HEP	% Fully
Darwin	288	91.3%	91.7%	93.1%	93.8%	91.0%
Winnellie PO Bag	78	91.0%	91.0%	93.6%	96.2%	91.0%
Palm/Rural	224	92.9%	92.9%	96.0%	96.4%	92.4%
Katherine	88	93.2%	93.2%	95.5%	95.5%	93.2%
Barkly	25	96.0%	96.0%	100.0%	100.0%	96.0%
Alice Springs	120	82.5%	82.5%	85.8%	85.8%	82.5%
Alice Springs PO Bag	56	85.7%	85.7%	91.1%	91.1%	85.7%
East Arnhem	45	91.1%	91.1%	95.6%	95.6%	91.1%
NT	924	90.5%	90.6%	93.3%	93.8%	90.3%
Indigenous	362	87.0%	87.0%	92.0%	92.5%	87.0%
Non-Indigenous	562	92.7%	92.9%	94.1%	94.7%	92.3%
Australia Indigenous	3,336	83.5%	83.5%	91.4%	91.7%	83.2%
Australia Non Indigenous	71,636	92.2%	92.1%	94.6%	94.5%	91.6%
Australian Total	74,972	91.8%	91.7%	94.4%	94.4%	91.3%

Immunisation coverage for children aged 24-<27 months at 31 December 2008

	Number in district	%DTP	%Polio	%HIB	%HEP	%MMR	% Fully
Darwin	253	93.7%	93.7%	91.3%	95.3%	94.5%	90.5%
Winnellie PO Bag	84	98.8%	98.8%	97.6%	98.8%	98.8%	97.6%
Palm/Rural	208	93.3%	93.3%	91.8%	94.2%	92.8%	91.3%
Katherine	89	98.9%	98.9%	97.8%	100.0%	97.8%	97.8%
Barkly	15	100.0%	100.0%	93.3%	100.0%	93.3%	93.3%
Alice Springs	121	95.9%	95.0%	92.6%	97.5%	95.9%	91.7%
Alice Springs PO Bag	45	100.0%	100.0%	100.0%	100.0%	97.8%	97.8%
East Arnhem	41	97.6%	97.6%	95.1%	97.6%	95.1%	95.1%
NT	856	95.6%	95.4%	93.6%	96.6%	95.2%	93.0%
Indigenous	367	95.6%	95.6%	93.5%	97.0%	95.4%	93.2%
Non-Indigenous	489	95.5%	95.3%	93.7%	96.3%	95.1%	92.8%
Australia Indigenous	3,028	93.9%	93.9%	92.8%	96.2%	93.5%	91.0%
Australia Non Indigenous	71,047	94.9%	94.8%	94.4%	95.6%	94.0%	92.7%
Australian Total	74,075	94.8%	94.8%	94.4%	95.6%	93.9%	92.7%

Immunisation coverage for children aged 60-<63 months at 31 December 2008

	Number in district	%DTP	%Polio	%HIB	%HEP	%MMR	% Fully
Darwin	208	88.5%	88.0%	0.0%	0.0%	87.5%	87.5%
Winnellie PO Bag	71	97.2%	97.2%	0.0%	0.0%	97.2%	97.2%
Palm/Rural	195	90.8%	90.8%	0.0%	0.0%	89.7%	89.7%
Katherine	94	100.0%	100.0%	0.0%	0.0%	98.9%	98.9%
Barkly	25	88.0%	88.0%	0.0%	0.0%	88.0%	88.0%
Alice Springs	128	91.4%	91.4%	0.0%	0.0%	91.4%	91.4%
Alice Springs PO Bag	41	97.6%	97.6%	0.0%	0.0%	97.6%	97.6%
East Arnhem	53	96.2%	96.2%	0.0%	0.0%	96.2%	96.2%
NT	815	92.5%	92.4%	0.0%	0.0%	91.9%	91.9%
Indigenous	344	94.2%	93.9%	0.0%	0.0%	93.6%	93.6%
Non-Indigenous	471	91.3%	91.3%	0.0%	0.0%	90.7%	90.7%
Australia Indigenous	2,988	86.4%	86.3%	0.0%	0.0%	86.6%	86.6%
Australia Non Indigenous	66,176	89.2%	89.1%	0.0%	0.0%	88.8%	88.8%
Australian Total	69,164	89.0%	89.0%	0.0%	0.0%	88.8%	88.8%

Immunisation Coverage 31 December 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 30.

Background information to interpret coverage

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

The cohort of children assessed at 12-<15 months of age on 31 December 2008 were born between 01 October 2007 and 31 December 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-<27 months of age on 31 December 2008 were born between 01 October 2006 and 31 December 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-<63 months of age on 31 December 2008 were born between 01 October 2002 and 31 December 2002 inclusive. To be considered fully vaccinated, these children must have received 4 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of measles, mumps, rubella vaccine (latest doses due at 4 years of age). All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation

Immunisation coverage in NT children was below the national average in the 12-<15 months cohort but above the national average in the 24 -<27 months and 60-<63 months cohort. Immunisation coverage in Indigenous children in the NT was lower in the 12-<15 months cohort but higher across the 24-<27 and 60-<63 months cohorts, compared to the national coverage of Indigenous children. Indigenous NT children had lower coverage than non-Indigenous NT children in the younger cohort (ie 12-<15 months) but higher in the other two cohorts.

Immunisation coverage for NT children as a whole at 60-<63 months of age (91.9%) remains lower than the younger cohorts, and this is a concern across Australia, with the national average for this cohort being 88.8%. For Indigenous NT children, immunisation coverage is lower at a younger age (ie 87.0% at 12-<15 months cohort) but higher for the older age group (ie 93.6% at 60-< 63 months), reflecting a concern that Indigenous children are not as immunised in a timely manner in early childhood. Strategies are in progress to address this challenge of delivering immunisations on time.

Disease Control staff updates

CDC

Nilva Egana is the Senior Policy Officer and Coordinator until mid June. **Nilva** has previously worked with CDC and as a Business Manager with CCIS. **Suzanne Hales** initially commenced as administration officer for community paediatrics but has moved to personal assistant for the Director CDC. **Renee McArthur** is providing administration support for the Business Unit.

Community Paediatrics/RHD

Dr **Rebecca Cresp**, is the Community Paediatric Registrar for the first half of 2009. **Kay McGough** is on LSL and **Janine Weston** is filling her position in the Rheumatic Heart Disease Team.

Immunisation

We welcome **Sierra Cutchie** who has joined the database team. Our treasured **Nan Miller** is back for 6 weeks while **Chris Nagy** is away. **Jenine Gunn** is returning as the targeted immunisation project officer until 30 June.

Medical Entomology

We farewell and thank **Darren Bowbridge** who is leaving in early April. **Ruth Peek** has extended her contract until end of June. We welcome back **Peter Whelan** and **Jane Carter** from LSL.

Surveillance

Peter Markey is on sabbatical at Colindale (http://en.wikipedia.org/wiki/Colindale) until July, 2009. **Peter's** position has not been filled to date but is being covered by a team effort.

Sexual Health &Blood Borne Viruses

Departures for the Sexual Health team include **David Adams**, **Natasha Tatapata** and **Sandra Noblet**. **Kim Jackson** has been appointed as hepatitis C Clinical Nurse Consultant, **Bindu Tharakkal** is working part time as a medical officer in C34 and **Kishan Kariippanon** is our new Youth Health Policy Officer – welcome all.

TB

Shaun Flint, has joined CDC in a CDC medical registrar rotation, having recently arrived from Melbourne and is working on a number of CDC projects. **Kerryn Coleman** has left CDC to join Health Gains Planning in her next rotation of the public health training.

Alice Springs

Rosalie Schultz is on a well-deserved bushwalking trip before returning to work in Alice as Senior Rural Medical Practitioner Maternal and Child Health from the end of April 2009. **Rosalie** will 'continue to work with passion and idealism for social justice and Indigenous health'. **Cate Coffey** will be Acting CDC Coordinator until the position is filled. Thanks Cate!

Gove

Thank you and farewell to **John Opa** who has worked in the medical officer position since 2006. After his stint in Gove CDC, **Dale Thompson** has returned to Darwin and taken a position with Menzies School of Health Research.

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