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Why is sitting the new smoking?

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Abstract

In 2011-13 the Australian Health Survey was completed which aimed to gain a better understanding of the health of Australians. As a result of these findings the Australian Government Department of Health has released information discussing the health risks of a sedentary lifestyle and provided recommended guidelines for all age groups called Australia's Physical Activity and Sedentary Behaviour Guidelines. This information and the new Guidelines are reviewed and commented on here.

Key Words: sedentary behaviour, physical activity, exercise, exercise guidelines, Australian Health Survey

Australian Health Survey

Regular physical activity and limiting sedentary behaviour is essential for good health and wellbeing irrespective of age, gender or ethnic background.[1] The Australian Health Survey (AHS) carried out in 2011-2013 is the largest and most comprehensive health survey to have been conducted in Australia.[2,3] It was designed to collect information from Australians that described their health status, risk factors, socioeconomic circumstances, health-related actions, use of medical services, nutrition and physical activity.[3] It has allowed researchers to gain an insight into the average activity and sedentary behaviour levels of Australians and consequently has generated new exercise guidelines and recommendations for all age groups. Understanding

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the health status of Australians will provide invaluable information to governments, health researchers and the community regarding the emerging issues in Australia today.[2]

What are the new Australia's Physical Activity and Sedentary Behaviour Guidelines?

Based on the findings of the AHS the Australian Government's Department of Health developed a new set of exercise guidelines called *Australia's Physical Activity and Sedentary Behaviour Guidelines.* The *Guidelines* have been created for all age groups, however for the purpose of this article the focus will be on the 18 -64 year age group which makes up the main work force. The *Guidelines* recommend:

- Doing any physical activity is better than none
- Completing 150-300 minutes of moderate intensity activity or 75-150 minutes of vigorous intensity physical activity, or an equivalent combination of both moderate and vigorous activities, each week
- Being active on most if not every day of the week
- Completing muscle strengthening activities at least 2 days each week and
- Minimising the amount of time in prolonged sitting and breaking up sedentary behaviour as often as possible.[4]

Notably the new *Guidelines* are aiming to minimise quantities of sedentary behaviour and to encourage an increase in exercise from the prior guidelines of 30 minutes to 60 minutes of activity a day.[5]

Risks of sedentary behaviour

Statistics state that Australians are sedentary on average for 7-10 hours a day, not including time spent sleeping.[5] Sedentary behaviour is associated with a multitude of poorer outcomes globally, including increased risk of type 2 diabetes, cardiovascular disease, mental health illnesses, musculoskeletal problems, some cancers, unhealthy weight gain and premature death.[5] Research is now looking deeper into the health effects of sedentary behaviour with emerging evidence demonstrating that negative health outcomes can occur even among those who meet the recommended new *Guidelines.*[5]

While researchers do not yet fully understand why sedentary behaviour creates such negative health effects, it is currently believed that prolonged sitting minimises the production and activity of enzymes used to process fats and sugars in our bodies.[5] Therefore such metabolites are not cleared from the bloodstream as quickly. This enzyme is released when certain muscles contract during activity eg. walking. It has been reported that high circulating levels of triglycerides eventually lead to metabolic illnesses such as diabetes, cardiovascular disease and breast and colon cancer.[6] This poses concerns, especially as only after 1 hour of sitting it is reported that, "the production of enzymes that burn fat declines by as much as 90%."[7]

Therefore even if you are reaching the recommended 30-60 minutes of exercise a day, you can still be considered sedentary.[5] Consequently your time being active is not guaranteed to counteract the negative health outcomes created by sedentary behaviour creating potential health and chronic disease risks.

How long should you sit?

The *Guidelines* do not specify a recommendation on how long you should sit for, however it is suggested that people should minimise their time spent in prolonged sitting.[5] It is suggested to break up sitting periods every 20-30 minutes simply by standing up for a few minutes or taking a short walk.[5] This short burst of activity can help prevent those key enzymes from being switched off and minimises the adverse effects of sedentary behaviour.[5] Alternatively, it is important to note that the *Guidelines* do not recommend standing all day either, which poses its own health issues.[5]

How active are Australians statistically?

The statistics from the AHS showed the following for Australian adults:

- 60% of Australian adults complete less than the recommended 30 minutes of moderate intensity physical activity per day

- We are sedentary between 7-10 hours a day, compared to 8.31 hours of sleeping
- The typical office worker is sedentary for 75 per cent of their working day
- Sedentary activity occupied an average 39 hours per week for adults with close to 10 hours of this sitting at work. People employed in more sedentary occupations such as clerical and administrative workers spent on average 22 hours a week sitting for work
- Levels of sufficient physical activity were associated with a range of factors such as socio-economical status, perceived health status, body mass index (BMI) and smoking status and
- Watching TV was the most prevalent sedentary activity, at nearly 13 hours a week, peaking at over 19 hours per week on average for people aged 75 years and over. Using the computer or internet (for non-work purposes) peaked at almost 9 hours per week for 18–24 year olds.[8]

Why sitting is the smoking of our generation

Many of us spend a large amount of our working day sitting, whether we utilise a computer, take phone calls, attend meetings or sit to eat lunch. This adds to the sedentary time we may spend commuting to work or in our personal lives. Statistics state that 35 million deaths worldwide are related to sugar intake, compared to 5 million deaths related to tobacco.[9] The difference being that sugar (and sugar substitutes) are believed to be more addictive than tobacco and reported to be 4 times more addictive than cocaine.[9] Due to the relationship between sugar intake and obesity, these statistics have been utilised to highlight the poor health outcomes related to sedentary behaviour, which were discussed in the Technology, Entertainment and Design (TED) presentation by Nilofer Merchant who stated "sitting is the smoking of our generation."[7]

Health risk statistics have also been evaluated from the World Health Organization (WHO) and Australian Bureau of Statistics (ABS). The WHO estimates that almost 6 million people die annually from smoking-related causes including direct and indirect smoking causes.[10] Approximately 2.8 million people die annually worldwide from being overweight or obese, and 3.2 million respectively from limited physical activity.[10] Additionally, unhealthy lifestyle choices have led to an increased risk of non-communicable diseases which caused 36 million deaths worldwide in 2008 out of a total 57 million deaths.[10]

Despite the WHO and ABS statistics differing from those stated by Nilofer Merchant, the same message is highlighted especially when evaluating Australian statistics. Tobacco smoking has been decreasing, demonstrated by a 12% decrease between 2004-2005 and 2007-2008, with Australians being below average when compared to other Organisation for Economic Cooperation and Development (OECD) countries.[10] Alternatively obesity has risen in Australia by 27% since 1995 to 2007-08 resulting in 25% of all adults being obese, placing Australia above the OECD countries' average of 18% in 2007.[10] Similarly the AHS state that 60% of Australians in 2011-13 were deemed insufficiently physically active compared to the global average of 36% in 2008.[10] These statistics highlight Australia's need to improve on the risk factors of obesity and sedentary behaviour to prevent potential unnecessary chronic disease and death.[10]

Recommendations to change work/life practice

If we are mindful to be more active throughout the day we can minimise the negative health effects of sedentary behaviour and potential chronic disease. The following recommendations provide ideas of how to be more active at work:[5]

- Encourage a standing or walking meeting, a standing break or a 'standing agenda' item
- Stand up when using the phone, or when reading emails/documents
- Set up printers, rubbish bins etc. away from your desk to encourage activity
- Walk to your colleagues to discuss items rather than emailing if possible
- Set yourself a reminder on your computer to stand up regularly (every 20-30 minutes)
- Break for lunch, even if it is just a 10 minute walk

- Walk or ride to work
- Get off public transport or park your car a little further from your work to encourage walking and
- Use the stairs instead of lifts.

Conclusion

Evidence demonstrates how much we take sedentary behaviour for granted and highlights the need to reflect on our own practices at work and at home. Statistics indicate that Australians are sitting down too much and we need to increase our activity from 30 to 60 minutes a day. Additionally, we need to move more regularly throughout the day and be mindful of our time spent being sedentary if we are to minimise the negative health impacts and chronic disease risks within the Australian society.

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A project plan to increase influenza vaccine uptake in children who are at risk of complications following influenza in the NT

Emily O'Kearney and Keith Edwards, Centre for Disease Control, Darwin

Abstract

In 2012 and 2013 only 1,701 children under 18 years of age received the influenza vaccine in the Northern Territory (NT). A project has been proposed to increase the number of immunisations given to children who are at risk of complications from influenza and are eligible for a free influenza vaccine. The project consists of 3 tasks: task 1 is to send the list of children's names who are at risk to remote communities so health staff can actively seek out these children and vaccinate them; task 2 is to increase awareness among vaccine providers of which conditions put children at risk of influenza complications; and task 3 is to evaluate the project by comparing the number of influenza vaccines given to children under 18 years of age in 2014 to those given in 2012 and 2013.

Key words: children, influenza, vaccine, vaccination program, Northern Territory

Background

Influenza can be dangerous for children and can result in time away from school and increased need for medical care, including hospitalisation and can also lead to death in severe cases. Children are also key transmitters of influenza in the community. Needing to treat influenza and complications arising from influenza add to the financial demands on the public health sector. Influenza may be prevented by vaccination. Vaccine policies and programs that maximise health benefits and use minimal resources are therefore important.

The Northern Territory (NT) immunisation registry began collecting data on influenza vaccines given to all ages in 2012. The number of influenza vaccines given to children under 18 years of age across the NT in 2012 was 959. In 2013, 742 vaccines were given to this population. In both years, more vaccines were given to females and significantly more vaccines were given to Indigenous children (89% of vaccines given) than non-Indigenous children (11% of vaccinations given). The age in both years which received the most vaccines were 17 year olds, despite the risk of complications from influenza being greatest in children under 2 years old. Of note, approximately 3000 births occur each year in the NT.[1]

Laboratory confirmed cases of influenza are reported to the notifiable disease register in the NT. In 2012 and 2013 combined, there were 296 confirmed cases of influenza in children under 18 years of age. Of these, 144 children (49%) were hospitalised and 272 (92%) were recorded as not having received the influenza vaccination. Indigenous children were over-represented with 186 (63%) children contracting the influenza virus.

Recent research has shown that immunising all children decreases transmission rates of influenza and reduces incidence in people of all ages. Loeb et al conducted a randomised trial involving 49 Hutterite colonies where children and adolescents aged 36 months to 15 years were assigned according to community to receive standard dosing of either inactivated trivalent influenza vaccine or hepatitis A vaccine.[2] No adverse events were observed in the study. Of all the participants 10.6% had confirmed influenza in the control group and 4.5% in the intervention group with an overall protectiveness of 59% and 61% against the participants who did not receive the influenza vaccine.[2] This paper provides evidence that immunising children decreases transmission of influenza in communities if 80% of children aged 3-15 years are immunised.

A comprehensive modelling study which uses an evidence-synthesis approach with virological, clinical, epidemiological and behavioural data developed an age-and risk-stratified transmission model that reproduces the strain-specific behaviour of influenza over 14 seasons in England and Wales.[3] The influenza vaccination program at the time of the study included all people in high-risk groups and those above 65 years. If children aged 5-16 years had been included in the program, the infections per dose of vaccine would have reduced by 0.70 compared to the usual program which averted 0.39 infections per dose. Including children into

the influenza vaccination program would also give an overall reduction in deaths by 1.95 per 1000 doses compared to the 1.74 deaths per 1000 doses in the usual program.[3] The English and Welsh influenza vaccination programs now include vaccinating all children and do not just focus on those at high-risk.

Both these studies reveal evidence for targeting children as being transmitters of influenza in vaccination programs to decrease transmission and incidence of influenza in the total population. In the Australian National Immunisation Program (NIP) individuals aged 65 years and above, Aboriginal and Torres Strait Islander people 15 years of age and above, pregnant women and individuals aged 6 months and over with medical conditions predisposing them to severe influenza are eligible for a free influenza vaccine. Therefore only children who are at risk of severe influenza are currently included in the Australian NIP. In Western Australia, a free influenza vaccine is offered to all children aged 6 months to younger than 5 years. A study was completed to evaluate the effectiveness of giving trivalent inactivated vaccines to all children under 2 years old. The results demonstrated the overall vaccine effectiveness in this age group to be 85.8%.[4]

In accordance with the recommendations from the *Australian Immunisation Handbook*[5] the NT Centre for Disease Control (CDC) has devised the following expanded list of conditions that increase a child's risk of developing complications from influenza:

- Cardiac disease such as
  - Congenital heart diseases
  - Rheumatic heart disease
- Down Syndrome
- Chronic respiratory conditions such as
  - Cystic fibrosis
  - Bronchiectasis
  - Severe asthma
- Neurological and physical disabilities such as
  - Cerebral palsy
  - Spinal cord injury
  - Acquired brain injury
  - Muscular dystrophy
  - Seizure disorders and epilepsy
- Oncology cases/those receiving treatment for cancer
- Other chronic and immune-compromising illnesses such as:
  - Diabetes mellitus
  - Chronic inherited metabolic diseases
  - Renal, liver and gastrointestinal diseases
  - Osteomyelitis
  - Tuberculosis- current or past fibrosis
- Long-term aspirin therapy needs (6 months to 10 years)

In the current NIP children with any of the above conditions should be vaccinated against influenza and are eligible for a free vaccine.

In 2014 the following information has been provided to all vaccine providers about childhood doses of influenza vaccine:

- **DO NOT** USE FLUVAX® brand of influenza vaccine in children under 10 years of age
- The dose for children under 3 years is 0.25ml. Use either Vaxigrip®Junior or use Vaxigrip® but first discard half the vaccine (up to the line on the syringe)
- If a child is having influenza vaccine for the first time and is under 10 years of age, 2 doses of vaccine given at least 1 month apart are required. If 2 doses are not given in that year then he/she needs 2 doses in the following year
- Please report **ALL** adverse events following immunisation to the CDC Immunisation Unit on 89228044 and complete the Adverse Event form available on the NT Department of Health immunisation website
- Report any incidence of Fluvax® given to children < 10 years of age and
- Immunisation providers are encouraged to report all influenza vaccines given for **ALL** children to the NT Immunisation Register, CDC on fax 89228897.

Project plan

It is proposed that the NT can improve the number of influenza vaccines given per year to children and decrease the incidence of complications from influenza. Currently the immunisation team in CDC send out information regarding that year's vaccines dosages and who is eligible for free vaccines to relevant

Table Brand and dose of influenza vaccine per age group in 2014

Age group	Brand and dose
All children 6 –35 months with medical conditions that predispose them to severe influenza*	**VAXIGRIP JUNIOR® 0.25ml IMI** * (1 or 2 doses may be required)
Children 3years–<10 years with medical conditions that predispose them to severe influenza*	**VAXIGRIP® 0.5 ml IMI** (1 or 2 doses may be required)

*Children with chronic medical conditions such as cardiac, respiratory, neurological and immune-compromising conditions

stakeholders (see Table). A project specific to children at risk of severe influenza has been planned consisting of 3 major tasks. The first task will identify and target children at risk of influenza complications in remote areas, the second aims to increase awareness about which children are eligible for a free vaccine to all stakeholders and the third task is to evaluate the project. The aim is to increase influenza vaccination uptake in children 6 months and over to less than 18 years of age who are at risk of severe influenza and its complications.

The first task is to create lists of names of children who are at risk of complications of influenza for each remote community that uses the Primary Care Information System. The lists can then be sent to community clinics for staff to actively find the children and attempt to vaccinate all the children on the list. To make this sustainable, placing an annual influenza vaccine on the care plans of all children with the above list of morbidities will be investigated.

The second task will be to raise awareness for all those across the NT who administer influenza vaccines to children at risk of complications from influenza. Emails will be sent to stakeholders including paediatricians, general practitioners, urban and remote community clinics and all child health nurses reminding them of which children are eligible for a free influenza vaccine. Posters will be made for waiting rooms of clinics and for doctors' and nurses' consultation rooms.

The final task, evaluation, will be carried out comparing numbers of influenza vaccines given in children 6 months to less than 18 years in 2014 to those given in 2012 and 2013. Statistics in 2014 will also be compared to statistics in 2012 and 2013, for numbers of laboratory confirmed infections, hospitalisations and deaths from influenza.

Conclusion

By raising awareness of the children who are at risk of complications of influenza and those who are eligible for a free influenza vaccine to the appropriate stakeholders, it is anticipated that the NT can increase uptake of influenza vaccinations for this vulnerable group. Providing the names of children who are at risk of influenza complications allows remote communities to actively seek out these children. Influenza vaccines are an easy, cost-effective approach to improving the health of our Territory's children.

For information about this project, please contact the project officer, Emily O'Kearney by phone 0889441310 or email Emily.O'Kearney@nt.gov.au.

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Meropenem use in the pre-hospital setting in the Top End

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Abstract

Meropenem is recommended in the CareFlight Northern Territory Top End Antibiotic Policy as pre-hospital treatment in critically unwell septic adults or children being evacuated to Royal Darwin Hospital (RDH), specifically to cover the possibility of melioidosis. A 12 month audit of the 3126 patients retrieved by CareFlight to RDH from Community Health Clinics, Katherine and Gove District Hospitals showed that 40 patients were given meropenem for presumptive severe sepsis and of these 17 (42.5%) were admitted to RDH Intensive Care Unit and 6 (15%) were confirmed to have melioidosis. Meropenem is an important drug carried by CareFlight and it is being used appropriately in evacuated patients who have severe sepsis.

Key words: meropenem, Careflight, melioidosis, sepsis, retrieval

Introduction

Melioidosis is caused by the gram-negative bacillus *Burkholderia pseudomallei,* which is found in the soil and water in the Top End.[1,2,3,4] Infection is most often by percutaneous inoculation or inhalation but can also be by ingestion or aspiration.[1,3,4] Presentation is seasonal with over 80% of cases presenting during the wet season (1 October to 31 April).[1,3,4] Current mortality is around 10 %.[3]

The most common presentations of melioidosis are pneumonia, genitourinary infection and skin infection. Over half of patients are bacteraemic on presentation with over 20% developing septic shock before or soon after admission. It is not unusual for patients to present with bacteraemia and septic shock without an obvious focus of infection.[1,3] Treatment is by prolonged antibiotic therapy and supportive care if the patient is critically unwell. Current Royal Darwin Hospital (RDH) Guidelines for therapy of melioidosis use IV ceftazidime for ward level patients and meropenem for patients in the intensive care unit (ICU).[5]

Risk factors for melioidosis include diabetes, hazardous alcohol use, chronic renal failure, chronic lung disease, malignancy and immunosuppressive therapy, but 20% of all cases have no identifiable risk factor.[1,3,5]

CareFlight is contracted by the Northern Territory (NT) Government to provide an aeromedical retrieval service across the Top End, performing approximately 3500 flights per year. Patients are transported from Katherine and Gove District Hospitals as well as Community Health Clinics to RDH for upgraded medical care. CareFlight is more than just a patient transport service though and critical care management can be initiated by the retrieval team from the time of first patient contact in the community.

Meropenem is recommended in the CareFlight NT Top End Antibiotic Policy as pre-hospital treatment in critically unwell septic adults or children specifically to cover the possibility of melioidosis.[6]

CareFlight's current *Medical Guidelines* state that "melioidosis should be considered in patients with signs of severe sepsis eg. hypotension, altered mental state, respiratory or renal failure or in those with risk factors." The *Guidelines* advise to give meropenem 25mg/kg up to 1g "if signs of severe sepsis or risk factors." They also remind retrieval teams of the importance of taking blood cultures from patients before antibiotics are given and of taking specific melioidosis swabs if melioidosis is in the differential diagnosis.[6]

Meropenem is not stocked at the Community Health Clinics but is stocked at Katherine and Gove District Hospitals and is carried by the CareFlight retrieval team.

The aim of our audit was to look at how often and when meropenem was being used as a treatment before and during transfer of patients with sepsis to definitive care at RDH. We aimed to follow up the patients in whom it was used, to

assess appropriateness of use and to elucidate the outcome of the patients in whom it was administered. We also wanted to see how well our *Guidelines* were being followed.

Methods

Prospective ethical approval for this audit was obtained from the Human Research Ethics Committee of the Menzies School of Health Research and NT Department of Health and data were de-identified for analysis.

The period studied was between 1 January 2012 and 31 December 2012. The CareFlight database was searched for patients who were retrieved during this period with an infection, sepsis or a 'sepsis-like-illness' which could have been caused by melioidosis. The patient group included patients with infections involving the chest, neurological system, skin, joints or bone, urinary tract, prostate, an unknown source, multiple sources or patients with a previous diagnosis of melioidosis. Patients were excluded if they were under 16 years of age, pregnant, were not transferred to RDH or were retrieved from Tennant Creek Hospital or Kununurra Hospital.

The data collected included:

- Date of retrieval
- Age and sex
- Urgency of retrieval
- Composition of retrieval team (nurse only or doctor and nurse)
- Likely diagnosis at time of retrieval
- Which, if any, antibiotics were given before and during retrieval
- Presence of hypotension during the pre-hospital phase
- Risk factors for melioidosis-diabetes, hazardous alcohol use, chronic kidney disease and chronic lung disease.

Further data were collected on the patients receiving meropenem from case notes and the hospital information system at RDH, including:

- The outcome of their admission to hospital
- Whether they required admission to the ICU
- Final diagnosis
- Whether meropenem was continued or stopped.

Data were then analysed using Microsoft Excel 2010.

Results

During 2012, 3126 patients were retrieved to RDH from Community Health Clinics, and Katherine and Gove District Hospitals by CareFlight. Of these, 362 (11.6%) were deemed to have an infection, sepsis or 'sepsis-like-illness' that could be melioidosis.

Out of these 362 patients, 40 (11%) received meropenem before they reached RDH. The demographics of these 40 patients and the details of their retrievals are in Table 1.

Table 1. Patient demographics and retrieval details

Age range (mean) in years	21 – 82 (51.2)
Sex	Male 23 (57.5%) Female 17 (42.5%)
P1 or P2 acuity*	27 (67.5%)
Retrieved by doctor and nurse team	34 (85%)
Retrieved by nurse only	6 (15%)
Episode of hypotension pre-hospital	22 (55%)

*Requirement for CareFlight aircraft to depart within 1 hour of referral due to urgency of the case.

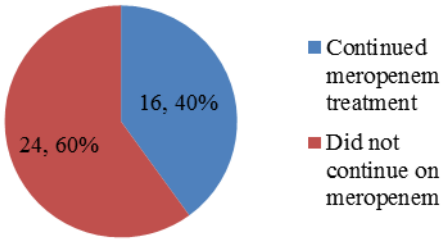
17 patients (42.5%) received meropenem before CareFlight arrived (Katherine and Gove Hospitals), whereas 23 (57.5%) were given meropenem by the CareFlight retrieval team. The likely source of infection as diagnosed during retrieval for these 40 patients is shown in Table 2.

Table 2. Likely source of infection

Chest	25 (62.5%)
Urinary tract/prostate	5 (12.5%)
Unknown	5 (12.5%)
Skin/joint/bone	2 (5%)
Neurological	2 (5%)
Other	1 (2.5%)

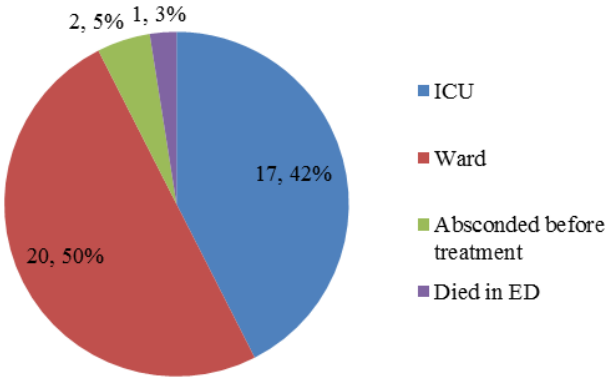
Once at RDH, 16 (40%) patients continued to be treated with meropenem (Figure 1).

Figure 1. Proportion of patients who continued on meropenem once admitted to RDH.



Of the 40 patients treated pre-hospital with meropenem, 17 (42.5%) were admitted to ICU, 1 (2.5%) died in the Emergency Department (ED), 2 absconded from ED before treatment (5%) and 20 (50%) were admitted to a ward (Figure 2).

Figure 2. Final destination of patients once admitted to RDH.



Of the 40 patients who received meropenem pre-hospital, 6 (15%) grew *Burkholderia pseudomallei* in cultures and so were confirmed to have melioidosis.

The presence of risk factors in the patients who received meropenem is detailed in Table 3. Of the 6 patients who were diagnosed with melioidosis, 5 had at least 1 risk factor. The sixth patient did not have any risk factors documented in their CareFlight notes.

Discussion

The number of patients transported to RDH by CareFlight who received meropenem before arrival at RDH is small (40 out of 3126). At the time of referral and during transfer, these patients were mostly very unwell - 67.5% were triaged as P1 or P2 acuity requiring urgent departure of the aircraft within 1 hour of referral and 85% were retrieved by a doctor and nurse team. In addition, 55% had at least 1 episode of hypotension before arrival at RDH. Once at RDH, 42.5% of these patients were admitted to ICU and 2.5% died in ED. This suggests that meropenem is not being overused by CareFlight clinicians and supports the current *CareFlight Guidelines* of using meropenem in suspected severe sepsis.

Table 3. Risk factors in patients

Risk Factor	Number of patients (percentage)
Diabetes	18(45%)
Chronic kidney disease	18(45%)
Chronic lung disease	17(42.5%)
Hazardous alcohol use	8(20%)

Culture results showed that 15% of those who received meropenem were subsequently diagnosed with melioidosis. 40% of patients who were given meropenem were continued on this treatment after admission to RDH. Almost all of the patients who were diagnosed with melioidosis had at least 1 risk factor for contracting it but lack of identified risk factors does not exclude the possibility of melioidosis.

As CareFlight has new medical staff starting every 6 months this audit will provide a good reminder to staff of the *Guidelines* for the treatment of severe sepsis and suspected melioidosis. It also stands as a reminder to consider melioidosis when appropriate and is a good introduction to staff who have not worked in the Top End previously. Dissemination of the information from this audit is planned through presentations at CareFlight education days.

Conclusion

Meropenem is an important drug carried by CareFlight and it is being used appropriately in evacuated patients who have severe sepsis. The *Guidelines* for its use are adequate and give clear indications as to when it should be used. The *Guideline* does not need any revision at this time.

Acknowledgements

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Northern Territory decides to ban smoking in cars with children

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In February 2014 the Northern Territory (NT) Government decided to ban smoking in cars carrying children under the age of 16 years. The NT Tobacco Control Act is now being amended to ban smoking in cars with children and these amendments are expected to be introduced in the May sittings of Parliament for passage in August 2014. The NT is the final Australian jurisdiction to make this ban. Health Minister Robyn Lambley stated that the ban would be enforced by police and people caught breaching the ban would be fined around $200.[1]

Smoking prevalence in the NT is 1.6 times higher than the national average[2] and children's health should not suffer as a result of secondary smoke. Passive smoke has negative effects on health for all people, but children are at particular risk. Second-hand smoke increases the risk of sudden infant death syndrome; respiratory illnesses such as bronchitis, asthma and pneumonia, meningococcal disease and makes children more prone to colds and middle ear infections.[3] The Centre for Disease Control supports the decision to make the ban and encourages people who smoke not to do so around children.

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Tennant Creek dengue mosquito elimination program update

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Abstract

The dengue mosquito, Aedes aegypti, was detected in Tennant Creek in November 2011. A dengue mosquito elimination program was swiftly established by the Northern Territory Department of Health. The program was expected to end in June 2013 but was extended until April 2014 as low numbers of Ae. aegypti were still present in the town. The program is now in its eighth round of property inspections and treatment with no Ae. aegypti detected since June 2013. The program is expected to be declared successful at the end of April 2014.

Key words: exotic mosquitoes, Aedes aegypti, elimination program, Tennant Creek

Background

The dengue mosquito *Aedes aegypti* has not been found in the Northern Territory (NT) since the late 1950s, when it disappeared, most likely due to the introduction of irrigation systems.[1,2] Incursions of this mosquito occurred in Tennant Creek in 2004 and on Groote Eylandt in 2006 but *Ae. aegypti* was eliminated from both locations after intensive elimination campaigns.[3,4]

Most recently, the dengue mosquito was again discovered in Tennant Creek in November 2011, where it was found breeding in an ovitrap (mosquito egg trap). Subsequent surveys showed that the species was widespread in the town and an elimination program was swiftly established[4] with funding provided by the Australian Government Department of Health and the NT Department of Health (DoH) until 30 June 2013.

The program involves rounds of property-by-property mosquito larval inspections and treatment of the 1115 main residential and commercial properties and hobby farms in Tennant Creek and the 107 residential properties in nearby communities. During these operations, every receptacle capable of holding water is inspected for mosquito larvae and treated with an insecticide to prevent mosquito breeding. In addition, the program involves adult mosquito surveillance and a media program to encourage public support.

To be considered successful the program requires that 1 round of property inspections is negative for *Ae. aegypti* during a wet season. The program has been carried out by Medical Entomology (ME) DoH in liaison with Environmental Health DoH, other CDC staff, volunteers, other government organisations and a dedicated elimination program team based in Tennant Creek.

The first round of property inspections and treatment commenced on 23 November 2011 and was completed on 8 February 2012. A total of 1070 properties were inspected, with 146 found positive for *Ae. aegypti.* Detailed survey and treatment results were reported in Whelan et al 2012.[5]

This report summarises the elimination program activities carried out between February 2012 and February 2014.

Elimination program activities and results (February 2012 to June 2013)

Rounds 2-6 were completed between February 2012 and October 2013, with over 800 properties inspected in each round (median 1115). A summary of the findings is shown in Table 1.

In each of Rounds 3-6, only 1 property was found to be positive for *Ae aegypti* larvae. In Rounds 3 and 4 larvae were found in outdoor spas while in Round 5 they were found in a plant drip tray and in Round 6 in a dog bowl.

In Round 4, in addition to the larva in a spa pool, a Biogents® BG mosquito trap set at the Tennant Creek hospital also captured 1 adult female *Ae. aegypti*. Subsequent surveys in the trap vicinity did not detect *Ae. aegypti* breeding. Likewise in Round 5 an adult female mosquito was collected in a BG trap on the same property where larvae were found.

During Round 6, previously identified high risk properties were also revisited to ensure they were free of *Ae. aegypti* breeding.

Table 1.Summary of property inspection and treatment rounds 23 November 2011 to 14 February 2014

Round	Start date	End date	Properties inspected and treated	Properties positive for *Ae. aegypti*	Receptacles positive for *Ae. aegypti*
1	23/11/2011	8/02/2012	1070	146 (13.6%)	197
2	9/02/2012	16/03/2012	822	14 (1.7%)	17
3	19/03/2012	9/10/2012	1208	1 (<0.1%)	1
4	12/10/2012	8/02/2013	1128	1 (<0.1%)	1
5	11/02/2013	8/4/2013	1115	1 (<0.1%)	1
6	9/04/2013	6/10/2013	1115	1 (<0.1%)	1
7	7/10/2013	6/01/2014	1092	0	0
8	7/01/2014	30/04/2014	812 (14/2/2014)	0	0
Total			8362	164	218

Rainwater tanks

During the elimination program, all 84 known rain water tanks were inspected for *Ae. aegypti* breeding and sealed or rectified to prevent the ingress and egress of mosquitoes. Tanks found breeding were treated with insecticides (s-methoprene).

Side entry pits and septic tanks

In October 2012 all side entry pits in Tennant Creek were cleaned by the Barkly Shire Council and insecticide treated by the elimination team using alpha-cypermethrin and s-methoprene. All side entry pits were re-treated in March 2013, and septic tanks located in public use areas and hobby farms treated with Baytex 550®.

Community inspections

Other NT population centres where *Ae. aegypti* larval surveys were carried out between November 2011 and June 2013 included Ti Tree, Ali Curung, Renner Springs, Three Ways, Elliott and Bootu Creek.

Media and public relations

Throughout the elimination program, media releases were issued to raise awareness and to seek public cooperation. A postal letter drop was organised early in the program to inform the public of expected program activities.

Elimination program continuation (July 2013 to April 2014)

Following the detection of *Ae. aegypti* in Round 5 (April 2013), it was evident that the elimination program needed to be continued to ensure the successful elimination of the dengue mosquito from Tennant Creek.

In May 2013, funding was extended by the Australian Government to continue the program until the end of April 2014.

Rounds 7 and 8 took place between October 2013 and March 2014 and the results are summarised in Table 1. No *Ae. aegypti* were found in Rounds 7 and 8.

Discussion

During previous incursions in Tennant Creek in 2004 and on Groote Eylandt in 2006, *Ae aegypti* was eliminated over a 2 year period. Although *Ae. aegypti* numbers rapidly decreased after the Round 1 of property inspections and treatment during the current incursion this species was detected in April 2013 close to the end date of the initial funding period. To ensure the successful elimination of the dengue mosquito from Tennant Creek the program was extended from July 2013 until April 2014 and is now in Round 8 of property inspections and treatment.

Since November 2013 substantial rain occurred in Tennant Creek with a total of 40mm recorded

in November and 42mm in December 2013. A further 252mm of rain has been recorded since January 2014. This rain would have been sufficient to trigger hatching of any dry *Ae. aegypti* eggs still present in receptacles. Therefore, rounds 7 and 8 of property inspections and treatment were considered crucial in determining the presence or absence of *Ae. aegypti* in Tennant Creek.

Until the end of April 2014, enhanced adult mosquito surveillance will be carried out in areas where the dengue mosquito was last found, and properties previously positive for *Ae. aegypti* re-inspected in an effort to detect any cryptic breeding sites. All rainwater tanks will also be re -visited to ensure they are properly sealed to prevent mosquito breeding.

If no further *Ae. aegypti* are detected by the end of April 2014, the dengue mosquito elimination program will be declared successful and the NT will be again free of the dengue mosquito.

Acknowledgements

We would like to thank all ME, EH, CDC and National Critical Care Trauma Response Centre staff and volunteers who assisted with the dengue mosquito elimination program in Tennant Creek for their tremendous contribution. We would also especially like to thank John Cusack and James Billings for the program supervision in Tennant Creek and the Commonwealth Department of Health for providing essential funding.

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World TB Day 24 March 2014

Reach the 3 million

A TB test, treatment and cure for all

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World TB Day, held on 24 March each year, is designed to build public awareness that tuberculosis (TB) today remains an epidemic in much of the world, causing the deaths of nearly 1.5 million people each year, mostly in developing countries.

The 2014 campaign promotes that while TB is curable, current efforts to find, treat and cure everyone who gets TB in the world are not sufficient. Of the 9 million people a year who get sick with TB, a third of them do not get the TB services they need. Many of these 'missed' 3 million people live in the world's poorest and most vulnerable communities.

The Stop TB Partnership, a collective force with nearly 1000 partners, operates through a secretariat hosted by the World Health Organization (WHO) and believes that no one should be left behind in the fight against TB. The 2014 World TB Day, called for a global effort to find, treat and cure the 3 million and accelerate progress towards zero TB deaths, infections, suffering and stigma.

The Stop TB Partnership state that "to reach the 3 million we need to aggressively scale up TB programs and ensure access and coverage for all, especially for the most vulnerable groups and in the areas most heavily affected by the diseases.

Investment in research and development is needed for the new tools - diagnostics, drugs and vaccines - in order to reach people faster, treat them more quickly and ultimately prevent them

from becoming ill with TB. If we are successful we can ensure that we meet the Millennium Development Goals and start to talk realistically about eliminating TB as a public health problem in the next 2 decades."

In Australia TB is a nationally notifiable disease which enables the Australian Government's Department of Health, in partnership with State and Territories, to continuously monitor TB incidence in Australia. Approximately 1,250 new cases of TB are diagnosed in Australia each year with an incidence rate of about 5.5-6.0 per 100,000 populations. This rate is comparable to other Organization for Economic Co-operation and Development countries including Germany and Canada. Australia has achieved and maintained good TB control since the mid-1980s. The *Strategic Plan for Control of Tuberculosis in Australia: 2011–2015* developed by the National Tuberculosis Advisory Committee (NTAC) is agreed upon by the Commonwealth and State and Territory Governments and outlines the strategic aims, together with a goal and objective based work plan, for TB control in Australia. The activities of NTAC are vital to ensuring ongoing TB vigilance and minimising the burden and human impact of TB in Australia and the Western Pacific Region.

In the Northern Territory (NT), Centre for Disease Control (CDC) units in regional areas are responsible for TB control activities. These units are situated in Darwin, Katherine, Alice Springs, Tennant Creek and Nhulunbuy. Each unit is responsible for all activities including screening, case management, contact tracing and disease notification.

Data extracted from the NT Notifiable Diseases System (NTNDS) from 2000 to 2011 shows there has been between 26 to 59 new cases of active TB notified in the NT per year with an average of 37 cases. Of these cases, 49% have occurred in Indigenous people, 45% in overseas born and 6% in the remainder of the community. Rates in the NT between 2000 and 2011 have been approximately 18 cases per 100,000 population ie. about 3 times the national average. The rates of TB in the NT Indigenous population are trending downwards while the incidence rates in people born overseas are increasing. Notification rates in the Indigenous and overseas born population are respectively 12.7 and 14.6 times higher than the rate seen in the Australian born non-Indigenous population. Just over half of the NT cases occur in people aged 15-44 years. The spectrum of disease in the NT is similar to that in other populations, with approximately 70% of new cases due to pulmonary TB and the most common cause of extra-pulmonary disease being lymph node disease. The health services in the NT as in the rest of Australia are fortunate to have excellent TB diagnostic capabilities. It is felt that very few cases are missed and all NT TB clients receive the recommended treatment and 95% achieve curative treatment courses.

This World TB Day, people all over the world, from TB program managers to frontline health care providers made a call to "Reach the 3 million" and ensure that everyone suffering from TB has access to adequate TB care, including diagnosis, treatment and cure.

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Notifications of haemolytic uraemic syndrome and Shiga-toxin producing *E. coli* infections to the Centre for Disease Control in the Northern Territory - an audit

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Abstract

The OzFoodNet epidemiologist position is based in the Centre for Disease Control (CDC) Darwin within the Department of Health and is funded by the Commonwealth Government. The purpose of the position is to enhance enteric disease surveillance in the Northern Territory (NT) and to assist with foodborne and some non-foodborne illness investigations.

An audit was conducted to ascertain the level of reporting of haemolytic uraemic syndrome to the NT CDC.

Keywords: Haemolytic uraemic syndrome (HUS), Shiga-toxin producing E. coli (STEC), Vero-toxin producing E.coli (VTEC), notifiable conditions, OzFoodNet, Northern Territory

Introduction

Haemolytic uraemic syndrome (HUS) is a serious and life-threatening illness that can result in renal failure and death. Approximately 10% of cases are atypical in that they do not follow an infection.[1] The majority of cases however are associated with infection by Shiga-toxin producing *E. coli* (STEC), which was first reported as a food pathogen in 1982 after an outbreak of gastroenteritis associated with undercooked beef mince.[2] STEC infection may be asymptomatic or result in symptoms ranging from mild diarrhoea to severe abdominal cramps, bloody diarrhoea, HUS or death.[3] A well-known outbreak of HUS in Australia occurred in 1995 when 23 people in South Australia (SA) developed HUS after eating mettwurst contaminated with STEC[4] resulting in 1 death.

The national case definition for HUS[5] is based on laboratory evidence but in the Northern Territory (NT) is only notifiable by doctors rather than laboratories. Hence notification relies on clinicians making the diagnosis and then notifying the Centre for Disease Control (CDC).

Australian national notifiable diseases case definition – Haemolytic uraemic syndrome (HUS)[5]

Reporting: Only **confirmed cases** should be notified.

Confirmed case: A confirmed case requires **clinical evidence** only.

Clinical evidence:

1. Acute microangiopathic anaemia on peripheral blood smear (schistocytes, burr cells or helmet cells), AND AT LEAST ONE OF THE FOLLOWING:
2. Acute renal impairment (haematuria, proteinuria, elevated creatinine) or
3. Thrombocytopaenia, particularly during the first 7 days of illness.

Australian national notifiable diseases case definitions - Shiga toxin-producing/vero toxin-producing *Escherichia coli* - STEC/ VTEC[6]

Reporting: Only **confirmed cases** should be notified.

Confirmed case: A confirmed case requires **Laboratory definitive evidence** only.

Laboratory definitive evidence

1. Isolation of shigatoxigenic/verotoxigenic *Escherichia coli* from faeces or

2. Isolation of shiga toxin or vero toxin from a clinical isolate of *E. coli* or

3. Identification of the gene associated with the production of shiga toxin or vero toxin in *E. coli* by nucleic acid testing on isolate or raw bloody diarrhoea.

Detection of STEC requires targeted testing as no laboratories in the NT test routinely for STEC. Samples are not referred interstate unless STEC testing is specifically requested. In SA, STEC is routinely tested for when there is laboratory macroscopic detection or clinical history of blood in the stool or when STEC or HUS is suspected. As a result, the rates of notified STEC in SA are the highest in the country at 2.4 cases per 100,000 per year.[7]

Given the paucity of notified cases and the risk of missed notifications it was decided to audit the current system by cross-checking notifications against discharge diagnoses derived from the hospital morbidity data, with the aim of ascertaining the sensitivity of the current surveillance system to detect cases of HUS and STEC.

Aims

To assess the sensitivity of the NT Notifiable Disease Surveillance System (NTNDS) for detecting cases of HUS and STEC by comparing it with cases detected in the NT public hospital admission data.

Methods

The audit was registered with the Human Research Ethics Committee (HREC) of the Northern Territory Department of Health and Menzies School of Health Research (HREC-EC00153).

The NTNDS was interrogated for notifications of STEC and HUS from January 1999 until June 30 2013. Similarly, with the NT public hospital admission data over the same period, cases were extracted if they had recorded the relevant ICD-10 (International Statistical Classification of Disease) codes for STEC (A04.0 – A04.1) or HUS (D59.3)[8] in the first 10 discharge diagnoses. The relevant ICD-10 codes are listed in Table 1. All cases identified were checked against the national case definitions.

Population data based on that from the Australian Bureau of Statistics were obtained from Health Gains Planning. Estimates of populations for the years 2011-13 were made by extrapolating from the 2009-10 data.[9]

Table 1. ICD-10 codes corresponding with HUS and STEC

ICD-10 Code	Description
A04.0	Enteropathogenic *E. coli* infection
A04.1	Enterotoxigenic *E. coli* infection
A04.2	Enteroinvasive *E. coli* infection
A04.3	Enterohaemhorragic *E. coli* infection
A04.4	other intestinal *E. coli* infections
D59.3	Haemolytic uraemic syndrome

Not all of the cases of HUS in the NTNDS were found in the NT hospital admission data. Therefore, two-source capture-recapture methodology was used to estimate the true number of cases to calculate the sensitivity of our system.

Capture-recapture analysis can be used in epidemiology to evaluate the completeness of case ascertainment by comparing 2 or more independent lists (or surveillance systems) of cases in order to estimate the total number of cases in a given population.[10] An example of capture-recapture methodology can be seen in the work of Hook and Chambers[11] who estimated maternal age-specific rates of Down syndrome by using 2 incomplete data sources; birth certificates and laboratory results. They estimated that the information on the birth certificates was only 35% complete and they were able to derive a higher estimated rate of Down syndrome based on their analysis.

The validity of capture-recapture estimates depends on the following underlying assumptions: cases can be uniquely identified, perfect record-linkage, a closed population, a homogenous population and in two-source capture-recapture methods, an independence between registers.[12] The reliability of capture-recapture estimates is also limited when sample sizes are small because there is an insufficient amount of overlapping information between information sets.[13]

We applied the following two-source capture-recapture formula for small numbers[14,15] to estimate the total number of HUS notifications between June 1999-2003:

$$N = [(a+1)(b+1)/(c+1)] - 1$$

Where *a* is the total number of cases from the primary source, *b* is the total number from the secondary source and *c* is the number of cases common to both sources.

Variance was obtained using the formula:

$$Var(N) = \frac{(a+1)(b+1)(a-c)(b-c)}{(c+1)^2(c+2)}$$

and the 95% confidence intervals = ± 1.96*√Var (N).[14]

Results

From January 1999 to June 2013, only 6 cases of HUS were notified to the NTNDS[16] correlating to an annual rate of 0.19 cases per 100,000 per year. The overall annual rate of notified HUS in Australia between 2000 and 2010 was 0.07 cases per 100,000 per year.[7]

In the same period there were 9 cases of STEC infection notified in the NT,[16] a rate of 0.29 per 100,000 per year. This compares with an annual national STEC rate of 0.4 cases per 100,000 per year between 2000 and 2010.[7]

All cases of HUS and STEC on the NTNDS fulfilled the case definition.

Table 2 shows the number of patients identified from the hospital admission data with diagnoses corresponding with HUS or STEC infection.

There were 17 cases of HUS identified in the hospital data, 9 of which did not fulfil the case definition. The majority of these excluded cases (8/9) had no evidence of microangiopathic anaemia while 1/9 had evidence of microangiopathic anaemia but without any evidence of renal impairment or thrombocytopaenia.

Of the 8 which fulfilled the case definition, only 1 was notified to the NTNDS (12.5% notification rate). In addition, only 1 had a faecal sample specifically tested for STEC/VTEC, STEC/VTEC genes or associated toxins.

Of the 6 cases of HUS notified to the NTNDS, 5 had faecal samples collected however none had a faecal sample specifically tested for STEC/ VTEC, STEC/VTEC genes or associated toxins.

Of the 13 cases of HUS identified in this audit that met the case definition, 8 had stool samples collected but only 1 was specifically tested for STEC/VTEC, STEC/VTEC genes or associated toxins.

Of the 9 STEC cases notified to the NTNDS, all fulfilled the case definition for STEC. The notification of STEC to CDC is by laboratories which interpret the simple case definition above. Efficiency of notification is enhanced by the incorporation in laboratory software of automated report generating functions.[17,18]

Investigation of the NT public hospital admission data found 10 cases in total with STEC infection. None of these cases fulfilled the case definition for STEC infection. Using the information available, of the 8 cases coded as A04.4 (other intestinal *E. coli* infections), 3 cases were correctly coded but did not fulfil the case definition for STEC as specific STEC testing did not occur with undifferentiated *E. coli* isolated from a stool sample only. Another 3 cases were incorrectly coded as A04.4 as a result of *E. coli* being isolated from blood cultures (2 cases) and the commensal parasite *Entamoeba coli* being isolated from a faeces sample (1 case).

Based on our results and using the two-sample capture-recapture method, 31 cases of HUS (95%CI = 4-57) were estimated to have occurred

Table 2. Potential HUS and STEC cases identified by ICD 10 codes in NT Government Hospital data

	HUS	STEC				
ICD10 Codes	D59.3	All	A04.0	A04.1	A04.2	A04.3	A04.3
Number of cases identified in NT Department of Health Hospital Data	17	10	0	1	0	1	8
Number which fulfilled case definition	8*	0	0	0	0	0	0

Footnotes: * Only 1 of these cases was notified to NTNDS.

in the NT from 1999 to June 2013, giving an annual incidence of 1.00 per 100 000 per year (95% CI = 0.12-1.85). The sensitivity of the NTNDS to detect cases of HUS was 19% (95% CI = 11 – 100). There were no confirmed STEC cases found in the NT public hospital admission data, so an estimate of the true number of cases could not be made.

Discussion

It has already been recognised in Australia that HUS is an undernotified condition.[7] Using two-source capture-recapture methodology, we estimated that the sensitivity of the NTNDS for detecting HUS was 19% but due to the fact that our estimate was based on only 1 case being common to both data sources the 95% confidence interval was wide (11-100%).

The fact that HUS is a condition notifiable by doctors rather than laboratories is likely to contribute to its underreporting. Laboratory notifiable conditions such as salmonellosis or shigellosis are based on the detection of organisms only. The advent of automatic report generating by laboratory software results in efficient notification of these conditions to CDC. HUS on the other hand is diagnosed on clinical features rather than 1 single laboratory result. A clinician needs to firstly recognise the triad of microangiopathic haemolytic anaemia, acute renal impairment or thrombocytopaenia, and then actively notify the condition to CDC. A blood film with features suggestive of HUS such as schistocytes, helmet cells, burr cells and thrombocytopaenia may occur in a number of conditions and a diagnosis of HUS does not usually occur at the laboratory level. It is the responsibility of the clinician interpreting these results to notify potential HUS cases to CDC where trained public health staff can compare with the case definition.

It is vital to determine whether HUS cases can be attributed to infections by Shiga-toxin producing *E. coli* (STEC). This enables public health authorities to detect potential foodborne sources and outbreaks early and to implement prevention strategies.

Specific testing for STEC/VTEC is not available in the NT and it does not appear that any of these samples had STEC testing specifically requested via referral interstate. The United States CDC recommends that all stools from persons with acute community-acquired diarrhoea are tested for STEC[19] regardless of whether blood is present or not. This testing involves specific culturing of STEC as well as testing for STEC toxins and/or genes. It is recommended that all potential HUS cases are tested for STEC infection in order to detect potential foodborne (or common) sources of infection early.

STEC infections are notified to the NTNDS when a laboratory diagnosis occurs. However, because none of the cases notified in the NTNDS appeared in the hospital data, estimates of the true figure could not be made. According to NTNDS data, 3/9 STEC cases were hospitalised. The lack of the NTNDS cases in the hospital data could be explained by miscoding of hospital data or that some cases were not unwell enough to present to hospital or they may have presented to a private hospital.

STEC is underreported as it is under tested. STEC testing is not performed on-site in any of the laboratories in the NT and the referral interstate of faecal specimens with laboratory detected macroscopic blood or clinical histories of bloody diarrhoea is not standard procedure when only routine microscopy and culture is requested. Of the 9 cases of STEC notified to the NTNDS, 8 were diagnosed in the Central Australian region where the South Australian Institute of Medical and Veterinary Science (IMVS) previously had a laboratory which referred all bloody faecal specimens for STEC testing as per South Australian guidelines. Likewise only one of the 13 HUS cases underwent STEC-specific testing.

Recommendations

To improve the capture of HUS and STEC we recommend:

1. Raising awareness of the importance of notifying HUS through regular inservices with hospital medical staff.
2. Testing possible HUS cases for STEC/ VTEC (through stool samples) early in the diagnosis to allow for the detection of potential foodborne (or non-foodborne) sources, for the detection of clusters and to facilitate timely public health responses.

3. An assessment of the cost-effectiveness of testing all cases of community acquired diarrhoea for STEC should be undertaken.
4. The periodic review of the NT public hospital admission data to improve completeness of HUS notifications to the NTNDS.

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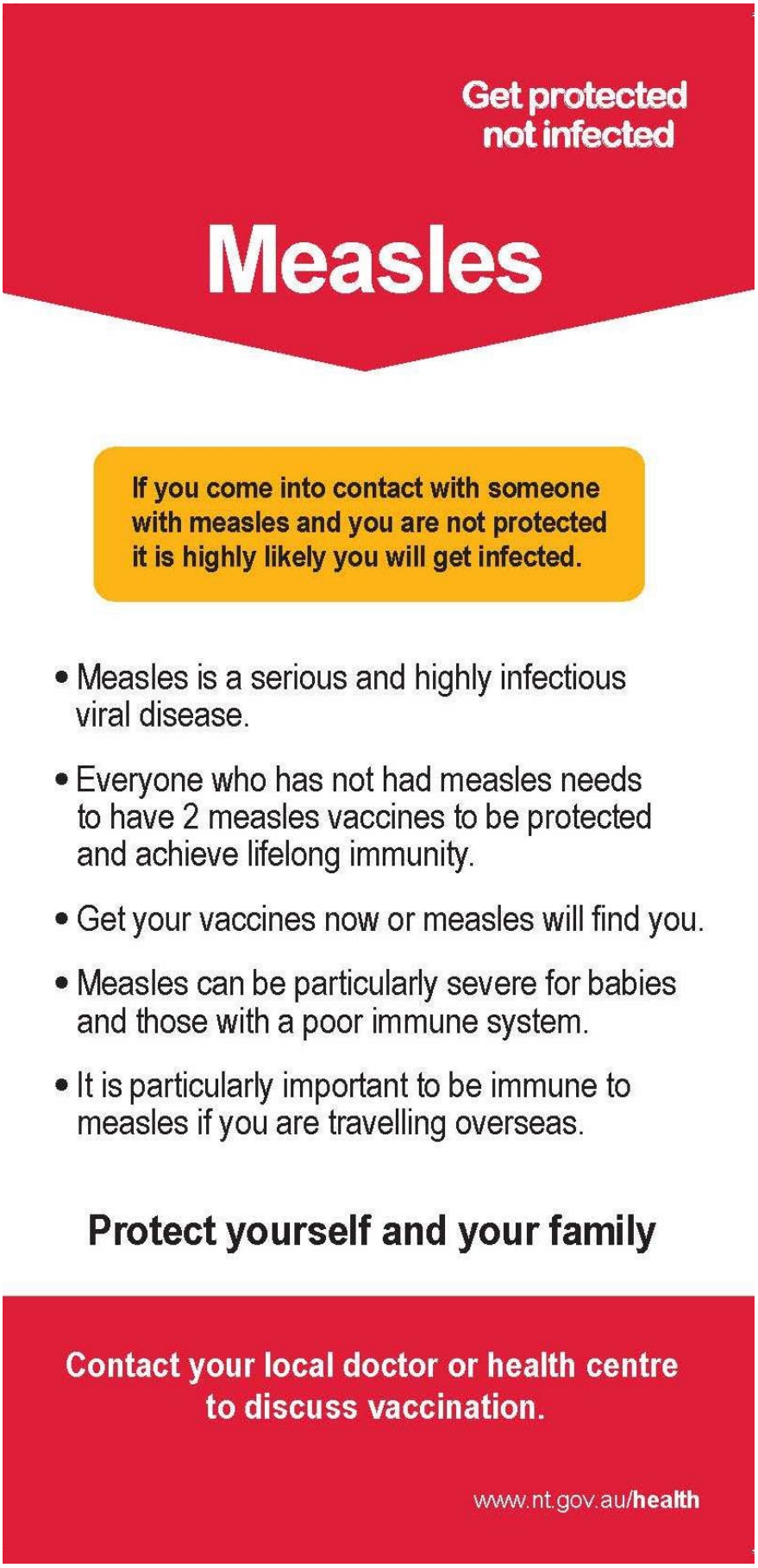
Northern Territory Government
Measles
BEFORE YOU TRAVEL
Get protected not infected
The BEST protection against measles is VACCINATION
It is important to be immune to measles if you are travelling overseas.
Contact your local doctor or health centre to discuss vaccination.
www.nt.gov.au/health


Get protected
not infected
Measles
If you come into contact with someone with measles and you are not protected it is highly likely you will get infected.
• Measles is a serious and highly infectious viral disease.
• Everyone who has not had measles needs to have 2 measles vaccines to be protected and achieve lifelong immunity.
• Get your vaccines now or measles will find you.
• Measles can be particularly severe for babies and those with a poor immune system.
• It is particularly important to be immune to measles if you are travelling overseas.
Protect yourself and your family
Contact your local doctor or health centre to discuss vaccination.
www.nt.gov.au/health

Measles outbreak summary

Peter Markey and Sophie Lines, Centre for Disease Control, Darwin

The measles outbreak in the Northern Territory which commenced in January 2014 was declared over on 4 April 2014. There were 48 confirmed cases, with 6 cases being imported from overseas (4 from the Philippines and 2 from Singapore). The timeline is illustrated in Figure 1. All but 4 cases resided in the greater Darwin area with almost half living in Palmerston. There were 2 cases from the Katherine Region, 1 from the Alice Springs Rural Region and 1 from interstate.

All cases in which the measles subtype was able to be determined were subtype B3.

Figure 2 shows the cases by sex and 5 year age groups. Cases were distributed evenly between the sexes (24 each) and the median age was 24 years (range 7 months to 62 years). The majority of cases (38) were either less than 12 months (9 cases) or between 17 and 47 years of age (29 cases). There were 7 cases (14.6%) who identified as Indigenous.

The majority of cases (25) had no measles immunisations, 20 reported being partially immunised and 3 cases reported being fully immunised. Over 2,000 contacts of these cases were followed up by CDC staff. A full report will be published elsewhere.

Figure 1. Cases of confirmed measles diagnosed in the NT in 2014; by date of onset and imported status

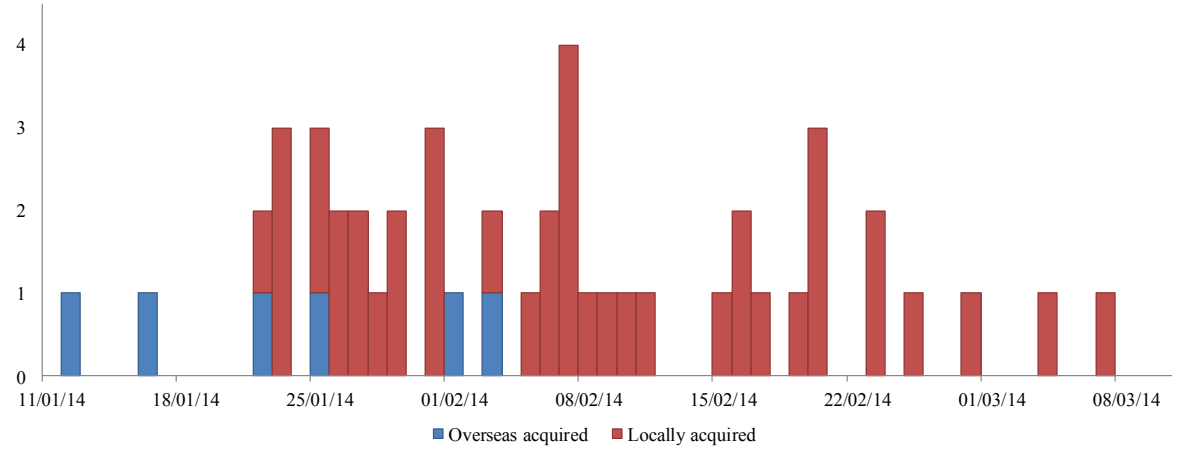
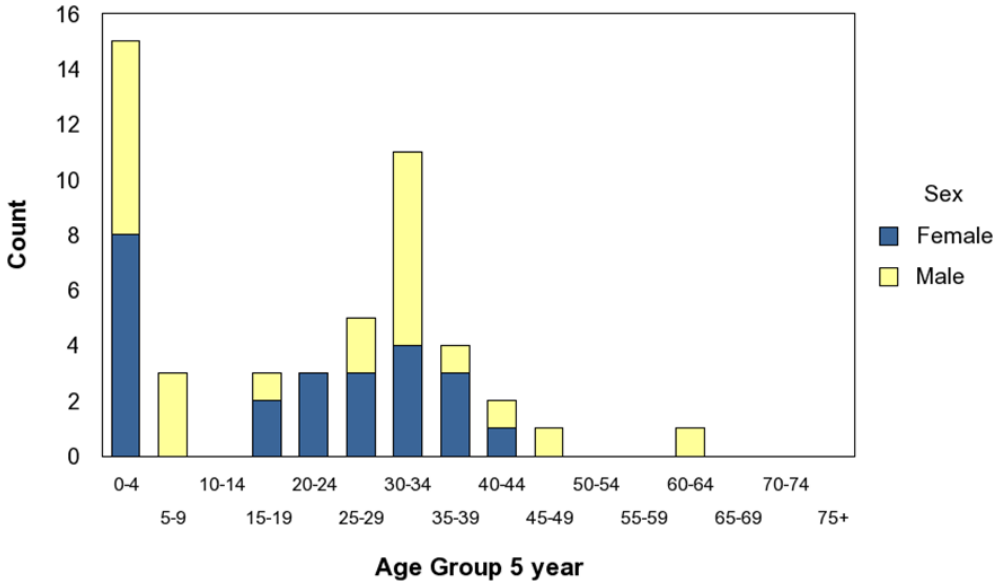


Figure 2. Cases of confirmed measles diagnosed in the NT in 2014; by age group and sex



New guideline: Contact tracing for sexually transmitted infections

Nathan Ryder, Centre for Disease Control, Darwin

A new contact tracing guideline will be released shortly by the Sexual Health and Blood Borne Virus (SHBBV) Unit. The *Guideline* aims to provide information to clinical staff regarding contact tracing for people diagnosed with a sexually transmitted infection (STI) or blood borne virus (BBV) in the Northern Territory.

Contact tracing can be a confusing and daunting prospect for clinical staff. Confusion may occur due to variation of the role of clinical versus public health staff in different regions and daunting due to the potential tactical burden of locating and treating sexual partners and issues related to confidentiality. In recognition of these important issues the new *Guideline* aims to clarify roles and assist services prioritise their contact tracing activities to ensure their resources are focused where they are of most benefit.

Contact tracing is the process of notifying and offering treatment to the sexual partners of people diagnosed with a STI. It is a well-recognised and important component of sexual health care that has been shown to reduce the re-infection rate of people with STIs. It is also likely to reduce the prevalence of infection in the community.

Clinical staff have ethical and legal responsibilities associated with contact tracing. When a person is diagnosed with an STI, staff must:

- Provide sexual health information and treatment according to approved clinical guidelines
- Discuss contact tracing options and action appropriate to the situation in order to inform known sexual partners of the risk of an STI.

Performing these steps is generally within the resources of most clinical services assuming they have trained staff and access to standard protocols such as the CARPA standard treatment manual. Actively locating and recalling partners requires an additional level of resources and outreach capacity. Recognising many services do not have the capacity to take this approach for all STI diagnoses the *Guideline* provides a framework for prioritising responses (see Table).

Table Prioritisation for contact tracing

Priority 1	All regular sexual partners of pregnant women All partners of people with infectious syphilis or HIV
Priority 2	All regular sexual partners of people with chlamydia or gonorrhoea
Priority 3	Any casual sexual partners of people with chlamydia or gonorrhoea
Priority 4	Any sexual partners of people with trichomonas

Contact tracing is best performed as a voluntary process and a rigorous approach to confidentiality must be taken. Staff should consider the potential risk of harm to the presenting patient and be aware that, in some circumstances, contact tracing may not be appropriate if the risk of harm outweighs the likely benefit.

For priority 1 cases the diagnosing health service should always ensure contact tracing occurs and the SHBBV unit will actively assist with this process.

In priority 2 to 4 cases the individual health service should determine whether the health service or the person themselves will take responsibility for informing partners. The full *Guideline* provides guidance to assist with this decision. The SHBBV unit will provide advice regarding these cases upon request but will not automatically contact health services.

When notifying health services in other areas about contacts it is important to ensure sufficient information is provided to allow that service to prioritise their efforts. Contact tracing referrals to other services is advised for Priority 1 and 2, should be considered for Priority 3 and is generally not recommended for Priority 4.

The *Guidelines* will soon be linked to the CDC webpage.

Valentine's Day sexual awareness in Tennant Creek

Leigh-ann Thomas, Centre for Disease Control, Tennant Creek

Tennant Creek's 2014 Valentine's Day will be well remembered with a variety of safe sex messages getting out into the public in a fun way.

Locals had the opportunity to win 1 of the 2 $50 gift vouchers at local businesses of their choice by entering the Condom Counting Competition. 9 jars filled with condoms were distributed around the town and we received just under 200 guesses at how many condoms were hiding inside.

It was great to see local businesses and organisations supporting the competition and placing the jars on their counters as well as encouraging clients to have a guess. The winners selected vouchers at Wok's Up Chinese Restaurant and Little Rippers Lifestyles Department Store and were very happy that having a go paid off for them.

Centre for Disease Control (CDC) also ran a staff condom quiz that went to Tennant Creek Department of Health staff and Anyinginyi Health Clinic with a variety of questions to really get people thinking. The questions were:

1. How long ago was the first condom thought to be used?
   a) 120 years, b) 1200 years, **c) 12,000 years**
2. Which of these materials have been used to make condoms?
   a) Oiled silk paper, b) Linen, c) Tortoise shell, d) Rubber, **e) all of the above**
3. How much water can the average condom hold?
   a)40mmls, b) 400mls, **c) 4000mls**
4. Which country's military first promoted the use of condoms?
   a) Australia, b) France, **c) Germany**, d) USA
5. How many condoms were in the longest condom chain ever made?
   a) 257, b) 2573, c) 25773, **d) 257730**
6. How many feet long was the largest condom ever made?
   a) 6, b) 26, **c) 260**

The quiz was a great opportunity for staff education and a little fun as well. The prizes were a stubby holder, a Toblerone bar and of course, some condoms!

In addition CDC staff and Aboriginal Health Promotion Officer Jennifer Kitching put in a combined effort to create some very appealing safe sex giveaways: Valentine's Day condom wallets with a Cadbury Roses chocolate attached and a condom and lubricant sachet inside. The wallets were a hit around town with many people talking about them and having a giggle at the Valentine's Day lunch at Katerina's Cafe and even sharing photos of them with their friends on Facebook.

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Northern Territory hepatitis B vaccination and public health guidelines

Lesley Scott, Centre for Disease Control, Darwin

A stakeholder workshop in 2011 prompted an updating of the 3rd Edition of *The Northern Territory hepatitis B vaccination and public health guidelines*. Following the workshop extensive consultation was undertaken by staff from the Centre for Disease Control and the Liver Clinic which included Infectious Diseases Physicians from Royal Darwin Hospital. The 4th Edition of the *Guidelines* has now been completed and endorsed and is now available on line.

Contents of *The Northern Territory hepatitis B vaccination and public health guidelines,* 4th Edition include:

- Northern Territory hepatitis B epidemiology
- Updated vaccination information to reflect the recommendations of *The Australian Immunisation Handbook*, 10th edition, 2013
- Testing recommendations
- Primary care guidelines for those with acute and chronic hepatitis B infection including pregnant women and
- Specialist referral guidelines

The *Guideline* can be downloaded from: http://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/86/54.pdf&siteID=1&str_title=Hepatitis B vaccination and public health guidelines Northern Territory.pdf

An accompanying Hepatitis B Fact Sheet is available at: http://www.health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/45/01.pdf&siteID=1&str_title=Hepatitis B.pdf

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New national Trachoma Guidelines—a SoNG

Gabrielle Watt, Centre for Disease Control, Darwin

The Communicable Diseases Network Australia (CDNA) have national guidelines for many conditions that are referred to as a Series of National Guidelines (SoNGs).

CDNA have released new national Guidelines for the Public Health Management of Trachoma in the SoNG format. These *Guidelines* supersede all previous trachoma guidelines, including the *NT Trachoma Guidelines* published in 2008.

The major changes in these new *Guidelines* relate to frequency of screening and treatment for active trachoma. Communities at risk of trachoma may no longer require annual screening – see page 14 of the new *Guidelines* for further information, or contact the Centre for Disease Control Trachoma Program on 8951 6917.

The new national Trachoma SoNG is available on the CDNA website: http://www.health.gov.au/internet/main/publishing.nsf/Content/D02F0C1C2AB90509CA257C66001C089C/$File/trachoma-SoNG-Jan2014.pdf

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BCG vaccine shortage

Liz Stephenson, Chris Nagy, Belinda Farmer and Vicki Krause
Centre for Disease Control, Darwin

Sanofi Pasteur have advised the Australian Department of Health that there is a worldwide shortage of BCG vaccine and that they will be temporarily unable to supply any BCG vaccine (BCG SSI® or BCG®).

All current BCG SSI® vaccine stock that is held in Australia will expire at the end of April, 2014. Sanofi Pasteur are working, to secure ongoing vaccine supply.

It is likely that there will be no BCG vaccine of any type available in Australia until July 2014. This means that eligible children will not be offered BCG vaccine from 1 May until July 2014. Northern Territory (NT) Centre for Disease Control (CDC) will advise when BCG stock becomes available, but until then:

- As all current BCG stock expires at the end of April, no BCG vaccine is to be administered after 30 April 2014 (the last planned BCG clinic in Darwin will be held on Wednesday 30 April)
- Any remaining stock of BCG SSI should be returned to pharmacy after 30 April and
- Pharmacy will not issue/fill any orders for BCG vaccine from 30 April 2014. All maternity and CDC units will be keeping lists of all eligible children who do not receive a BCG or who present requesting a BCG, so that follow-up can be facilitated when vaccine is available.

The BCG catch-up plan for 2014 will be the same as that in 2012. When vaccine becomes available later in 2014 CDC will coordinate a vaccine catch-up process:

- Priority for BCG vaccine administration will be targeted at communities that have recently had cases of tuberculosis (TB)
- If necessary a TB/Leprosy or Immunisation Unit Public Health Nurse will visit these communities to administer multiple BCGs
- Additional BCG clinics will be held at the Darwin and regional CDC units when vaccine becomes available. Times will be advertised at a later date
- CDC units will contact patients on the recall list to offer vaccine when it becomes available.

Please contact the TB/Leprosy unit or Immunisation unit in your region for further advice.

Darwin	89228044
Katherine	89739044
Tennant Creek	89624259
Alice Springs	89517540
Nhulunbuy	89870282

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Updated CDC fact sheets October-December 2013

The Centre for Disease Control (CDC) fact sheets and guidelines are updated on a regular basis. Below are the fact sheets updated over the October to December 2013 quarter. They can be found on the CDC website at http://health.nt.gov.au/Centre_for_Disease_Control/Publications/CDC_Factsheets/index.aspx

- **Immunisation recommendations for adults at occupational risk excluding health care workers**
- **Immunisation recommendations for health care workers**
- **Measles**
- **Measles information for general practitioners**
- **Pertussis.**

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Abstracts from peer reviewed published articles related to the Northern Territory

Impact of pneumococcal polysaccharide vaccine in people aged 65 years or older

R. Menzies, S. Jayasinghe, V. Krause, C. Chiu, P. McIntyre.

MJA 2014; 200: 112–115, doi: 10.5694/ mja12.11759

Objective: To evaluate the impact and effectiveness of the 23-valent polysaccharide pneumococcal vaccine (23vPPV) in ≥65-year-old Australians in the context of concurrent 7-valent pneumococcal conjugate vaccine (7vPCV) use in infants.

Design, patients and setting: Ecological analysis of trends in invasive pneumococcal disease (IPD) notification rates and vaccine effectiveness estimation using the screening method, using data on Australians aged ≥65 years (23vPPV funded) and 50–64 years (23vPPV not funded).

Intervention: National 23vPPV program for people aged ≥65 years and national 7vPCV program for infants, both commencing in 2005.

Main outcome measures: IPD incidence rate ratios, 2002–2004 to 2010–2011, and 23vPPV effectiveness against 23vPPV-type IPD.

Results: The proportion of people aged ≥ 65 years who were vaccinated within the previous 5 years in jurisdictions excluding Victoria ranged from 41% to 64% over the study period, with no clear trend over time. Incidence rate ratios in the ≥65-year age group were 0.11 (95% CI, 0.09–0.14) for 7vPCV serotypes, 1.64 (95% CI, 1.41–1.91) for 23vPPV–non-7vPCV serotypes and 2.07 (95% CI, 1.67– 2.57) for non-23vPPV serotypes. The incidence rate ratio for total IPD was 0.65 (95% CI, 0.59–0.71) for people aged ≥65 years, and 0.80 (0.71–0.90) for people aged 50–64 years. The estimate of 23vPPV effectiveness was 61.1% (95% CI, 55.1%–66.9%).

Conclusions: The greater reduction in IPD among ≥65-year-olds compared with 50–64-year-olds did not reach statistical significance. However, vaccine effectiveness was significant. Greater reductions in IPD in ≥65-year-olds would be expected from the indirect effects of using 13-valent pneumococcal conjugate vaccine in infants (introduced for Australian infants in 2011) and an increase in 23vPPV coverage.

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Molecular characterization of an Australian serotype 1 *Streptococcus pneumoniae* outbreak

M. Staples, R. Graham, A. Jennison, L. Ariotti, V. Hicks, H. Cook, V. Krause, C. Giele, H. Smith

Epidemiol. Infect., 2014 doi:10.1017/ S0950268814000648

Serotype 1 *Streptococcus pneumoniae* is a cause of invasive pneumococcal disease (IPD) worldwide and has been associated with IPD outbreaks, while carriage is rarely detected in healthy adults or children. This study details an Australian multi-state and territory outbreak of serotype 1 *S. pneumoniae* IPD between 2010 and 2012. Molecular characterization demonstrated the outbreak was largely due to the clonal expansion of sequence type 306, MLVA type 261 *S. pneumoniae* serotype 1.

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The changing epidemiology of Murray Valley encephalitis in Australia: The 2011 outbreak and a review of the literature

L. Selvey, L. Dailey, M. Lindsay, P. Armstrong, S. Tobin, A. Koehler, P. Markey, D. Smith

PloS Negl Trop Dis 2013; 8(1): e2656:doi:10.1371/journal.pntd.0002656, http://www.plosntds.org/article/info%3Adoi%2F10.1371%2Fjournal.pntd.0002656

Murray Valley encephalitis virus (MVEV) is the most serious of the endemic arboviruses in

Australia. It was responsible for six known large outbreaks of encephalitis in south-eastern Australia in the 1900s, with the last comprising 58 cases in 1974. Since then MVEV clinical cases have been largely confined to the western and central parts of northern Australia.

In 2011, high-level MVEV activity occurred in south-eastern Australia for the first time since 1974, accompanied by unusually heavy seasonal MVEV activity in northern Australia. This resulted in 17 confirmed cases of MVEV disease across Australia. Record wet season rainfall was recorded in many areas of Australia in the summer and autumn of 2011. This was associated with significant flooding and increased numbers of the mosquito vector and subsequent MVEV activity. This paper documents the outbreak and adds to our knowledge about disease outcomes, epidemiology of disease and the link between the MVEV activity and environmental factors.

Clinical and demographic information from the 17 reported cases was obtained. Cases or family members were interviewed about their activities and location during the incubation period.

In contrast to outbreaks prior to 2000, the majority of cases were non-Aboriginal adults, and almost half (40%) of the cases acquired MVEV outside their area of residence. All but two cases occurred in areas of known MVEV activity.

This outbreak continues to reflect a change in the demographic pattern of human cases of encephalitic MVEV over the last 20 years. In northern Australia, this is associated with the increasing numbers of non-Aboriginal workers and tourists living and travelling in endemic and epidemic areas, and also identifies an association with activities that lead to high mosquito exposure. This outbreak demonstrates that there is an ongoing risk of MVEV encephalitis to the heavily populated areas of south-eastern Australia.

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Applications of a sugar-based surveillance system to track arboviruses in wild mosquito populations

A. van den Hurk, S. Hall-Mendelin, M. Townsend, N. Kurucz, J. Edwards, G. Ehlers, C. Rodwell, F. Moore, J. McMahon, J. Northill, R. Simmons, G. Cortis, L. Melville, P. Whelan, S . Ritchie.

Vector Borne and Zoonotic Dis, 2014, 14 (1). DOI: 10.1089/vbz.2013.1373

Effective arbovirus surveillance is essential to ensure the implementation of control strategies, such as mosquito suppression, vaccination, or dissemination of public warnings. Traditional strategies employed for arbovirus surveillance, such as detection of virus or virus-specific antibodies in sentinel animals, or detection of virus in hematophagous arthropods, have limitations as an early-warning system. A system was recently developed that involves collecting mosquitoes in CO_2-baited traps, where the insects expectorate virus on sugar-baited nucleic acid preservation cards. The cards are then submitted for virus detection using molecular assays. We report the application of this system for detecting flaviviruses and alphaviruses in wild mosquito populations in northern Australia. This study was the first to employ nonpowered passive box traps (PBTs) that were designed to house cards baited with honey as the sugar source. Overall, 20/144 (13.9%) of PBTs from different weeks contained at least one virus-positive card. West Nile virus Kunjin subtype (WNV_{KUN}), Ross River virus (RRV), and Barmah Forest virus (BFV) were detected, being identified in 13/20, 5/20, and 2/20 of positive PBTs, respectively. Importantly, sentinel chickens deployed to detect flavivirus activity did not seroconvert at two Northern Territory sites where four PBTs yielded WNV_{KUN}. Sufficient WNV_{KUN} and RRV RNA was expectorated onto some of the honey-soaked cards to provide a template for gene sequencing, enhancing the utility of the sugar-bait surveillance system for investigating the ecology, emergence, and movement of arboviruses.

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A new insect-specific flavivirus from northern Australia suppresses replication of West Nile virus and Murray Valley encephalitis virus in co-infected mosquito cells

J. Hobson-Peters, AWY. Yam, JWF. Lu, Y. Setoh, F. May, N. Kurucz, S. Walsh, N. Prow, S. Davis, R. Weir, L. Melville, N. Hunt, R. Webb, B. Blitvich, P. Whelan, R. Hall

PLoS ONE 8(2): e56534. doi:10.1371/ journal.pone.0056534

Recent reports of a novel group of flaviviruses that replicate only in mosquitoes and appear to spread through insect populations via vertical transmission have emerged from around the globe. To date, there is no information on the presence or prevalence of these insect-specific flaviviruses (ISFs) in Australian mosquito species. To assess whether such viruses occur locally, we used reverse transcription-polymerase chain reaction (RT-PCR) and flavivirus universal primers that are specific to the NS5 gene to detect these viruses in mosquito pools collected from the Northern Territory. Of 94 pools of mosquitoes, 13 were RT-PCR positive, and of these, 6 flavivirus isolates were obtained by inoculation of mosquito cell culture. Sequence analysis of the NS5 gene revealed that these isolates are genetically and phylogenetically similar to ISFs reported from other parts of the world. The entire coding region of one isolate (designated 56) was sequenced and shown to have approximately 63.7% nucleotide identity and 66.6% amino acid identity with its closest known relative (Nakiwogo virus) indicating that the prototype Australian ISF represents a new species. All isolates were obtained from Coquillettidia xanthogaster mosquitoes. The new virus is tentatively named Palm Creek virus (PCV) after its place of isolation. We also demonstrated that prior infection of cultured mosquito cells with PCV suppressed subsequent replication of the medically significant West Nile and Murray Valley encephalitis viruses by 10–43 fold (1 to 1.63 log) at 48 hr post-infection, suggesting that superinfection exclusion can occur between ISFs and vertebrate-infecting flaviviruses despite their high level of genetic diversity. We also generated several monoclonal antibodies (mAbs) that are specific to the NS1 protein of PCV, and these represent the first ISF-specific mAbs reported to date.

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A New Species of Mesonivirus from the Northern Territory, Australia

D. Warrilow, D. Watterson, R. Hall, S. Davis, R. Weir, N. Kurucz, P. Whelan, R. Allcock, S. Hall-Mendelin, C. O'Brien, J. Hobson-Peters

PLoS ONE 9(3): e91103. doi:10.1371/ journal.pone.0091103

Here we describe Casuarina virus (CASV), a new virus in the family Mesoniviridae. This is the first report of a mesonivirus in Australia, which extends the geographical range of this virus family to 3 continents. The virus was isolated in 2010 from Coquillettidia xanthogaster mosquitoes during surveillance in the suburbs of Darwin, the capital of the Northern Territory. Cryo-electron microscopy of the CASV virions revealed spherical particles of 65 nm in size with large club-shaped projections of approximately 15 nm in length. The new virus was most closely related to Alphamesonivirus 1, the only currently recognized species in the family. In 2013 a further 5 putative new mesonivirus species were described: Hana, Me´no, Nse´, Moumo and Dak Nong viruses. The evolutionary distance between CASV and 2 of its closest relatives, Cavally and Hana viruses (Jones-Taylor-Thornton distance of 0.151 and 0.224, respectively), along with its isolation from a different genus of mosquitoes captured on a separate continent indicate that CASV is a new species.

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Using urinary leucocyte esterase tests as an indicator of infection with gonorrhoea or chlamydia in asymptomatic males in a primary health care setting

M.S. Rahman, W. Beever, S. Skov, J. Boffa

Int J STD AIDS 2014 25: 138 originally published online 19 July 2013 DOI: 10.1177/0956462413495670

To evaluate a leucocyte esterase test as a predictor of gonorrhoea or chlamydia in

asymptomatic Aboriginal males at the Central Australian Aboriginal Congress Male Clinic (Ingkintja), first-void urine samples and clinical information were collected from consecutive asymptomatic males presenting to the Ingkintja in Alice Springs between March 2008 and December 2009. Urine was tested immediately with a leucocyte esterase test dipstick and then by polymerase chain reaction for gonorrhoea and chlamydia. Among the 292 specimens from asymptomatic males, 15.4% were positive for gonorrhoea or chlamydia. In this group, compared with polymerase chain reaction result for gonorrhoea or chlamydia, leucocyte esterase test alone and in combination with age _35 years showed sensitivities of 66.7% and 60%, specificities of 90.7% and 94.7%, positive predictive values of 56.6% and 67.5%, negative predictive values of 93.7% and 92.8% and the area under receiver operating characteristics curve values of 0.79 and 0.85, respectively. Leucocyte esterase tests can reasonably be used as a basis for immediate empirical treatment for gonorrhoea or chlamydia in asymptomatic central Australian Aboriginal men under 35 years of age.

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'Young clean and safe?' Young people's perceptions of risk from sexually transmitted infections in regional, rural and remote Australia

K. Senior, J. Helmer, R. Chenhall, V. Burbank

Culture, Health and Sexuality: An International Journal for Research, Intervention and Care, DOI: 10.1080/13691058.2014.888096, http:// dx.doi.org/10.1080/13691058.2014.888096

This paper examines young people's perceived vulnerability to sexually transmitted infections (STIs) and their efforts to create a sense of personal safety within an environment in which risks may be high and where STIs are highly stigmatised. The paper reports on findings from research involving both Indigenous and non-Indigenous 16- to 25-year-olds from remote, rural and regional Australia, including communities in the Northern Territory, Western Australia and South Australia. The study used qualitative methods, including body mapping and scenario based interviewing, to explore how young people made decisions about potential sexual partners and how STIs were understood within the context of young people's everyday social worlds. The paper has important implications for the design and implementation of sexual-health education programmes by documenting the stigmatisation of young people with STIs and the protective mechanisms peer groups employ to create perceptions of personal safety.

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Trachoma elimination in remote Indigenous Northern Territory communities: baseline health-promotion study

F. Lange, E. Baunach, R. McKenzie and H. Taylor

Australian Journal of Primary Health, http://dx.doi.org/10.1071/PY1204

Identify trachoma knowledge, attitudes and practice of staff in clinics, schools and community workplace settings to optimise trachoma-elimination health-promotion programs in the Katherine West Health Board region of the Northern Territory.

Prior to the introduction of a suite of health promotion resources the Indigenous Eye Health Unit and Katherine West Health Board conducted a baseline survey of open, multi-choice and closed questions regarding knowledge, attitudes and practices in relation to trachoma with 72 staff members over a 6-month period in 2010-11. Data were analysed for differences between settings.

2 significant barriers and 1 enabling factor were identified. 1 in 5 staff members in clinics and 29% of staff members in schools were unaware they lived and worked in a trachoma-endemic area. One-third of school staff and 38%of clinic staff considered it normal for children to have dirty faces. However, the majority of participants felt comfortable talking about hygiene issues with others. The presence of dirty faces in young Indigenous children underpins the continuing prevalence of trachoma.

Increasing the awareness of the health effects of children's nasal and ocular secretions and

changing community acceptance of dirty faces as the norm will reduce the risk of trachoma and other childhood infections. Staff in clinics, schools and community work settings can play a role in trachoma elimination by actively encouraging clean faces whenever they are dirty and by including face washing in holistic hygiene and health education. Staff in schools may need additional support. Trachoma-elimination health promotion should increase awareness of trachoma prevalence and encourage all who work and live in remote Indigenous communities to take action to promote facial cleanliness and good hygiene practices.

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The development of culturally safe and relevant health promotion resources for effective trachoma elimination in remote Aboriginal communities

E. Baunach, D. Lines, B. Pedwell, F. Lange, R. Cooney and H. Taylor.

Aboriginal and Islander Health Worker Journal 2012; 36(2), 9-16.

Blinding Trachoma is still present in remote Aboriginal communities in Australia. A barrier to eliminating this disease was found to be the varying degree of quality and cultural appropriateness of the current trachoma health promotion resources. To help overcome this barrier, a partnership was formed between Katherine West Health Board, the Indigenous Eye Health Unit at the University of Melbourne and the Centre for Disease Control, Department of Health Northern Territory. The Trachoma Story Kits were developed after extensive consultation with the Ngumpin Reference Group at Katherine West Health Board who were able to guide the development of culturally appropriate health promotion resources relevant for their community context and understandable to their own people. Around 700 Trachoma Story Kits are used in the Northern Territory, Western Australia, South Australia and Queensland. Aboriginal Health Workers find the kits "help them (clients) to understand what trachoma is and how to stop it with clean faces, antibiotics, clean environment and surgery".

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NT malaria notifications October to December 2013

Liz Stephenson, Centre for Disease Control, Darwin

There were 6 cases of malaria notified in the 4th quarter of 2013. The following Table provides details about where the infection was thought to be acquired, why the patient was travelling, the infecting agent, whether chemoprophylaxis was used and the Northern Territory (NT) region where the patient resided.

No. cases	Origin of infection	Reason exposed	Agent	Chemoprophylaxis	NT region
1	Indonesia West Papua	Expatriate visiting relatives	*P. falciparum*	No	Darwin
1	Indonesia West Papua	Expatriate visiting relatives	*P. vivax*	No	Darwin
1	Kenya	Refugee	*P. falciparum*	No	Darwin
1	Basino Farso West Africa	Work	*P. falciparum*	No	Darwin
1	Uganda	Expatriate visiting relatives	*P. vivax*	No	Alice Springs
1	Southern Sudan	Expatriate visiting relatives	*P. falciparum*	Yes	Alice Springs

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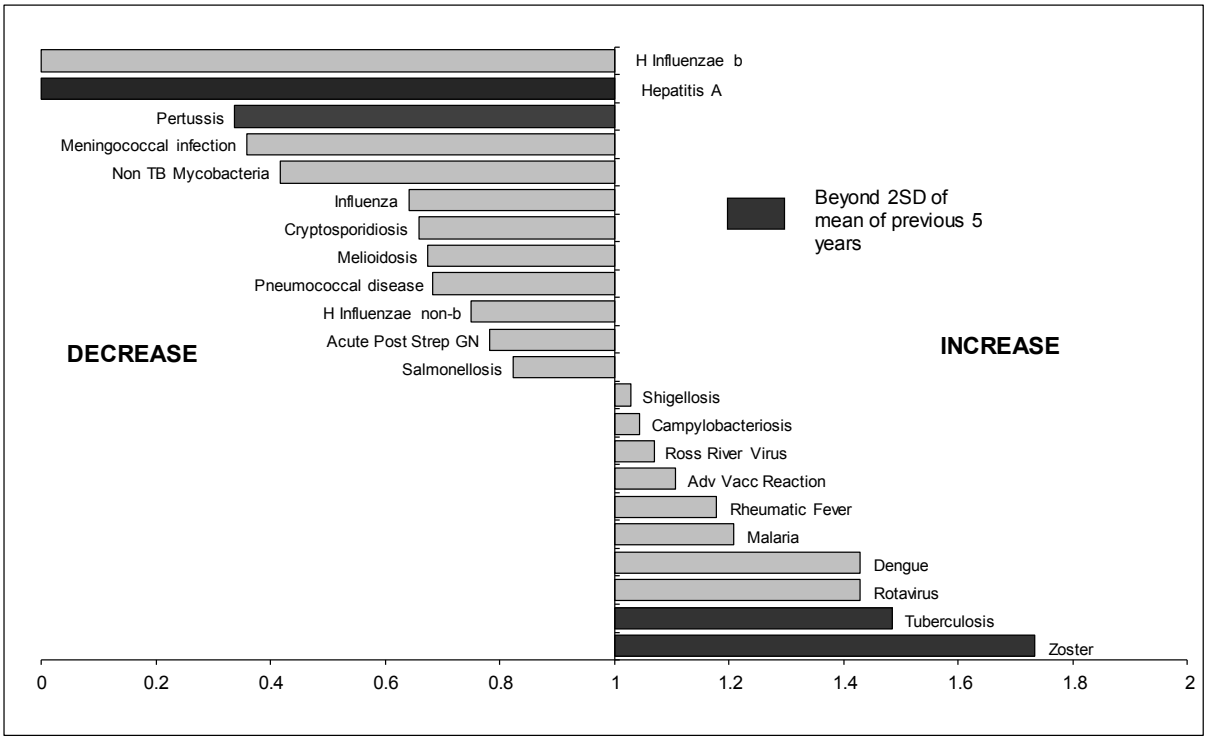
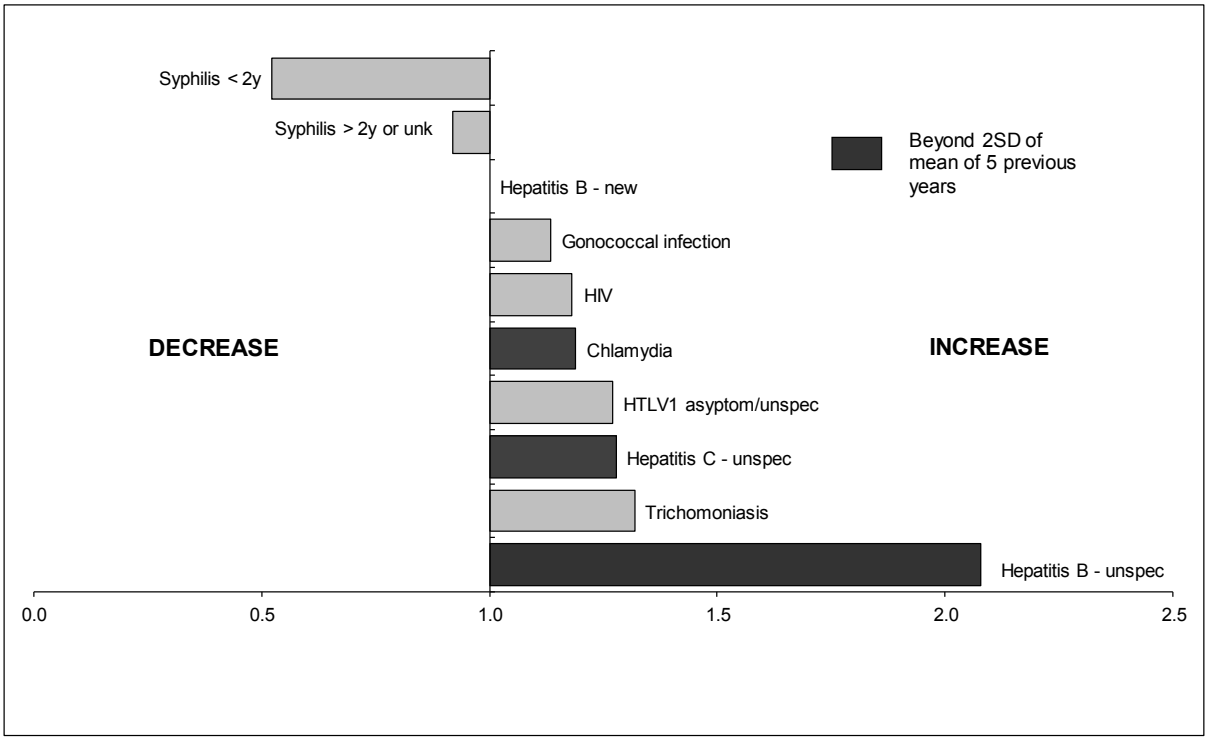
NT NOTIFICATIONS OF DISEASES BY ONSET DATE AND DISTRICTS
1 January — 31 December 2012 and 2013

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		N T	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Acute post strep glomerulonephritis	11	6	7	2	14	5	8	4	1	8	41	25
Adverse vaccine reaction	12	11	3	1	30	34	0	2	3	12	48	60
Amoebiasis	0	0	0	1	0	1	0	0	1	0	1	2
Arbovirus not otherwise specified	0	0	0	0	0	1	0	0	0	0	0	1
Barmah Forest	11	39	0	1	69	331	3	18	4	30	87	419
Campylobacteriosis	33	69	2	2	133	106	4	8	14	23	186	208
Chickenpox	38	16	3	0	59	67	17	15	33	3	150	101
Chikungunya	0	0	0	0	0	3	0	0	0	0	0	3
Chlamydia	841	974	51	87	1353	1525	194	168	327	313	2766	3067
Chlamydial conjunctivitis	0	2	0	0	8	14	2	0	4	11	14	27
Ciguatera	0	0	0	0	1	0	0	0	0	0	1	0
Congenital rubella	0	0	0	0	1	0	0	0	0	0	1	0
Cryptosporidiosis	32	24	8	9	157	26	19	11	22	21	238	91
Dengue	3	3	0	1	79	60	1	6	5	0	88	70
Food/water borne disease	2	9	7	1	23	49	0	0	0	0	32	59
Gastroenteritis - related cases	1	34	0	0	0	18	0	2	0	0	1	54
Gonococcal conjunctivitis	1	2	0	0	0	2	0	0	1	1	2	5
Gonococcal infection	1020	1075	47	67	400	461	80	60	331	369	1878	2032
Group A strep invasive	19	21	4	5	33	27	2	8	6	5	64	66
Hepatitis A	0	0	0	0	3	0	0	0	0	0	3	0
Hepatitis B - chronic	45	44	2	2	30	21	44	26	2	1	123	94
Hepatitis B - new	1	1	0	2	2	0	0	0	2	2	5	5
Hepatitis B - unspecified	37	66	2	1	158	257	2	6	6	7	205	337
Hepatitis C - new	0	0	0	0	0	1	0	0	0	0	0	1
Hepatitis C - unspecified	30	25	1	3	193	220	4	1	9	13	237	262
Hepatitis D	0	1	0	0	0	0	0	0	0	0	0	1
H Influenzae b	1	0	0	0	0	0	0	0	0	0	1	0
H Influenzae non-b	7	2	0	0	3	3	1	0	0	1	11	6
HIV	9	1	0	0	27	20	0	0	0	0	36	21
HTLV1 asyptomtomatic/unspecified	61	86	1	3	3	1	0	0	1	1	66	91
HUS	0	0	0	0	0	1	0	0	0	0	0	1
Hydatid	0	0	0	0	1	2	0	0	0	0	1	2
Influenza	158	98	18	9	198	230	38	102	66	61	478	500
Legionellosis	0	0	1	0	2	3	0	1	1	1	4	5
Leprosy	0	1	0	0	0	1	0	0	0	0	0	2
Leptospirosis	1	0	0	0	0	6	0	0	0	0	1	6
Listeriosis	0	0	0	1	0	2	0	0	0	0	0	3
Malaria	5	2	0	0	12	20	0	0	0	0	17	22
Measles	0	0	0	0	3	0	0	0	0	0	3	0
Melioidosis	0	0	0	0	65	35	9	4	10	2	84	41
Meningococcal infection	1	1	0	0	3	1	0	0	0	0	4	2
Mumps	0	2	0	0	0	4	0	0	0	0	0	6
Non TB Mycobacteria	4	0	0	0	6	3	0	0	1	0	11	3
Pertussis	5	15	0	0	231	87	23	6	45	8	304	116
Pneumococcal disease	39	30	6	3	24	18	5	2	4	6	78	59
Q Fever	3	0	0	0	0	1	0	0	1	0	4	1
Rheumatic Fever	34	27	3	4	47	27	35	20	14	15	133	93
Ross River Virus	6	6	1	2	189	269	16	12	17	24	229	313
Rotavirus	39	112	10	8	52	153	8	12	14	30	123	315
Salmonellosis	91	67	13	17	255	255	20	28	50	37	429	404
Shigellosis	65	46	15	19	18	16	3	14	16	18	117	113
STEC/VTEC	1	0	1	0	0	0	0	0	0	0	2	0
Syphilis < 2years	8	12	2	0	2	10	0	0	2	0	14	22
Syphilis > 2years or unknown	11	20	2	4	49	62	2	2	5	4	69	92
Syphilis congenital	0	1	0	0	0	0	0	0	0	0	0	1
Trichomoniasis	654	950	73	179	811	970	487	474	571	544	2596	3117
Tuberculosis	2	7	0	0	35	42	1	1	2	4	40	54
Typhoid	1	0	0	0	3	0	0	0	0	0	4	0
Typhus	0	1	0	0	0	0	0	0	0	0	0	1
Varicella - unspecified	5	3	1	0	3	7	0	1	0	0	9	11
Yersiniosis	1	0	0	0	0	2	0	0	0	1	1	3
Zoster	31	50	4	3	100	149	13	19	42	36	190	257
Sum	**3,380**	**3,962**	**288**	**437**	**4,888**	**5,629**	**1,041**	**1,033**	**1,633**	**1,612**	**11,230**	**12,673**

Ratio of the number of notifications in 2013 to the 5 year mean (2008-12): selected diseases



Ratio of the number of notifications in 2013 to the 5 year mean (2008-12): sexually transmitted diseases



Comments on notifications

Hepatitis A

There were no cases of hepatitis A notified in the Northern Territory in 2013, the first time this has happened since electronic records began in 1990. This reflects the effect of introducing hepatitis A vaccine into the childhood schedule for Indigenous infants in 2006. Since 2007 only 3 locally acquired cases have been reported, the last 1 being in 2010. The 6 cases in 2011-2012 were imported and the lack of imported cases in 2013 may represent improvement in hepatitis A vaccine coverage for travellers. See article in previous *Bulletin* from 2010*:*

Markey P. Nearing elimination of hepatitis A in the Northern Territory following immunisation of indigenous infants. *NT Dis Control Bull* 2010;17(3):1-6

Zoster

The higher than expected number of zoster cases (257 cases versus 148 expected) continues the trend upward which is likely due to the gradual uptake of PCR testing for diagnoses combined with the recognition that zoster is a notifiable condition. Further investigation into this trend is planned.

Pertussis

Pertussis case numbers in 2013 were significantly lower than expected with 116 being notified, 66% fewer than the number expected according to the 5 year mean (344). This decrease continues the fall which occurred in the last half of 2012 following the epidemic of 2011-12. It may reflect in part an increasing proportion of the population being immunised through school-based and antenatal programs as well as the cyclical nature of pertussis.

Tuberculosis

There were 54 cases of tuberculosis notified in 2013, 50% more than the 5 year mean of 36. This increase was mainly due to the increase in numbers of irregular maritime arrivals (IMAs) in Darwin detention centres. IMA cases were diagnosed on screening in detention and successfully treated while in the NT.

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Immunisation coverage for children aged 12-<15 months at 31 December 2013

Region	Number in District	%DTP	%Polio	%HIB	%HEP B	% Fully vaccinated
Darwin	310	90.6%	90.6%	90.0%	90.0%	89.7%
Winnellie PO Bag	78	91.0%	91.0%	91.0%	91.0%	91.0%
Palm/Rural	253	91.3%	91.3%	91.3%	91.3%	90.9%
Katherine	92	95.7%	95.7%	95.7%	95.7%	95.7%
Barkly	12	91.7%	91.7%	91.7%	91.7%	91.7%
Alice Springs	121	86.0%	86.0%	86.8%	86.0%	86.0%
Alice Springs PO Bag	45	93.3%	93.3%	93.3%	93.3%	93.3%
East Arnhem	50	86.0%	84.0%	88.0%	84.0%	82.0%
NT	961	90.6%	90.5%	90.6%	90.3%	90.0%
Australia	78258	91.1%	91.0%	90.8%	90.6%	90.1%

Immunisation coverage for children aged 24-<27 months at 31 December 2013

Region	Number in District	%DTP	%Polio	%HIB	%HEP B	%MMR	% Fully
Darwin	291	92.1%	92.1%	89.3%	88.0%	91.4%	89.7%
Winnellie PO Bag	69	98.6%	98.6%	98.6%	98.6%	97.1%	97.1%
Palm/Rural	246	93.5%	93.5%	94.7%	93.5%	92.7%	91.5%
Katherine	104	98.1%	98.1%	98.1%	98.1%	97.1%	97.1%
Barkly	12	100.0%	91.7%	100.0%	91.7%	100.0%	91.7%
Alice Springs	115	93.9%	93.9%	96.5%	93.9%	94.8%	92.2%
Alice Springs PO Bag	50	94.0%	94.0%	94.0%	94.0%	92.0%	92.0%
East Arnhem	38	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NT	925	94.4%	94.3%	94.2%	93.0%	93.7%	92.4%
Australia	76432	94.7%	94.7%	95.0%	94.3%	93.6%	92.2%

Immunisation coverage for children aged 60-<63 months at 31 December 2013

Region	Number in District	%DTP	%Polio	%MMR	% Fully vaccinated
Darwin	288	88.5%	88.5%	88.2%	86.8%
Winnellie PO Bag	83	97.6%	97.6%	97.6%	97.6%
Palm/Rural	231	92.6%	92.6%	93.1%	92.6%
Katherine	83	98.8%	98.8%	98.8%	98.8%
Barkly	16	93.8%	93.8%	93.8%	93.8%
Alice Springs	105	91.4%	91.4%	91.4%	91.4%
Alice Springs PO Bag	43	100.0%	100.0%	100.0%	100.0%
East Arnhem	48	97.9%	97.9%	95.8%	95.8%
NT	897	92.9%	92.9%	92.8%	92.2%
Australia	79515	92.3%	92.2%	92.2%	91.8%

Immunisation coverage at 31 December 2013

Charles Strebor, Centre for Disease Control, Darwin

Immunisation coverage rates for Northern Territory (NT) children by regions based on Medicare address postcode as estimated by the Australian Childhood Immunisation Register are shown on page 36.

Background information to interpret coverage

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

The cohort of children assessed at 12 to <15 months of age on 31 December 2013 were born between 1 July 2012 and 30 September 2012 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 or 3 doses of PRP-OMP Hib or 3 doses of another Hib vaccine
- 3 doses of hepatitis B vaccine and
- 3 doses of pneumococcal vaccine.

All vaccinations must have been administered by 12 months of age. ***Please note that the definition of fully immunised for this cohort of children has changed since December 2013 from the previous definition as it now includes 3 doses of pneumococcal vaccine by 12 months of age.***

The cohort of children assessed at 24 to <27 months of age on 31 December 2013 were born between 1 July 2011 and 30 September 2011 inclusive. To be considered fully vaccinated, these children must have received:

- 3 or 4 valid doses of vaccines containing diphtheria, tetanus, pertussis
- 3 doses of vaccines containing poliomyelitis antigens
- either 3 or 4 doses of PRP-OMP Hib or 4 doses of another Hib vaccine
- 3 doses of hepatitis B vaccine and
- 1 dose of measles-mumps-rubella (MMR) vaccine.

All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to <63 months of age on 31 December 2013 were born between 1 July 2008 and 30 September 2008 inclusive. To be considered fully vaccinated, these children must have received:

- 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens
- 4 doses of poliomyelitis vaccine and
- 2 valid doses of MMR vaccine.

All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation and comment

The vaccination coverage rates for children in the NT are comparable with the national average for all age cohorts, with NT children being slightly under the national average for the 12 to <15 months of age group (NT 90.0%, National 90.1%) and slightly above the national average for the 24 to <27 months (NT 92.4%, National 92.2%) cohorts and 60 to <63 months cohort (NT 92.2%, National 91.8%). Indigenous children were less likely (Indigenous 88.7%, non -Indigenous 90.8%) to be fully immunised than non-Indigenous children in the 12 to <15 month cohort but more likely to be fully immunised than non-Indigenous children in the 24 to <27 months (Indigenous 95.7%, non-Indigenous 90.5%) and the 60 to <63 (Indigenous 96.7%, non-Indigenous 89.5%) cohorts.

Further information about the Australian Childhood Immunisation Register coverage may be found at: http://ncirs.edu.au/immunisation/coverage/index.php.

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Disease Control staff updates January—March 2014

Top End

Darwin

Congratulations to Trachoma Program Coordinator **Gabrielle Watt** and Mark FitzSimons who were married on a beautiful, cool December day in Victoria.

The NT Immunisation Register (NTIR) team has 2 new staff members, **Be Schopfer** and **Genevieve Suringa,** who have joined the team as Immunisation Data Entry Officers. Be started with the NTIR in February and comes to us from working at the Disability Equipment Program as well as working in private General Practice as a medical receptionist. Genevieve started with us in March and has most recently worked in private General Practice as a medical receptionist. **Nellie Olsen** left us at the end of 2013 as she has retired and will be spending her time on boat cruises and line dancing.

Alex Young has been continuing the Injury Prevention Project Officer position while Meredith Neilson has been acting in the Senior Policy and Coordination Officer position.

Paul Bilal commenced with the Adolescent Sexuality Education Program as an Adolescent Sexual Health Promotion Officer in January. **Linda Garton** has moved from the Central Australian Remote Sexual Health Team to the Top End Remote Sexual Health Team.

Bill Pettit has transferred from the Medical Entomology Operations Manager position to the Exotic Vector Officer position following **Huy Nguyen's** resignation from the position.

Welcome to our new CDC doctors. **Daniel Judge** has replaced **Matthew Pittman** in the TB Medical Officer role**. Charlie McLeod** and **Matt O'Brien** have commenced a 6 month rotation as Community Paediatrics Registrars. **Natalia Rode** and **Sophie Lines** are GP Registrars with Natalia working in the Community Paediatrics Unit and Sophie across CDC.

Belinda Farmer has returned to Darwin CDC as the TB Unit Coordinator after 2 years working at Katherine CDC and managing the unit. Belinda will continue to manage Katherine CDC from Darwin in her current role. A CDC Registered Nurse (RN) position has been moved from Nhulunbuy to Darwin. **Liz Stephenson** (RN) fills that position and will remain in Darwin following her role as the TB Unit Coordinator for 2 years. Many thanks to Liz.

Rowena Boyd has successfully completed her Masters of Applied Epidemiology. Congratulations Rowena! She has won a CDC RN position in Darwin.

Nhulunbuy

Annette Cotterill has replaced **Kathy Shield** as a Sexual Health Nurse in Nhulunbuy while Kathy completes 12 months study leave.

Central Australia

Alice Springs

Central Australia has 2 new trachoma nurses, **Helen Rudolph** and **Anna Huigen**. Helen has been a Remote Area Nurse in Central Australia for several years, most recently at Titjikala. Anna has been a Theatre Nurse at Alice Springs Hospital (ASH) for the past few years.

Daniel Williams is a new Aboriginal Health Practitioner for the Remote Sexual Health Team. Daniel has recently worked at Remote Health at various clinics around Central Australia.

Anna Montgomery joins the team as a Rheumatic Heart Disease Register Co-ordinator. Anna is job sharing with **Nina Missen,** and works the rest of the time at ASH.

Vale Veronica Barrett

Veronica Barrett, an admired and respected retired staff member of the Centre for Disease Control (CDC), died in January this year. Veronica came to the Northern Territory in 1971 and soon started work with the Department of Education. In 1990 Veronica joined CDC and soon became the Matriach of CDC. As well as being the administration officer for the Director of CDC and the voice of CDC on #28044, Veronica was an efficient and highly organised database officer. After many years at CDC Veronica retired in 2007 much to the staff of CDC's dismay.

Veronica is remembered as a remarkable, unflappable woman with a great sense of humour, a wonderful smile and a kind heart. We extend our deepest sympathy to all her family and as we mourn her passing we celebrate having known such a strong and dear woman.

Veronica ringing the bell for the morning meeting and bringing us all together.

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