



CENTRE FOR DISEASE CONTROL  
NORTHERN TERRITORY

# THE NORTHERN TERRITORY DISEASE CONTROL BULLETIN



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## Nearing elimination of hepatitis A in the Northern Territory following immunisation of Indigenous infants

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### Abstract

*Until 2007 the NT had significantly higher rates of hepatitis A compared to the rest of Australia. This was thought to be due to the high rates in Indigenous communities (in particular Indigenous infants) where the disease was hyperendemic.*

*The Queensland Health Department introduced hepatitis A vaccine into the childhood schedule for Indigenous children in 2000 with a subsequent fall in hepatitis A notifications. Despite this, there was concern in the NT that introducing a vaccine into a population where the disease was hyperendemic might increase the burden of disease in older age groups.*

*Nevertheless, in 2007 hepatitis A vaccine was introduced into the national childhood vaccination schedule although only for Indigenous children in SA, WA, QLD and NT. Since then hepatitis A has become a rare disease in the NT; the fears concerning increased burden of disease have not been realised.*

*Key words: hepatitis A; vaccination; vaccine effectiveness*

### Introduction

Hepatitis A is an acute infection of the liver caused by the hepatitis A virus and usually transmitted

through the faecal-oral route. In young children, the infection is often asymptomatic or causes a mild illness. In older people it is characterised by a 4-10 day prodrome of fever, fatigue, nausea, diarrhoea and vomiting followed by the onset of jaundice with subsequent waning of symptoms over the next few weeks.<sup>1</sup> The mortality rate is low but fulminant hepatic failure can occur. Infection bestows life-long immunity and hepatitis A does not cause chronic liver disease.

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The infecting dose of virus is thought to be low and as such it is readily transmissible, particularly where sanitation infrastructure and hygiene are poor, such as in developing countries and some remote Indigenous communities. In these settings, the risk of exposure to the infectious agent is high so that most infants are infected and become immune before the age of 5 years. The disease is then said to be “hyperendemic”, and, given the generally mild nature of the illness in infants, the overall burden of disease is usually low. Nevertheless, there have been reports of serious sequelae of hepatitis A including death in Indigenous infants in Queensland.<sup>2</sup>

In the Northern Territory (NT), hepatitis A has historically been hyperendemic in remote Indigenous communities. A 1994 serosurvey of Indigenous people living in remote Top End communities revealed that 18/20 (90%) of samples from 5 year olds and 344/337 (98%) of all samples had hepatitis A antibodies.<sup>3</sup> In this situation, the burden of disease is likely to reside in that group of non-immune individuals who have contact with Indigenous children (for example, NT paediatric hospital staff). This group had been the target of the immunisation program in the NT prior to 2005.

Immunisation of populations with any hyperendemic disease is not without risk, particularly if the severity of the disease increases with increasing age as it does with hepatitis A. With immunisation causing a decrease in the number of individuals infected, the probability of exposure for susceptible individuals falls and therefore the time to exposure increases. This means that members of the population will be older before they are exposed and therefore more likely to have higher morbidity.

Despite this risk, reports from both Queensland, where a vaccination program was commenced in 2001, and from overseas have noted that hepatitis A rates had fallen dramatically with the introduction of the vaccine into childhood immunisation programs, without any indication of increasing age of cases or burden of disease.<sup>4,5</sup> A national program was commenced in October 2005 recommending that Indigenous and Torres Strait Islander infants be vaccinated at 12 and 18 months; this was immediately implemented in the NT.

This report looks at the impact the vaccination program has had on rates of hepatitis A in the NT.

## Methods

Data on cases of hepatitis A were obtained from the Northern Territory Notifiable Diseases System. The time-frame 1991-2010 was divided into 5 year periods and analysed by 5 age-groups; 0-4, 5-14, 15-24, 25-49 and 50 and over. The last 5 year period (2006-2010) was truncated at the end of April 2010. The pre-vaccine era was defined as 2001-2005 while the post-vaccine era was defined as January 1 2006 to April 30 2010.

To calculate the incidence data according to Indigenous status, it was necessary to make an assumption about the Indigenous status of cases in whom the status was unknown. It was assumed therefore, that the proportion Indigenous of those of unknown Indigenous status was the same as those of known Indigenous status within each age/time stratum.

Population data were obtained from the Health Gains Planning Branch of the Department of Health and Families, derived from that of the Australian Bureau of Statistics. The population denominator for 2010 data (Jan 1 to April 30) was assumed to be a third of the 2009 population. Confidence intervals were calculated using the Fisher Exact test.

## Results

In the Indigenous population the overall crude rate of hepatitis A was 26.7 per 100,000 per year compared to non-Indigenous of 28.9 per 100,000 per year. The epidemiology in the Indigenous population was characterised by rates which were high in the very young but low after the age of 24 years. In the non-Indigenous population the incidence rate was similar across all age groups with the exception of those 50 years and over. (Figure 1).

Rates of hepatitis A declined in all age groups over each of the 5 year periods 1991-2010. The steepest decline was in the infant age-group (Figure 2). Nearly all of the decline was in the non-Indigenous population (data not shown).

Comparing the pre-vaccination era to the post-

Figure 1. Incidence rate of hepatitis A in the NT, 1991-2010 by age-group and Indigenous status

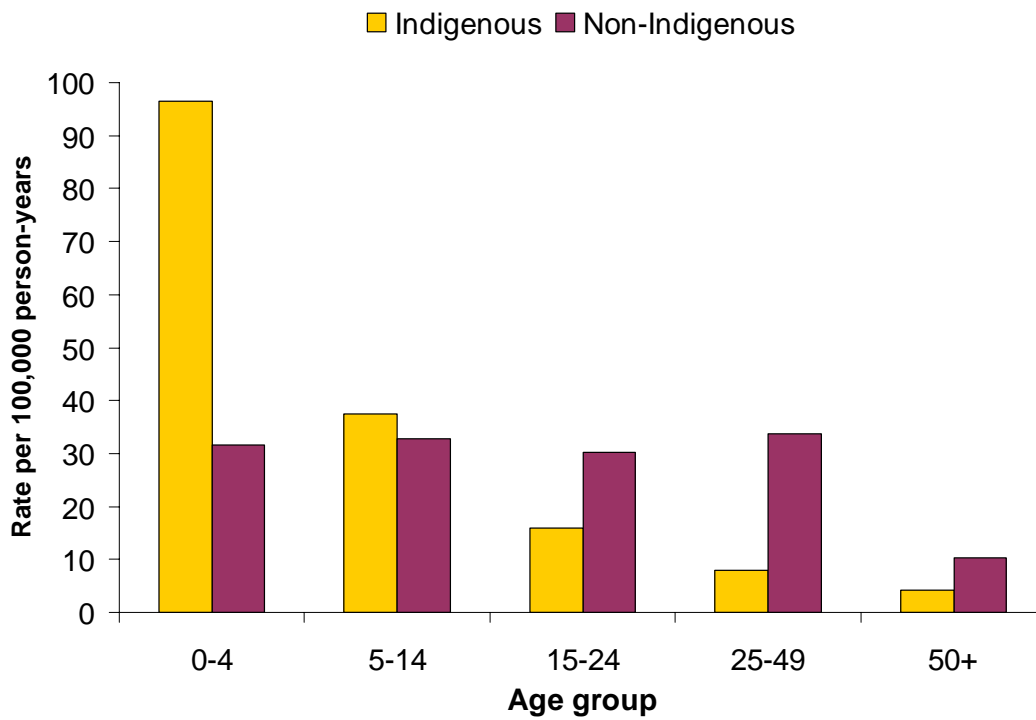
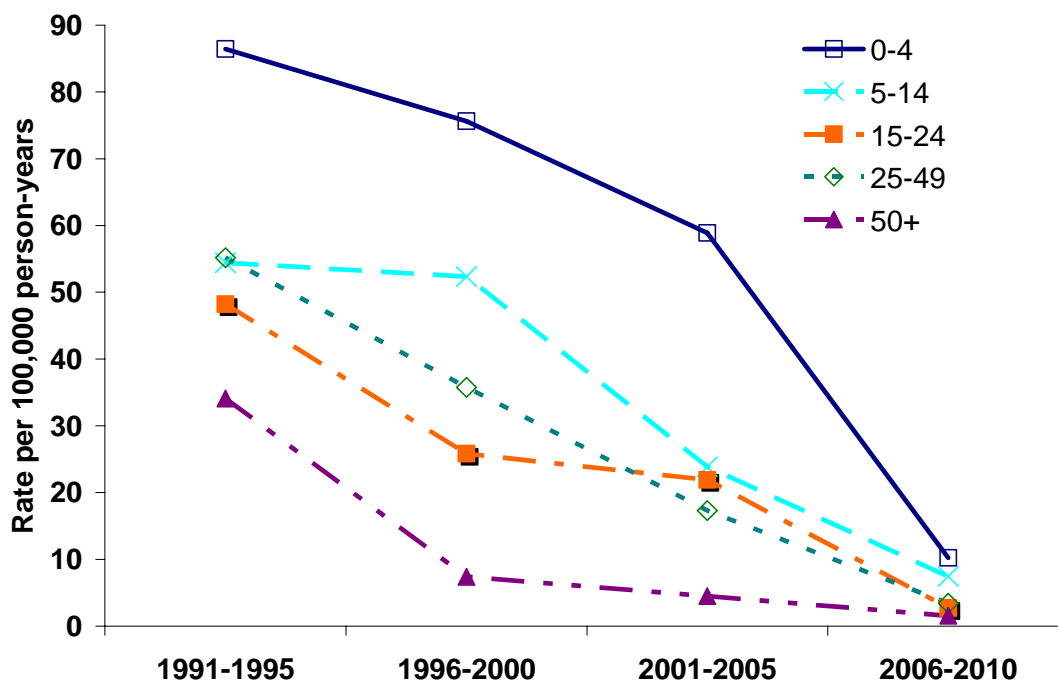
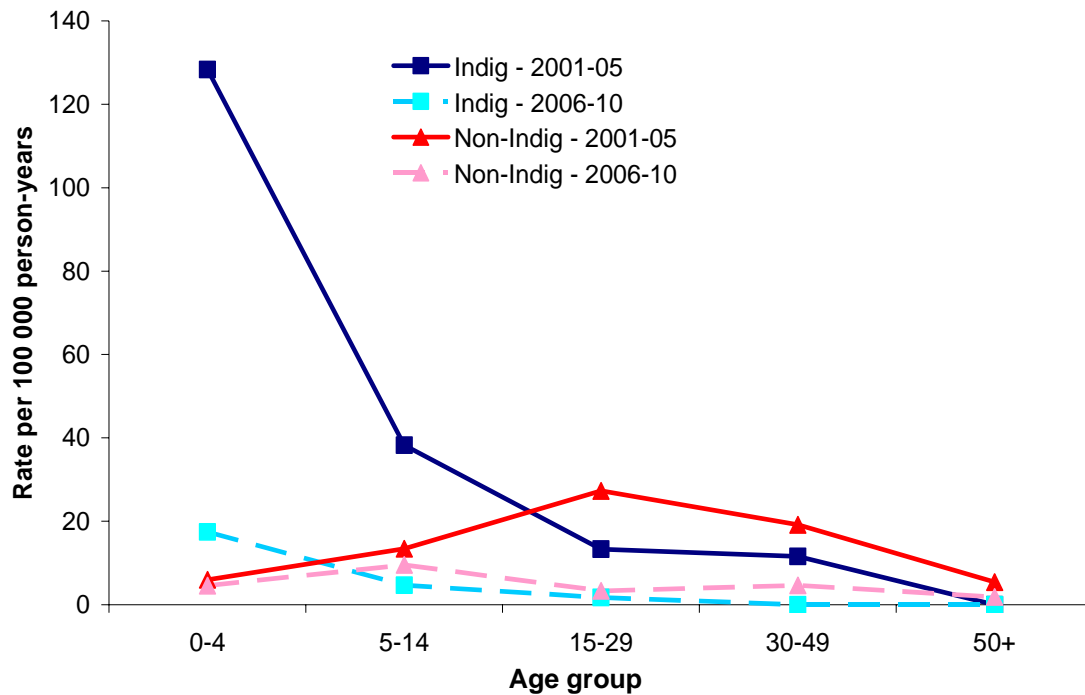


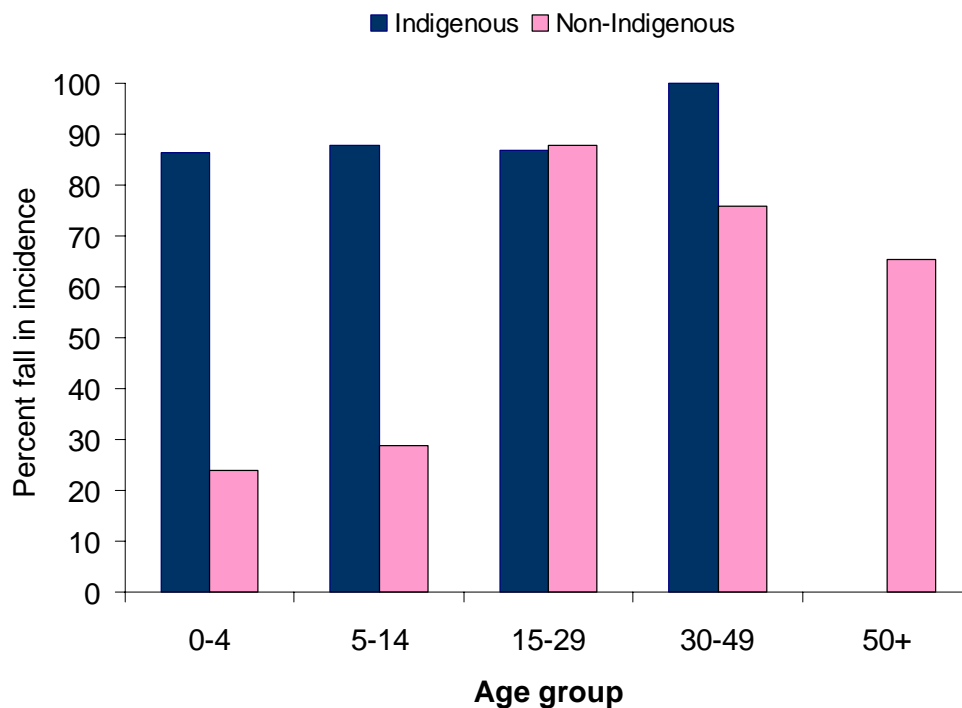
Figure 2. Age-specific incidence rates of hepatitis A in the NT by 5-year time period



**Figure 3. Age-specific incidence rates by indigenous status from the pre-vaccination era (2001-05) and post-vaccination era (2006-2010)**



**Figure 4. Percent fall in the incidence rate from the pre-vaccination era to the post-vaccination era by age-group and Indigenous status**



vaccination era the rates of hepatitis A fell in all age-groups in both Indigenous and non-Indigenous populations (Figure 3). The vaccine effectiveness, being the proportionate fall in rates post-vaccination (or;  $1 - (\text{post-vaccination rate} / \text{pre-vaccination rate})$ ) was 89.0% (95% Confidence Interval: 78.8-94.9) in the Indigenous population, 71.9% (95% CI:57.3-82.0) in the non-Indigenous population and 79.9% overall (95% CI:71.5-86.1).

While the greatest vaccine effectiveness was in Indigenous infants, all age-specific rates in the Indigenous population fell by at least 85% (Figure 4). In the non-Indigenous population, the rates in the younger age-groups fell to a lesser degree (20-30%) while 15-29 year age-group fell by 85%, similar to the rate fall in corresponding Indigenous age-group.

Since 2006, there has not been a notified case of hepatitis A in the Indigenous population and only 9 in the non-Indigenous population, 6 of which were acquired overseas.

## Discussion

The different epidemiology of hepatitis A in the 2 population groups in the NT reflects the different transmission dynamics as a consequence of the inequalities in housing, sanitation infrastructure, hygiene and education. It also illustrates the interaction between the risk of exposure, population immunity and disease incidence. The probability of exposure to the pathogen in the Indigenous setting is high and therefore most infants will become infected and subsequently immune at an early age. While all age-groups might have a high degree of exposure to the virus, infants are more likely to be non-immune and therefore acquire the disease. In the non-Indigenous population, where the probability of exposure is low, the vast majority of the population will not be exposed and therefore be non-immune. Given that most age-groups will remain, to a large degree, susceptible, the age-specific rates of infection will therefore be similar if age-specific exposure is similar.

It is important to note that rates of hepatitis A were falling in both populations prior to the introduction of the vaccination program, but mainly in the non-Indigenous population. This

was likely due to the success of the targeted vaccination program, which promoted the vaccine in people who were likely to be susceptible to hepatitis A and who, through their occupation, lifestyle or circumstances were likely to come into contact with Indigenous children. While this program was partly successful it was unlikely to achieve the same effectiveness given that many infections in the non-Indigenous population were in people outside the identified risk groups.

The extent of the fall in the incidence of hepatitis A in the non-Indigenous population was unexpected even though it has been documented elsewhere.<sup>4</sup> It had been previously recognised that most hepatitis A infections in the NT population were acquired through contact with Indigenous infants and so it should not be surprising that the herd effect from the program has extended across the whole population. A strong herd effect was noticed in the USA where a coverage rate of 10% in children was estimated to have prevented 51% of the cases of hepatitis A.<sup>6</sup>

In the non-Indigenous population, the decline in incidence was not the same across all age-groups; this is likely to be due to the different origin of the infection in this demographic group – ie interstate or overseas. However, the large decline in the 15-29 year age group, similar to that in the Indigenous population, might suggest that the origins of the disease relate to contact with Indigenous children. On the other hand the results may be confounded by a large outbreak in 2004 in this demographic group.

The true population vaccine effectiveness is likely to be higher than our estimates for 2 reasons. Firstly, the surveillance system is likely to underestimate by a significant proportion the true number of hepatitis A infections in Indigenous infants. This is because the surveillance system relies on positive laboratory tests whereas the mild or asymptomatic nature of the disease in infants often means that testing is not done. Secondly, it is important to note that the majority of infections in the post-vaccination era were in 2006, when the vaccine program was still being implemented and when a full cohort of infants was yet to be immunised. Following 2006, it appears that hepatitis A has disappeared from the Indigenous population and is

predominantly acquired outside the NT in the non-Indigenous population. This suggests that the vaccine effectiveness might be approaching 100%.

The theoretical increase in burden of disease did not occur presumably because of the excellent efficacy of the vaccine and the likely high coverage rates in the Indigenous population. The hepatitis A vaccination program has resulted in the near elimination of hepatitis A from the NT.

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## Pregnant women and children under 5 years of age - Flu vaccine Update

*Andre Wattiaux, Head of Immunisation Unit, CDC, Darwin*

Since 1 March 2010, more than 19,000 people in the Territory have received the 2010 seasonal influenza vaccine. The vaccine offers protection against the pandemic (H1N1) 2009 or 'swine flu virus' which is the predominant flu strain circulating this year, as well as 2 other strains of flu. Groups at higher risk of complications (see Figure 1) from the flu are always particularly encouraged to be vaccinated. This approach has been quite successful in certain at risk groups with an uptake of more than 36% in non-Indigenous people aged 65 and over, and an uptake of more than 42% in Indigenous people aged 50 and over.

### Pregnant women

Unfortunately uptake in pregnant women remains very low (estimated at 3%). Pregnant women were already identified as being at higher risk of complications from influenza infection in flu seasons preceding the 2009 swine flu (H1N1) pandemic and were recommended for yearly flu vaccination. The pandemic (H1N1) 2009 season emphasized this higher rate of complications from flu in pregnant women, which included a higher number of hospitalisations.<sup>1,2,3,4</sup> In this 2010 season we have already seen cases of pregnant women

requiring hospitalisation in the Northern Territory (NT). Vaccine providers are encouraged to work with pregnant women to attain a high seasonal flu vaccine coverage.

While the recommendation to vaccinate pregnant women against the flu has been longstanding, only in 2010 was the vaccine funded as a free vaccine for pregnant women by the federal government. The NT Centre for Disease Control will continue to work together with vaccine providers to educate pregnant women about the increased risks that flu presents in pregnancy and to make them aware of their eligibility for free seasonal influenza vaccine.

### Children under 5 years

In the last few months, recommendations about the use of the 2010 seasonal influenza vaccine in children under 5 years of age have changed a few times. Initially the vaccine was suspended in the under 5 year age group in recognition of increased febrile episodes and the subsequent increase in febrile convulsions following immunisation in this group.

Further investigation from regulatory authorities

confirmed that the increase in rates of febrile episodes following immunisation were associated with one brand of vaccine, CSL Fluvax® (both the 0.5mL formulation and the Fluvax Junior® 0.25mL formulation). Other brands of seasonal influenza vaccine were not associated with an above-than-expected rate of febrile episodes following immunisation.

In view of this finding, the current recommendation for children between 6 months and 5 years of age is to use 2010 seasonal flu vaccines other than CSL Fluvax® (both the 0.5mL formulation and the Fluvax Junior® 0.25mL formulation). Of note the Fluvax Junior® 0.25mL formulation is now withdrawn from the market. In the NT in 2010, Influvac® is the Government-funded seasonal flu vaccine available for use in children between 6 months and 5 years of age who are eligible for free vaccine (that is, those over 6 months of age with medical conditions predisposing to severe

complications of influenza see Figure 1 ). Other seasonal flu vaccines are available in the NT on the private market for children in that age range that do not fit the eligibility criteria.

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**Figure 1. List of people at increased risk of complications from the flu and eligible for free seasonal influenza vaccine**

<ol style="list-style-type: none"> <li>1. <b>Pregnant women</b></li> <li>2. <b>Indigenous people over 15 years of age (previously over 50 years of age)</b></li> <li>3. <b>All people 6 months of age and over with medical conditions predisposing to severe influenza*</b></li> <li>4. <b>All people over 65 years of age</b></li> </ol> <p>*Medical conditions predisposing to severe influenza can be found in the influenza section of the Australian Immunisation Handbook 9<sup>th</sup> edition (pp. 190-191) and include:</p> <p><b>Heart problems including;</b></p> <ul style="list-style-type: none"> <li>• rheumatic heart disease priority 1 &amp; 2 patients</li> <li>• cyanotic congenital heart disease</li> <li>• coronary artery disease</li> <li>• congestive cardiac failure</li> </ul> <p><b>Chronic lung/breathing problems including;</b></p> <ul style="list-style-type: none"> <li>• severe asthma</li> <li>• suppurative lung disease</li> <li>• bronchiectasis</li> <li>• cystic fibrosis</li> <li>• chronic obstructive pulmonary disease</li> <li>• chronic emphysema</li> </ul> <p><b>Chronic illness requiring medical follow-up or hospitalisation in the preceding year including;</b></p> <ul style="list-style-type: none"> <li>• diabetes mellitus</li> <li>• chronic metabolic diseases</li> <li>• chronic renal failure</li> <li>• haemoglobinopathies</li> <li>• impaired immunity including drug-induced immune impairment</li> </ul> <p><b>Chronic neurological problems including;</b></p> <ul style="list-style-type: none"> <li>• multiple sclerosis</li> <li>• spinal cord injuries</li> <li>• seizure and neuromuscular disorders</li> </ul> <p><b>People with lowered immunity including;</b></p> <ul style="list-style-type: none"> <li>• HIV</li> <li>• malignancy</li> <li>• chronic steroid use</li> </ul> <p><b>Children aged 6 months to 10 years who receive long term aspirin</b></p>
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## NT a winner

### GSK childhood immunisation award for innovation

The winners of the 2010 GlaxoSmithKline Childhood Immunisation Awards were announced at the Public Health Association of Australia's 12th National Immunisation Conference in Adelaide.

Four Australian organisations, including the General Practice Network NT, each received \$15,000 awards to support the development of practical and innovative programs designed to improve coverage and/or timely delivery of childhood immunisation in their community.

General Practice Network NT received the award for improved coverage and/or timely delivery of childhood or adolescent vaccines as per the Australian National Immunisation Program schedule.

The **General Practice Network NT** said

*"We intend to use the GSK Childhood Immunisation award to improve immunisation coverage even further. We also plan to print and laminate the new poster, to work with many of the new arrivals in Darwin to increase awareness of immunisation, and to provide more education to clinic staff to cater for the NT's ever-changing workforce".*

An initiative that aimed to improve coverage and/or timely delivery of childhood or adolescent vaccines as per the Australia National Immunisation Program Schedule

### WINNER: GENERAL PRACTICE NETWORK NT, Northern Territory

#### Summary

General Practice Network NT (GPNNT) has undertaken a significant step to improve coverage and timely delivery of childhood vaccines by updating and reprinting the resource 'Immunisation For All' (IFA). The aim of the initiative is to improve clinical practice in the immunisation encounter through better knowledge, increased confidence and more appropriate resources for multidisciplinary practitioners. A particular emphasis is placed on ensuring indigenous workers and community members in the NT have access to suitable information that will increase awareness of the importance of immunisation.

#### Situation Analysis

GPNNT believes there is increasing demand for a resource that can be shared across state borders. A significant factor in the redevelopment of the IFA book has been its increased focus on encompassing more indigenous languages, as well as the wide range of consultation and interest from across state boundaries having access to this resource. GPNNT reasons to provide vaccine providers with an updated resource are:

- To encourage more Aboriginal Health Workers to be part of the immunisation provisions with useful resource for their education and reference
- More overseas trained doctors are coming to the NT and have been finding the resource useful
- Turnover of staff in the NT is high and often of short duration

#### Desired outcome

The desired outcome for the update of IFA was to ensure increased knowledge and improved practice associated with immunisations by having an improved, multimedia resource for adult education that is:

- Relevant to the whole of the Northern Territory
- Culturally appropriate for indigenous people
- A useful resource that would educate clinic staff and in turn improve provision
- Suitable for educating communities.

GPNNT is also developing a range of additional resources to compliment the revised IFA book and DVD.

#### The initiative

IFA provides an easy to read, accessible resource for all Northern Territory clinic staff. The project commenced in December 2008 by the GPNNT immunisation team who were seeking feedback on the IFA resource and gathering suggestions for changes. In addition to changing the original IFA book, a range of new resources in the form of a tear off sheet and a poster for parents outlining the side effects of immunisation, as well as a poster to encourage timely vaccinations were all developed to provide a comprehensive and useful package, targeting indigenous populations.

#### Results and outcomes

GPNNT's desired outcomes for this initiative have been achieved despite delays and extension to the original timeframe. High quality resources have been completed and distributed, with extensive collaborative relationships giving broad ranging input and a resulting ownership of the IFA resource. The update of IFA has involved collaboration with CDC immunisation staff who provided clinical accuracy of the content. The initiative has encouraged very positive communication between vaccine providers in the three states which share cross border regions in the centre of Australia and use the NT Childhood Vaccinations Schedule (NT, SA and WA). Another positive outcome of the initiative is that the IFA will increase communications between all immunisations providers from all areas of the NT, CDC and NT Government clinics.

#### Conclusion

The completed and newly updated 'Immunisation For All' book, which has been printed in the GPNNT colours for easy identification as the updated edition, has retained the look of the original edition which is well known to all clinics in the NT, SA and WA. The review and the update of the IFA book, DVD and other materials have involved working with many immunisation providers and organisations in the NT, resulting in a high quality resource.

#### Using the grant

GPNNT intends to use the GSK Childhood Immunisation Award to improve immunisation coverage by educating for different groups through the development of additional resources or group presentations, as well as to:

- Commercially print and laminate the new poster
- Work with many of the new arrivals to Darwin to increase awareness of immunisation
- Provide more education to clinic staff in either face to face encounters or via teleconference, as the NT has an ever-changing workforce.

For further information please contact Prue Crouch on (08) 8950 4800 or visit [www.gpnnt.org.au](http://www.gpnnt.org.au)

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## Establishment of the Notifiable Diseases Committee

*Peter Markey, Head of Surveillance Unit, CDC, Darwin*

In the Northern Territory the Notifiable Diseases Act (1981) (NDA) governs the reporting of notifiable diseases, and stipulates that doctors and laboratories notify the Chief Health Officer (CHO) or delegate of any disease which is scheduled on a list of notifiable diseases. The list can be varied by the Minister through a gazettal notice, and advice to the Minister to add or subtract diseases from the list is made through the CHO by the Centre for Disease Control Director. Until 2008, the process for adding or subtracting diseases was an informal one, made in consultation with relevant staff and experts from both within the NT and at the national level where appropriate.

In December 2007, the Notifiable Diseases Committee was formed to formalise this process and make it more transparent. The Committee met again in 2008 and in May 2010 and agreed on its terms of reference. It was agreed that the Committee should report to the CHO and be comprised of the following:

- Head of Surveillance (Chair)
- Director of CDC
- Infection Control representative

- Infectious Diseases Physician
- DMO representative
- GP representative
- Central Australian representative
- Laboratory representative

The criteria by which decisions are made have been discussed over many years at both local and national levels, and the Committee has decided to adopt the criteria as listed in Table 1. The list is a guide only and judgements need to be made about each criterion and whether enough criteria have been fulfilled to justify notifiable disease status.

The Committee is currently considering the following diseases for notifiable disease status;

- Invasive Vibrio disease
- Ciguatera fish poisoning
- Disseminated strongyloidiasis
- Invasive Group A Streptococcal disease

The current list of notifiable diseases is on the following page (Figure 1).

**Table 1. Criteria for making a disease notifiable**

<b>Feasibility of collection</b>	The data for the disease must be relatively simple to collect
<b>Definable*</b>	Disease must be a recognisable syndrome and easily definable
<b>Priority</b>	There are diseases that are important at state and territory level, but the disease must have a demonstrated priority at a national level (i.e. disease affects most or all jurisdictions)
<b>Immediacy of an intervention</b>	The disease requires an immediate response to prevent transmission through the community
<b>Vaccine preventability*</b>	Vaccine preventable diseases should be monitored through a robust surveillance system and making the disease notifiable is a recognised method.
<b>Outbreak potential of the disease</b>	The disease is prone to outbreaks that have a substantial burden on the community
<b>Potential for disease control programs</b>	The disease should be preventable through the implementation of control programs
<b>High-case fatality rate</b>	There is a high proportion of deaths from this disease relative to the number of cases of the disease
<b>Community or political concerns</b>	Some diseases may be of high concern to the community or the occurrence of the disease may have political implications



## A review of enteric disease in 2009 from the OzFoodNet perspective

Michelle Harlock, OzFoodNet Epidemiologist, CDC, Darwin

### Abstract

In 2009, notifications for salmonellosis cases were higher than expected, however notifications for campylobacteriosis and shigellosis were lower than expected. There were a small number of outbreak and cluster investigations performed this year.

**Key words:** salmonellosis; shigellosis, campylobacteriosis; outbreak; Northern Territory

### Introduction

In 2009 there were 832 notifications of foodborne or potentially foodborne disease. This is 3% less than the 5 year mean (858) and 5% less than the previous year (936). Salmonellosis notifications accounted for 62% of the foodborne disease notifications in the Northern Territory (NT), followed by campylobacteriosis notifications (26%) and shigellosis (11%). All notification counts in this article are generated by using the notification date from the Northern Territory (NT) Notifiable Disease System.

### Salmonellosis

In 2009 there were 516 notifications of salmonellosis in the NT. This represents a 15% increase in comparison to the 5 year mean (438 cases) and a 4.65% increase compared to the previous years number of notifications (492). The overall rate of salmonellosis cases was 229 per 100,000. The median age of salmonellosis cases was 2 years (range 0 – 93; mean 17.6 years).

The serovar with the highest number of notifications was *Salmonella* Saintpaul (n=59) followed by *Salmonella* Virchow (n=54), *Salmonella* Typhimurium (n=43) and *Salmonella* Ball (n=39). In the past, *S.*Ball and *S.* Saintpaul were the most commonly reported serovars in the NT, with these 2 serovars thought to have established an ecological niche in the NT.

Of the *S.*Virchow isolates reported this year, the

majority were *S.* Virchow phage type 8 (80%, 43 of 54 isolates) with the remainder being sporadic cases of various other phage types, or no typing data available (n=3). There was one cluster of *S.*Virchow 8 cases investigated. There was a variety of different phage types of *Salmonella* Typhimurium reported in 2009 in the NT. Among the *S.*Typhimurium cases, there was 1 small outbreak associated with *S.*Typhimurium U302 and a cluster of *S.*Typhimurium, 108 cases were investigated.

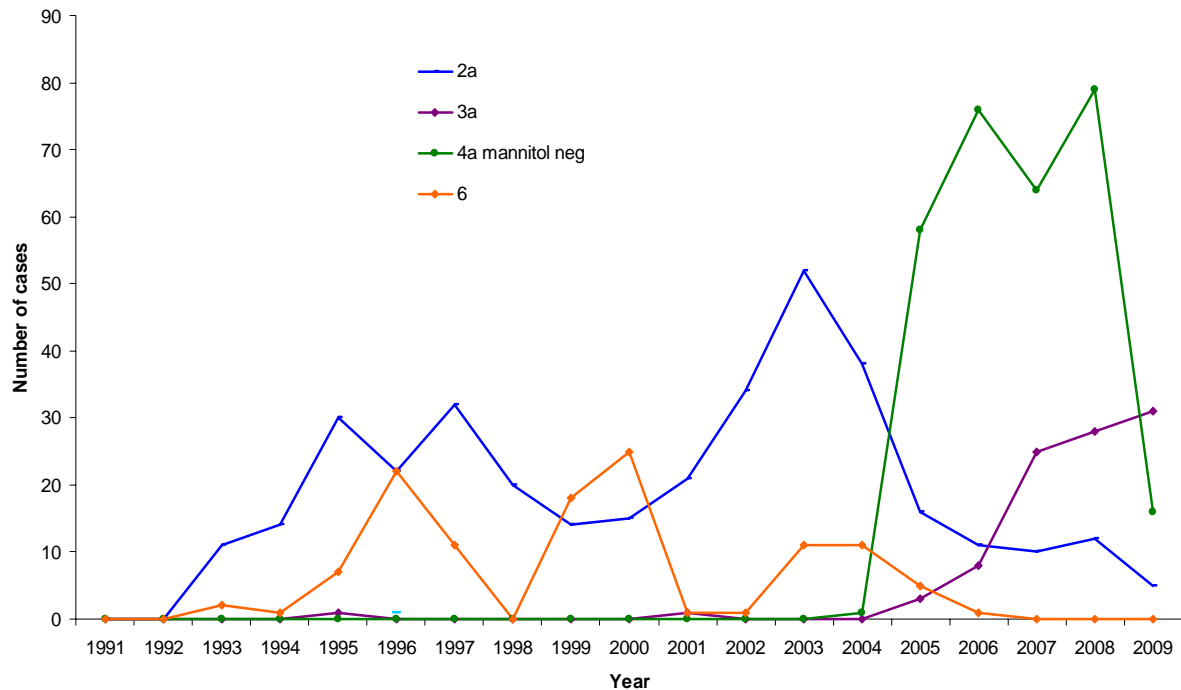
### Campylobacteriosis

In 2009 there were 214 notifications of campylobacteriosis in the NT. This is a 21% decrease compared with last year (258) and the expected 257 (5 year mean). The overall rate of campylobacteriosis was 95 cases per 100,000. The median age of campylobacteriosis cases was 16.5 years (range 0 – 79; mean 21 years). Speciation of *Campylobacter* isolates is not routinely done by NT laboratories and the majority of isolates (93%) were reported as *Campylobacter* species (not further specified).

### Shigellosis

In 2009 there were 95 notifications of shigellosis reported in the NT. This number of cases is 65% lower than the 5 year mean (157 cases) and 89% lower than the number of notifications received in 2008 (180). The overall rate of shigellosis was 42 cases per 100,000 population. The median age of cases was 8 years (range 0-74, mean 20.7 years).

The most commonly reported species of *Shigella* was *Shigella flexneri* (66 cases) followed by *Shigella sonnei* (25 cases). The most commonly reported biotype was *S.flexneri* 3a (31 cases). This is a change from what has been noted in previous years where *S.flexneri* 4a mannitol negative was emerging as the most commonly reported biotype. The most commonly reported biotype of *S.sonnei* was *S.sonnei* biotype a (22 cases). When a selection of the more commonly notified biotypes is examined (Figure 1) it is possible to see that biotypes such as *S. flexneri* 6 and *S. flexneri* 2a

**Figure 1. A selection of *Shigella flexneri* biotypes over time (1991-2009) in the Northern Territory**

are declining in number over the last few years, while *S. flexneri* 4a mannitol negative and *S. flexneri* 3a have emerged in increasing numbers.

The sharp decrease in reported cases of *S. flexneri* 4a mannitol negative in 2009 is interesting to note, as this 'outbreak' has been occurring since 2005. *Shigella flexneri* 4a mannitol negative was first reported in the NT as a single case in October 2004, a 1 year old Indigenous female whose residence was in South Australia. Prior to this case there were no isolates of this serovar reported in the NT. In the following years, this biotype had been increasingly reported throughout the NT. It is also interesting to note the steady concurrent increase in reported cases of *S. flexneri* 3a since 2004.

### Outbreak and cluster investigations

There were 4 foodborne or suspected foodborne outbreaks investigated. Of these outbreaks, 2 were associated with restaurants, 1 with a private residence and 1 with a rally drive.

There were 2 restaurant associated foodborne outbreaks investigated. In December, cases of

gastroenteritis in patrons attending a Christmas party function were investigated, with 4 of 13 specimens tested being positive for *Norovirus*. It was suspected that contamination of served food, or the environment, by a food handler or other restaurant patron was the cause of the outbreak. A takeaway restaurant was investigated in December following complaints of gastroenteritis. Stool specimens from patrons were negative for common pathogens, but food sampled tested positive for high counts of coliform bacteria in at least 1 dish. The outbreak was likely due to poor hygiene and hand washing at the restaurant combined with inadequate temperature control. The restaurant was voluntarily closed.

During routine follow up of a case of salmonellosis, it was found that 2 people out of 6 attending a private dinner party became ill with similar symptoms and onsets, with 1 case returning a positive specimen for *S. Typhimurium* U302. The source of infection was suspected to be a tiramisu desert which was made with raw eggs.

A multi-jurisdictional outbreak investigation was launched following identification of several *S. Litchfield* cases diagnosed in the NT who

were associated with a rally drive. The source of illness was not definitively identified, though a barramundi dish was thought to possibly be associated with illness<sup>1</sup>. Food for the trek was catered for by a variety of different groups at various locations.

There were 11 non-foodborne outbreaks investigated in the NT in 2009. Of these outbreaks, 2 were associated with childcare centres, 4 in remote communities, 3 in private residences and 1 in a camp setting. Outbreaks were attributed to *Cryptosporidium* in 3 cases, 1 outbreak was possibly due to both *Salmonella* and *Cryptosporidium*. The etiological agent in 1 outbreak was unknown. Four outbreaks within families were identified when following up individual salmonellosis cases (3) and a campylobacteriosis case.<sup>1</sup>

Three outbreaks associated with *Cryptosporidium* in remote communities were documented in 2009. These outbreaks occurred in the late months of the wet season. Transmission was suspected to be waterborne, possibly in combination with some person to person transmission. There were reports of localised flooding in the communities. The drinking water at the communities was not suspected to be the source of illness.

An outbreak of gastroenteritis with an unidentified etiological agent was of interest. There were 17 cases of gastroenteritis over a 1 month period in a remote community. Routine microbiological testing of several clinical specimens did not identify a pathogen. The duration of symptoms was prolonged, reportedly 1 to 2 weeks with cases almost wholly restricted to young children. Anecdotal reports of symptoms were loose bowel motions and mild fevers. It was difficult for health staff in the

community to obtain detailed illness histories and line listings of cases presenting. There were reports of children swimming in flooded creeks and rivers. A creek that ran through the community also ran through a local cattle station and there were reports of material from the cattle station being washed into the creek. It is possible that the pathogen may have been an organism such as *Escherichia coli* (or another enteric microbe) with transmission being waterborne. The investigation highlighted some of the difficulties investigating outbreaks in remote communities with already busy health clinic staff being asked to collect data.

There were 5 cluster investigations conducted in 2009. One cluster investigation for *S. Ball* cases occurred in a family with transmission suspected to be person to person. The source of infection for the index case was not identified. Other clusters investigated were *S. Virchow* PT8, *S. Lansing*, *S. Typhimurium* PT108 and *S. Paratyphi B* var Java (with 2 different phage types later identified – Battersea and RDNC A001). No source was identified for these 4 clusters.

For more information on OzFoodNet go to <http://www.ozfoodnet.gov.au/>

### **Acknowledgments**

Thank you to Jenine Gunn for undertaking the OzFoodNet Epidemiologist position for part of 2009 while I was on maternity leave.

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## Firework-related injury survey report 2010

*Laura Edwards, Public Health Registrar, Steven Skov, Public Health Physician, CDC, Darwin*

### Abstract

#### Objective

*The Centre for Disease Control conducts an annual survey to determine the number of fireworks-related injuries in the Northern Territory (NT) surrounding Territory Day on 1 July. This is the 12th survey in the series.*

#### Methods

*All Emergency Departments in the NT and the Department of Defence participate by completing survey forms for patients that present with burns or other injuries related to fireworks.*

#### Results

*In 2010 there were 13 injuries caused by fireworks 12 of which were burns. Multiple visits to the burns clinic or other health practitioners were required for 11 of the injuries. There were no hospital admissions.*

#### Conclusion

*The number of fireworks injuries fluctuates from year to year across the NT with less than average however in 2010. This may relate to increased awareness of the public on safe use of fireworks.*

*Keywords: fireworks; injuries; survey; burns*

### Introduction

Territory Day, celebrated annually on 1 July since 1978 marks the anniversary of self-government in the Northern Territory (NT). Each year on this day, Territorians are allowed to purchase and light fireworks without a permit. Following changes to the legislation in the Australian Capital Territory in 2009, the NT is now the only jurisdiction in Australia that allows the personal use of fireworks without a permit.

### Background

The NT Centre for Disease Control (CDC) has conducted an annual survey of fireworks-related injuries in the NT since 1998. This is the 12<sup>th</sup>

survey in the series. In addition to the survey, the CDC, in conjunction with NT WorkSafe, promote the safe use of fireworks. In 2010 methods used to inform the public on the safe use of fireworks included media releases, radio interviews, press conferences and distribution of safety flyers to all points of sale and to schools around Darwin and Alice Springs. Each year there is considerable media and public debate over fireworks and the restrictions on their use. Since 2006 the CDC has also conducted 3 analyses of the public discussion related to fireworks in the letters pages of the NT News,<sup>1,2</sup> the latest is published in this edition of this Bulletin, page 18.

### Methods

The 2010 survey process was carried out as in previous years.<sup>3</sup> All 5 Emergency Departments (EDs) of the public hospitals in the NT participated in the survey (Gove, Katherine, Alice Springs, Tennant Creek and Darwin), as well as the Department of Defence health services in Darwin. General Practitioners and Community Health Centres have not been involved in the survey since 2008.

The survey period covered from midnight of 29 July to midnight 4 July. All people who presented to the ED or Defence medical units were provided with survey information and consent was obtained prior to inclusion in the analysis.

Information was collected on age, sex, date and time of injury, percentage burned (where applicable), site of injury, severity, cause of injury, bystander or lighter status, location, suburb or community and firework type. The severity of the injury was categorised as either mild (requiring 1 visit to a health practitioner), moderate (requiring 2 or more visits) or severe (requiring admission to hospital).

### Results

There were 13 individuals with injuries recorded in 2010 across the NT. All but 1 of these injuries occurred in Darwin. For details on individual cases see Table 1. Summary details

are as follows:

- Ages ranged from 3.5 years to 74 years. The median age was 20.5 years.
- All injuries occurred on 1 July and all of those with a recorded time (7 of 13) occurred between 8PM and 11PM.
- 11 injured were male, 2 were female.
- 12 of 13 individuals with injuries had burns. The location of the burns included hands (4), arms (1) neck/back (2), eye (1), multiple sites (1) and legs (3). 1 burns victim also sustained a burst ear drum and 1 person presented with hearing loss but no burn.
- 11 injuries were moderate with 1 of these initially classified as severe but later reclassified as moderate when the burn healed well with dressings and did not require admission to hospital for skin grafting. The other 2 injuries were minor.
- The causes of injury included people lighting fireworks while holding them (4 hand and finger injuries), a direct eye injury, 5 fireworks firing in the wrong direction including 2 that deflected off trees, and 1 that hit the underside of a canvas chair. There was 1 intentional injury from a firework being placed in a friend's pocket.

- The person lighting the firework was injured in 5 instances and the other 8 were bystanders.
- 5 injuries occurred in a backyard, 2 on a beach, 3 on the street and 3 in parks.
- The types of fireworks to causing injury included 4 skyrocket, 4 multishots, 1 sparkler, 1 flyer, 1 bomb cracker and 1 spinner.

## Discussion

### *Injuries in the NT 2000 to 2010*

The total number of injuries recorded in this survey has fluctuated over the last 10 years with a range from 9 to 35 injuries. The median number of injuries is 14. This year saw the equal third lowest total number of injuries in the past 10 years. This is only the second year in which there were no hospital admissions. In past years up to 10 people have required admission with the average being 3.

The number of injured persons each year is relatively small and highly variable making it difficult to identify trends. The past 3 years however has seen a reduction in the number of injuries compared with 2006 - 2007. The highest

**Table 1. Summary of injuries 2010**

Age in years	Sex	Cause	Bystander	Site	No. healthcare appointments
39	Male	Firecracker fell over	Yes	Back and neck	6
19	Male	Lighting firework in hand	No	Hand	5
55	Male	Lighting firework in hand	No	Hand	10
3.5	Female	Sibling poked sparkler in eye	Yes	Eye	6
20	Male	Lighting firework in hand	No	Hand	4
14	Male	Firework deflected off a tree	Yes	Neck and shoulder Perforated ear drum	6 and may require surgery in future
12	Male	Lighting firework in hand	No	Hand	7
18	Male	Firework exploded while moving away	No	Leg and arm	4
22	Female	Firework exploded horizontally	Yes	Arm	2
20	Male	Firework placed in pocket by a friend	Yes	Thigh	3
20	Male	Firework exploded horizontally	Yes	Leg	3
31	Male	Firework exploded close to ear	Yes	Ear – hearing loss	1
74	Male	Firework hit underside of canvas chair burning through	Yes	Leg/buttock	1

**Table 2. Firework injuries, hospitalisation and injuries to bystanders 2001 – 2010**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
<b>Hospital admissions</b>	1	7	1	2	0	7	10	1	3	0	32
<b>Bystanders injured</b>	4	8	9	3	5	12	13	8	6	8	76
<b>Total injured persons</b>	9	14	31	11	18	35	32	14	13	13	190

number of injuries since the survey began was seen in 2006 and 2007 (35 and 32 respectively), including 1 life-threatening event which left the victim with permanent brain damage. In previous years many injuries have occurred as a result of lighting multiple sparklers simultaneously. Promotion of the use of just 1 sparkler at a time may have resulted in the reduction in sparkler injuries, with just 1 occurring in 2010.

Tightening and enforcing the regulations surrounding fireworks use in recent years may also have resulted in a reduction in injuries. In 2008 purchasing of fireworks was restricted to 1 July and the age restriction was raised to 18 years from 16 years of age. The use of fireworks has been for some years restricted to 1 July between the hours of 6PM and 11PM. Changes in the Darwin City Council by-laws in 2009 resulted in a prohibition of possession and ignition of private fireworks in the Mindil Beach area. Offences are punishable with a \$520 spot fine. This Mindil Beach area is the most popular viewing location for the public fireworks display and has previously been a site of a number of injuries recorded in these surveys.

It is important to emphasise that the number of injuries each year is highly variable which makes identification of trends difficult within the data available.

### ***Risk factors for fireworks injuries***

There are a number of risk factors consistently associated with fireworks injuries in the world literature. These include male gender, the act of lighting the firework and age less than 15 years. The United States Centre for Disease Control report a ratio of male to female injuries of 3 to 1 for fireworks which matches the NT in the

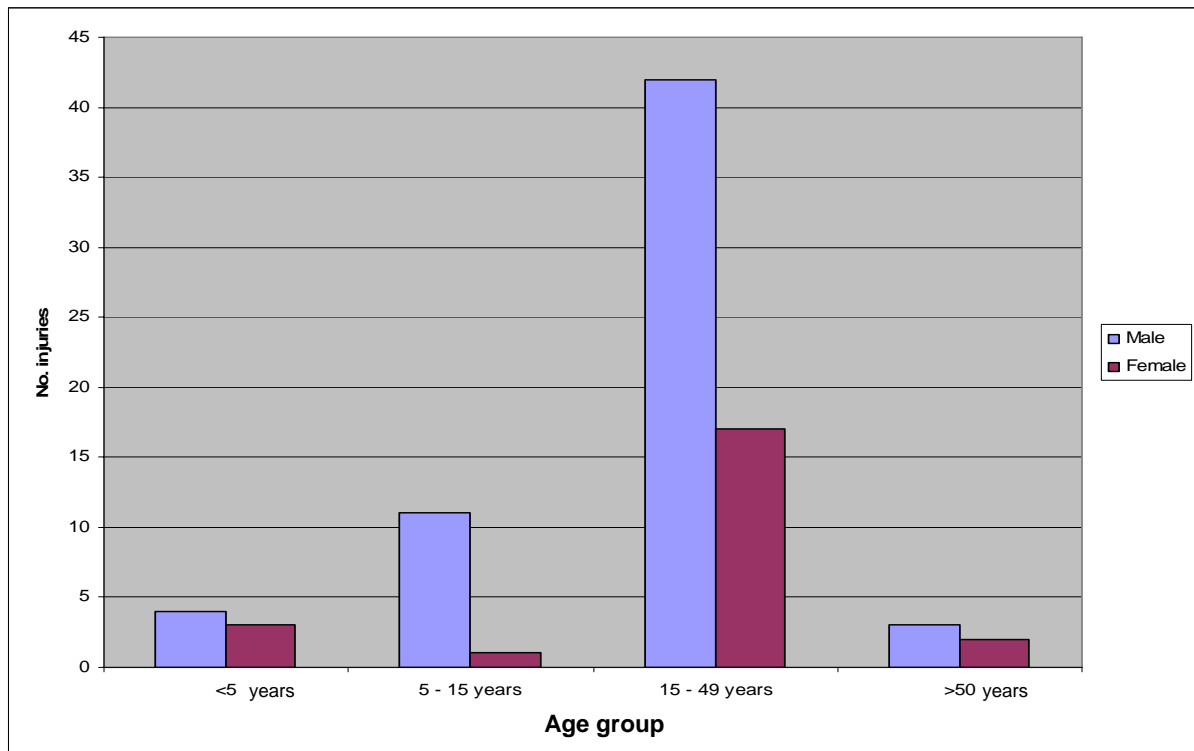
period 2006 – 2010 (see Figure 1) In 2010, 11 of the 13 injured were males.

Figure 2 shows the distribution of firework injuries by age group, sex and bystander status from 2006 to 2010. There is a preponderance of males in the 15 – 49 year age group who were injured while lighting the firework. This may reflect risk-taking by males while lighting the firework or simply that males are more likely to light fireworks than females. In 2010 several injuries occurred after people chose to light a firework in 1 hand while holding it in the other, resulting in burns to the hands and fingers.

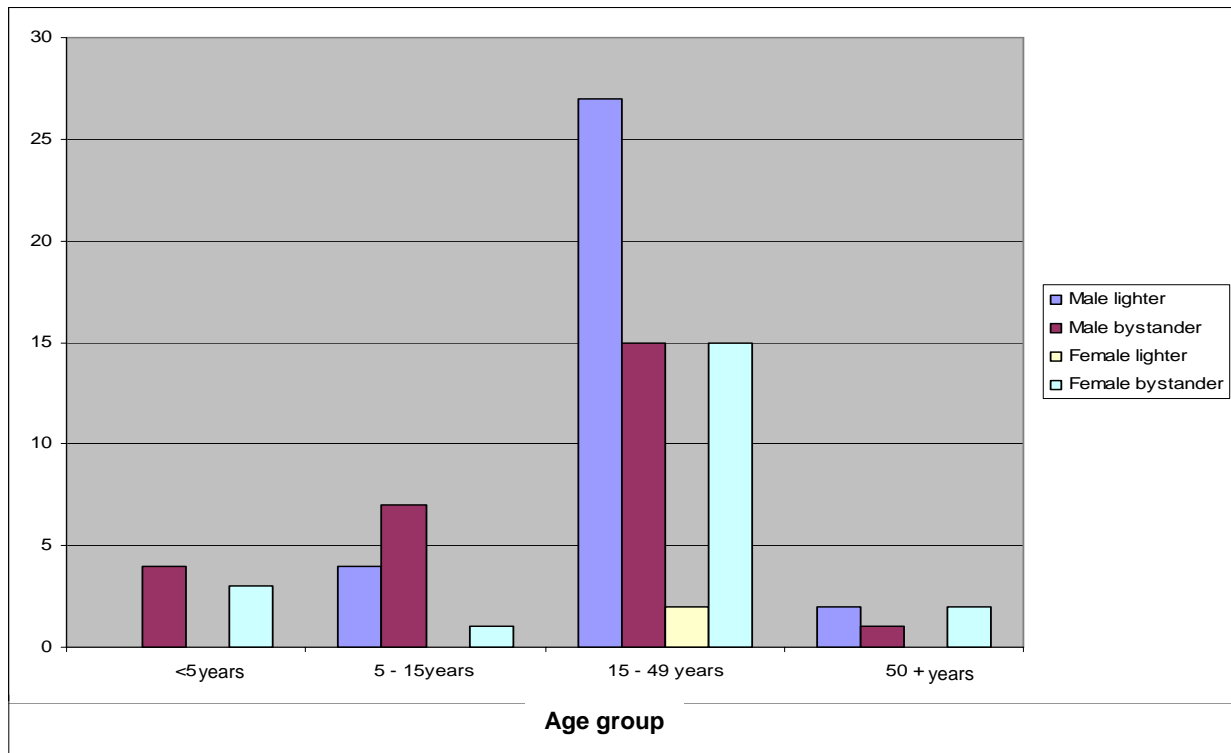
Bystanders make up a significant proportion, 76 of 190 (40%), of total firework injuries in the NT in the past 10 years. Since 2006, 21 of 23 females injured have been bystanders. Injuries due to ‘errant’ fireworks are common and making sure fireworks are lit on a flat and stable surface is 1 of the most effective methods of preventing bystander injuries. Determining what is a “reasonably safe” distance for observing fireworks is difficult. In 2009 a child was burned in a pram at a distance of approximately 50 metres from where the firework was lit. Ensuring that “reasonable” distances are large ones and avoiding crowded locations with public use of fireworks is a recommended precaution to reduce the number of injuries.

Understanding the true burden of fireworks injuries goes well beyond that of simply counting the number of injured persons. Days of work or school lost, medium to long term disabilities, personal inconvenience and psychosocial costs should be taken into consideration when estimating the societal burden of fireworks injuries. A total of 58 ED, outpatient and burns clinic appointments so far this year (Table 1) already represents significant

**Figure 1. Firework injuries by age and sex (2006 - 2010)**



**Figure 2. Firework injuries by age, sex and bystander status (2006 - 2010)**



financial cost. The direct cost of fireworks care in Royal Darwin Hospital was estimated at \$293 000 in 2007 alone.

While it is fortunate that there were no severe injuries from fireworks requiring admission to hospital in 2010 a number of preventable injuries did occur. In particular the number of hand injuries from misuse of fireworks is cause for concern. Hand burns are painful, slow to heal and the long term scarring or contractures that frequently occur lead to substantial disability. As has occurred in past years both males and bystanders observing private displays were injured most frequently.

It has been shown that the use of fireworks only by professionals is the most effective method for preventing injuries and this is endorsed in the United States by the National Fire Protection Authority, Centre for Disease Control and the Consumer Product Safety Commission.<sup>4</sup> In Ireland, revision of the legislation in 1996 to allow over the counter sale of fireworks resulted in a 3-fold increase in fireworks injuries over the period 1994 to 1998.<sup>5</sup>

There are a range of opinions on fireworks and

significant media coverage of fireworks surrounding Territory Day. To our knowledge there are no proposed changes to the NT Legislation in the near future. The NT CDC will continue to monitor fireworks injuries in the NT and work to promote the safe use of fireworks.

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## “Crackerwars”-An analysis of opinions published by the NT News on the use of fireworks surrounding Territory Day

*Laura Edwards, Public Health Registrar , Steven Skov, Public Health Physician, CDC, Darwin*

### Abstract

#### Objective

*To analyse the comments and opinions published in the NT News regarding fireworks used on Territory Day (1 July) to determine whether more people are in favour of, or against the personal use of fireworks.*

#### Methods

*To analyse all published text messages and letters in the NT News from 14 June to 14 July 2010 and all online comments from 29 June to 7 July 2010.*

#### Results

*The majority of messages were annoyed by aspects of fireworks use surrounding Territory*

*Day. Similar numbers of comments were clearly in favour of, or clearly against a ban on personal use of fireworks.*

#### Conclusion

*Public debate on fireworks is intense and opinions are divided on the ongoing personal use of fireworks in the NT.*

*Keywords; fireworks, NT News, media survey, Territory Day, public opinion*

### Introduction

Following changes to the legislation in the Australian Capital Territory in 2009 the Northern Territory (NT) became the only Australian jurisdiction that permits the personal use of fireworks as part of the Territory Day

celebrations on the 1 July. On this day fireworks may be purchased and used by the public without a permit. Government-funded public fireworks displays are also held at several places throughout the NT.

The issue of whether the personal use of fireworks in the NT is desirable has for many years been the subject of considerable and intense public discussion. An impression of the views of the general public may be gained by following the letters and text messages sections of newspapers. The *NT News*, a tabloid newspaper owned by News Limited, is the only daily newspaper in the NT. It has an average daily readership of 42 000 on weekdays and 56 000 on Saturdays.<sup>1</sup> The paper has a section for letters to the editor and text messages as well as an online forum where people may leave comments in direct response to articles available for public viewing on the internet. In recent years the subject of fireworks use has been extensively canvassed in these submissions in the weeks leading up to and following Territory Day.

The Centre for Disease Control (CDC) has previously conducted 2 analyses of the letters to the editor and text message discussions of the fireworks issue in the *NT News* and these have been published in the CDC Disease Control Bulletin in 2008 and 2009.<sup>2,3</sup> This survey is the third in the series.

**Methods**

All letters and text messages published in the *NT News* between 14 June and 14 July that referred to fireworks were examined. This year, online comments to articles or reports on fireworks during the period 29 June to 7 July were also included.

The letters and comments were classified initially as generally negative towards fireworks use, generally positive towards fireworks, and other, where the nature of the opinion could not clearly be classified as either for or against fireworks. The “negative” messages were then further classified into 3 groups: clearly in favour of a ban, clearly in favour of further restriction or expressing an annoyance with some aspect of fireworks use but without explicitly calling for a ban or further restriction. The “positive” messages were also classified into 3 groups, generally in favour of the status quo, in favour of reduced restriction, or clearly against a ban.

The letters were initially classified by LE and subsequently independently reviewed by SS. See Figure 1.

**Results**

A total of 155 messages appeared in the 3 sources during the timeframes. The majority (99) were online communications, with 48 text messages and 6 letters to the editor published in print.

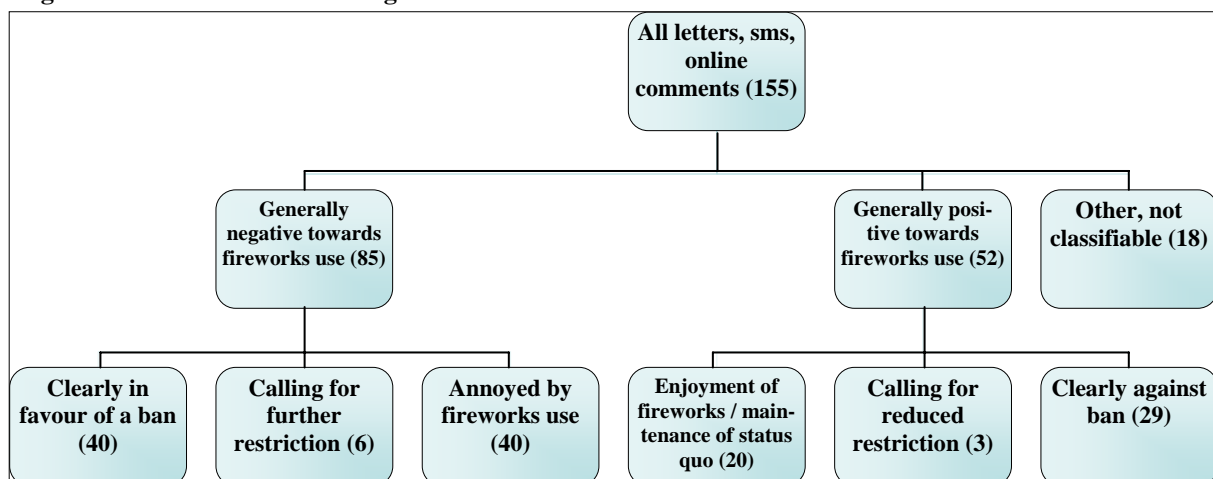
Overall, the majority of messages were classified as “negative” towards personal fireworks use 85/155 (55%) while 52/155 (34%) were classified as “positive”. The remainder 18/155 (12%) were not able to be so classified. See Figure 2.

**Discussion**

*Themes*

In analysing the comments a number of recurring themes emerged. While saying this there was considerable overlap in the reasons why people contacted the newspaper, and many people expressed multiple reasons for their opinion(s). For the purpose of the analysis the

**Figure 1. Classification of messages**



primary reason or opinion was reviewed.

Overall the most common themes within the negative comments related to the irresponsible use of fireworks and use outside of licensed times. Within the positive messages general enjoyment and the unique nature of the NT were the most common themes.

Table 1 shows recurring reasons amongst those expressing a negative opinion on the personal use of fireworks.

Examples of such messages include:

*“Ban fireworks, ban them now. How much property damage, injury and lost nights of sleep should normal law abiding citizens have to endure. Ban the fireworks forever.”*

*“Love the beautiful display of fireworks, think it would be really great if people actually stopped letting them off at 11pm...at this rate will need a public holiday on the 2<sup>nd</sup> July so we can get some sleep...”*

*“It is enjoyable, and it would be a shame to have them banned, so maybe if the actual fines were enforced, it might stop the idiots...”*

*“It is insanity to let Darwin explode every year...it’s got to stop. Have some respect for the environment, small animals, children and our ears!”*

*“WOW, Darwin you really know how to go insanely out of control. Two blazes and a firework lit under a moving car. Fun for some but NT Govt really?? How controlled is it?”*

Table 2 shows the reasons behind the opinions of those generally in favour of personal use of fireworks.

Examples of these messages include:

*“You Territorians have it all, weather, great people, awesome lifestyle and cracker night. Wish I was there. Miss it soooo much.”*

*“Shut-up whingers! If you don’t like fireworks buy some ear plugs, stay at home, wrap yourself in cotton and let the majority of people that love fireworks have their fun. It’s an awesome*

*tradition and regardless of the stats the NT News has put up I think you’ll find barely anyone was treated for injuries last year. It’s once a year – get over it!”*

*“Lets make Territory day, Territory week celebrations. And celebrate as they would in many Asian countries. This will give everyone heaps of time to let off their crackers. Great cash injection for our local economy.”*

*“If you think that Fire Cracker night in Darwin should be banned then you are living in the wrong place. My dog was fine, the family was happy, smiling and having fun. Don’t let a few minor incidents of your “BAD” experience spoil just one night or move away. Mr Henderson don’t let southerners who keep complaining about Darwin life change the Northern Territory...”*

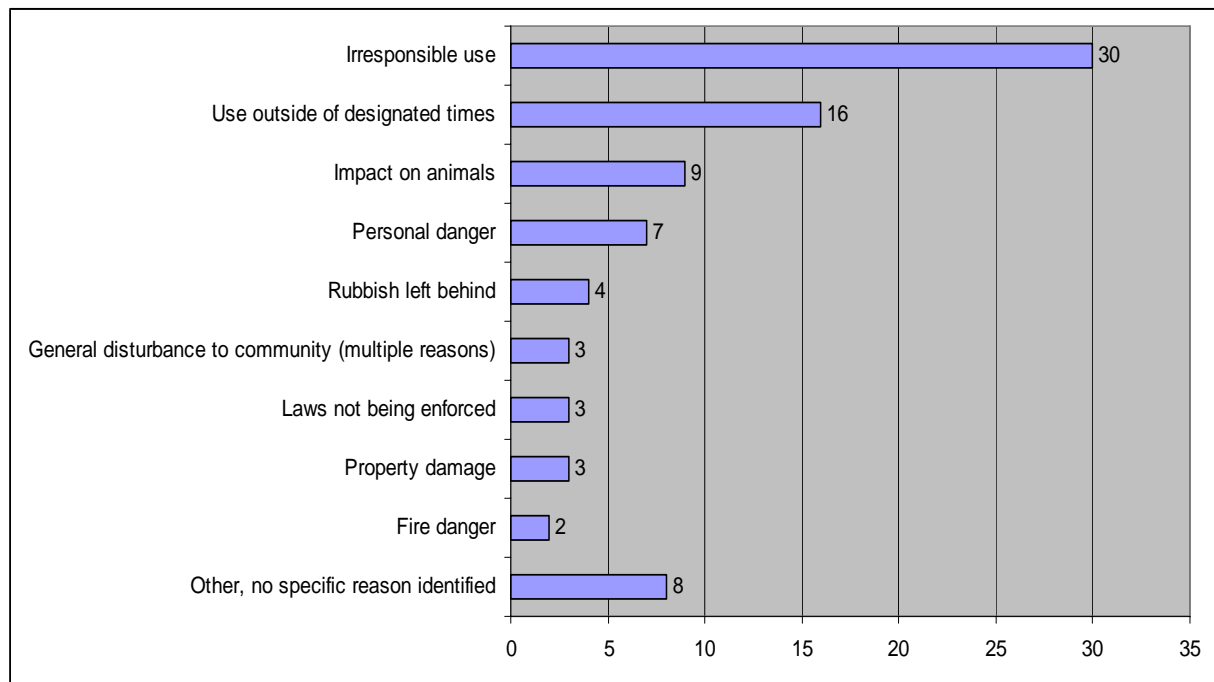
*“Lets have a referendum on fireworks to silence the do-gooders. Just because minorities have rest of the country by the balls doesn’t mean we have to follow.”*

#### **Comparison with previous surveys**

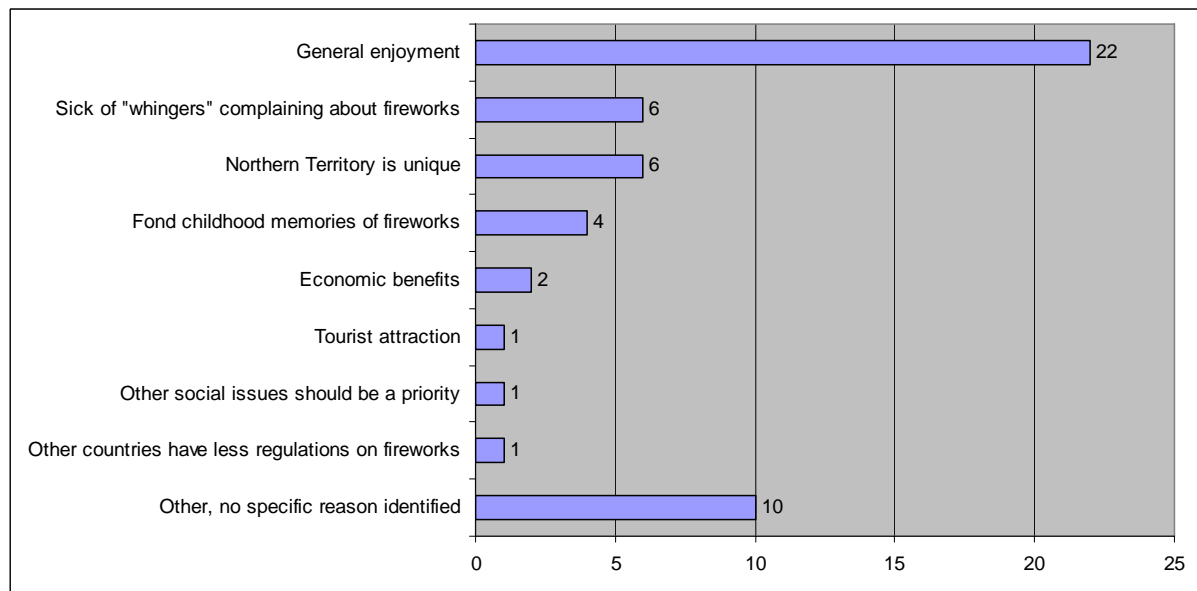
The major difference between the media survey in 2010 and the previous 2 surveys in 2006 and 2007 was the inclusion of online comments. We recorded a total of 155 comments in the survey period which is considerably higher than the 113 in 2006 and 109 in 2007. To some extent it appears that online comments have replaced comments in print as there was a reduction in the total number of letters and text messages (6 and 48 respectively) compared with 82 text messages and 27 letters in 2007 and 102 text messages and 11 letters in 2006.

The overall position towards fireworks was similar to that seen in the previous surveys. In 2007, 57% of messages were classified as being against or at least negatively concerned with fireworks, and 18% classified as calling for an outright ban. In 2006 71% and 33% were classified as negative and calling for an outright ban respectively (see Table 3). The 2010 survey differed slightly from previous surveys in the further classification of “positive” messages into those that were generally positive and those that clearly were against a ban (see flowchart, page 19).

**Table 1: Reasons behind negative messages on fireworks**



**Table 2: Reasons behind positive messages on fireworks**



The data collected since 2006 show that the majority of responses to fireworks are annoyed by some aspect of their use (60% overall). The total number of positive messages (clearly against a ban, expressing enjoyment of fireworks) compared with the number of messages calling for an outright ban is collective similar in the three surveys (range 18-34%).

### **Survey limitations**

There is a possibility of publication bias in the data that was collected by the survey as letters and text messages are published at the editor's discretion. We are not aware of the number of submissions that were not published by the newspaper. Online comments are much less subject to publication bias as they are only occasionally removed by online moderators if their content is deemed offensive or abusive to others. However it is important to recognise that only people with access to the internet are able to post comments in this way.

Another limitation in interpreting the data in our survey is the self-selection bias that arises from the messages being sent in based entirely on the will of the authors. It is highly likely that people who feel most passionately about the use of fireworks will be most likely to submit their comments for publication. Some people may have commented more than once either online or in text messages as names are not verified during

the publication process. Alternatively, the process of writing and sending a letter to the editor is prohibitive to some people, however the ease of submission of text messages and online comments may reduce that obstacle, particularly in younger age groups.

The *NT News* did conduct their own online poll of readers with the question "Should the use of fireworks be restricted to public displays only on Territory Day", of which 442 of 741 (57%) responders were in favour of further restriction. However, this type of survey also suffers from the same type of bias as the survey of unsolicited messages. The only way to properly gauge public opinion would be to conduct a community survey with a formal sampling process to invite community members to participate.

In 2010 the intense public debate towards the personal use of fireworks continued with a wide variety of opinions expressed in the *NT News*. Our survey showed that the majority of messages are either annoyed by, calling for further restriction or clearly in favour of a ban on personal use of fireworks while the proportion of messages either clearly in favour of a ban compared with those expressing enjoyment of fireworks or against a ban has been relatively similar overall since 2006.

**Table 3. Trends in fireworks opinions 2006 – 2010 [Total number (%)]**

		2010	2007	2006
Negative towards fireworks use	Total	85/155 (55)	62/109 (57)	73/102 (72)
	Outright ban	40/155 (26)	20/109 (18)	22/102 (22)
Positive towards fireworks use	Total	52/155 (34)	28/109 (26)	19/102 (19)
	Clearly against ban	29/155 (19)	NA	NA
Other		18/155 (12)	19/109 (17)	10/102 (10)

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## Needle syringe programs: A return on investment

*Oanh Nguyen, Sexual Health and Blood Borne Virus Unit, CDC, Darwin*

### Abstract

*The sharing of syringes by people who inject drugs (PWID) is a common mode of global transmission of blood borne viruses (BBVs). The BBVs HIV and HCV infections are associated with significant morbidity and mortality. Needle syringe programs (NSPs) are an effective public health measure to reduce the spread of BBVs among PWID and the significant associated morbidity and mortality. As well as distributing sterile injecting equipment to prevent the transmission of BBVs, NSPs provide a range of services that include the provision of education and information on reducing drug-related harms, referral to drug treatment agencies, medical care, legal support and other social services.*

*The recently released 'Return on Investment 2' Report was conducted for the 10 year period from 2000 to 2009. Using mathematical modelling and economic analysis method, this report details the benefits of NSPs over the last decade including the prevention of HIV and HCV infections among PWID; the substantial healthcare cost savings to government and gains in life years. The report also suggests that expansion of NSPs into the future (2010 onwards) will continue to yield these epidemiological, economic and health gains.*

*Key Words: needle syringe programs; injecting drug use; blood borne viruses; return on investment; prevention*

### Introduction

The sharing of syringes by people who inject drugs (PWID) is a common mode of transmission of blood borne viruses (BBVs), such as Human Immunodeficiency Virus (HIV) and hepatitis C virus (HCV).<sup>1</sup> At the end of 2008, an estimated 284,000 people in Australia were living with HCV antibodies with the vast majority (50-80%) of HCV infections occurring through unsafe injecting drug use (IDU).<sup>2,3</sup> From estimates at the end of 2008, an estimated 17 444 people are living with HIV infection in Australia. While the majority of all new HIV transmissions in Australia are acquired through

sexual contact between men, IDU remains a risk factor (4%) for transmission.<sup>2,3</sup>

In 2009, the Northern Territory (NT) reported 176 HCV infections and, where data were recorded, 49% of notifications reported current IDU. Of the 19 reported cases of HIV in the NT in 2009, IDU was not identified as a risk factor for any cases.<sup>4</sup>

Data strongly supports the benefit of needle syringe programs (NSPs) programs in reducing HIV and HCV infections.<sup>5</sup> A recently published Australian report has detailed the benefits of NSPs over the last decade including the prevention of HIV and HCV infections among PWID substantial healthcare cost savings to government and gains in life years.<sup>1</sup>

### Needle syringe programs (NSPs)

NSPs in Australia began as a pilot study in 1986 in Sydney.<sup>6</sup> In 1987 the New South Wales government endorsed NSPs through policy, and other Australian States and Territories were quick to follow.<sup>7</sup> NSPs are a public health measure funded to prevent and reduce the harmful consequences arising from unsafe IDU. As part of Australia's *National Drug Strategy* (first developed in 1985), NSPs form part of the harm-reduction component of a broader harm minimisation framework. Harm minimisation aims to reduce drug-related harm and encompasses integrated approaches including supply-reduction (law enforcement) and demand-reduction (including abstinence-orientated interventions). This framework acknowledges that, while governments do not condone illegal behaviours such as IDU, this behaviour does occur and there is a responsibility of authorities to develop and implement public health measures that contribute to reducing the harm caused by IDU, both to individuals and the community.

NSPs distribute sterile injecting equipment to prevent the transmission of BBVs. This distribution includes needles and syringes, swabs, sterile water, and sharps bins for the safe disposal of injecting equipment. NSPs additionally provide services that include the

provision of education and information on reducing drug-related harms, counselling, referral to drug treatment, medical care, legal support and other social services.

Many clients who access NSPs have never been in contact with these services, making NSPs an important first point of contact between PWID and health and social service. NSPs are therefore invaluable in providing opportunities for early uptake of drug treatment and increased access to BBV treatment education.<sup>1</sup> In addition, the provision of condoms and safer sex education by NSPs addresses the potential for transmission of HIV and Hepatitis B infection via sexual contact, and the transmission of other sexually transmitted infections.

There are now more than 3000 NSP sites operating in Australia and include:

**Primary NSPs:** Dedicated to the provision of a wide range of sterile injecting equipment to PWID. Primary NSPs also provide information, education and referrals relating IDU and health; they may also advocate on behalf of IDUs, liaising with stakeholders such as local government, police, legal and criminal justice service providers.

**Secondary NSPs:** Operate within existing health or community services but are not directly funded to deliver NSP services. Such services may include Hospital Emergency Departments or health clinics, where staff provide NSP services in addition to their primary roles.

**Pharmacy NSPs:** Retail pharmacies that distribute injecting equipment on a commercial basis, selling *Fitpacks*\* and/or individual needle/syringes. Pharmacies account for around 15% of syringes used for injecting drugs and are a critical component of NSP service delivery in Australia.

NSP services are usually provided through fixed-sites, such as from a designated building within identified operating hours. Some States/Territories provide an outreach/mobile service which operate from vehicles or use a 'foot outreach' model. Additionally, over half of Australian States/Territories provide Syringe

Vending Machines (SVMs), which are nondescript machines that do not advertise their contents, and provide 24-hour access to sterile injecting equipment for a small fee.

### NT NSPs

NSPs have been operating in the NT since 1989. There are 26 NSPs in the NT, including:

- 3 Primary NSPs operated by the NT AIDS & Hepatitis Council (NTAHC) - funded by Commonwealth & Territory Governments – in Darwin, Palmerston, and Alice Springs;
- 10 Secondary NSPs operated by the Centre for Disease Control/Clinic 34 in Darwin, Alice Springs, Katherine, Nhulunbuy, Tennant Creek and Hospital Emergency Departments in Alice Springs, Katherine, Nhulunbuy and Tennant Creek;
- 13 Pharmacy NSPs, primarily in the Darwin Region but also in Alice Springs, Katherine and Nhulunbuy.

The number of needles and syringes distributed in the NT is relatively small compared to other jurisdictions and has remained steady over the last decade. In Australia in 2008, approximately 31 million needles and syringes were distributed. The NT distributes an average of 382,286 syringes per year. The majority of these syringes are distributed in the Darwin Region. In the year from July 2008 to June 2009, 91.0% syringes were distributed in the Darwin Region (including just over 1/3 of these in the Palmerston area); 6.4% in Alice Springs; 2.8% in Katherine; 0.2% in Nhulunbuy; and 0.6% in Tennant Creek.

Approximately 14 % of clients who access NSPs in the NT are of Aboriginal or Torres Strait Islander background, reflecting an under-representation in this group who make up 30% of the NT population.

### Effectiveness of NSPs

The dispensing of needles and syringes to people injecting illegal drugs has always been a divisive issue. Today there continues to be opposition and concern about NSPs; however, there is increasing evidence that NSPs are an effective public health measure in reducing the harms associated with IDU.

\* FITPACKS are ready made packs, which contain needle/syringes, alcohol swabs, sterile water for injection, and a disposal container.

### **‘Return on Investment 1’ (1991 – 2002)**

The cost-effectiveness of NSPs has been considered in a number of publications including the ‘Return on Investment’ report. This study sought to analyse the effectiveness of NSPs in preventing HIV and HCV in Australia over the 10 year period from 1991 to 2000.

The study estimated that due to the introduction of NSPs in Australia from 1991-2000:

- 25,000 HIV infections were prevented.
- 21,000 HCV infections were prevented (of which, 16,000 would have developed chronic HCV) by the year 2000.

The Australian Government invested \$130 million in NSPs between 1991 and 2000. It was estimated that the savings to the health system in avoided treatment costs over a lifetime was between \$2.4 and \$7.7 billion.<sup>8</sup>

### **‘Return on Investment 2’ (2000 – 2009)**

The ‘Return on Investment 2’ (ROI2) study sought to analyse the effectiveness of NSPs in preventing HIV and HCV in Australia over the 10 year period from 2000 to 2009. As well as estimate the population benefits of NSPs on HIV and HCV related outcomes among IDUs, this study sought to explore changes in the provision of NSPs, populations at-risk, and sharing behaviour on these outcomes. The study also sought to calculate the net value, future values and cost-effectiveness of NSPs in terms of HIV and HCV infections averted from a health sector (government as third party payer) perspective.

An epidemiological transmission model for HIV and HCV was applied to PWID and NSPs in Australia. The model estimated that due to NSPs being implemented over the 10 year period 2000-2009:

- ~32,050 HIV infections were prevented and
- ~96,667 HCV infections were prevented.

The cumulative incidence of other disease outcomes, such as the number of cirrhosis cases, has also decreased substantially due to NSPs. When secondary transmissions (sexual or mother-to-child transmission from infected IDUs) are considered, the epidemiological benefits are even greater.

The modelling suggests the potentially high prevalence of HIV and HCV among PWID that would have resulted were NSPs not in place as:

- HIV prevalence: 0.1% with NSPs vs, 14.0% without NSPs and
- HCV prevalence: 65.1% with NSPs; vs, 87.1% without NSPs.

During 2000-2009, gross funding for NSP services was \$243 million. The report states that this investment yielded:

- Healthcare cost savings of \$1.28 billion.
- Approximately 140,000 Disability Adjusted Life Years (DALYs<sup>§</sup>) gained.
- Net financial cost-saving of \$1.03 billion.

The ROI2 found that for every \$1(Aus) invested in NSPs, more than \$4 (Aus) were returned (additional to the investment) in healthcare cost-savings in the short-term (10 years) if only direct costs are included; greater returns are expected over longer time horizons.<sup>1</sup> The ROI2 also found that NSPs are very cost-effective compared to other common public health interventions, such as vaccinations, allied health, lifestyle, and in-patient interventions, and interventions addressing diabetes and impaired glucose tolerance or alcohol and drug dependence.<sup>9</sup>

It is important to note that the ROI2 report is based on the effectiveness of NSPs in averting HIV and HCV infections among PWID only and not on the many other benefits of NSPs, such as avoided mental health episodes and injecting related injury, psychosocial benefits, other support, referral, education and prevention etc. Thus while costs of NSPs in the ROI2 analysis included some other services, the results are likely to be conservative estimates of the true return on investment.

### **Northern Territory**

The epidemiological transmission model for HIV and HCV was applied to IDUs and NSPs specifically in the NT. The model estimated that over the last 10 years:

- On average, less than one HIV infection would be expected due to syringe sharing by PWID even without NSPs.

§ DALYs = Disability Adjusted Life Years: The sum of years of potential life lost due to premature mortality and the years of productive life lost due to disability.

- 483 new HCV infections have been averted.

Thus, whilst NSPs are currently not preventing HIV infections in the NT, NSPs are effective at averting HCV transmissions. As for other States and Territories, the ROI2 found that majority of the NSP cost savings were associated with HCV-related outcomes.

The economic evaluation of NSPs in the NT indicated that the spending of \$5.2m in funding from 2000-2009 has resulted in a saving of \$4.2m in healthcare costs. NSPs were found to be cost-effective in the NT and, over the longer term, NSPs were found to be highly cost-saving in all jurisdictions, including the NT.

### Conclusion

While NSPs enjoy strong public support in Australia there continues to be a number of enduring criticisms or objections, including that programs are responsible for discarded injecting equipment in a local area and that NSPs condone drug use. Much of this fear stems from the fact that the general public has been and remains poorly informed about the nature of drug use, drug dependence, and the great difficulty individuals have in ceasing their drug use.<sup>5</sup> Research has shown that NSPs do not increase IDU or the number of needles and syringes discarded in public places.<sup>10</sup> There have been no published cases of BBV transmission following community needle stick injury in Australia and studies have shown that the risk of BBVs transmission from syringes discarded in community settings appears to be very low.<sup>11</sup>

Evidence from studies such as the ROI2 contribute important evidence about the benefits and effectiveness of NSPs as an important public health intervention for individuals and the community. Certainly NSPs have come a long since they were endorsed through policy in Australia in 1987. As found in the ROI2, however, there is a clear indication that significant public health benefits can be attained with further expansion and diversification of sterile injecting equipment distribution.

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## Newly diagnosed HIV infection in the Northern Territory, 2003 - 2009

*Nathan Ryder, Sexual Health and Blood Borne Virus Unit, CDC, Darwin*

### Abstract

#### **Introduction**

Recent Australian and Northern Territory (NT) reports have highlighted an increase in the number of heterosexually acquired cases of HIV. This report analysed data from HIV notifications in the NT in order to describe risk factors, disease stage and testing location of recent newly diagnosed HIV infections.

#### **Method**

Data was extracted from the Sexual Health and Blood Borne Virus (SHBBV) unit database for all newly diagnosed cases of HIV in the NT from 2003 - 2009. For each case the HIV risk factors including country of origin, sex with a partner from overseas, CD4+ cell count, clinical symptoms of late disease at diagnosis, place of testing and country of residence during the 3 months preceding diagnosis was extracted.

#### **Results**

From 2003 - 2009 there were 64 newly diagnosed HIV cases in the NT. Men who have sex with men (MSM) accounted for 24 (38%) of cases, heterosexuals 37 (58%) and injecting drug users (IDU) 2 (3%). The majority of heterosexual cases (28:74%) were associated with a sexual partner from a high prevalence country. Late diagnosis was more likely in heterosexual or IDU acquired cases. A large proportion of cases were diagnosed in the primary health care and hospital setting.

#### **Conclusion**

While heterosexual acquisition accounts for the greatest proportion of HIV cases in the NT, overall the majority of cases were associated with the traditional risk factors of MSM and sex with a partner from a country with high HIV prevalence. Continued efforts to encourage HIV testing and condom use in these risk groups are needed to prevent HIV transmission and late presentation.

**Key words:** HIV; Northern Territory; epidemiology

### Introduction

While HIV infection in Australia remains predominantly among men who have sex with men (MSM), all States/Territories have reported a large increase in the proportion attributed to origin in a high-prevalence country. Recent reports from the Northern Territory (NT) have highlighted a series of cases attributed to heterosexual contact while travelling outside Australia. In order to guide HIV prevention programs an understanding of current local testing rates, risk behaviours and incidence is required. This paper aims to describe risk factors, disease stage and testing location of recent, newly diagnosed, HIV infections in the NT.

### Method

Data was extracted from the Sexual Health and Blood Borne Virus (SHBBV) unit internal database of HIV notifications. All newly diagnosed cases of HIV from 2003-2009 were included. Cases prior to 2003 were excluded due to incomplete data. Exposure category was defined as either MSM, injecting drug use (IDU) or heterosexual contact. The heterosexual contact category was further divided into persons from a high-prevalence country, those having a regular sexual partner from a high-prevalence country, and those who probably became infected while travelling outside Australia. Additional variables were CD4+ cell count, clinical symptoms of late disease at diagnosis, place of testing and country of residence during the 3 months preceding diagnosis. As a measure of late diagnosis the proportion of those presenting with a CD4+ cell count less than 200 was calculated. For heterosexual cases, additional data was obtained from the medical records where the exposure category was unclear in the database.

### Results

From 2003 - 2009 there were 64 cases of newly diagnosed HIV infection in the NT. MSM accounted for 24 (38%) of cases, injecting drug

users 2 (3%) and heterosexuals with no other risk 37 (58%). There was no information on exposure details for 1 case. Among the heterosexual cases, people originating from a high prevalence country accounted for 18 (49%) of the cases with an additional 6 (16%) reporting an ongoing sexual relationship with a person from a high prevalence country. Among all 64 cases sexual contact while travelling overseas was reported by 5 people (8%), 3 in a high prevalence country (Thailand) and 2 people reported sex in other countries (Indonesia and Nepal). Of these 5 people 4 reported engaging in heterosexual commercial sex. There were no identifiable risk factors reported in 5 people (8%), although 2 were from East Timor where the HIV prevalence is unclear.

The average CD4+ cell count at diagnosis was 424. The CD4 count among MSM was 543 compared to 325 in heterosexuals. Overall 15 people (31%) were diagnosed with a low CD4+ count (less than 200). Of the 15 people diagnosed with a low CD4+ cell count 9 (60%) were tested following presentation with symptoms of advanced HIV immunosuppression and 9 (60%) were either MSM or from high-prevalence countries. Of the 15 late diagnoses 12 were resident in Australia for at least 3 months prior to their diagnosis.

The location of testing was the NT SHBBV Clinic 34 in 25 cases (39%), general practice in 13 cases (20%), hospitals in 21 cases (33%), Health Services Australia in 4 cases (6.3%) and corrective services in 1 case (1.6%).

## **Discussion**

The NT recorded higher statistics of newly diagnosed HIV infections from heterosexual transmission (58%) when compared to the national statistics (21%).<sup>1</sup> The proportion of NT infections among MSM is much lower while that due to IDU remains low in both the NT and the rest of Australia.

The relative distribution of exposure categories in known cases does not necessarily correlate with prevalence in the underlying population groups. Data from the Australian Study of Health and Relationships (ASHR) has found that, compared to Australia as a whole, men in the NT are only half as likely to identify as

homosexual or report sex with another man.<sup>2,3</sup> Additionally, the prevalence of HIV is lower among MSM living outside the major Australia cities.<sup>4</sup> However, there is a very high HIV testing rate in urban Australia, with 68% of MSM in Sydney being tested within the past year according to a periodic survey; this rate is unknown in the NT. Despite the uncertainty introduced by an unknown rate of testing, it is very likely HIV diagnoses in MSM in the NT would be at least half the Australia national rate. It is likely that the higher proportion of heterosexual transmission of HIV in the NT is due to the fewer MSM cases.

Using data from the ASHR and the census to estimate the size of the MSM and heterosexual population in the NT, the incidence of HIV among heterosexuals and MSM over the period can be estimated. Given the proportion of men in the NT who identify as MSM is 0.9%, the incidence of HIV over the study period was 3.7%, compared to 0.2% among the general population. Despite MSM contributing to a lower proportion of newly diagnosed HIV cases in the NT they remain at a far greater risk of infection.

Overall the pattern of heterosexually acquired cases was similar between the NT and national figures. In both the NT and nationally, the majority of heterosexually acquired cases were in people either originating in a country with a high HIV prevalence, or reporting sexual contact with a person from a high prevalence country. In the NT ongoing sexual relationships accounted for 6 of 10 transmissions related to partners from high prevalence countries. Three of the remaining 4 transmissions related to commercial sex in South East Asia. This suggests the vast majority of heterosexual cases could be identified through a continued focus on recognition of high prevalence country of birth in clients and their sexual partners by general practitioners, and subsequent offer of testing regardless of perceived sexual risk behaviours, as is recommended in the National HIV testing policy.<sup>5</sup> Targeted promotion of HIV testing among people returning from high prevalence countries, or engaging in commercial sex outside Australia, would be a useful strategy.

A late diagnosis of HIV was more likely for IDU and heterosexual acquisition in the NT,

which is consistent with national statistics.<sup>1</sup> There are 2 factors likely to be responsible for this, a lower testing rate and migration to Australia of people with advanced HIV. Many of the late diagnoses were in people who had been Australian residents for at least 3 months. It is possible that improved recognition of risk factors and more frequent testing by primary health care workers could lead to earlier diagnoses. Earlier diagnosis is associated with improved clinical outcomes and reduced transmission.

Similar to national trends, the NT had a large proportion of HIV diagnoses made in the primary health care or hospital settings. Recognition of this should lead to efforts to further improve the capacity of these providers to test appropriately, improve support to deal with positive results, and ensure campaigns promoting testing are appropriate for these services.

The proportion of cases with an unknown exposure category is much lower in the NT than nationally. This achievement reflects the availability of centralised skilled and intensive follow-up of all newly diagnosed cases by the CDC SHBBV Unit. The dataset is limited however by not systematically recording the country of origin of sexual partners.

In conclusion, while heterosexual acquisition accounts for a higher proportion of HIV cases in the NT, the priority groups for HIV testing and prevention remain similar to the national picture. Strategies to build on the successes of existing programs should include continued recognition by primary health care providers of known risk

factors, such as MSM and sex in a high prevalence country. Secondly, there is a need to increase understanding of the HIV prevalence, testing rates and sexual behaviours of MSM in the NT, including those not identifying as homosexual. Finally, targeted promotion of safer sex and HIV testing to people having sex, especially commercial sex, while travelling in high prevalence countries is recommended.

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## Are you feeling “Lousy”?

*Keith Edwards, Community Paediatrician, CDC, Darwin*

Head lice continue to be a frustrating problem for Northern Territory (NT) schoolchildren. The current recommended treatment and control measures are summarised in the NT Centre for Disease Control *Nits? Not! The Northern Territory Head Lice Action Pack*<sup>1</sup> distributed to schools through the NT Department of Education and available on <http://digitallibrary.health.nt.gov.au/dspace/handle/10137/451> web address or PROMPT.

Resistance to the topical pediculicides malathion, permethrin, phenothrin and carbaryl results in treatment failure in most cases and wet-combing with conditioner remains the recommended most effective treatment available, although it is labour intensive. In addition there are ongoing concerns about toxicity from repeated use of pediculicides that have a neurotoxic mode of action.

A relatively new topical preparation, dimeticone, has been shown to be effective in producing cures at rates of 69-97% in reasonably conducted clinical trials. This preparation is thought to work by suffocating the lice and is entirely non-toxic to humans.

Some oral preparations, including albendazole and ivermectin have been shown to be effective and the regular use of albendazole in the current under 5 year olds program in the Top-End of the NT has probably had a positive impact on the incidence of head-lice in Indigenous children. ivermectin, although effective, is currently not approved for children in Australia and requires further study..

Hot air from various hair dryer devices has also been shown to have some promise at not only killing live lice but also the eggs (nits). The *Nits? Not! The Northern Territory Head Lice Action Pack*<sup>1</sup> is being revised in light of the current evidence relating to effectiveness and safety<sup>2</sup> and will be published in the next edition of this *Bulletin*.

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Centre for Disease Control

August 2010

## Dengue Fever

### What is dengue fever?

Dengue fever is a viral illness caused by infection with 1 of 4 types of the dengue virus. When a person recovers from dengue infection they develop a long-term (not always lifetime) immunity to that type, but not the other 3 types. If the person is infected again with a different virus type, they may develop the more severe form of the illness known as dengue haemorrhagic fever (DHF).

### How is it spread?

It is spread by the bite of an infected dengue mosquito (usually the *Aedes aegypti* species). There is no spread from human to human.

### Where and when is it found?

Dengue fever occurs in tropical and sub-tropical areas of the world, including north Queensland. Although the mosquito capable of spreading dengue is found in Queensland as far south as Roma in the inland and Gladstone on the coast, and as far west as Mt Isa, the area at particular risk for acquiring dengue is coastal to sub coastal Queensland north of Bowen.

*Aedes aegypti* mosquitoes have not been established in the Northern Territory (NT) for over 80 years.

The mosquito is imported periodically into Darwin on overseas vessels such as foreign fishing vessels and cargo ships, but has been detected and eliminated each time. Dengue mosquitoes were imported into Tennant Creek from Queensland in 2004 and eradicated by March 2006 and on Groote Eylandt in 2006 and eradicated by 2008. Surveys continue in the NT to ensure early detection and identification of any importation of the dengue mosquito.

For the past 80 years all persons notified with dengue fever in the NT have been interviewed to confirm that the disease was acquired in known dengue endemic areas overseas or in north Queensland. Over the last 10 years the NT has notified between 15 and 45 cases of imported dengue with Indonesia and East Timor being the countries most represented as places of acquisition.

In July 2010 an isolated case of dengue fever was diagnosed in a man in the Darwin area. Mosquito surveys did not identify any mosquitoes capable of transmitting dengue in the area where the man lived

or visited during the time he would have acquired the disease. Therefore it is assumed to be a one-off case with the most likely source being an isolated importation of an infected mosquito from an endemic area. Without mosquitoes capable of transmitting dengue being established in the NT the risk of further cases is thought to be exceedingly low. Mosquito surveys by the Department of Health and Families continue to ensure that knowledge about the presence of any exotic mosquito population remains current.

### What are the symptoms?

It usually takes 3 to 14 days (commonly 4-7 days) between getting bitten by a dengue virus infected mosquito and becoming sick.

#### *Dengue fever*

Dengue fever is more commonly seen in older children and adults. It is characterised by abrupt onset of high fever lasting 3-7 days, severe frontal headache, pain behind the eyes and muscle and joint pains. Other symptoms may include loss of appetite, nausea, vomiting and diarrhoea, a blanching rash and sometimes minor bleeding (eg from nose and gums).

The acute symptoms of dengue fever last up to 10 days. Some people may experience repeated episodes of fever.

Full recovery may be slow and associated with weakness and depression. It is rarely fatal.

#### *Dengue haemorrhagic fever*

DHF is most commonly seen in children under 15 years of age but can also occur in adults. It begins with the same symptoms as dengue fever but is followed by rapid deterioration, bleeding and cardiovascular collapse 2-5 days later.

The duration of DHF depends on the severity of the illness and response to treatment. It can be fatal.

### What is the treatment?

There is no specific treatment or vaccine. Supportive treatment includes plenty of oral fluids and paracetamol for relief of fever and body aches and pains. Aspirin and non-steroidal anti-inflammatory drugs should not be used as they can affect blood clotting. Anyone with DHF should be hospitalised for fluid replacement and observation.

## Things to know about dengue mosquitoes

Only the female mosquito transmits the virus. They are most active during daylight hours. They rest indoors in closets, behind curtains and other dark places. Outdoors they rest where it is cool and shaded.

Breeding sites are mainly around the home in containers that can hold water. The mosquito rarely flies more than 200 metres from its breeding site. They do not breed in dirt pools on the ground, swamps or dirt storm water drains.

The eggs of the mosquito capable of transmitting dengue are drought resistant and can last over 12 months in receptacles that have previously held water. The carriage of pot plant saucers, old tyres and any formerly rain filled receptacles from north Queensland, where dengue mosquitoes exist, could introduce the mosquito to the NT.

## How to avoid getting dengue fever

Be aware of countries or areas where dengue fever is endemic. In our region dengue fever is well established in southern Cambodia, China, Indonesia, Laos, Malaysia, Myanmar, Papua New Guinea, the Philippines, Thailand, Timor Leste and Vietnam. Make sure to take appropriate clothing and insect repellent to these areas when travelling.

### Residual spray

Barrier sprays such as outdoor barrier surface spray or similar can be purchased from supermarkets or applied by pest companies to kill adult mosquitoes harboured in or near the house. This is a residual surface treatment for use in dark sheltered areas or dark objects inside houses such as behind wardrobes or cupboards, under tables and chairs, and behind or on curtains. It can be sprayed on outdoor dark sheltered surfaces close to a house such as under wash troughs, in accumulations of rubbish or equipment, and in corners on verandahs. Precautions on any treatment should be read before application.

### Personal Protective Measures

- avoid areas of likely mosquito activity
- wear loose light coloured clothing with long sleeves, trousers and socks
- use repellents containing di-ethyl-toluamide (DEET) or picaridin as supplements to protective clothing
- ensure flyscreens in houses, caravans and tents are in good repair
- use mosquito coils and electric insecticide vapour mats or mosquito lanterns in enclosed or sheltered areas.

## How to prevent dengue fever from being established in the NT?

### Avoid importing or spreading mosquitoes

Spray any container or receptacle that has previously held water in north Queensland with a residual surface spray insecticide, or wipe thoroughly with a strong bleach or chlorine solution. Do not spray current eating or drinking utensils.

### Eliminate potential breeding sites

- Empty and apply surface spray to any old unused container that has held water eg tyres, plastic containers, black sheet plastic or pot plant drip trays. Store any containers upside down and undercover or under a domed tarpaulin in good repair.
- Avoid using saucers or drip trays under pot plants. Let pots drain directly onto the ground or make sure saucers are emptied at least once/week. Wipe their inner surface firmly with a cloth several times or fill with sand, or apply surface spray or methoprene insecticide pellets.
- Empty bird baths and pet drinking water at least weekly and wipe as above, or use methoprene pellets.
- Cover and completely seal septic tanks, rainwater tanks or other large water storage containers. Use methoprene briquettes in unsealed tanks as a temporary measure.
- Dispose of rubbish around the yard that may collect water eg plastic sheets or old tarpaulins, pot plant holders, old wheelbarrows, old tyres, and plastic containers of any type.
- Ensure roof gutters drain freely so that pools of water are not left at any low points. Throw a small amount of methoprene pellets on to the roof above problem gutters.
- Fishponds with fish do not breed mosquitoes. Tadpoles do not eat mosquito larvae. Keep fishponds and frog ponds stocked with fish and do not spray surface spray onto or at the edge of fishponds.

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

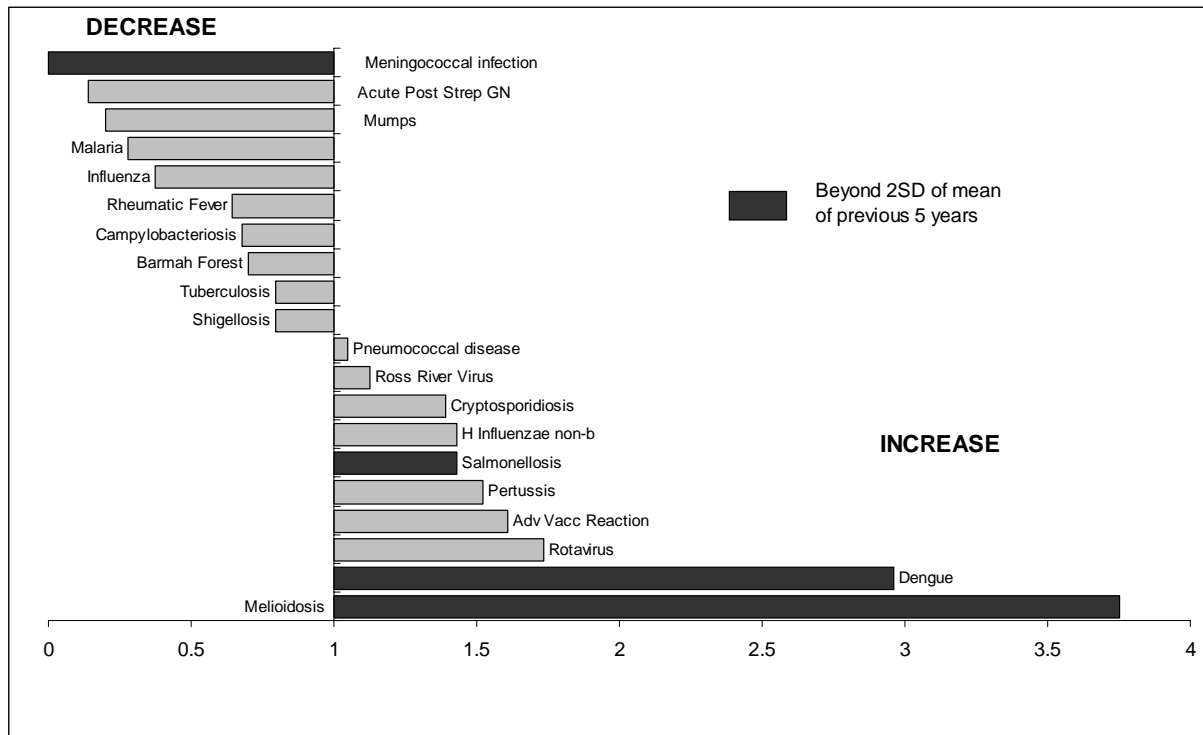
Darwin	8922 8044
Katherine	8973 9049
Tennant Creek	8962 4259
Alice Springs	8951 7540
Nhulunbuy	8987 0357

For more information on mosquitoes and virus ecology contact CDC, Medical Entomology on 8922 8901  
Further fact sheets and treatment protocols available at [www.nt.gov.au/health/cdc](http://www.nt.gov.au/health/cdc)

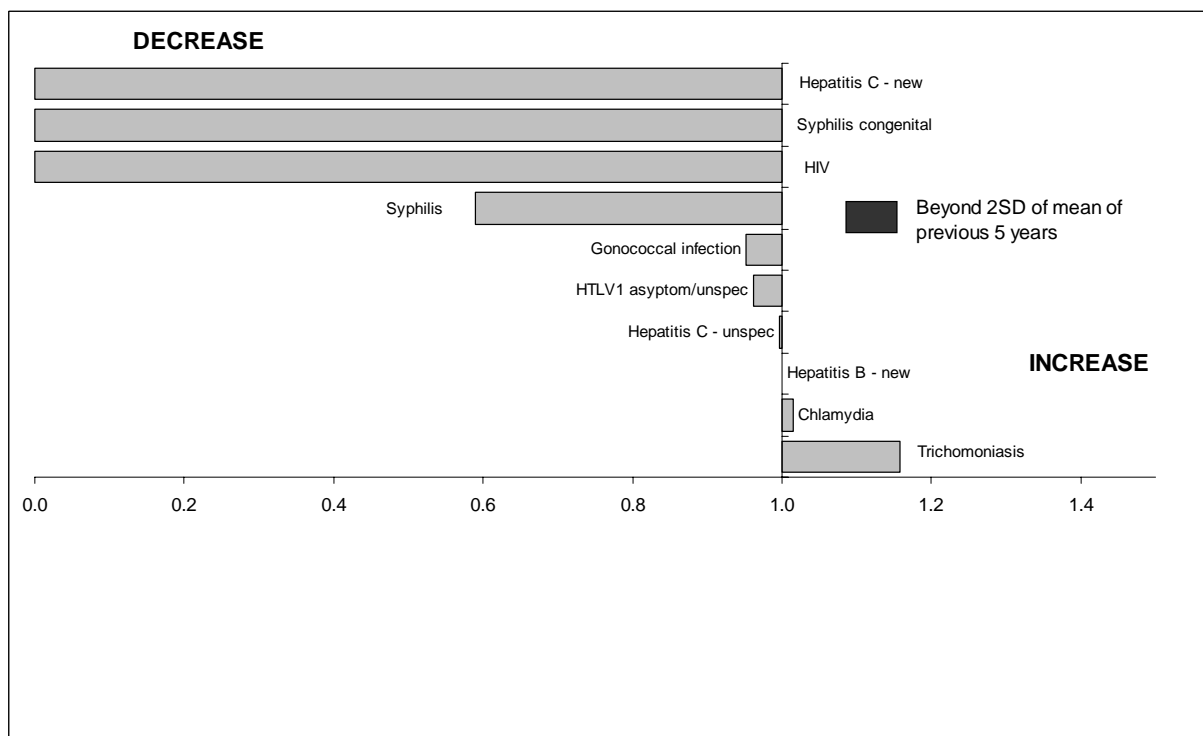
**NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS**  
**1 April—30 June 2010 & 2009**

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		NT	
	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009
Acute Post Strep glomerulonephritis	0	1	0	0	1	5	1	6	0	1	2	13
Adverse vaccine Reaction	6	0	0	1	11	6	0	3	0	0	17	10
Arbovirus not otherwise specified	0	0	0	0	0	1	0	0	0	0	0	1
Barmah Forest	0	4	1	0	15	23	4	3	0	4	20	34
Campylobacteriosis	14	20	1	3	29	37	0	0	6	7	50	67
Chickenpox	0	0	0	0	12	16	3	5	2	6	17	27
Chlamydia	179	315	10	14	315	251	50	38	77	54	631	672
Chlamydial conjunctivitis	3	61	2	5	6	1	0	0	0	1	11	68
Cryptosporidiosis	16	9	2	0	10	29	3	2	6	5	37	45
Dengue	0	0	0	0	12	10	1	1	3	0	16	11
Food/water borne disease	5	0	0	0	0	0	0	0	0	0	5	0
Gastroenteritis - related cases	0	0	0	0	4	0	0	0	1	0	5	0
Gonococcal conjunctivitis	0	1	0	0	0	0	0	0	0	0	0	1
Gonococcal infection	311	321	18	14	86	63	25	28	58	71	498	497
Hepatitis A	0	1	0	0	0	0	0	0	0	0	0	1
Hepatitis B - chronic	16	9	1	0	10	9	13	20	6	5	46	43
Hepatitis B - new	0	0	0	0	2	0	1	0	0	0	3	0
Hepatitis B - unspecified	11	14	2	3	22	14	0	1	6	7	41	39
Hepatitis C - new	0	0	0	0	0	1	0	0	0	1	0	2
Hepatitis C - unspecified	5	8	2	2	41	39	1	0	6	0	55	49
<i>H Influenzae non-b</i>	4	1	0	0	0	1	0	0	0	0	4	2
HIV	0	0	0	0	0	6	0	0	0	0	0	6
HTLV1 asymptomatic/unspecified	20	9	0	0	0	0	0	0	0	0	20	9
Influenza	2	238	0	1	4	260	40	12	0	67	46	578
Kunjin Virus	0	0	0	0	1	0	0	0	0	0	1	0
Malaria	0	0	0	0	3	4	0	1	0	0	3	5
Melioidosis	0	0	0	0	20	4	3	0	1	0	24	4
Meningococcal infection	0	1	0	0	0	1	0	0	0	0	0	2
Mumps	0	0	0	0	0	1	0	0	1	0	1	1
Murray Valley Encephalitis	0	0	0	0	0	1	0	0	0	0	0	1
Pertussis	54	4	1	0	19	57	0	4	3	4	77	69
Pneumococcal disease	9	11	2	1	6	8	0	0	1	2	18	22
Rheumatic Fever	0	8	0	0	1	0	1	0	4	5	6	13
Ross River Virus	11	11	0	3	45	84	3	3	7	5	66	106
Rotavirus	98	30	16	0	62	65	8	11	33	23	217	129
Salmonellosis	31	22	2	10	118	98	11	10	15	19	177	159
Shigellosis	10	13	5	2	7	1	3	4	3	1	28	21
Syphilis	20	14	2	1	16	26	3	1	4	5	45	47
Trichomoniasis	156	175	29	15	143	132	77	70	125	76	530	468
Tuberculosis	0	1	0	0	6	5	0	0	1	0	7	6
Typhoid	0	0	0	0	1	0	0	0	0	0	1	0
Varicella unspecified	0	1	0	0	1	0	2	0	0	0	3	1
Yersiniosis	0	0	0	0	0	2	0	0	0	0	0	2
Zoster	12	5	1	0	24	23	2	1	1	2	40	31
<b>Total</b>	<b>993</b>	<b>1,308</b>	<b>97</b>	<b>75</b>	<b>1,053</b>	<b>1,284</b>	<b>255</b>	<b>224</b>	<b>370</b>	<b>371</b>	<b>2768</b>	<b>3262</b>

**Ratio of the number of notifications (in second quarter 2010 cases to the mean 2005-09): selected diseases**



**Ratio of the number of notifications (in second quarter 2010 cases to the mean 2005-09): sexually transmitted infections and other blood borne viruses**



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## Comments on notifications p 34

### Meningococcal infection

There were no cases of meningococcal disease in either of the first 2 quarters of 2010 whereas we would normally expect about 2 cases per quarter. This is the first time since 1993 that there have been 2 consecutive quarters without a case. The majority of cases in the NT are due to *Neisseria meningitidis* group B, therefore the vaccination program, which is targeted against group C is not likely to explain the fall in case numbers.

### Salmonellosis

Salmonellosis notifications this quarter were greater than expected (177 vs 124 expected). Most cases were sporadic with no common source. There was a small cluster of *Salmonellosis* Virchow PT8 cases investigated in June, but no common source was found. There were no *Salmonella* outbreaks detected in the second quarter of 2010.

### Dengue

There were 16 cases of dengue in the second quarter compared with an expected 5 cases. While this was less than the previous quarter (23 cases), the cases this year continue to be high. The majority of cases were acquired in Indonesia (9) and East Timor (4) where there have been recent outbreaks of dengue fever.

### Melioidosis

During the 2009-10 wet season there was a record number of melioidosis cases notified and this trend continued through the second quarter of 2010, with 24 cases notified compared to an expected 6 cases. Some of this increase might be due to late wet season rainfall but a more detailed investigation into the 2009-10 figures is being undertaken.

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### Immunisation coverage for children aged 12-<15 months at 30 June

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Fully vaccinated
Darwin	278	92.8%	92.8%	95.0%	95.0%	91.4%
Winnellie PO Bag	100	96.0%	96.0%	100.0%	100.0%	96.0%
Palmerston/Rural	220	89.1%	89.1%	90.9%	90.9%	87.3%
Katherine	128	91.4%	91.4%	93.0%	93.0%	91.4%
Barkly	15	73.3%	73.3%	86.7%	86.7%	73.3%
Alice Springs	109	89.9%	89.9%	89.9%	89.9%	87.2%
Alice Springs PO Bag	63	93.7%	93.7%	93.7%	93.7%	90.5%
East Arnhem	62	93.5%	93.5%	95.2%	95.2%	93.5%
NT	975	91.6%	91.6%	93.5%	93.5%	90.3%
NT Indigenous	416	88.2%	88.2%	91.1%	91.1%	87.3%
NT Non-Indigenous	559	94.1%	94.1%	95.3%	95.3%	92.5%
Australia Indigenous	3,400	84.9%	84.9%	85.0%	85.0%	84.5%
Australia Non-Indigenous	69,733	92.3%	92.3%	92.2%	92.2%	91.8%
Australia Total	73,133	92.0%	92.0%	91.8%	91.8%	91.5%

### Immunisation coverage for children aged 24-<27 months at 30 June

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	%MMR	% Fully vaccinated
Darwin	276	96.4%	96.4%	93.5%	95.7%	94.6%	92.0%
Winnellie PO Bag	93	98.9%	98.9%	97.8%	98.9%	96.8%	96.8%
Palmerston/Rural	240	97.1%	97.1%	94.6%	96.3%	96.7%	93.8%
Katherine	111	97.3%	96.4%	96.4%	96.4%	96.4%	95.5%
Barkly	21	95.2%	95.2%	90.5%	95.2%	90.5%	90.5%
Alice Springs	117	92.3%	92.3%	88.9%	91.5%	88.0%	86.3%
Alice Springs PO Bag	62	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
East Arnhem	52	98.1%	98.1%	98.1%	98.1%	98.1%	98.1%
NT	972	96.7%	96.6%	94.5%	96.1%	95.2%	93.4%
NT Indigenous	403	97.8%	97.8%	94.8%	97.8%	97.0%	94.8%
NT Non-Indigenous	569	96.0%	95.8%	94.4%	94.9%	93.8%	92.4%
Australia Indigenous	3,625	94.6%	94.6%	92.8%	94.5%	94.6%	90.6%
Australia Non-Indigenous	71,235	94.9%	94.8%	94.8%	94.3%	93.9%	92.5%
Australia Total	74,860	94.9%	94.8%	94.7%	94.3%	93.9%	92.4%

### Immunisation coverage for children aged 60-<63 months at 30 June

Region	Number in District	% DTP	% Polio	%MMR	% Fully vaccinated
Darwin	227	80.6%	80.6%	79.7%	78.9%
Winnellie PO Bag	101	95.0%	95.0%	95.0%	95.0%
Palmerston/Rural	195	87.2%	87.2%	87.7%	87.2%
Katherine	100	96.0%	96.0%	96.0%	96.0%
Barkly	26	96.2%	96.2%	96.2%	96.2%
Alice Springs	116	86.2%	86.2%	85.3%	85.3%
Alice Springs PO Bag	60	90.0%	90.0%	88.3%	88.3%
East Arnhem	44	93.2%	93.2%	93.2%	93.2%
NT	869	88.0%	88.0%	87.7%	87.3%
NT Indigenous	408	90.7%	90.7%	90.2%	90.0%
NT Non-Indigenous	461	85.7%	85.7%	85.5%	85.0%
Australia Indigenous	3,153	86.1%	86.2%	86.4%	85.7%
Australia Non-Indigenous	66,086	90.4%	90.3%	90.1%	89.7%
Australia Total	69,239	90.2%	90.1%	89.9%	89.6%

## Immunisation Coverage 30 June 2010

*Charles Roberts, Coordinator of NT Immunisation Register, CDC, Darwin*

Immunisation coverage rates for NT children by regions based on Medicare address postcode as estimated by the Australian Childhood Immunisation Register are shown on page 34.

### ***Background information to interpret coverage***

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

The cohort of children assessed at 12 to <15 months of age on 30 Jun 2010 were born between 1 Jan 2009 and 31 Mar 2009 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 2 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) (latest doses due at 6 months of age). All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to <27 months of age on 30 Jun 2010 were born between 1 Jan 2008 and 31 Mar 2008 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 3 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 2 doses of hepatitis B vaccine (not including the birth dose) and 1 dose of measles, mumps, rubella vaccine (latest doses due at 12 months of age). All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to <63 months of age on 30 Jun 2010 were born between 1 Jan 2005 and 31 Mar 2005 inclusive. To be considered fully vaccinated, these children must have received 4 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of measles, mumps, rubella vaccine (latest doses due at 4 years of age). All vaccinations must have been administered by 60 months (5 years) of age.

### ***Interpretation***

Immunisation coverage in NT children was above the national average for the 24 to <27 months cohort and below the national average across the other cohorts.

Immunisation coverage in Indigenous children in the NT was higher across all cohorts compared to the national coverage of Indigenous children. Indigenous NT children had lower coverage than non-Indigenous NT children in the 12 to <15 months cohort and higher coverage than non-Indigenous NT children in the 24 to <27 months and 60 to <63 months cohorts.

Immunisation coverage for NT children as a whole at 12 to <15 months and 60 to <63 months remains lower than national average.

Please note that this quarter's coverage is the first time the children in the 60 to < 63 month age group have had the new national overdue rules applied – resulting in a 5.8% increase nationally from the previous coverage quarter in March 2010. These new rules specify that all children need to have completed the equivalent of the national Childhood Immunisation schedule by 4 years 1 month to be fully vaccinated.

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## Disease Control staff updates

### Darwin

**Tim Gray** an ID Registrar at RDH came in late July 2010 to work at CDC for 6 months. Within weeks however he became part of a civilian medical team to help flood affected communities in Pakistan's Punjab province. The team - drawn from health agencies in the Northern Territory, Western Australia, Queensland and Victoria - left on 31 August and returned on 1 October from Pakistan. The team included doctors, nurses, paramedics and support workers. We are very glad to have Tim back at CDC and will look forward to hearing of and learning from his experiences in Pakistan.

**Lesley Scott** commenced 3.5 months long service leave on 17 September.

**Lyn Barclay** will be working 4 days a week to act in Lesley Scott's Senior Research position and also help out in the TB/Leprosy unit as needed.

**Heather Cook** will assume responsibility for the on-call roster and will coordinate the orientation for new CDC staff in Lesley Scott's absence.

Farewell to **Christine Quirk**, Senior Policy and Coordination Officer who has taken up the position of Project Manager National Health Reforms, Office of the Chief Executive, Department of Health and Families.

**Justine Glover** has been recruited to the CDC Senior Policy and Coordination position and vacates the Safety and Injury Unit position. This position will be advertised.

### SHBBV Unit

**Autumn Goodall** commenced maternity leave for 1 year as of 22 September. Mark Ryan will be acting in her position as Urban Manager for this time and his position will not be backfilled.

**Kim Jackson** commenced maternity leave as of July 2010. **Kirsten Thompson** is acting as Hepatitis C CNC at Clinic 34 Darwin. There are 3 new employees at Clinic 34 Darwin – **Kate Allardice** (Public Health Nurse), **Marie Louise Walker** (Clinical Nurse) and **Roberta Smith** (Administration Assistant).

### Alice Springs

Farewell to **Pam Brook** (AO3) who has returned to Community Health after working at CDC for a year in the Swine Flu Clinic and the general administrative area.

**Kaylene Prince** has been reappointed as Immunisation Quality and Timeliness Nurse for 2 years.

### Immunisation

**Andre Wattiaux**, will be leaving at the end of December to take up a Paediatric Registrar position at Westmead Hospital. A temporary Head of Immunisation will be recruited.

**Ros Webby** has extended her maternity leave for another 6 months and will return to her position as Head of Immunisation in July 2011.

### CDC Alice Springs

**Charmaine Taylor** Tennant Creek Public Health Nurse left to go to Queensland after many years of service in Tennant Creek in DHF, the last 3 being with CDC.

**Debbie Heller** completed a year of enthusiastic work as a business manager at CDC and at the end of September returned to work at Remote Health.

**Carleigh Cowling** started as a Trachoma Nurse (N4) in August, coming to us from the Communicable Disease Control Branch in Adelaide, SA.

**Nicole Goulding** is taking a few weeks of ARL and then will be moving to Victoria. She has been in Alice Springs for many years working in several positions in CDC over the last few years. Most recently she served as the Public Health Nurse in Clinic 34.

### Medical Entomology

**Barbara Love**, Technical Officer, has secured a position with Pathology RDH where she now works. A replacement position has been advertised.

**Nadine Copley**, Technical Officer, will go on maternity leave in first week of November. Her replacement **Alex Roberts** will start training and hand over at Medical Entomology on 11 October.