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Firework-related injury survey report 2013

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Abstract

Background

The Northern Territory (NT) is the only jurisdiction in Australia that still permits the sale of fireworks without a permit. CDC has conducted an annual survey for the past 15 years of patients who present to acute care health facilities for fireworks-related injuries. The aim of the surveys is to monitor fireworks-related injury on Territory Day and provide feedback on the effectiveness of safety campaigns and regulation.

Methods

The survey included NT public hospitals, the Australian Defence Force and for the first time, the Palmerston General Practice Superclinic in Darwin. Data were collected on firework-related injuries between 30 June and 4 July 2013, including details of the time, place and circumstances surrounding the injury event and clinical information about the injury and its severity.

Results

There were 25 firework-related injuries in people aged between 2 and 56 years; 8 people required admission to hospital. Most injuries were moderate in nature, requiring 2 or more reviews by a health practitioner. Of the 14 people who consented to complete the survey and provide more detailed information 50% suffered injuries to their hand and the majority were bystanders.

Conclusion

A greater than average number of fire-work related injuries and hospital admissions occurred in 2013 in the survey period; however injury numbers fluctuate unpredictably from year to year. Most injuries were caused by misuse of fireworks. Campaigns to promote the safe use of fireworks need to continue. Future campaigns should investigate the use of social and digital media to deliver fireworks safety messages appropriate to the target younger population groups.

Keywords: Northern Territory, fireworks, Territory Day, injury, survey

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Introduction

On 1 day of the year – Territory Day (1 July) – anyone in the Northern Territory (NT) 18 years and older can purchase fireworks and ignite them from 6pm to 11pm. This day marks the anniversary of NT self-government and has traditionally been celebrated with fireworks. Since 2009, the NT is the only jurisdiction in Australia that still permits the sale and personal use of fireworks without a permit.

In 1998 the Centre for Diseases Control (CDC) started conducting annual surveys of patients who present to acute care health facilities for fireworks-related injuries. The aim of the surveys is to monitor the magnitude and trend of fireworks-related injury on Territory Day and thereby provide feedback on the effectiveness of safety campaigns and regulation. Data from these surveys over 14 years indicate that there is an average of 18 injuries annually and 3 hospitalisations.[1]

This year the CDC, in collaboration with NT WorkSafe and the NT Fire and Rescue Services, conducted a campaign on the safe use of fireworks. This involved disseminating educational information on how to use fireworks safely, children and pet safety and the emergency management of burns, eye injuries and lacerations. A poster and brochure were available on the Department of Health and the NT Fire and Rescue Service internet sites. These resources were also distributed to fireworks retail outlets, NT hospitals, urban community health clinics, government and non-government schools and fire stations. In addition, senior public health practitioners at the CDC gave several radio and television news interviews to reinforce safety messages in the days leading up to Territory Day.

Notably, this was the first Territory Day celebration since the recent election of the Country Liberal Party in the NT. In the weeks leading up to 1 July, the Chief Minister stated in the media that there was mounting public pressure to put an end to the tradition of 'cracker night' and warned Territorians that the government would consider banning private sales if people did not act responsibly.[2]

Previously the CDC has analysed comments and letters to the NT News regarding fireworks to explore the arguments put forward by the public either in favour of or against the personal use of fireworks.[3,4] The most recent of these analyses revealed that the main themes among those who expressed a negative opinion were 'irresponsible use' of fireworks and the use of fireworks outside of the designated times on Territory Day.[3] While fear for personal safety was also cited as a concern, this theme was less frequent.

Methods

The Emergency Departments of the 5 NT hospitals, the Australian Defence Force and for the first time, the Palmerston General Practice Superclinic, took part in the 2013 Fireworks Injury Survey. Surveys and consent forms together with information sheets for clinicians and patients were distributed to these health facilities to enable the recording of firework-related injuries between 30 June and 4 July 2013. All of the Emergency Departments (EDs) were contacted on the morning of the 2 July for a verbal report of the numbers of patients seen and the spectrum of injuries overnight. All health facilities were encouraged to fax their injury surveys to CDC on a daily basis throughout the survey period and were contacted by phone at the end of the period to ensure they had returned all of the completed surveys.

The survey asked questions about patient demographics, details of the time, place and circumstances surrounding the injury event, as well as clinical information about the injury and its severity. Hospital records of those patients who consented to the survey were also reviewed to gather further clinical data regarding the initial and follow up health care visits. In some instances the Medical Officer overseeing the survey contacted consenting patients, where possible, for any missing information.

The data were manually entered from the hard copy survey forms into a Microsoft Office Excel spreadsheet, which was then imported into a statistical software program (STATA, version 11.0 for Windows). Using STATA, the data were analysed descriptively.

Results

Overall results

This year there were 25 firework-related injuries. Of the 25 people 14 consented to complete the survey. We did not collect information on reasons for the 11 who declined. However, anecdotal evidence from a few of the hospital EDs suggest that some people who declined did not want fireworks to be banned in the NT and felt that providing data on their injuries may contribute to further regulation of fireworks in the future.

The median age of patients with injuries was 25 years, with a range between 2 and 56 years. The majority (44%) were young adults, aged between 16 and 25 years (see Table 1). Just over half (52%) of the cases were under 30 years of age. Of the 2 children included in this cohort; 1 was 2 years and the other 10 years old. Males accounted for 60% (15/25) of patients.

Table 1. Severity of injury by age group

	Severity of injury			
	Severe	Moderate	Mild	Total
Age yrs				
≤ 5	1	0	0	1
6 – 15	0	1	0	1
16 – 25	2	7	2	11
26 – 35	2	1	1	4
≥ 36	3	2	3	8
Total	8	11	6	25

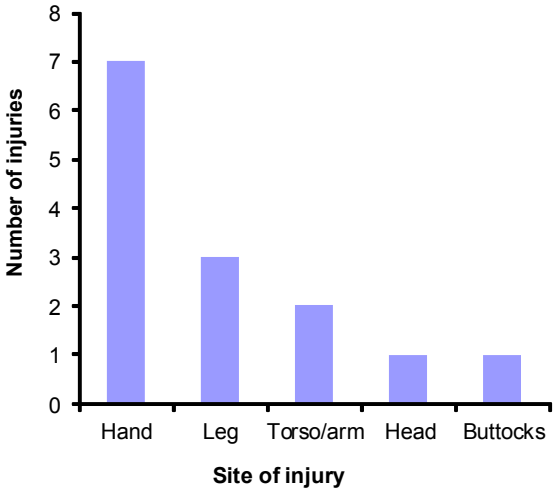
Overall, most injuries (44%) were moderate in nature, requiring 2 or more reviews by a health practitioner. However, 8 of 25 (32%) injuries were severe and these patients required admission to hospital. There was no statistical relationship between age category of patients and severity of injury (Fisher's exact test = 0.5).

Results from patients who consented to the survey

Among those who consented to the survey, approximately 80% (11/14) of their injuries occurred on Territory Day, with 3 occurring the next day. All but 1 of the injured individuals resided in the NT. Of the 13 patients for whom we have timeline data, the median time to presentation from injury was around 1 hour. However, 2 patients presented over 36 hours after their injury and both required admission and surgical debridement of their wounds.

Hand injuries accounted for 50% (7/14) of all injuries (see Figure 1). The remainder of the injuries were to the leg (3), torso/arm (2), buttocks (1) and head (1). The majority of the injuries were burns (93%; 13/14); 2 burns cases also suffered lacerations and another, a ruptured tympanic membrane. One individual presented with a traumatic fracture of a bone in his hand.

Figure 1. Injuries by anatomical site



Surgical debridement of wounds was required for 6 of 14 patients with 1 of these patients also requiring a skin graft. The other patients required burns dressings or no specific intervention. One child suffered significant mid-dermal burns to the buttocks after their clothing was set on fire by a multi-shot firework that fell over and landed between the child's legs. This child required 5 outpatient appointments at the Burns Clinic for dressings following the injury.

Eight of 14 injuries (57%) happened in the backyards of personal residences. A firework that misfired from a neighbouring residence caused 3 adults to experience serious injury requiring hospitalisation, with 1 patient suffering a fracture of a phalanx of his left hand on raising the hand to shield his face from the oncoming

firework. In a separate scenario, a misfired skyrocket firework landed on 2 patients sitting in their yard resulting in burns injuries to their legs that required surgical debridement. There were 3 further injuries in a park and 3 others in a residential street.

In 10 of 14 (71%) cases, we could establish from the participant's explanation of the event that their injury was likely the result of misuse of fireworks (e.g. picking up unlit fireworks, fireworks falling over, holding more than one lit sparkler). Skyrocket fireworks were responsible for 4 injuries and multi-shots for 4 others. The 4 injuries caused by multi-shot fireworks were the result of the firework falling over (3/4) or discharging off in an unpredictable direction. The injuries resulting from skyrockets all occurred from fireworks that had been set off in neighbouring residences. Sparklers caused 3 injuries and a fountain firework was responsible for 1. In 1 of the cases involving sparklers, the injury resulted from holding 2 sparklers; sparks from 1 ignited the other resulting in burns to the hand. In 2 cases, the type of firework that caused the injury is unknown.

The majority of patients (64%; 9/14) were bystanders (i.e. they did not light the firework that caused their injury). A greater proportion of bystanders suffered severe injuries, compared with non-bystanders and this relationship was statistically significant (Fisher's exact test = 0.03). Overall, 9 people reported knowing if the person who lit the firework had consumed alcohol in the past 3 hours and 5 of these 9 patients reported that alcohol had been consumed by the individual responsible for setting off the firework that resulted in injury.

Discussion

This year there was a greater than average number of fire-work related injuries and hospital admissions in the period of study between 30 June and 4 July 2013. The reason for this is unknown and may be due to random fluctuation of numbers. Notably, there has been no discernible trend in the number of firework-related injuries between 2000 and 2012.[1]

Similar to previous reports in the literature the majority of the injured cases were male and young,[5,6] with over 50% under 30 years of age.

Most injuries were caused by misuse of fireworks, consistent with previous studies,[5] and may have been prevented with additional care. Misuse of fireworks did in some instances have serious implications for bystanders, who made up the bulk of the cases in this survey. Additionally, in the majority of cases for whom we had data (albeit a small number), most reported that alcohol had been consumed by the person who lit the firework that resulted in injury.

Most injuries occurred to the hands and upper extremity, again in line with findings from previous studies.[5,7] The 1 injury to the face this year was a ruptured tympanic membrane. Similar to previous surveys between 2010 and 2012, the most common causes of injury were multi-shot and skyrocket fireworks.

There are some limitations to this work. We may have missed some presentations to the participating health services, as we relied on staff to report on overall number of firework-related injuries, request patient consent for the survey, and return completed surveys to us. Additionally, we only had the capacity to focus on key services in the Territory, including all of the hospital EDs, the Australian Defence Force and a large bulk-billing primary care service in Palmerston. So, we did not capture presentations to other health services for firework-related injuries, and our record is likely to under-represent the true number of injuries. This year, there were a significant number of people who did not consent to completing the survey. It would be useful to collect information about why people do not consent in future surveys. Finally, the results may be subject to some reporting bias. For example, some people may not have wanted to report that they were responsible for setting off a firework that had resulted in their injury or that they had consumed alcohol.

Despite the limitations, there are some important messages arising from this survey. Although previous CDC research has found that fewer people are concerned about individual safety compared with irresponsible use of fireworks and general disturbance to the community, the costs of firework-related injuries to the individuals and to the health system is considerable. While it was beyond the scope of

this survey to measure these costs, they include lost time from work or study, costs to the health system (this year the cost of 8 admissions, 6 surgical procedures and a total of 46 follow-up health care appointments), not to mention pain and suffering experienced by the patient.

As such, it is important that the CDC and other key stakeholders continue campaigns to promote the safe use of fireworks. It is concerning that despite explicit messages about the particular danger of multi-shot fireworks and the need to securely anchor them prior to ignition, 2 severe and 1 moderate injury resulted from multi-shots falling over. This raises the question of whether we are targeting the people who really need to hear these messages, that is, people under 30 years of age, particularly people between the ages of 15 and 30 years who may not be attending school. We may not be reaching young people using conventional health promotion and health education methods and future campaigns should investigate the use of social and digital media to deliver fireworks safety messages appropriate to the target younger population groups.[8,9]

A *NT News* editorial on August 20, 2013 stated that "tighter regulations [of the use of fireworks on Territory Day] will eventually be inevitable."[10] Another news piece reported that the CLP Member for Goyder, Kezia Purick, was distributing a petition to ban the sale of fireworks to the public which she will reportedly present to Parliament in October.[11] And so while it seems Territorians are still split on their support for the private use of fireworks, in the wake of 2013 'cracker night' there are some in the community who are calling loudly for tighter regulation. Restricting personal use of fireworks through legislation is the most effective method for reducing the number of injuries due to fireworks.[12]

The NT Government has stated that it has no plans to ban the private use of fireworks on Territory Day.[11] The CDC will continue to implement the annual survey of firework-related injuries to provide valuable information to the public and key stakeholders, such as the fireworks industry and community-based organisations, about the numbers and mechanisms of injury. These data will inform future firework safety campaigns.

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Maningrida mosquito survey 2010/11

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Abstract

Background
Maningrida was assessed by Medical Entomology in 1984 to determine the potential for malaria and mosquito borne disease transmission and was identified as having the potential for malaria transmission and local mosquito borne disease transmission. The 1984 survey did not include peak season trapping to identify the magnitude of potential problems.

Methods
The current survey was designed to carry out trapping during peak season months for important mosquito species.

Results and conclusions
Results from this survey concurred with the 1984 findings that there is potential for malaria transmission, and the community would be affected by pest mosquitoes and mosquitoes that can transmit endemic mosquito borne diseases. Mosquito species such as the northern salt marsh mosquito Aedes vigilax were recorded in very high numbers throughout the study area, while certain areas surrounding Maningrida recorded high numbers of potential malaria (Anopheles sp.) vectors and relatively high numbers of the common banded mosquito Culex annulirostris. Results can be used by government and local council to improve the management of mosquito problems, and assist in future expansions of Maningrida by indicating which areas to avoid.

Key words: Maningrida, mosquito, malaria, endemic, management

Introduction

Maningrida lies on the north coast of the Northern Territory (NT), located approximately 370km east of Darwin, and approximately 270km west of Nhulunbuy. The community is located in the vicinity of seasonally flooded tidal and freshwater areas that are potential sources of pest and disease carrying mosquitoes. Surveys in 1984 identified many of the main potential mosquito breeding sites affecting Maningrida and the problem mosquito species affecting the community.[1] The purpose of the current adult mosquito trapping was to identify peak season abundance of certain mosquito species to complement the existing data that had been previously gathered, as well as to conduct a desktop examination of potential breeding sites using high resolution aerial photography.

Adult mosquito trapping was to be carried out during the nominal peak seasons for important mosquito species. These included from 9 to 16 days after the October monthly high tide event to locate peak season northern salt marsh (*Aedes vigilax*) mosquito problems and in January and in June to identify the usual months of increased abundance for many freshwater or brackish water breeding mosquitoes.

Methods

Trapping

CO^2 baited encephalitis virus surveillance (EVS) traps were set at 5 locations around Maningrida

Figure 1. Maningrida mosquito Trap Sites October 2010, January and June 2011

in the sites as shown in Figure 1. Traps were set by Environmental Health Darwin-Rural staff during the afternoons of 21 October 2010, 12 January 2011 and 1 June 2011 and collected the following morning after sunrise at each location.

Results

21 to 22 October 2010 trapping

The October trapping revealed high to extremely high levels of adult female *Ae. vigilax* at all sites with Trap Sites 3 and 1 recording extremely high numbers. See Table 1.

Table 1. 21-22 October 2010 trapping results by Trap Site and 7 selected important mosquito species

Trap location	*Ae. (Och) vigilax*	*An. (Ano) bancroftii*	*An. (Cel) farauti s.l.*	*Cq. (Coq) xanthogaster*	*Cx. (Cux) annulirostris*	*Cx. (Cux) sitiens*	*Ma. (Mnd) uniformis*
Trap Site 1 Sewage Ponds	10741	66	33	330	66	1124	6147
Trap Site 2 Monsoon Jungle	1203	35	12	35	23	304	2441
Trap Site 3 East of Airport	12717	0	157	587	157	39	665
Trap Site 4 House 440	742	0	0	3	5	82	147
Trap Site 5 Bottom Camp	2705	55	0	0	44	88	806

Mansonia uniformis was the second most common mosquito, with an extremely high adult mosquitoes recorded at Trap Site 1 (see Table 1).

Culex sitiens was recorded in very high numbers at Trap Site 1 and *Coquillettidia xanthogaster* was recorded in moderately high numbers at Trap Site 3. *Anopheles farauti s.l.* was recorded in relatively high numbers for this species at Trap Site 3 with minimal numbers in the other traps.

12 -13 January 2011 trapping

Mosquito numbers were very low in January. *Ae. vigilax* was virtually absent, while no individual mosquito species was recorded in levels above 68 per trap night. Trap Site 2 showed the most important result with 62 *An. farauti s.l.* recorded.

Table 2. 12-13 January 2011 trapping results by Trap Site and 6 selected important mosquito species

Trap location	*Ae. (Och) vigilax*	*An. (Cel) farauti s.l.*	*Cq. (Coq) xanthogaster*	*Cx. (Cux) annulirostris*	*Cx. (Cux) sitiens*	*Ma. (Mnd) uniformis*
Trap Site 1 Sewage Ponds	6	15	11	34	44	1
Trap Site 2 Monsoon Jungle	3	62	1	7	68	1
Trap Site 3 East of Airport	2	7	10	9	0	1
Trap Site 4 House 440	4	0	0	4	1	0
Trap Site 5 Bottom Camp	38	1	5	8	0	0

Table 3. 1-2 June 2011 trapping results by Trap Site and 6 selected important mosquito species

Trap location	*Ae. (Och) vigilax*	*An. (Ano) bancroftii*	*An. (Cel) farauti s.l.*	*Cq. (Coq) xanthogaster*	*Cx. (Cux) annulirostris*	*Ma. (Mnd) uniformis*
Trap Site 1 Sewage Ponds	1	7	3	0	164	1
Trap Site 2 Monsoon Jungle	3	30	10	3	538	0
Trap Site 3 East of Airport	21	42	494	27	542	0
Trap Site 4 House 440	0	0	0	0	2	0
Trap Site 5 Bottom Camp	0	6	0	0	51	1

1-2 June 2011 trapping

Culex annulirostris was recorded in moderate levels at Trap Sites 3 and 2 with low numbers recorded at the other sites.

An. farauti s.l. was recorded in relatively high numbers at Trap Site 3 with minor numbers at the other trap sites. *Anopheles meraukensis* was also recorded in appreciable numbers at Trap Site 3 with low numbers at the other trap sites.

All other mosquitoes were recorded in low numbers in June.

Potential mosquito breeding sites

Potential *Ae. vigilax* breeding sites were discussed in the 1984 report, with those sites and additional potential breeding areas outlined in Figure 2.

The largest potential *Ae. vigilax* breeding site likely to affect Maningrida is the large brackish water reed swamp associated with upper tidal reaches of Gudjerama Creek, 5km east of Maningrida at Site 1, Figure 2. The *Ae. vigilax* breeding area of the swamp appears to be in the order of 50 hectares (500,000 square metres), indicating this site is likely to be an enormous source of *Ae. vigilax*. The most extensive breeding would occur in the months of September to January, after high tides and early wet season rainfall, with productive breeding also likely to occur in the early dry season in some years. This swamp was identified by Davis and Kelton[1] as the most important likely source of *Ae. vigilax* to residents of Maningrida. This swamp is also likely to be a very productive breeding area for *An. farauti s.l.* and *Anopheles hilli* during the late wet-early dry season, and extensive *Cx. annulirostris, Cq. xanthogaster, Ma. uniformis* and *Anopheles bancroftii* breeding area in the late wet-mid dry season, although Maningrida is located outside of the usual pest range of these species.

Figure 2. Potential large mosquito breeding sites affecting Maningrida, and indicative location of localised mosquito breeding sites

A smaller brackish reed/upper tidal mangrove swamp at Site 2 (Figure 2) is associated with a tributary of Gudjerama Creek, 1.75km east of the nearest residents in Maningrida. The potential mosquito breeding area appears to be approximately 9ha, indicating it is likely to be a productive swamp for *Ae. vigilax* and *An. farauti s.l.* This swamp is therefore likely to be a large source of *Ae. vigilax* to residents in Maningrida, and the source of some *An. farauti s.l.* to the fringe residents in the new subdivision in Maningrida.

The large saltmarsh, *Shoenoplectus* brackish reed and upper tidal mudflat swamp located in the northern upper tidal reaches of the Gudjerama Creek system at Site 3 (Figure 2) would also be a major breeding site for *Ae. vigilax, An. farauti s.l., Cx. sitiens* and *An. hilli.* The swamp is located around 4km northeast of Maningrida, and could be an appreciable source of *Ae. vigilax* to residential areas of Maningrida.

The large brackish swamp located 1.5km south-west of Maningrida (Site 9, Figure 2) was identified as a potential source of *Ae. vigilax* affecting Maningrida by Davis and Kelton.[1] Other mosquito species that are likely to breed in this swamp include various *Anopheles* species mosquitoes, *Cx. annulirostris, Cq. xanthogaster* and *Ma. uniformis,* with these mosquitoes likely to affect mainly the southern portion of Maningrida.

A relatively large upper tidal depression (Site 4, Figure 4) is located approximately 700m north of the edge of the new subdivision in Maningrida. The depression is likely to be a productive breeding site for *Ae. vigilax* and *Cx. sitiens* from September to January and

during the early dry season, and productive *Cx. annulirostris*. *Cq. xanthogaster, Ma. uniformis* and *Anopheles* sp. breeding site in the late wet-early dry season. Due to its relative proximity to Maningrida residents, it would be an important localised source of these mosquitoes. The new subdivision would be particularly affected by mosquito breeding in this depression.

Other potential mosquito breeding sites include upper tidal tributaries, localised depressions and freshwater drainage lines within close proximity to Maningrida (Figure 2). These breeding sites could be localised sources of mosquito species such as *Ae. vigilax, An. farauti s.l., Cx. annulirostris* and *Cx. sitiens.*

Distant *Ae. vigilax* breeding sites associated with upper tidal tributaries of the Liverpool River and the Tomkinson River tidal plains, greater than 10km from Maningrida, could affect residents of Maningrida to some extent, mainly during very large breeding events. The large swamps associated with the peninsular starting 5km north-east of Maningrida appear to be freshwater swamps, therefore mosquito breeding in these swamps would not affect residents of Maningrida to any great extent.

Discussion

Ae. vigilax will be the principal pest mosquito affecting residents of Maningrida. Peak abundance is likely to occur from September to January inclusive, with high to very high pest problems likely to be experienced during the months of October to December inclusive. Early dry season problems may occur in May and June in some years. This mosquito is a known vector of Ross River virus (RRV) and Barmah Forest virus (BFV).[2] The risk of mosquito borne disease transmission from this mosquito is likely to be seasonally high to very high in residential areas.

Cx. annulirostris is likely to occur in seasonally moderate to high numbers from January to August, with highest problems affecting the eastern and southern residential fringe of Maningrida closest to the brackish and freshwater swamps. This mosquito is a known vector of RRV and BFV, as well as the potentially fatal Murray Valley encephalitis virus, Kunjin virus and other viruses,[2] and therefore is likely to pose a seasonally moderate to high virus risk in residential areas.

While malaria elimination in Australia was declared in 1981,[3] Maningrida is receptive to potential malaria transmission, due to the presence of *Anopheles* mosquitoes. Seasonal abundance affecting residential areas is not likely to be high due to the distance from the major swamps, but is likely to be elevated enough to pose a potential malaria risk, should persons with malaria parasites be resident, mainly during the late wet to mid dry season.

Pest mosquitoes such as *Cq. xanthogaster* and *Ma. uniformis* are likely to affect residents of Maningrida to a moderate to high degree on a seasonal basis, mainly during the late wet to late dry season.

Localised mosquito breeding sites within 1.6km of residents should be identified and rectified by filling or draining, or a combination of both.

Mosquito control of the large brackish water swamps within 5km of Maningrida would require the use of a helicopter, applying target specific insecticides such as *Bacillus thuringiensis* var. *israelensis* or methoprene. An effective aerial mosquito survey and control program is likely to be cost prohibitive for Maningrida.

Ground mosquito control operations could effectively target localised mosquito breeding in depressions and creeklines within 1.6km of Maningrida residents, utilising methoprene 30 day pellets or 150 day briquettes. Ground control could also be effective for treating localised areas of productive mosquito breeding in the large brackish swamps.

The use of barrier insecticides can provide effective control of adult mosquitoes near residences and recreation areas,[4] and can be utilised during mosquito problem periods. Public areas such as swimming pools, sporting ovals, community halls and other evening or early morning use areas, as well as residential houses, could be treated to provide effective residual adult mosquito control for up to 4 weeks.

Information from media warnings regarding mosquito pest problems and mosquito borne disease risk periods should be passed on to the community, along with advice regarding personal protection and avoidance. This could be in the form of community notices and the education of children. An annual publicity program should occur before the wet season, advising residents to prevent backyard mosquito breeding.

A 200m wind buffer should be created on the eastern and northern edge of the new subdivision in Maningrida, and also along the southern edge of Maningrida. The wind buffer should provide an appreciable disruption to the dispersal of most mosquito species except *Ae. vigilax.*

Any further new subdivisions should continue to be located a minimum 1.6km from the nearest swamp or any appreciable mosquito breeding site, in compliance with Medical Entomology planning recommendations for urban residential subdivisions.[5] Where possible, a greater urban residential buffer distance should be provided from the 3 Gudjerama Creek brackish swamps within 5km of Maningrida and the swamp 1.6km southwest of the existing residential areas in Maningrida. A detailed biting insect assessment should be carried out for any future planned subdivisions in Maningrida.

Conclusions

The adult mosquito trapping carried out in 2010 and 2011 was useful in adding to the knowledge gained during the 1984 survey of Maningrida, particularly by identifying actual peak season abundance of important mosquito species. Combined with using high resolution aerial photography that was not available during the time of the 1984 survey, a clearer picture of the mosquito problems and major potential breeding sites affecting Maningrida has been achieved. Information in this report can be used to carry out best practice mosquito control or avoidance strategies in Maningrida, and assist in future planning of new subdivisions in Maningrida.

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Fetal alcohol spectrum disorder in Australia and the Northern Territory

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Abstract

The following is an overview of fetal alcohol spectrum disorder (FASD) in Australia with a specific focus on the Northern Territory (NT). Current prevalence and reasons for under-reporting are reviewed. The Commonwealth Action Plan and suggested ways forward are discussed.

Background

FASD is one of the most common and preventable causes of intellectual disability. FASD is an umbrella term to describe a range of adverse effects, which include the diagnostic terms fetal alcohol syndrome, partial fetal alcohol syndrome, alcohol-related neurodevelopmental disorders, fetal alcohol effects, or alcohol-related birth defects, caused by prenatal exposure to alcohol. In the presence of a confirmed history of prenatal alcohol exposure the syndrome consists of a triad of:[1]

- Central Nervous System (CNS) dysfunction, which may manifest as intellectual impairment, behavioural problems, sensory impairment, motor disorders, speech delay, and seizures
- Craniofacial dysmorphia, characterized by small palpebral fissures, a flattened elongated philtrum and a thin upper lip (vermillion border)
- Poor growth, usually under the tenth centile in the domains of height, weight and head size.

While most children with FASD are born to mothers who consume alcohol heavily during and before pregnancy,[2] even occasional consumption has been linked to adverse birth outcomes.[3] For this reason, the National Health and Medical Research Council recommends abstinence as the safest policy for pregnant women.[4]

Prevalence

Estimating the prevalence of FASD in Australia has been difficult. In 2000, a Western Australian study found a prevalence of 0.02 per 1000 births for non-Indigenous children and 2.76 per 1000 births for Indigenous children.[5] In 2008, the first Australia-wide prognostic survey by the Australian Paediatric Surveillance Unit estimated the prevalence at a mere 0.58 per 100,000 live births.[6] A study conducted in 2003 in the NT by Harris and Bucens showed the prevalence of FASD to be 0.68 and 1.87 per 1000 births in non-Indigenous and Indigenous Australians respectively.[7] There are several factors that may explain these low figures which fall short of the international rate of 1–3 per 1000 live births in the general population and rise to as many as 9.1 per 1000 live births among high-risk populations.[8]

Reasons for FASD under-reporting

Reasons for FASD under-reporting include the reluctance of the health care professional to burden a child with the stigma of the diagnosis of FASD.[9] Under-diagnosis may result from a lack of routine screening for alcohol use in pregnant women which also leads to under-reporting of the condition.[6]

Lack of knowledge of the diagnostic criteria for FASD also leads to under-reporting. Diagnosis is complicated by the fact that the symptoms are not dichotomous but present in varying degrees; hence the term spectrum disorder. Health practitioners should be aware that FASD does not always present with characteristic facial features which increases difficulty of diagnosis as CNS dysfunction and poor growth are not specific to FASD.[10] In one survey, only 19% of Western Australian paediatricians and 12% of other healthcare practitioners were able to correctly identify the diagnostic criteria for FASD.[11,12] While clinicians may use the *University of Washington 4-Digit Diagnostic code*, or the *Hoyme Diagnostic Guidelines*[13] there is currently no standardised diagnostic tool for FASD in use in Australia. In 2010 the government allocated $450,000 to develop a national diagnostic instrument and this is currently in final the stages of development.[14]

FASD initiatives in the NT

Residents of the NT consume a substantially greater quantity of alcohol compared to the national average. The per capita pure alcohol consumption was 14.6 litres in the NT and 10.3 litres Australia-wide for residents aged 15 years and over in 2007/2008.[15] The *Northern Territory Midwives' Collection, Mothers and Babies 2007* states that at the first antenatal visit 13% of Indigenous mothers and 9% of non-Indigenous mothers reported drinking alcohol in 2007.[16]

There are very few initiatives for FASD in Australia and the NT. In the NT, Anyinginyi Health Aboriginal Corporation was provided with 1 year of funding to run a FASD project, commencing September 2011. The project aimed to identify and partner with existing programs/services to develop resources to be used by the community even after the life of the project and to consolidate and expand on community knowledge and ownership of FASD issues, while supporting individuals, families and services dealing with FASD.[17] Activities implemented include:

1. The development of Pregnancy Pamper Packs which consist of toiletries, healthy lifestyle cookbook, healthy pregnancy information book, information about pregnancy and alcohol use and smoking and a pamphlet about the FASD project which are distributed to pregnant women through health professionals.
2. Warning signage displayed in local licensed premises warning that pregnant women should not consume alcohol.
3. Education and prevention sessions on FASD with various community groups.
4. The creation of a hip-hop song on FASD with local young people projecting a prevention message for pregnant mothers to abstain from drinking alcohol while pregnant.[17]

The Pregnancy Pamper Packs have been used as a tool to assist health professionals broaching the topic of alcohol use with pregnant women as they assist in making this conversation positive.

The antenatal clinic at Royal Darwin Hospital collects self-reported alcohol use data during the first visit and at approximately 36 weeks gestation. If a woman admits to drinking alcohol at either of these 2 visits she is recommended to discontinue alcohol use while pregnant and if high alcohol use is present, referral to drug and alcohol services is recommended. In the last *Mothers and Babies report* in 2007, 11% of alcohol consumption data were absent from the first visit and 19% from 36 weeks gestation indicating room for improvement in this strategy.[16] Resources and videos are also available as education tools for health professionals to inform pregnant mothers that the safest option is to consume no alcohol while pregnant. Child and family health nurses also ask about the frequency and amount of alcohol use by the mother while pregnant in their universal home visit assessments.

FASD Commonwealth Action Plan

The Australian Government has recently created a Commonwealth Action Plan titled *Responding to the Impact of Fetal Alcohol Spectrum Disorders in Australia.*[18] A further $20 million has been dedicated towards the FASD Action Plan to be implemented from 2013-14 to 2016-17. The 5 priority areas of the plan are:

1. Prevention
2. Secondary prevention targeting alcohol dependent women
3. Diagnosis and management
4. Prevention of FASD within remote Indigenous communities
5. Coordination and workforce support.[18]

Suggested ways forward

Recognising that only a small proportion of healthcare professionals are able to accurately diagnose FASD[11] capacity building to ensure health practitioners can correctly diagnose FASD may be the first step to better FASD management and future prevention. Routine surveillance for children at high risk of FASD needs to be implemented to ensure these children are supported and connected to health and education services. Teachers can then be given strategies on how to more effectively include and teach these children. If a mother admits to consuming alcohol at antenatal visits, screening of the child for FASD should occur. A FASD register of cases would start to provide accurate prevalence data for FASD. Prevalence data is important to garner funding for

developing prevention and management services.[19] To tackle the burden of FASD in remote Indigenous communities programs should be designed collaboratively with the communities to ensure the communities are empowered and support FASD initiatives.[20]

Conclusion

The burden of FASD in Australia is still not well delineated. Accurate FASD prevalence data is lacking. Having such data would assist in planning future prevention and management initiatives.[19] Screening high risk children for FASD will improve knowledge of the burden of FASD which in turn will direct proposals to gain adequate support for the person and family. An accepted diagnostic tool will aid surveillance, increase correct diagnoses and referral processes and the recent Australian Government funding will support finalising the development of the national FASD diagnostic tool. As with other health programs there needs to be collaboration with the community and ownership of a FASD program for it to be effective.[20]

It is important to conclude with the advice from Guideline 4 in *The Australian Guidelines to Reduce Health Risks from Drinking Alcohol* that maternal alcohol consumption can harm the developing fetus or breastfeeding baby. For women who are pregnant or planning a pregnancy, or breastfeeding not drinking is the safest option.[4]

More information about support for people with FASD, their families and carers can be accessed from 2 peak organisations, the National Organisation for Fetal Alcohol Spectrum Disorders and the Russel Family Fetal Alcohol Disorders Association.

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An investigation into the use of screening for domestic violence and alcohol misuse in Centre for Disease Control sexual health and tuberculosis clinics.

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Domestic violence and alcohol misuse have serious consequences for the physical and mental health of the individual as well as their families and society at large. The Northern Territory (NT) has the highest rate of hospitalisation due to assault[1] and alcohol misuse[2] of all jurisdictions in Australia. Health professionals are well placed to detect individuals misusing alcohol and victims of domestic violence while attending health care appointments through screening.

To determine if screening for domestic violence and alcohol misuse was of benefit for clients in clinical settings at the NT Centre for Disease Control (CDC), a literature review was undertaken as well as consultation with NT CDC staff and experts nationally. A discussion paper was developed and based on the evidence and consultation a decision was reached.

It was determined that there was insufficient evidence for the effectiveness of screening for domestic violence in improving health outcomes and reducing the recurrence of domestic violence. Thus, screening for domestic violence in NT CDC clinics will not commence at present. However a review will be undertaken again at a later date to re-assess the evidence and new practices aimed at reducing domestic violence.

In contrast, there is strong evidence to demonstrate the effectiveness of screening and brief intervention for alcohol misuse in reducing alcohol intake and therefore improving health outcomes. This concept is supported by the US Preventive Services Task Force who recently recommended that primary care clinicians screen adults aged 18 years and older for alcohol misuse and provides persons engaged in risky or hazardous drinking with brief behavioural counselling interventions to reduce alcohol misuse.[3]

The CDC will now commence steps to include screening for alcohol misuse and brief intervention for those with risky or hazardous drinking behaviours in assessments for clients attending NT CDC sexual health and TB clinics.

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Sero-prevalence of hepatitis C virus antibody among prisoners in the Northern Territory, 2003-2006

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Abstract

Objectives

To determine the sero-prevalence of antibodies to hepatitis C virus (HCV) among prisoners in the Northern Territory (NT), Australia, for the period of 2003-2006.

Methods

HCV antibody testing data were retrieved from the prison health database, sero-prevalence was calculated, and the association between positive HCV antibody results and various demographic features was assessed.

Results

A total of 2863 individuals with HCV testing results were included in the study. The overall sero-prevalence was 4.3% (95% CI: 3.6-5.1%), 4.3% in males and 6.4% in females. The sero-prevalence was 1.5% in Indigenous prisoners (who represented 74.5% of all prisoners) and 14.8% in non-Indigenous prisoners (representing 21.5% of all prisoners). Non-Indigenous ethnicity and older age groups showed significant association with HCV antibody positivity in multivariate analysis.

Conclusions

The sero-prevalence of HCV antibody among NT prisoners was low in comparison to other prison populations in Australia. It can be inferred that the prevalence of HCV infection was also low. As injecting drug use is the most important risk factor for HCV infection, it is likely that injecting drug use was not wide-spread in the NT Indigenous population during the study period.

Keywords: Hepatitis C; HCV Antibody; Prison; Sero-prevalence; Indigenous

Introduction

Infections with hepatitis C virus (HCV) are a serious public health problem both in Australia and worldwide. HCV is predominantly transmitted through injecting drug use (IDU), which accounts for approximately 90% of new infections in Australia.[1] The World Health Organization estimates that there are more than 170 million people chronically infected with HCV and 3 to 4 million cases of new infection occur each year.[2] In Australia, an estimated total of 284,000 people have been exposed to HCV and approximately 10,000 new infections occur annually.[3] These statistics make it one of the most commonly reported notifiable diseases in Australia.

A disproportionately high prevalence of HCV antibody in prisoners has been well documented in most Australian States and Territories.[4-13] In addition to the prevalence studies conducted within a single jurisdiction, the *National Prison Entrants' Bloodborne Virus and Risk Behaviour Survey* was conducted in 2004, 2007 and 2010 to investigate the sero-prevalence of HCV antibody and associated risk factors among prisoners.[9] The survey conducted in 2010 reported a prevalence of 22% in this population nationally ranging from 33% in Victoria to 4% in the NT.[9] However, the reported prevalence in other studies has been as high as 58%.[6] The prevalence was generally higher in female prisoners.[8,9] The reported prevalence in Indigenous prisoners was as high as 60% in a study conducted in South Australia,[12] but was 18% nationally in the 2010 national survey, compared with the non-Indigenous prevalence of 23%.[9]

The high prevalence of HCV antibody among prisoners has been attributed to a high proportion of prisoners having multiple risk factors, including previous infection with HCV, a history of injecting drug use, unsafe injecting behaviour, high rates of imprisonment due to drug-related crimes, non-sterile tattooing and skin piercing activities, injury, self-harm, fighting and assaults.[14] Therefore, the *Third National Hepatitis C Strategy 2010-2013*[15] included people in custodial settings as a priority population.

There is insufficient information previously published about the prevalence of HCV in the Northern Territory (NT) prisoner population. NT prisons participated in the national survey

mentioned above for the first time in 2010, but the sample size taken was small (83 prisoners) and represented a consecutive cross-section of prison entrants over 2 weeks during October 2010. Therefore, whether this small sample was representative of the prisoners of the NT in general is questionable. To date there has been only 1 published study that investigated the prevalence of HCV in the NT prison population, but it was limited to the prisons in Darwin only and was published more than 10 years ago.[16] Further, the demographic make-up of the NT prison population is vastly different from that of other states/territories in that Indigenous people are substantially over-represented in the NT prisons. For instance, in 2006, Indigenous people accounted for 82% of the total NT prisoner population, more than 3 times higher than the national average of 24%.[17] Therefore, the findings of the national surveys and other Australian studies may not accurately reflect the HCV situation in NT prisons.

All prison entrants in the NT were required to undergo testing for HCV antibody as part of the mandatory health check during the period 2003-2006, and all health check results were entered into a dedicated health database. This study seeks to use these data to determine the sero-prevalence of HCV antibody among the NT prisoner population and investigate its association with relevant demographic and risk factors recorded in the database.

Methods

This audit study used data retrieved from the prison health database used by all NT prisons (2 in Darwin—adult and juvenile; 1 in Alice Springs—adult) for the period April 2003 to June 2006. This study period was chosen as a dedicated pathology module and was implemented in the database in this period resulting in better data capture. Data retrieval was conducted by the local government epidemiology branch currently maintaining the database. A new set of identification codes was generated in the retrieved dataset to replace the original prisoner identifiers eliminating the possibility of tracing back to the original records. The data retrieved for each prisoner included HCV-antibody testing results, Indigenous status, age, sex and the prison location. Equivocal antibody test results were deemed negative for the purpose of this study. All HCV-antibody tests were performed at the Pathology Laboratory of Royal Darwin Hospital.

We calculated prevalence with breakdown by age group, sex, Indigenous status and prison location. The chi-squared test was used in univariate analysis to examine the association between each variable and a positive HCV-antibody test result. Variables showing a significant association were included in the multivariate analysis, which was carried out by fitting a log binomial model. A p value less than 0.05 was deemed significant. All statistical analyses were performed using Stata (version 11.0, Stata Corporation, College Station Texas, 2009).

Ethics approvals to conduct this study were obtained from both Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research and Central Australian Human Research Ethics Committee.

Results

A total of 3,002 unique prisoners were identified in the retrieved dataset for the study period. HCV testing results were available for 2,863 people (95.4%), which were included in the analysis. The median age was 30.7 years (interquartile range 23.8-38.3 years). The majority of the prisoners were male (90.7%), Indigenous (74.5%) and in the 25-39 year age group (49.3%). Indigenous people predominated in both sexes (78.1% in males and 70.4% in females). Other demographic results are listed in Table 1.

The overall sero-prevalence of HCV antibody was 4.3% (95% confidence interval [CI]: 3.6-5.1%). Notably, it was higher in Darwin prisons (5.0%, 95%CI: 4.1-5.9%) compared with the prison in Alice Springs (1.3%, 95%CI: 0.5-2.7%). The sero-prevalence was higher in females than in males, but the difference was not statistically significant (p=0.193, see Table 2). The sero-prevalence for non-Indigenous prisoners was 14.8%, about 10 times that for Indigenous prisoners (1.5%). The sero-prevalence for the 40 years and over age group was considerably higher than younger age groups in both sexes. Sero-prevalence results with breakdown by sex and other variables are summarised in Table 3.

Table 1. Demographics of prisoners with HCV antibody testing results in the Northern Territory, April 2003-June 2006

Demographic variable	Percentage (n=2863) (%)
Sex	
Female	6.0
Male	90.7
Unknown	3.4
Ethnicity	
Indigenous	74.5
Non-Indigenous	21.5
Unknown	4.0
Age groups in years	
<25	28.4
25-39	49.3
40 and over	18.9
Unknown	3.4
Prison location	
Alice Springs	18.5
Darwin	81.5

The HCV testing of the 325 prisoners aged under 20 years, showed 261 were non-Indigenous, 51 Indigenous and 13 had unknown ethnicity. Of the 261 non-Indigenous young offenders 4 (1.5%) tested positive for HCV; all 51 Indigenous young offenders tested negative.

In univariate analyses (see Table 2), non-Indigenous ethnicity, age group and prison location were found to be significantly associated with positive HCV-antibody test results. Only non-Indigenous ethnicity and age group retained a statistically significant association in multivariate analysis. Compared with Indigenous prisoners, non-Indigenous prisoners carried a higher than 8-fold adjusted risk of showing positivity for HCV-antibody. The 40 years and over age group had the highest adjusted risk for HCV-antibody positivity.

Discussion

This audit study is the first comprehensive study to investigate the sero-prevalence of HCV

Table 2. Results of statistical testing of association with positive HCV antibody results among prisoners, Northern Territory, April 2003-June 2006

Variable	Univariate analysis			Multivariate analysis	
	Sero-prevalence of HCV antibody	Prevalence risk ratio (95%CI)	p-value	Adjusted risk ratio (95% CI)	Adjusted p value
Sex*					
Female	6.4	[reference category]		-	-
Male	4.3	0.67(0.37-1.22)	0.193	-	-
Ethnicity^					
Indigenous	1.5	[reference category]			
Non-Indigenous	14.8	9.86(6.66-14.61)	<0.001	8.22(5.49-12.30)	<0.0005
Age group in years#					
<25	1.7	[reference category]			
25-39	4.5	2.59(1.46-4.59)	0.001	2.44(1.39-4.28)	0.002
40 and over	8.5	4.92(2.73-8.87)	<0.001	3.35(1.88-5.97)	<0.0005
Prison location					
Alice Springs	1.3	[reference category]			
Darwin	5.0	3.76(1.77-8.03)	0.001	2.13(1.00-4.55)	0.051

* Excluding 96 prisoners without sex information recorded.
^ Excluding 115 prisoners with unknown ethnicity.
# Excluding 97 prisoners with missing age information.

Table 3. Results of HCV antibody tests by sex, age group, ethnicity and prison location, Northern Territory, April 2003-June 2006

Ethnicity *				
Indigenous	2010	1.3	119	4.2
Non-Indigenous	564	15.1	50	12.0
Unknown	22	0.0	2	0.0
Age group in years*				
<25	770	1.6	39	5.1
25-39	1316	4.5	92	4.4
40 and over	501	8.2	40	12.5
Unknown age	9	0.0	0	0.0
Prison location*				
Alice Springs	515	1.4	10	0.0
Darwin	2081	5.1	161	6.8
Total	2596	4.3	171	6.4

* Excluding 96 prisoners without sex information

antibody among prisoners of all NT prisons, and also the first one to report sero-prevalence in Indigenous prisoners in the NT. The high testing coverage rate (95.4%), the relatively long study period, and the fact that the dataset included mandatory testing data for both sentenced prisoners and prisoners in remand allowed the data to cover seasonal and year-to-year variations as well as both long-term and short-term prisoners. Therefore, the findings of the study should be free from the biases commonly seen in studies employing cross-sectional survey methods, including the national surveys mentioned above.[18] This is important for HCV prevalence studies given that injecting drug using prisoners, who are most at-risk for HCV infection, tend to be incarcerated for relatively short periods of time.[8,19]

Compared with other Australian studies, this study found a considerably lower sero-prevalence of HCV antibody in both Indigenous and non-Indigenous prisoners in the NT. The prevalence is also lower in young prisoners aged less than 20 years when comparing with the findings of a recent study conducted in young offenders in New South Wales.[20] As a positive HCV antibody test signifies past or present HCV infection, these low levels of sero-prevalences can also be deemed to indicate corresponding low prevalences of HCV infection in this population. In addition, the NT sero-prevalence for non-Indigenous prisoners (14.8%) was considerably lower than the sero-prevalence reported in other jurisdictions, and also lower than the 25% reported in the 2010 national survey.[9] The sero-prevalence of 1.5% in Indigenous prisoners found in this study is also significantly lower compared with other Australian studies conducted at about the same time, but close to the 2% reported in the 2010 national survey.[9]

The findings of low levels of sero-prevalences in Indigenous prisoners in the NT have important implications for estimating the extent of IDU among Indigenous Territorians. Compared with other areas in Australia, the NT had the lowest proportion of sentenced prisoners incarcerated due to illicit drug offences.[21] With Indigenous people consistently accounting for 80% or more of NT prisoners, the extent of IDU among Indigenous prisoners should be similar to the extent of IDU in the general Indigenous population in the NT. As Larson et al. showed in their study,[14] a high proportion (51%) of Indigenous people who injected drugs had shared needles at least once in the previous month and pointed out that Indigenous people who inject drugs are likely to be incarcerated and have friends and relatives who share these 2 features; the very common needle sharing will most likely lead to an accelerated epidemic of infection with blood borne viruses. This is particularly true for HCV as IDU is the most important risk factor for HCV infection. Therefore, the very low prevalence of HCV in Indigenous prisoners in the NT suggests little injecting drug use in this population overall. However as 12.5% of HCV notifications were among Indigenous people (in 2006),[22] and virtually all of these notifications are from urban residents, it is possible that injecting drug use may be relatively more common in urban areas, and was not occurring widely in remote communities during the study period.

Considering the points discussed above, it is not difficult to understand why the sero-prevalence found in this study was much lower than those of other jurisdictions. On the other hand, it is also likely that the common biases of survey methods (for instance, selection bias) might have to some extent affected the resultant prevalence in other Australian studies.[18]

Our finding that non-Indigenous status and the relatively older age group were significantly associated with HCV antibody positivity is consistent with similar studies conducted in Western Australia and South Australia.[8,12,13] However, unlike most other Australian studies, the female sex was not a significant factor for HCV antibody positivity in our study. It is not possible to tell whether this difference is due to the comparatively high male-to-female ratio in our study population (15:1) or the fact that sex information was not recorded in 3.2% of the prisoners.

Two recent studies conducted in South Australia[8,12] found considerably higher prevalence of HCV antibody in Indigenous prisoners incarcerated in metropolitan prisons compared with those incarcerated in remotely located prisons. Our study, however, did not find a significant difference in sero-prevalence between the prisons in Darwin (the only urban area in the NT) and Alice Springs after adjusting for other variables. This might be because it was not uncommon for people living in Alice Springs or other remote areas to be incarcerated in prisons in Darwin.

The main limitation of this study is that it is a retrospective audit study and data were not specifically collected for the purpose of this study. Therefore data on some important risk factors (such as IDU) were not available. Secondly, data entry was not complete in sex, age and ethnicity for about 3% of prisoners included in this study. As all those with missing data in sex, age or ethnicity recorded negative results, the sero-prevalence would be lower if these were included in the prevalence calculation. Finally, the fact that the data used for this study are relatively old can limit the usefulness of the results. It is therefore important to conduct ongoing surveillance and regular audits like this and aim for timely analysis in order to monitor the prevalence of HCV infection in this particular population.

Conclusion

This study has found a low sero-prevalence of HCV antibody in both Indigenous and non-Indigenous prisoners in the NT when compared with corresponding figures reported for other Australian jurisdictions. It can thus be inferred that the prevalence of chronic HCV infection was also low. As injecting drug use is the most important risk factor for HCV infection, it is likely that injecting drug use was not wide-spread in the NT Indigenous population during the study period.

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Immunisation update

Rosalind Webby, CDC, Darwin

The Northern Territory (NT) childhood schedule has recently been updated with the introduction of 2 new combination vaccines:

- Measles, Mumps, Rubella, Varicella (Priorix –Tetra®) to be given at 18 months of age and
- *Haemophilus influenzae type b*/ Meningoccocal C (Menitorix®) to be given at 12 months of age.

This new schedule commenced on 1 July 2013 (see Childhood Vaccination Schedule 1 July 2013 page 22).

In addition to the schedule updates 2 new vaccine brand choices have been added. Varivax® now joins Varilrix® as a varicella vaccine to be given on its own at 13 years of age for those with no history of previous disease or any dose of a varicella containing vaccine. MMR_II® joins Priorix® as a measles mumps and rubella (MMR) vaccine to be given to all children at 12 months of age and for a limited time for children at 4 years of age who have not yet received a 2nd MMR containing vaccine.

Measles Mumps Rubella Varicella (MMRV) vaccine (Priorix-Tetra®)

The MMRV vaccine for children aged 18 months replaces and combines the components of the measles, mumps, rubella (MMR) vaccine previously given to 4 year olds and the chickenpox vaccine previously given on its own at 18 months of age. The MMRV vaccine reduces the total number of injections for children by 1 and will provide earlier 2-dose protection for children against measles, mumps and rubella.

DO NOT use Priorix-Tetra® in infants who are 12 months of age or as the first dose of MMR vaccine as there is an increased risk of febrile convulsions if given as the first dose. To date there has been no increased rate of febrile convulsions detected in children given MMRV at 18 months of age.

Priorix-Tetra® is supplied as a vial containing an MMRV pellet and a prefilled syringe of diluent with which to dissolve the pellet. The reconstituted vaccine dose is 0.5 ml and the colour varies from clear peach to a fuchsia-pink. This vaccine is administered by subcutaneous injection. *Remember to reconstitute Priorix-Tetra®.*

Points to be clear on when giving just an MMR vaccine

- A measles mumps rubella (MMR) containing vaccine (either MMR-II® or Priorix®) should still be used at 4 years of age for children who previously had MMR vaccine at 12 months of age and a varicella vaccine at 18 months of age.
- MMR vaccine will continue to be offered to children at 4 years of age who have not received the second dose of MMR until the end of 2015 when the catch up phase will be complete.

Haemophilus influenzae type b / Meningococcal C vaccine (Mentorix®)

Mentorix® replaces the single dose of monovalent meningococcal C conjugate vaccine (MenCCV) and booster dose of monovalent *Haemophilus influenzae type b* (Hib) vaccine previously due at 12 months of age which means 1 less injection is required at this schedule point.

Due to the use of the combination vaccine, issues may arise when planning catch-up with MenCCV or Hib vaccines. Where multiple injections are required at a single visit (often in a child aged ≥12 months when few or no prior vaccine doses have been administered) local disease epidemiology is important in deciding the priority given to each required catch-up vaccine. Due to the current very low incidence of meningococcal serogroup C disease in children priority should be given to catch-up other overdue infant vaccines i.e. Infanrix®Hexa, Prevenar 13® and MMR vaccines. Please see Australian Technical Advisory group on Immunisation (ATAGI) clinical advice for immunisation providers regarding the use of Menitorix® in delivering catch up vaccinations at http://www.immunise.health.gov.au.

Menitorix® is supplied as a vial containing a Hib and Meningococcal C white powder and a colourless prefilled syringe of diluent with which to dissolve the powder. The reconstituted vaccine dose is 0.5 ml. Administer the vaccine by intramuscular injection. *Remember to reconstitute Menitorix®.*

Adverse event reporting — a reminder

Please ensure that all adverse events after immunisation are reported on the NT Adverse Event following Immunisation form and sent immediately to CDC. This form is available at http://health.nt.gov.au/library/scripts/objectifyMedia.aspx?file=pdf/50/51.pdf&siteID=1&str_title=Adverse%20event%20following%20immunisation%20form.pdf

Telephone CDC to report serious adverse events on 8922 8044. All adverse events following immunisations are reviewed by senior medical staff and forwarded onto the Therapeutic Goods Administration who review all reports and monitor any national safety signals.

All bats in Australia have the potential to carry Australian bat lyssavirus (ABL) an invariably fatal disease in humans.
Anyone scratched or bitten by a bat needs to seek medical attention. See page 35.

Northern Territory Government

Childhood Vaccination Schedule

Effective from 1 July 2013

	Hepatitis B	Rotavirus	Diphtheria Tetanus Pertussis Hepatitis B Poliomyelitis *Haemophilus influenzae* type b	Conjugate Pneumococcal (13vPCV)	*Haemophilus influenzae* type b Meningococcal C	Measles Mumps Rubella	Hepatitis A	Measles Mumps Rubella Varicella	Diphtheria Tetanus Pertussis Poliomyelitis	Human Papillomavirus	Varicella	Polysaccharide Pneumococcal	Adult Diphtheria Tetanus Pertussis	Influenza REPEAT YEARLY
	Engerix B™ 0.5ml IMI	Rotarix® 1.5ml ORAL	Infanrix®Hexa 0.5ml IMI	Prevenar 13® 0.5ml IMI	Menitorix® 0.5ml IMI	M-M-R- II® 0.5ml SC or Priorix® 0.5ml IMI	VAQTA® 0.5ml IMI	Priorix-Tetra® 0.5ml SC	Infanrix®IPV 0.5ml IMI	Gardasil® 0.5ml IMI	Varivax® or Varilrix® 0.5ml SC	Pneumovax23® 0.5ml IMI	Boostrix® 0.5ml IMI	Vaxigrip® or Fluvax® 0.5ml IMI
Birth ●	✓													
2 months*		✓	✓	✓										
4 months		✓	✓	✓										
6 months			✓	✓										
12 months					✓	✓	◘							
18 months				■			◘	✓ ‡						
4 years*						▲			✓					
12 years										✓✓✓				
13 years											❖		✓	
15 years												■		■

Vaccine notes:

✓	= All children.	▲	= Only give if a 2nd MMR containing vaccine has not already been given.
●	= BCG for all Indigenous newborns, newborns who will live in Indigenous communities, newborns of overseas born parents from high incidence tuberculosis (TB) countries who will be going back for extended visits and newborns of families who have been treated for leprosy. Hepatitis B Immunoglobulin for all newborns of Hepatitis B surface antigen positive mothers.	‡	= NOT to be given as the 1st dose of a MMR containing vaccine.
*	= All vaccines due at 2 months can be given from 6 weeks of age. All vaccines due at 4 years can be given from 3 years and 6 months of age.	◘	= All Indigenous children. Non-Indigenous children living in remote communities.
	= ORAL VACCINE: first dose must be given by 14 weeks and 6 days of age; second dose must be given by 24 weeks and 6 days of age.	✓✓✓	= All children. Requires 3 doses given at 0, 2 and 6 month intervals.
■	= Indigenous children only.	❖	= If no history of previous disease or any dose of a varicella containing vaccine.

Information:

For more information contact your nearest Centre for Disease Control.

Darwin	**8922 8044**
Katherine	**8973 9049**
Barkly	**8962 4259**
Alice Springs	**8951 7549**
East Arnhem	**8987 0357**

Hedrin 15® - look out head lice!

Emily O'Kearney, Centre for Disease Control (CDC), Darwin

Occlusive products that kill head lice by smothering them, and contain dimeticone as the active component, have been the recommended treatment for head lice in the Northern Territory (NT) for just over a year. Hedrin® formulation contains 4% dimeticone and uses cyclomethicone as the carrier. Although this product is effective at killing lice, it does not kill all eggs and it has low viscosity and tends to drip or run after application.

Hedrin® has recently launched 2 new products, a spray gel and a liquid gel, named Hedrin 15® in Australia. The active component is still 4% dimeticone, however the carrier is a lower weight dimeticone which increases the viscosity of the solution. This has a residual effect and the product remains on the lice for longer.[1]

The new products also have increased action on the lice eggs. Nerolidol is a product that has been found to have effective ovicidal activity and the ability to kill 100% of eggs in vitro.[2] Hedrin 15® products now contain 2% nerolidol to ensure lice and eggs are being killed with the 1 solution. A study done by Burgess and Burgess found that a 15 minute application of dimeticone 4% liquid gel killed all lice and no new nymphs were found 7 days post application, meaning no eggs had hatched.[1]

The spray gel and liquid gel are now the recommended treatment for head lice in the NT. Please ask your pharmacist about these products if you require head lice treatments. It has been suggested to towel dry the hair and scalp before application of Hedrin 15® products, to remove grease and sweat that may create a barrier between the product and the insects, limiting Hedrin 15®'s ability to kill lice and eggs.

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TB in East Timor

Helen Tindall, Centre for Disease Control, Alice Springs

In October 2012 I travelled to East Timor to volunteer at Bairo Pite Hospital (BPH) in Dili, for 3 weeks. BPH is a non-government organisation providing free health care to those in need both in outpatient clinics and in more recent times as inpatients. It is the most visited health service provider in East Timor, with over 530 people attending the clinic and hospital per day (with a single doctor reviewing inpatients, coordinating the outpatient clinic and overseeing the various programs). People travel from all parts of East Timor to seek medical attention at BPH and a number of primary health care programs are coordinated from the hospital, including a very busy tuberculosis (TB) unit. This is a very brief synopsis of my experience from a TB program perspective only.

It took me an hour to travel from Darwin to Dili, but I could have travelled to another planet, the differences were so vast. As I sat outside the hospital clinic on my first morning, among the waiting crowds I observed an emaciated man sitting against the wall with his knees tucked under his chin, struggling to breathe, his whole rib cage recessing with every inspiration. I was tempted to diagnose him on-sight with all-consuming pulmonary TB. I then sat in on the morning clinic with the doctor and in my first 2 hours, witnessed 7 people (including this man) diagnosed with probable TB.

The TB section of the hospital consists of 2 ward rooms with 8 and 10 hospital beds and a TB laboratory next to them, where Ziehl-Neelsen staining of sputum specimens for AFB is

undertaken daily, on specimens ordered for both inpatients and outpatients.

Testing, follow up and treatment are all conducted as per the *National Tuberculosis Guidelines,* which are available in English and based on World Health Organization (WHO) recommendations. Most sputum specimens are not cultured (specimens have to be sent outside East Timor for culturing, and this is only done after treatment failure where there is persisting smear positivity). BPH has a GeneXpert machine available for PCR testing for *Mycobacterium tuberculosis* and rifampicin resistance testing. This test is reserved for smear positive specimens, or smear negative specimens where TB confirmation would be very useful, eg sputum with haemoptysis; or cases of TB treatment failure to see if rifampicin resistance should be suspected.

Chest Xrays (CXRs) were only ordered for those in which further clinical confirmation would be useful and patients travel to the radiology department at Guido Valadares Nacional Hospital, approximately 2kms away, if this is required.

The hospital has a coordinated Directly Observed Treatment, Short-course (DOTS) program, run by competent local health staff with specific training. These staff members provide treatment to an average of 103 new cases per month, including an average of 5 to 6 children under the age of 5 years old, who commence DOTS each month.

There is also a TB sanatorium at a fishing village about a 20 minute drive west of Dili where I observed approximately 20 people at any 1 time, living together in a pretty setting on an estate behind locked gates, awaiting sputum clearance.

The WHO estimates the TB prevalence rate in 2011 for East Timor to be 701 per 100,000.[1] Other health and economic statistics for East Timor include:

- 54% of infants have chronic malnutrition – the world's third highest child malnutrition rate. BPH has a malnutrition program which includes an inpatient area for severely malnourished infants, and a World Food Program distribution centre providing fortified cereal to malnourished outpatients.
- More than 40% of East Timorese live in absolute poverty (less than US$1.25 per day). 80% are unemployed. Many of those employed are in the informal labour market, such as fishing, weaving, even selling stones along the foreshore, and therefore not protected by the new National Labour Code which has implemented a minimum wage (US$115/month) as well as other employee rights.

All statistics I could find online or in discussion with local staff reflect a population surviving in extreme poverty which was certainly my observation during my time in Dili.

In my time at BPH, the TB beds were usually full with constantly rotating admissions and discharges of people with either confirmed or suspected TB. TB cases I encountered included: a 56 year old man with 10 years of weight loss and cough; a young man with overwhelming disseminated TB; a 27 year old woman reporting a chronic cough who weighed 24 kilograms; a number of cases of TB uveitis; a 60 year old woman with a pleural effusion filling her entire right lung; an 11 year old girl with left hemiparesis, disconjugate gaze and drooping left eyelid following TB meningitis with TB optical nerve involvement.

The most interesting clinical case for me, due to the diagnostic delay and resulting debilitation was the presentation of a 32 year old woman from a remote district of East Timor, and her 11 year old daughter. The mother reported an 11 year history of extensive, itching lesions over her face. She had a scar on her right clavicle suggestive of previous scrofuloderma (a skin condition caused by TB involvement of the skin by direct extension, often from underlying TB lymphadenitis). She was well nourished at 48 kilograms, but reported some weight loss and night sweats. She reported no current or previous respiratory symptoms. Some right sided sub-maxillary lymphadenopathy was palpable.

The doctor straight away diagnosed this woman on clinical grounds with lupus vulgaris (TB of the skin caused by haematological spread from a primary source elsewhere, occurring in people with moderate immunity where healing occurs in one area, while the lesions extend in another. The painful cutaneous TB lesions usually have a

nodular appearance, are most often on the face around nose, eyelids, lips, cheeks, ears). As mentioned she probably had previous scrofuloderma, in this case probably from a supra-clavicular lymphadenopathy.

Her daughter presented to the hospital with her mother wearing dark sunglasses, with chronic, purulent discharge oozing from both eyes that reportedly had been ongoing for the past 3 years. Upon removal of her sunglasses, she had signs of photophobia and was unable to open her eyes more than narrowly and briefly. She also was well nourished at 30 kilograms, and reported no weight loss, fevers, night sweats or cough. She also had palpable right sided sub-maxillary lymphadenopathy.

This young patient was also diagnosed rapidly with probable TB conjunctivitis, contracted by direct contact with the lesions on her mother's face repeatedly over many years.

Sputums were not taken because neither had respiratory symptoms and it was felt it would not change the treatment plan. 'Point of Care' HIV and malaria tests were negative. Both were commenced on standard TB treatment immediately, and admitted for observation. Within 48 hours the itching lesions on the face had ceased to itch. Within a short period the girl, who had not attended school for 3 years due to vision impairment, removed her sunglasses and was comfortable in the sunlight. Once able to open her eyes, it was noted that she had phlyctenular kerato-conjunctivitis, an inflammation of the conjunctiva and cornea caused by the mycobacteria, which has specific clinical features and may result in scarring and vision loss after healing. For this reason treatment should include multidrug TB treatment *in combination* with topical and oral corticosteroids. TB uveitis was also diagnosed, as the edges of her pupils had visible nodules. Upon discharge 1 week later, her visual acuity was 36/3 (left) and 12/3 (right), with possible permanent damage caused by the uveitis.

I spent some time talking to this family via a Tetum translator. They are subsistence farmers, growing corn and other vegetables, for their own needs and also to sell locally as their only source of income. The daughter is the eldest of 4 children with the other 3 being cared for by extended family during the time of the mother and daughter's hospitalisation. No other family had any signs or symptoms of TB. The only contact tracing undertaken is to ask about any signs or symptoms of TB and recommend medical review for anyone reporting and signs or symptoms.

Upon questioning, I was told that they live in a small concrete, ground-level home in a rural area. My observations in Dili were that those with a better standard of living have concrete style homes, while many live in thatched-roof, mud-floor, bamboo huts without running water or sanitation.

The 2 patients had visited many clinicians and healers over years, including at 2 sub-district hospitals, seeking a diagnosis and treatment. In 2010 they spent a week as in-patients, where they were given unknown tablets and treatments with no improvement.

The journey from their home was approximately 250 kilometres and cost 8 US dollars each on a bus which took approximately 5 hours. They stayed with family in Dili and first attended a private clinic in Dili but were then advised to attend BPH.

This case highlighted to me the difficulty of diagnosing a relatively rare form of a common illness (which TB is in East Timor) because of limited medical capacity, education and resources.

Issues working at Bairo Pite Hospital included an extreme shortage of even the most basic supplies such as gloves, masks, medications and dressings. Utilities are extremely basic. Taps and water outlets are damaged and liquid soap is sometimes watered down so much that it does not lather up.

Coming from a low-prevalence, high-resourced TB Control program in Australia, the experiences I had at BPH were informative, astonishing and life-changing on many levels. I would highly recommend the experience to gain knowledge and insight, for anyone genuinely interested in global health particularly in our geographical region.

Reference

1. WHO. (http://www.who.int/countries/tls/en/)

Correspondence; for those wanting more information contact Helen at: tinders@iinet.net.au.

Leprosy - a case report

Charles Douglas, Centre for Disease Control, Darwin

A 51 year old man presented to the Emergency Department (ED) of Royal Darwin Hospital (RDH) complaining of left sided back pain. He was a crewmember on board an asylum seeker boat that arrived in Australia some weeks earlier and had been transferred to Darwin 2 days previously.

He reported lower back pain for 1 month which was made worse by movement. The pain was getting more severe and was not responding to paracetamol.

He also reported a long history of constipation and haemorrhoids but no other significant illnesses.

On examination his blood pressure was 150/100, he was tender on his left lower back, had reduced sensation peri-anally and a small reducible haemorrhoid. No other abnormalities were noted at the time. He was diagnosed with musculo-skeletal pain and an MRI of the spine was ordered. He was discharged with analgesia and a recommendation to provide regular laxatives.

He re-presented to ED 4 days later with increasing back pain and the referral letter also mentioned headaches, body aches and a rash.

An observant member of staff noticed the rash and suggested it looked like leprosy. The patient reported that the rash had been present for 1 month, was slightly painful, non-pruritic and that he possibly had some decreased sensation.

An Infectious Diseases consultant with considerable experience with leprosy was asked to review him. The report shows that he had 'multiple annular skin lesions over torso, hypo pigmented, not anaesthetic, about 15cm in diameter, darkened edges, not raised or nodular, some patches appear slightly oedematous / raise but this was subtle' He was also noted to have thickened post-auricular nerves bilaterally and thickened ulnar nerves bilaterally.

A provisional diagnosis of leprosy was made and he was referred to the tuberculosis (TB)/ leprosy clinic the following day for further investigation.

Slit skin smears were taken from both earlobes and were smear positive for AFB (see Figure 1). PCR tests on a punch biopsy of one of the skin lesions and swabs from both nostrils tested positive for *Mycobacterium leprae.* He was therefore diagnosed as having multibacilliary leprosy.[1]

Figure 1. Ziehl-Neelson stain for AFB in slit skin smears

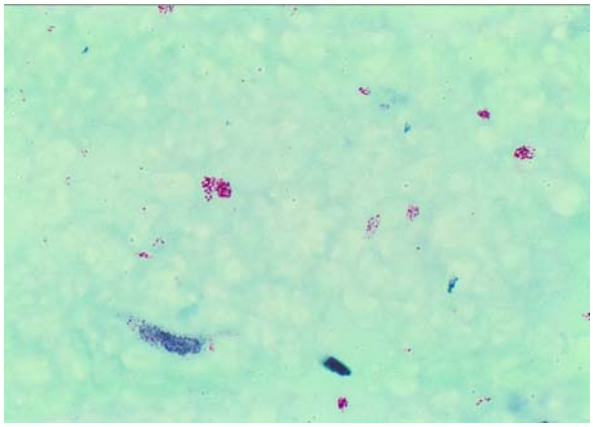

Photo courtesy of Dae Sharrock Royal Darwin Hospital Microbiology.

The patient was commenced on treatment on 13 May 2013. Initially he was prescribed daily oral doses of rifamipicin 450mg, dapsone 100mg and clofazimine 50mg plus an extra 300mg clofazimine monthly. All doses were supervised. Ideally he would receive 24 months treatment.[1]

He was further investigated and did not have evidence of TB or HIV.

Skin scrapings from a lesion that was separate from and morphologically distinct from his leprosy rash demonstrated *Malassezia furfur* and he was treated for tinea versicolor.

Due to worsening back pain radiating down his legs he was suspected of having a Type 1 reaction and was started on prednisolone. This resulted in a rapid reduction in his back and leg pain.

There is no good evidence as to the optimal length of steroid treatment for Type 1 reactions, however the WHO recommends 12 weeks in total.[2] A review of clinical trials[3] found that in borderline leprosy 5 months treatment with prednisolone was superior to 3 months treatment. It is recommended in the *NT Guidelines* that people being treated for Type 1 reactions receive 9 months of prednisolone[1] but it became apparent that this gentleman was soon to leave the country. In order to avoid the risk of an Addisonian crisis if the steroid was withdrawn abruptly he was put onto a more accelerated tapering prednisolone regimen. It was agreed to delay his departure from Australia until he had been successfully weaned off his prednisolone.

The patient was considerably improved when last seen on 2 July 2013 and he departed Australia on 5 July 2013 with 2 months' treatment in blister packs. An Australian non-government organisation has a contract to make an initial appointment at a clinic in the home towns of patients with ongoing issues. This was said to have been done in the case of this patient, however no feed-back has been received.

Issues raised by this case include:

1. A rash in people from countries with a high prevalence of leprosy should have leprosy in the differential diagnosis.

   Currently leprosy continues to have pockets of high burden in Angola, Brazil, the Central African Republic of the Congo, India, Madagascar, Mozambique, Nepal, and the United Republic of Tanzania. Leprosy is also present in Timor-Leste and numerous other countries in the Southeast Asian region.[1]
2. As the rash in leprosy is not always anaesthetic, looking for other signs of leprosy when any rash is present is recommended.
3. Consideration should be given to including a skin check as part of the induction medical for irregular maritime arrivals.
4. A conflict of interest can arise when there is an impending departure to overseas destinations of people with diseases that have a public health consequence as well as a consequence for the individual concerned if left partially treated. In many cases the individual is also eager to return home to his or her family.
5. Arranging continuity of leprosy treatment abroad is often difficult.

Acknowledgements

I would like to acknowledge those giving clinical or laboratory input to this case including Dr Emma Spencer, Dr Helena White and scientist Dae Sharrock.

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Abstracts from peer reviewed published articles related to the Northern Territory

STI in remote communities: improved and enhanced primary health care (STRIVE) study protocol: a cluster randomised controlled trial comparing 'usual practice' STI care to enhanced care in remote primary health care services in Australia

J. Ward, S. McGregor, R. Guy, A. Rumbold, L. Garton, B. Silver et al.

BMC Infectious Diseases 2013, 13:425 doi:10.1186/1471-2334-13-425

Background: Despite two decades of interventions, rates of sexually transmissible infections (STI) in remote Australian Aboriginal communities remain unacceptably high. Routine notifications data from 2011 indicate rates of chlamydia and gonorrhoea among Aboriginal people in remote settings were 8 and 61 times higher respectively than in the non-Indigenous population.

Methods/design: STRIVE is a stepped-wedge cluster randomised trial designed to compare a sexual health quality improvement program (SHQIP) to usual STI clinical care delivered in remote primary health care services. The SHQIP is a multifaceted intervention comprising annual assessments of sexual health service delivery, implementation of a sexual health action plan, six-monthly clinical service activity data reports, regular feedback meetings with a regional coordinator, training and financial incentive payments. The trial clusters comprise either a single community or several communities grouped together based on geographic proximity and cultural ties. The primary outcomes are: prevalence of chlamydia, gonorrhoea and trichomonas in Aboriginal residents aged 16–34 years, and performance in clinical management of STIs based on best practice indicators. STRIVE will be conducted over five years comprising one and a half years of trial initiation and community consultation, three years of trial conditions, and a half year of data analysis. The trial is currently being implemented in 68 remote Aboriginal health services in the Northern Territory, Queensland and Western Australia.

Discussion: STRIVE is the first cluster randomised trial in STI care in remote Aboriginal health services. The trial will provide evidence to inform future culturally appropriate STI clinical care and control strategies in communities with high STI rates.

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Blood-borne viruses in the haemodialysis-dependent population attending Top End Northern Territory facilities 2000–2009

J. Davies, Z. Jabbar, F. Gagan and R. Baird

Nephrology 17 (2012):501–507

Summary: This paper is an audit of viral infectious serology in a predominantly Indigenous dialysis service in the Northern Territory. Its value relates to documentation of previous exposure, HBcAb, and current HBsAg positivity in a significant proportion of this population and, on the other hand, low seroconversion rates for haemodialysis patients positive for HBsAg managed with current non-isolation unit strategies.

Aim: To describe the incidence and prevalence of blood-borne viruses (BBV) including: hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV) and human T-cell leukaemia virus type-1 (HTLV) in the haemodialysis-dependent population of the Top End of the Northern Territory (TENT).

Methods: We retrospectively reviewed the serology of BBV in a longitudinal fashion in the haemodialysis-dependent population treated in the TENT of Australia from 2000 to 2009 inclusive. HBV, HCV, HIV and HTLV serology on commencement of dialysis and at exit or January 2010, whichever was earlier, as well as demographic details were collected. Patients with a change in serological status had all serology reviewed.

Results: Four-hundred and forty patients were included in the analysis. Of these, 84.3% were Indigenous and 55.4% female, with a median

age of 50 (IQR 43–59) years at the commencement of haemodialysis. Evidence of past HBV infection was documented in 42.7% and 8.9% were hepatitis B surface antigen-positive. Positive serology for HTLV was documented in 2.2%, 1.6% were hepatitis C antibody-positive and no individual was HIV-positive. Three patients had a definite change in their HBV serology over time; this equates to an absolute seroconversion risk of 0.1 per 100 person years or 0.0006 per dialysis episode.

Conclusions: In this cohort, there was a high rate of past and current hepatitis B infection but low rates of seroconversion while on haemodialysis.

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Are Australian sexual health clinics attracting priority populations?

H. Ali, B. Donovan, C. Fairley, N. Ryder, A. McNulty, M. Chen, L. Marshall, C. O'Connor, B. Dickson, A. Grulich, M. Hellard, J. Kaldor and R. Guy on behalf of the ACCESS Collaboration

Sexual Health August 2013
http://dx.doi.org/10.1071/SH13066

Abstract. To answer a key question ('Are Australian sexual health clinics attracting priority populations?'), we used data from 44 Australian sexual health clinics between 2004 and 2011. We assessed the proportion of patients that were from priority populations (deemed to be at risk of sexually transmissible infections) and compared this to their proportions in the general population using data from Australian Bureau of Statistics and the Australian Study of Health and Relationships. A c2-test was used. A total of 278 154 new patients attended during 2004–2011. The proportions from each priority population were significantly higher ($P < 0.01$ for all) than for the general population: young people aged 15–29 years (58.1% *v.* 20.1%), men who have sex with men (26.0% *v.* 6.0%), female sex workers (10.8% *v.* 0.5%), and Aboriginal and Torres Strait Islander people (4.2% *v.* 2.3%). This study confirms that Australian sexual health clinics attract higher proportions of priority populations and are thus meeting their mandate as defined in the 2010–2013 National Sexually Transmissible Infections Strategy.

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Intussusception Risk and Disease Prevention Associated With Rotavirus Vaccines in Australia's National Immunisation Program. (English)

J.B. Carlin, K. Macartney, K.J. Lee, H.E. Quinn, J. Buttery, R. Lopert, J. Bines, and P. McIntyre.

Clinical Infectious Diseases: An Official Publication Of The Infectious Diseases Society Of America [Clin Infect Dis], ISSN: 1537-6591, 2013 Aug 19; PMID: 23964090

Background. Estimates of the risk of intussusception (IS) associated with currently licensed rotavirus vaccines (RV1, Rotarix®, GSK, and RV5, RotaTeq®, Merck) diverge. Contemporaneous introduction of both vaccines in Australia enabled a population-based assessment of risk.

Methods. Confirmed cases of IS in infants 1-<12 months were identified from national hospitalisation databases, supplemented by active hospital-based surveillance from July 2007-June 2010. Vaccination histories were verified by the Australian Childhood Immunisation Register, which was also used to identify age-matched controls. Self-controlled case-series and case-control methods were used to assess risk of IS associated with both vaccines in pre-specified periods post-vaccination. The estimated burden of vaccine-attributable IS was compared with estimated reductions in gastroenteritis hospitalisations.

Results. Based on 306 confirmed cases of IS, the relative incidence (RI) of intussusception in the 1-7 day period following the first vaccine dose, was 6.8 (95% confidence interval [CI] 2.4 to 19.0, p<0.001) for RV1, and 9.9 (95% CI 3.7 to 26.4, p<0.001) for RV5. There was a smaller increased risk 1-7 days following the second dose of each vaccine. The case-control analysis gave similar results. We estimate an excess of 18 IS cases and >6,500 fewer gastroenteritis hospitalisations in young children annually in Australia following vaccine introduction.

Conclusions. We found a similarly increased risk of IS following both vaccines but the balance of benefits and risks at population level was highly favourable, a finding likely to extend

to other settings despite varying incidence of IS and potentially higher morbidity and mortality from both gastroenteritis and intussusception.

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No evidence of increasing *Haemophilus influenzae* non-b infection in Australian Aboriginal children

R.I. Menzies, P. Markey, R. Boyd, A.P. Koehler and P.B. McIntyre

International Journal of Circumpolar Health 2013, Vol 72. http://www.circumpolarhealthjournal.net/index.php/ijch/rt/printerFriendly/20992/html

Background: High, or increasing, rates of invasive *Haemophilus influenzae* (Hi) type a disease have been reported from North American native children from circumpolar regions, raising the question of serotype replacement being driven by vaccination against Hi type b (Hib). Indigenous Australians from remote areas had high rates of invasive Hib disease in the past, comparable to those in North American Indigenous populations.

Objective: Evaluate incidence rates of invasive Hi (overall and by serotype) in Indigenous Australian children over time.

Design: Descriptive study of Hi incidence rates by serotype, in the Northern Territory (NT) and South Australia (SA) from 2001 to 2011. Comparison of NT data with a study that was conducted in the NT in 1985_1988, before Hib vaccine was introduced.

Results: The average annual rate of invasive Hi type a (Hia) disease in Indigenous children agedB5 years was 11/100,000 population. Although the incidence of Hi infection in Indigenous children in 2001_2003 was lower than during 2004_2011, this may be due to changes in surveillance. No other trend over time in individual serotypes or total invasive Hi disease, in Indigenous or non-Indigenous people, was identified. Compared to 1985_1988, rates in 2001_2011 were lower in all serotype groupings, by 98% for Hib, 75% for Hia, 79% for other serotypes and 67% for non-typeable Hi.

Conclusions: There is no evidence of increases in invasive disease due to Hia, other specific non-b types, or non-typeable Hi in Australian Indigenous children. These data suggest that the increase in Hia some time after the introduction of Hib vaccine, as seen in the North American Arctic Region, is not common to all populations with high pre-vaccine rates of invasive Hib disease. However, small case numbers and the lack of molecular subtyping and PCR confirmation of pre-vaccine results complicate comparisons with North American epidemiology.

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Impact of swimming on chronic suppurative otitis media in Aboriginal children: a randomised controlled trial

A.T.N. Stephen, A.J Leach, P.S. Morris

MJA 199 (1) 8 July 2013; 51-55

Objectives: To measure the impact of 4 weeks of daily swimming on rates of ear discharge among Aboriginal children with a tympanic membrane perforation (TMP) and on the microbiology of the nasopharynx and middle ear.

Design, **setting and participants:** A randomised controlled trial involving 89 Aboriginal children (aged 5–12 years) with a TMP, conducted in two remote Northern Territory Aboriginal communities from August to December 2009.

Intervention: 4 school weeks of daily swimming lessons (45 minutes) in a chlorinated pool.

Main outcome measures: Proportions of children with ear discharge and respiratory and opportunistic bacteria in the nasopharynx and middle ear. Results: Of 89 children randomly assigned to the swimming or non-swimming groups, 58 (26/41 swimmers and 32/48 non-swimmers) had ear discharge at baseline. After 4 weeks, 24 of 41 swimmers had ear discharge compared with 32 of 48 non-swimmers (risk difference, -8% (95% CI, - 28% to 12%). There were no statistically significant changes in the microbiology of the nasopharynx or middle ear in swimmers or non-swimmers. Streptococcus pneumoniae and nontypeable Haemophilus influenzae were the dominant organisms cultured from the nasopharynx, and H. influenzae,

Staphylococcus aureus and Pseudomonas aeruginosa were the dominant organisms in the middle ear.

Conclusions: Swimming lessons for Aboriginal children in remote communities should be supported, but it is unlikely that they will substantially reduce rates of chronic suppurative otitis media and associated bacteria in the nasopharynx and middle ear. However, swimming was not associated with increased risk of ear discharge and we found no reason to discourage it.

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Variability in disease burden and management of rheumatic fever and rheumatic heart disease in two regions of tropical Australia.

Rémond MG, Severin KL, Hodder Y, Martin J, Nelson C, Atkinson D, Maguire GP

Internal Medicine Journal [Intern Med J] 2013 Apr; Vol. 43 (4), pp. 386-93.

Background: Acute rheumatic fever (ARF) and rheumatic heart disease (RHD) contribute to Aboriginal Australian and Torres Strait Islander health disadvantage. At the time of this study, specialist ARF/RHD care in the Kimberley region of Western Australia was delivered by a broad range of providers. In contrast, in Far North Queensland (FNQ), a single-provider model was used as part of a coordinated RHD control programme.

Aims: To review ARF/RHD management in the Kimberley and FNQ to ascertain whether differing models of service delivery are associated with different disease burden and patient care.

Methods: An audit of ARF/RHD management. Classification and clinical management data were abstracted from health records, specialist letters, echocardiograms and regional registers using a standardised data collection tool.

Results: Four hundred and seven patients were identified, with 99% being Aboriginal and/or Torres Strait Islanders. ARF without RHD was seen in 0.4% of Aboriginal and/or Torres Strait Islander residents and RHD in 1.1%. The prevalence of RHD was similar in both regions but with more severe disease in the Kimberley. More FNQ RHD patients had specialist review within recommended time frames (67% vs 45%, $\chi(2)$, P & lt; 0.001). Of patients recommended benzathine penicillin secondary prophylaxis, 17.7% received ≥80% of scheduled doses in the preceding 12 months. Prescription and delivery of secondary prophylaxis was greater in FNQ.

Conclusions: FNQ's single-provider model of specialist care and centralised RHD control programme were associated with improved patient care and may partly account for the fewer cases of severe disease and reduced surgical procedures and other interventions observed in this region.

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Utility of auscultatory screening for detecting rheumatic heart disease in high-risk children in Australia's Northern Territory

K.V. Roberts, A.D.H. Brown, G.P. Maguire, D.N. Atkinson, and J. Carapetis

MJA 2013; 199: 196–199 doi: 10.5694/mja13.10520

Objectives: To evaluate the utility of auscultatory screening for detecting echocardiographically confirmed rheumatic heart disease (RHD) in high-risk children in the Northern Territory, Australia.

Design: Cross-sectional screening survey.

Setting: Twelve rural and remote communities in the NT between September 2008 and June 2010.

Participants: 1015 predominantly Indigenous schoolchildren aged 5–15 years.

Intervention: All children underwent transthoracic echocardiography, using a portable cardiovascular ultrasound machine, and cardiac auscultation by a doctor and a nurse. Sonographers and auscultators were blinded to each others' findings and the clinical history of the children. Echocardiograms were reported offsite, using a standardised protocol, by cardiologists who were also blinded to the clinical findings.

Main outcome measures: Presence of a cardiac murmur as identified by nurses (any murmur) and doctors (any murmur, and "suspicious" or "pathological" murmurs), compared with echocardiogram findings. RHD was defined according to the 2012 World Heart Federation criteria for echocardiographic diagnosis of RHD.

Results: Of the 1015 children screened, 34 (3.3%) had abnormalities identified on their echocardiogram; 24 met echocardiographic criteria for definite or borderline RHD, and 10 had isolated congenital anomalies. Detection of any murmur by a nurse had a sensitivity of 47.1%, specificity of 74.8% and positive predictive value (PPV) of 6.1%. Doctor identification of any murmur had 38.2% sensitivity, 75.1% specificity and 5.1% PPV, and the corresponding values for doctor detection of suspicious or pathological murmurs were 20.6%, 92.2% and 8.3%. For all auscultation approaches, negative predictive value was more than 97%, but the majority of participants with cardiac abnormalities were not identified. The results were no different when only definite RHD and congenital abnormalities were considered as true cases.

Conclusions: Sensitivity and positive predictive value of cardiac auscultation compared with echocardiography is poor, regardless of the expertise of the auscultator. Although negative predictive value is high, most cases of heart disease were missed by auscultation, suggesting that cardiac auscultation should no longer be used to screen for RHD in high-risk schoolchildren in Australia.

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Experimental comparison of aerial larvicides and habitat modification for controlling disease-carrying Aedes vigilax mosquitoes. (English)

S.C. de Little, G.J. Williamson, D.M. Bowman, P.I. Whelan, B.W. Brook, and C.J. Bradshaw.

Pest Management Science [Pest Manag Sci], ISSN: 1526-4998, 2012 May; Vol. 68 (5), pp. 709-17; PMID: 22076747;

Background: Microbial and insect-growth-regulator larvicides dominate current vector control programmes because they reduce larval abundance and are relatively environmentally benign. However, their short persistence makes them expensive, and environmental manipulation of larval habitat might be an alternative control measure. Aedes vigilax is a major vector species in northern Australia. A field experiment was implemented in Darwin, Australia, to test the hypotheses that (1) aerial microbial larvicide application effectively decreases Ae. vigilax larval presence, and therefore adult emergence, and (2) environmental manipulation is an effective alternative control measure. Generalised linear and mixed-effects modelling and information-theoretic comparisons were used to test these hypotheses.

Results: It is shown that the current aerial larvicide application campaign is effective at suppressing the emergence of Ae. vigilax, whereas vegetation removal is not as effective in this context. In addition, the results indicate that current larval sampling procedures are inadequate for quantifying larval abundance or adult emergence.

Conclusions: This field-based comparison has shown that the existing larviciding campaign is more effective than a simple environmental management strategy for mosquito control. It has also identified an important knowledge gap in the use of larval sampling to evaluate the effectiveness of vector control strategies.

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Outcomes for Indigenous and non-Indigenous patients who access treatment for hepatitis C in the Top End of the Northern Territory

J. Davis, A. Kulatunga and K. Hajkowicz

MJA 199 (1) 8 July 2013
doi: 10.5694/mja13.10083

Summary of letter to the editor: Chronic hepatitis C virus (HCV) is a leading cause of the need for liver transplantation and of liver-related death, but curative treatments are available. Ethnicity is a major determinant of treatment responsiveness, with the lowest sustained virological response (SVR) rates in African patients, and highest in Asian patients. This difference is accounted for by racial differences in polymorphisms in the interleukin-28B (*IL28B*) gene. It is unknown how common these polymorphisms are in Indigenous Australians.

The hepatitis C treatment service for the Top End of the Northern Territory is run from a community-based sexual health clinic in Darwin. Our perception was that Indigenous people rarely accessed the service or received treatment for HCV infection. We were concerned that due to social, cultural and linguistic barriers Indigenous people who accessed the service may be less likely to commence treatment and to successfully complete treatment and achieve an SVR. We performed a retrospective case-note audit to determine the number of Indigenous people accessing the hepatitis C treatment service and their characteristics and treatment outcomes.

From 1 January 2006 to 31 December 2010, 243 patients were seen on at least 2 occasions for assessment of HCV infection; all were adults and 22 (9%) were Indigenous. During the audit period, HCV infection was treated with pegylated interferon- plus ribavirin for 24–48 weeks. There were no significant differences in the proportion of patients who went on to commence and complete treatment, and to achieve an SVR, between Indigenous and non-Indigenous patients (Box). Of 5 Indigenous patients tested for *IL28B* genotype, all had the favourable CC polymorphism at the rs12979860 locus. Compared with the unfavourable TT and CT polymorphisms, the CC polymorphism at this locus is associated with at least a twofold higher chance of achieving a cure of HCV with interferon treatment, due to enhanced host immune responsiveness to interferon.

Indigenous people in the NT who access hepatitis C treatment services have a similar chance of achieving a cure (SVR) to non-Indigenous people. This may be partly because they are likely to carry the favourable CC polymorphism at the *Il28B* gene.

Indigenous compared with non-Indigenous patients who attended a hepatitis C treatment service on at least two occasions for assessment of HCV infection*

	Indigenous (*n* = 22)	Non-Indigenous (*n* = 221)	*P*
Age, median (interquartile range)	41.0 (36.2–45.0)	47.3 (39.3–52.1)	0.14
Men	15/22 (68% [45%–86%])	144/221 (65% [58%–71%])	0.78
HCV genotype 1	10/18 (56% [31%–78%])	87/173 (50% [43%–58%])	0.67
Commenced HCV treatment	11/22 (50% [28%–72%])	99/221 (45% [38%–52%])	0.58
Completed HCV treatment	9/11 (82% [48%–98%])	80/99 (81% [72%–88%])	0.94
Achieved sustained virological response†	4/8 (50% [16%–84%])	54/88 (61% [50%–72%])	0.53

HCV = hepatitis C virus. * Data are number/denominator (% [95% CI]) unless otherwise indicated. † Denominators represent those patients for whom 6-month post-treatment blood test results were available.

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Hepatitis B prevalence and prevention: antenatal screening and protection of infants at risk in the Northern Territory

R. Schultz, F. Romanes, and V. Krause

Australian and New Zealand Journal of Public Health (impact factor: 1.2). 01/2009; 32(6):575-6. DOI:10.1111/ j.1753-6405.2008.00313.x

Summary of letter to the editor: Estimates of the prevalence of HBV infection, as shown by detection of hepatitis B surface antigen (HBsAg), are required to monitor the effectiveness of HBV prevention strategies, and the need for treatment services.

We aimed to estimate antenatal population-based HBV prevalence in NT by Indigenous status, and monitor the implementation of screening and immunisation recommendations.

We examined hospital records of all women who gave birth at Royal Darwin Hospital (RDH) in 2003 and at Alice Springs Hospital (ASH) in 2005. These two hospitals delivered 63% of NT births and 71% of Indigenous births in 2004.

We documented antenatal screening for HBsAg, and women who were HBsAg positive. For HBsAg positive women, presence of HBeAg, a marker of higher infectivity was noted. We then reviewed the immunisation records of infants born to HBsAg positive women.

Hospital records of 1,473 of 1,492 births at RDH in 2003 (98.7%); and 796 of 797 births at ASH in 2005 (99.9%) were reviewed. HBsAg results from the current pregnancy were located for 94.9% and 98.2% of the women in RDH and ASH respectively. Any record of HBsAg testing was available for 95.4% and 99.5% of the women.

There were 30 and 16 surviving infants born to HBsAg positive women at RDH in 2003 and ASH in 2005. Immunisation provision is shown in Table 1.

As HBsAg prevalence was similar in the women at each hospital the birth cohorts were aggregated.

Overall, 3.7% of Indigenous and 0.98% of non-Indigenous women were HBsAg positive. HBsAg prevalence by hospital and indigenous status, together with HBeAg prevalence are shown in Table 2.

The comparable HBsAg prevalence results in hospitals at each end of NT suggest HBsAg prevalence may be similar NT wide. This is notable because the 1989 survey found different prevalences in different regions of NT.

Antenatal screening and hospital management to prevent transmission of HBV were of high standards in both RDH and ASH. Over 90% of women were screened, and close to 90% of infants born to HBsAg positive women were appropriately managed. Further doses of vaccine according to Australian recommendations were less timely.

The protection provided by this immunisation program is uncertain. Effectiveness will be documented by the implementation of the *9th Australian Immunisation Handbook*, which recommends testing hepatitis B status of infants born to HBsAg/ HBeAg positive women.

Both immunisation and treatment services have roles in controlling the burden of HBV. Antenatal screening provides a convenient sample for surveillance of seroprevalence. Monitoring of immunisation provision, through testing of high risk infants after immunisation, will assure the quality of immunisation services.

Table 1: Infants born to HBsAg positive women who received hepatitis B immunisation doses.

Birth cohort	Immunoglobulin	Birth dose of hepatitis B vaccine	3 doses by 12 months	3 doses by 15 months	4 doses at appropriate intervals
RDH 2003	30/30 (100%)	28/30 (93%)	28/30 (93%)	28/30 (93%)	12/30 (40%)
ASH 2005	15/16 (94%)	14/16 (87%)	9/16 (56%)	14/16 (87%)	8/14 (50%)

Table 2: Prevalence [95% confidence interval] of HBsAg and HBeAg among women who gave birth at Royal Darwin Hospital (RDH) in 2003 and at Alice Springs Hospital (ASH) in 2005, and aggregated results.

	HBsAg Prevalence		HBeAg among HBsAg positive women	
	Indigenous	Non-indigenous	Indigenous	Non-indigenous
RDH 2003 births	22/540 = 4.1% [2.6%, 6.2%]	10/862=1.2% [0.6%, 2.2%]	[a]14/21=67% [43%, 85%]	2/8=25% [4.5%, 64%]
ASH 2005 births	14/433 = 3.2% [1.8%, 5.5%]	2/359=0.6% [0.01%, 2.2%]	[a]7/13 = 53% [26%, 80%]	0/2=0.0% [0.0%, 80%]
Aggregated results	36/973=3.7% [2.6%, 5.1%]	12/1221=0.98% [0.53%, 1.8%]	21/34=62% [44%,77%]	2/10=20% [3.5%, 56%]

Note: (a) women whose HBeAg status was not recorded are excluded from HBeAg prevalence estimate

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Northern Territory Government

Centre for Disease Control

September 2013

Australian bat lyssavirus

What is Australian bat lyssavirus (ABL)?

ABL is a virus found in bats which is similar to the rabies virus. It causes a disease which like rabies is invariably fatal. There have only been 3 human cases of ABL disease in Australia with the first case occurring in 1996 and all cases have died. The virus has been found in both fruit bats (flying foxes) and insect eating bats in Australia.

How is it spread?

ABL is usually transmitted to humans via bites or scratches. Injuries causing breaks in the skin allow direct access of the virus in bat saliva to exposed tissue. ABL can also be transmitted through direct saliva contact with mucous membranes (eyes, nose and mouth).

The virus cannot survive more than a few hours outside the bat. Contact such as patting bats or contact with their urine, faeces or blood does not constitute a risk for ABL, however avoiding exposure to them is recommended as bats can carry other micro-organisms that cause human disease.

Fruit freshly picked from bat infested trees, should be washed thoroughly with soap and water before eating.

There is no risk of ABL infection from eating flying foxes that have been thoroughly cooked.

Who is at risk?

Anyone who handles bats is potentially at risk through scratches, bites and direct saliva contact to the mucous membranes of your mouth, eyes or nose.

How is it prevented?

The best protection is to avoid handling bats. Do not touch or try to rescue bats.

Anyone who regularly handles or cares for bats (members of bat care groups, wildlife officers, vets etc) should be vaccinated prior to exposure. Routine vaccination is not recommended for other people.

If you find a sick or injured bat, contact your nearest wildlife rescue service for assistance.

People designated to handle bats should:

- Ensure they are vaccinated before handling bats
- Cover any unhealed cuts or wounds
- Wear puncture proof gloves and long sleeved clothing of thick material and protective glasses
- Avoid handling any new bat in their care for 24 hours and if it displays signs of illness take it to the vet
- Pick up sick bats by wrapping them in thick cloth to reduce the chance of being bitten or scratched
- Take soap and water when rescuing bats so thorough cleaning of bites or scratches occurs as soon as possible.

If you are scratched or bitten

- Wash the wound thoroughly for a minimum of 5 minutes with soap under running water as soon as possible. Proper cleaning of the wound is the most effective way to reduce transmission of the virus. Apply an antiseptic solution after washing if possible (i.e. povidone-iodine).
- Cover the wound and seek medical attention *immediately*. Vaccination is still protective against ABL if given promptly.
- If you get bat saliva in your mouth, eyes or nose you should flush the area with water.
- Even if already vaccinated, medical attention should be sought as soon as possible for further (treatment) vaccine.

CENTRE FOR DISEASE CONTROL

- If the bat is available (dead or alive) and without putting yourself at any further risk of sustaining an injury, place it in a box and contact the CDC in your area to arrange testing of the bat. It may reduce the length of your treatment.

Symptoms of ABL in a sick bat

- Muscular weakness such as partial wing or hind limb paralysis
- Difficulty or inability to fly
- Unusually docile or unusually aggressive
- Relentless attachment to hands or heads of humans
- Depressed and unresponsive
- Unusually active during daylight.

Any bats with these symptoms should be reported to your nearest wildlife rescue service.

NB Not all ABL infected bats exhibit unusual behaviour.

Disposal of dead bats

If the bat had any of the above symptoms your nearest wildlife rescue service should be contacted for appropriate disposal of the body.

Other bats may be disposed of by placing them in a bag and burying them.

Although ABL is not thought to live long in a dead bat, precautions should be taken to avoid being scratched when disposing of the body.

For more information contact your nearest Centre for Disease Control.

Darwin	89228044
Katherine	89739049
Nhulunbuy	89870357
Tennant Creek	89624259
Alice Springs	89517540

Further fact sheets and treatment protocols are available at:

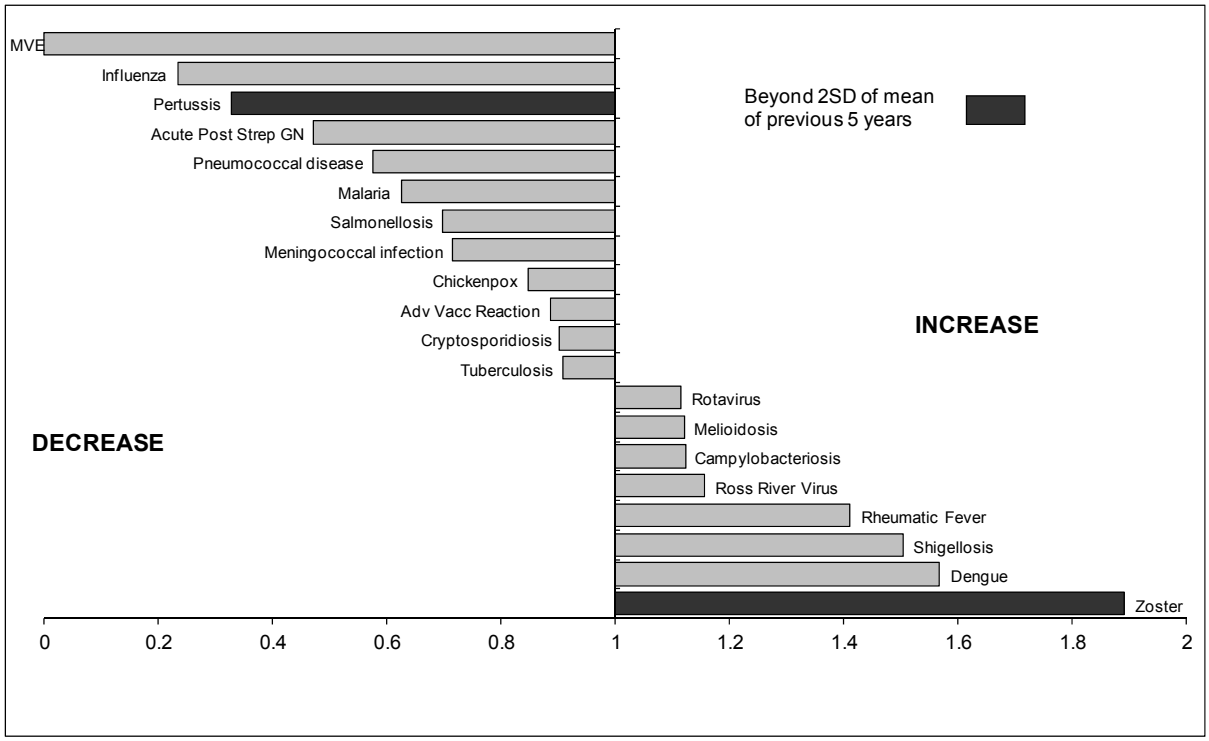
www.nt.gov.au/health/cdc

Australian bat lyssavirus

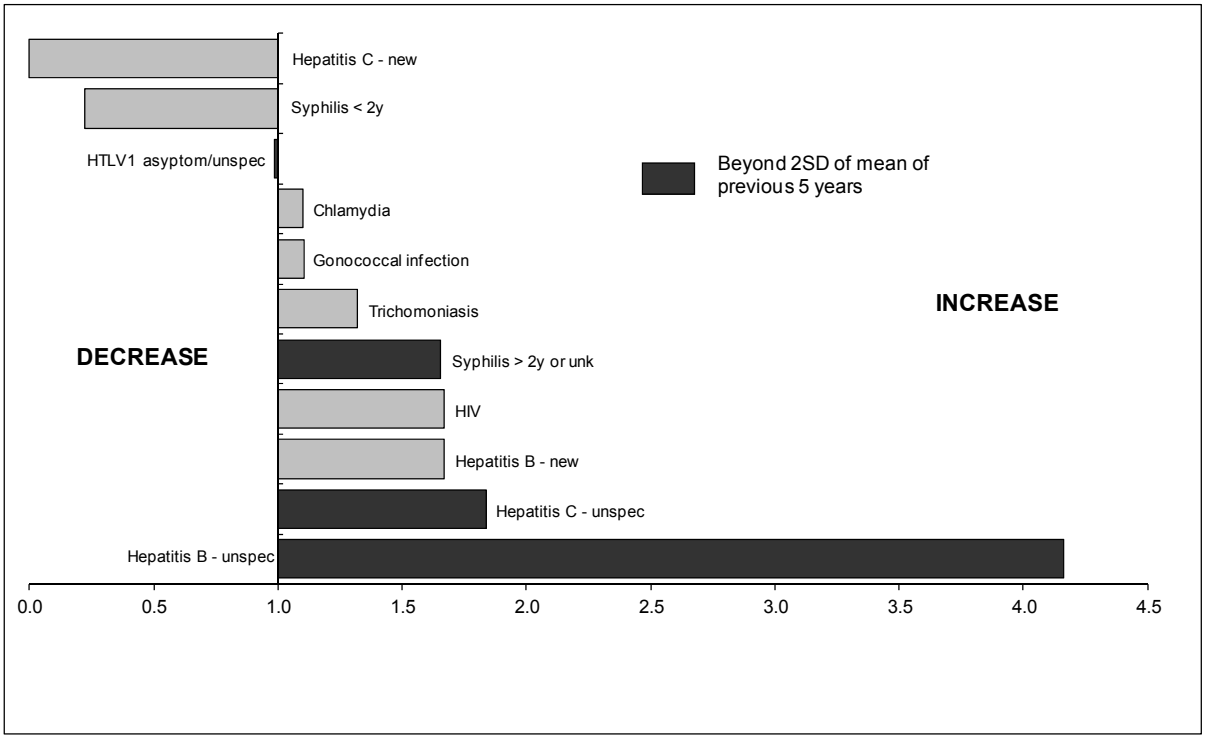
NT NOTIFICATIONS OF DISEASES BY ONSET DATE AND DISTRICTS
1 April - 30 June 2013 and 2012

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		N T	
	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013	2012
Acute post strep glomerulonephritis	3	1	0	5	1	3	1	4	0	0	5	13
Adverse vaccine reaction	4	3	0	1	8	11	0	0	2	0	14	15
Barmah Forest virus	14	0	0	0	131	14	11	0	14	1	170	15
Campylobacteriosis	30	10	0	1	29	31	1	2	2	0	62	44
Chickenpox	1	4	0	0	14	14	3	5	2	11	20	34
Chlamydia	246	159	30	14	369	332	34	49	72	98	751	652
Chlamydial conjunctivitis	1	0	0	0	1	4	0	1	0	1	2	6
Cryptosporidiosis	8	5	6	1	5	60	5	3	9	3	33	72
Dengue	0	1	0	0	15	13	1	0	0	1	16	15
Food/water borne disease	2	0	1	2	44	0	0	0	0	0	47	2
Gastroenteritis - related cases	9	0	0	0	14	0	0	0	0	0	23	0
Gonococcal conjunctivitis	2	0	0	0	1	0	0	0	0	0	3	0
Gonococcal infection	277	159	24	14	123	102	15	14	92	81	531	370
Group A strep invasive	7	1	0	1	5	10	1	2	1	0	14	14
Hepatitis A	0	0	0	0	0	1	0	0	0	0	0	1
Hepatitis B - chronic	10	4	0	0	4	5	5	5	0	1	19	15
Hepatitis B - new	1	0	1	0	0	1	0	0	0	0	2	1
Hepatitis B - unspecified	22	6	0	2	134	34	1	0	2	1	159	43
Hepatitis C - chronic	0	0	0	0	1	0	0	0	0	0	1	0
Hepatitis C - unspecified	5	6	1	0	79	27	0	1	5	1	90	35
***H. Influenzae* non-b**	1	2	0	0	0	0	0	0	0	0	1	2
HIV	0	3	0	0	6	4	0	0	0	0	6	7
HTLV1 asyptomatic/unspecified	14	11	1	0	0	0	0	0	0	0	15	11
HUS	0	0	0	0	1	0	0	0	0	0	1	0
Hydatid	0	0	0	0	1	0	0	0	0	0	1	0
Influenza	11	65	0	10	20	48	3	11	4	15	38	149
Legionellosis	0	0	0	0	1	0	0	0	0	0	1	0
Leprosy	1	0	0	0	1	0	0	0	0	0	2	0
Leptospirosis	0	0	0	0	3	0	0	0	0	0	3	0
Malaria	0	0	0	0	2	1	0	0	0	0	2	1
Melioidosis	0	0	0	0	10	9	1	0	0	1	11	10
Meningococcal infection	0	1	0	0	1	2	0	0	0	0	1	3
Non TB Mycobacteria	0	1	0	0	1	1	0	0	0	0	1	2
Pertussis	3	2	0	0	25	55	1	11	1	21	30	89
Pneumococcal disease	6	16	1	3	5	5	0	1	1	1	13	26
Q Fever	0	0	0	0	0	0	0	0	0	1	0	1
Rheumatic Fever	4	7	1	0	7	7	7	9	5	5	24	28
Ross River virus	2	2	0	0	70	50	2	1	3	9	77	62
Rotavirus	9	1	0	0	71	10	8	0	16	1	104	12
Salmonellosis	13	25	5	4	66	79	6	6	5	10	95	124
Shigellosis	21	11	4	3	3	4	3	0	3	1	34	19
Syphilis < 2years	1	3	0	1	2	1	0	0	0	0	3	5
Syphilis > 2years or unknown	9	3	0	0	34	13	0	1	3	2	46	19
Trichomoniasis	266	161	58	22	259	181	102	120	127	144	812	628
Tuberculosis	0	1	0	0	8	11	0	0	2	1	10	13
Typhoid	0	0	0	0	0	1	0	0	0	0	0	1
Varicella - unspecified	0	0	0	0	1	1	0	0	0	0	1	1
Yersiniosis	0	1	0	0	0	0	0	0	0	0	0	1
Zoster	12	7	1	0	43	21	3	2	8	8	67	38
Sum	**1,015**	**682**	**134**	**84**	**1,619**	**1,166**	**214**	**248**	**379**	**419**	**3361**	**2599**

Ratio of the number of notifications (2nd quarter 2013 cases to the mean of 2nd quarter cases 2008-12): selected diseases



Ratio of the number of notifications (2nd quarter 2013 cases to the mean of 2nd quarter cases 2008-12): sexually transmitted diseases



Comments on notifications

Pertussis

In the 2nd quarter 2013 there were only 30 pertussis cases notified compared to an expected 92 based on the 5 year mean. This represents a continuation of the welcomed decrease in pertussis cases noted in 2012 and reflects the end of the 2010-11 outbreak. Increased public awareness and better adult vaccination coverage may also have contributed to the decline.

Zoster

There were 67 notified cases of zoster during the 2nd quarter which is 90% more than the 5 year mean of 35. Notified cases have been increasing since the disease became notifiable in 2006 and is likely due to the gradual uptake of PCR testing.

Hepatitis and syphilis

The increase in the notifications of syphilis greater than 2 years or unknown duration, hepatitis B and hepatitis C was largely due to a high number of new diagnoses made in irregular maritime arrivals (IMAs). Of note, 32 out of the 46 cases of syphilis greater than 2 years or unknown duration, 107 of the 159 cases of unspecified hepatitis B and 43 of the 90 cases of unspecified hepatitis C were IMAs.

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NT malaria notifications April to June 2013

Liz Stephenson, CDC Darwin

There were 2 cases of malaria notified in the 2nd quarter of 2013. The following table provides details about where the infection was thought to be acquired, the infecting agent, whether chemoprophylaxis was used and where the patient lived.

No. cases	Origin of infection	Reason exposed	Agent	Chemoprophylaxis	NT region
1	Southern Sudan	Expatriate visiting relatives	*P. falciparum*	Yes	Darwin
1	Indonesia West Papua	Expatriate visiting relatives	*P. vivax*	No	Darwin

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Immunisation coverage for children aged 12-<15 months at 30 June 2013

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Fully vaccinated
Darwin	306	92.8%	92.8%	92.5%	91.8%	91.8%
Winnellie PO Bag	96	96.9%	96.9%	96.9%	96.9%	96.9%
Palm/Rural	242	91.3%	91.3%	91.3%	91.3%	91.3%
Katherine	114	88.6%	88.6%	88.6%	89.5%	88.6%
Barkly	22	100.0%	100.0%	100.0%	100.0%	100.0%
Alice Springs	137	88.3%	88.3%	88.3%	88.3%	88.3%
Alice Springs PO Bag	55	87.3%	87.3%	87.3%	87.3%	87.3%
East Arnhem	50	94.0%	94.0%	94.0%	94.0%	94.0%
NT	1022	91.7%	91.7%	91.6%	91.5%	91.4%
Australia	73719	92.0%	92.0%	91.9%	91.6%	91.5%

Immunisation coverage for children aged 24-<27 months at 30 June 2013

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% MMR	% Fully vaccinated
Darwin	297	94.9%	94.9%	93.6%	94.6%	93.9%	91.9%
Winnellie PO Bag	93	95.7%	95.7%	93.5%	95.7%	94.6%	93.5%
Palm/Rural	218	95.0%	95.0%	94.5%	95.0%	95.0%	93.6%
Katherine	94	98.9%	98.9%	98.9%	98.9%	98.9%	98.9%
Barkly	36	94.4%	94.4%	91.7%	94.4%	94.4%	91.7%
Alice Springs	116	92.2%	92.2%	91.4%	91.4%	91.4%	88.8%
Alice Springs PO Bag	49	95.9%	95.9%	98.0%	95.9%	98.0%	95.9%
East Arnhem	37	97.3%	97.3%	97.3%	97.3%	100.0%	94.6%
NT	940	95.2%	95.2%	94.4%	95.0%	94.9%	93.1%
Australia	72532	94.5%	94.5%	94.7%	94.0%	93.7%	92.2%

Immunisation coverage for children aged 60-<63 months at 30 June 2013

Region	Number in District	% DTP	% Polio	% MMR	% Fully vaccinated
Darwin	277	88.8%	89.5%	89.2%	88.1%
Winnellie PO Bag	66	95.5%	95.5%	95.5%	95.5%
Palm/Rural	240	91.7%	91.7%	92.9%	91.7%
Katherine	102	95.1%	95.1%	95.1%	95.1%
Barkly	19	94.7%	94.7%	94.7%	94.7%
Alice Springs	124	87.9%	87.9%	88.7%	87.9%
Alice Springs PO Bag	30	100.0%	100.0%	100.0%	100.0%
East Arnhem	46	93.5%	93.5%	93.5%	93.5%
NT	904	91.4%	91.6%	91.9%	91.2%
Australia	76239	92.4%	92.3%	92.1%	91.8%

Immunisation coverage at 30 June 2013

Compiled by Charles Strebor, CDC Darwin

Immunisation coverage rates for Northern Territory (NT) children by regions based on Medicare address postcode as estimated by the Australian Childhood Immunisation Register are shown on page 40.

Background information to interpret coverage

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

The cohort of children assessed at 12 to <15 months of age on 30 June 2013 were born between 1 January 2012 and 31 March 2012 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 2 or 3 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine. All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to <27 months of age on 30 June 2013 were born between 1 January 2011 and 31 March 2011 inclusive. To be considered fully vaccinated, these children must have received 3 or 4 valid doses of vaccines containing diphtheria, tetanus, pertussis, 3 doses of vaccines containing poliomyelitis antigens, either 3 or 4 doses of PRP-OMP Hib or 4 doses of another Hib vaccine, and 3 doses of hepatitis B vaccine and 1 dose of measles-mumps-rubella (MMR) vaccine. All vaccinations must have been administered by 24 months of age.

The cohort of children assessed at 60 to <63 months of age on 30 June 2013 were born between 1 January 2008 and 31 March 2008 inclusive. To be considered fully vaccinated, these children must have received 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of MMR vaccine. All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation and comment

The vaccination coverage rates for children in the NT are comparable with the national average for all age cohorts.

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

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Splashfest 2013

Meredith Neilson, CDC, Darwin

Centre for Disease Control (CDC) staff got into the 'swim' of things on Sunday 22 September at Splashfest. Splashfest is a fun day for kids and families at the Darwin Waterfront to celebrate Water Safety Week and to promote water safety messages.

CDC injury prevention staff promoted 2 main safety messages; stinger safety and avoidance of unsafe alcohol consumption when swimming or boating.

Stingers, or box jellyfish, can be found in our sea waters at any time but from now until the end of May 2014 they will be at their peak. An adult box jellyfish can have 40 or more tentacles, each up to 2 metres long. The tentacles are loaded with venom that can cause excruciating pain and extensive scarring and can effect the heart and even cause death. Staff urged people to steer clear of sea water to avoid stingers or to cover up appropriately if there is a need to be in the water, for example, to pull in boats.

Along with the Alcohol and Other Drugs team, CDC staff encouraged the safe use of alcohol when on the water, particularly when boating. The Alcohol and Other Drugs team provided great enthusiasm and excellent resources to promote the safe use of alcohol.

A big thank you to all the staff that attended! A great day was had by staff and families.

Disease Control staff updates July-September 2013

Top End

Dr Steven Skov has commenced a 6 month position as the Acting Chief Health Officer (CHO). He shares his time between the CHO and the Community Physician position at CDC. **Justine Glover** commenced a 6 month position as the Executive and Strategic Policy Officer for the CHO. **Meredith Neilson** from the Injury and Safety Unit of CDC is acting in Justine's position as the Senior Policy and Coordination Officer.

Infectious Diseases Registrar, **Dr Matthew Pittman,** has commenced a 6 month period in the Darwin Tuberculosis (TB) clinic and general CDC work taking over from Dr Rebecca Byrnes who has gone to the Haematology Unit at Royal Darwin Hospital. **Kimberley Caffery** from the Darwin TB unit has gone on 12 months maternity leave with **Beatrice Akello-Zweck** replacing Kimberly over this period. **Janelle Baker** has provided administrative assistance to the Darwin TB Unit for the last 4 months while staff have been on leave.

Dr Rosalind Webby has returned to her Head of Immunisation role after 12 months maternity leave while **Dr Helena White** has returned to the UK.

Congratulations to **Nina Kurucz** the new Section Head of Medical Entomology starting from August 2013.

Welcome to **Emily O'Kearney** who is the new Community Paediatric Project Officer working with Keith Edwards in the Community Paediatrics team. Emily comes from Melbourne and has a physiotherapy and public health background.

Roberta Smith is back-filling DaHye Baker as the Senior Administrative Assistant for CDC. DaHye has taken a 6 month position at the Corporate Support Bureau.

Eliza Dobie has commenced as the Sexual Health and Blood Borne Virus Unit Administrative Officer in Darwin. **Edwin Lubari** is now the Project Manager of the Adolescent Sexuality Education Project following **Michael Borenstein's** move to the Alcohol and Other Drugs program. The Remote Sexual Health Aboriginal Health Worker, **Florence Henaway**, has left the department to take a position in the private sector.

Welcome to **Terrance Guyula** who is the new public health Aboriginal health practitioner in sexual health in Gove. Terrance has a long history of working in the East Arnhem region.

Central Australia

Amy Bonanni has commenced as the new Trachoma Data and Administrative Officer in Alice Springs. Amy grew up in Alice Springs and has recently returned after travelling and working in the UK.

Lee Davis has retired from the Administrative Officer position at Tennant Creek where she has worked since 2007. She is planning to move to Perth to be closer to her family. **Leigh-ann Thomas** has replaced Lee Davis in the position. Leigh-ann is originally from Alice Springs but has lived in Tennant Creek for the past few years.

Alison Gray has started as the Rheumatic Heart Disease database coordinator in Alice Springs. Alison has a background in medical science and public health.