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More on drowning - including drowning deaths and efforts to reduce the drowning rates in the Northern Territory

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Abstract

The Northern Territory (NT) has the highest rate of drowning deaths in Australia. A report on non-intentional injury hospitalisations from water-related activities in the NT from 2001-2011 was published in the December 2014 Northern Territory Disease Control Bulletin. The report included a review of hospitalisations for drowning/submersion injury. This article focuses further on NT hospital admissions for drowning and reviews NT, national and global reports on drowning deaths. Efforts to reduce drowning rates in the NT and globally are discussed.

Key words: Drowning; water-related injury; hospitalisation; mortality

Drowning/submersion injury hospitalisation

The definition of drowning used in this and a previously published report is 'the process of experiencing respiratory impairment from submersion/immersion in liquid'.[1] Various outcomes can occur from drowning including death, survival with lasting effects of greater or lesser severity, or survival with no detectable consequences.[2] 'Near-drowning' or submersion refers to survived episodes of respiratory impairment from submersion/immersion in liquid. It can also refer to episodes in which a person nearly experiences respiratory impairment from submersion/immersion in liquid (for example, a person who becomes exhausted while swimming, but manages to reach a shore, perhaps with assistance).[2]

A previous article published in the December 2014 *Northern Territory Disease Control Bulletin* described water-related injury hospitalisations in the Northern Territory (NT) from 2001 to 2011.[3]

Contents

More on drowning, including drowning deaths and efforts to reduce the drowning rates in the Northern Territory.....1
A collaborative public health response to cases of acute post-streptococcal glomerulonephritis around Tennant Creek, 23-25 July 2014 6
Detection of the Tiger mosquito, Aedes albopictus, in Darwin port areas, NT, Australia 28 November and 5 December 2013 12
Syphilis outbreak in the NT: 2015 update.....15
Report on NT Hepatitis B Action Plan March 2015 16
New NHMRC reference guidelines for assessing blood lead levels in Australians.....18
Key achievements 2014: Centre for Disease Control.....19
NT malaria notifications October-December 2014 20
Policy and fact sheet update January-March 2015 20
Zika virus infection fact sheet 21
Abstracts from peer reviewed published articles related to the Northern Territory.....23
NT notifications of diseases by onset date and districts.....24
Graphs of selected diseases and STIs.....25
Comments on notifications 26
Immunisation coverage.....27
Disease control staff updates January-March 2015.....29
Be bat aware 30

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According to the Australian Institute of Health and Welfare (AIHW) definition of drowning or submersion there were 110 cases over the study period at an age-standardised rate of 3.6 per 100,000 population (95% CI 2.9-4.3).[3] Only 1 of the cases that were admitted to hospital subsequently died.

Males accounted for 70.4% of admissions for drowning/submersion injury.[3] There was no statistically significant difference between admission rates for drowning based on Aboriginal status. The majority of people admitted were children with 59.7% of people admitted being under the age of 5 years (median age 3 years). The majority of drowning/ submersion events occurred in a swimming pool followed by a body of natural water. Over the 11 year period hospitalisations for drowning/ submersion fluctuated with no clear trend being apparent.

Similar water-related injury studies have demonstrated that children under the age of 5 years are the most frequent group to be admitted for drowning/submersion injuries.[4,5,6] A study by the AIHW examining national rates of injury hospitalisations over the 2009-10 period found that the NT had the highest age-standardised rate for drowning/near drowning compared to the other states/territories at 4.4 per 100,000 population (95% CI 2.3-7.6).[7] Comparatively, the national age-standardised rate was 2.5 per 100,000 population (95% CI 2.3-2.7).

Drowning deaths

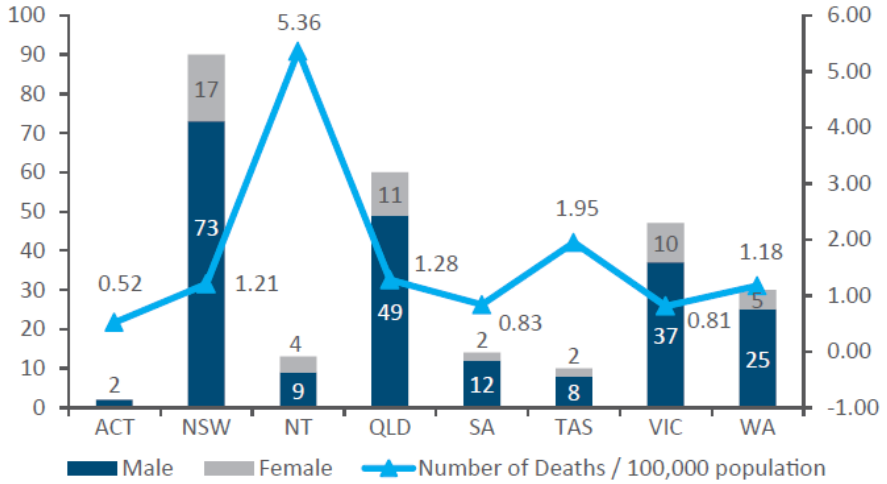
Each year the Royal Life Saving Society (RLSS) of Australia releases a report on state/territory and national drowning deaths. The majority of the people who drown do not present to hospital and will therefore not be included in the previously discussed injury hospitalisation reports.

Drowning death rates

There were 266 drowning deaths in Australia between 1 July 2013 and 30 June 2014.[8] New South Wales (NSW) recorded the largest number of drowning deaths with 90 or 34% of all Australian drowning deaths. This was followed by Queensland with 60 drowning deaths (23%) and Victoria with 47 drowning deaths (18%). The NT had 13 drowning deaths (5%). The NT had the highest rate of drowning deaths in Australia at 5.36 per 100,000 population (see Figure 1)[8] almost 4 times higher than NSW and Queensland (1.21 and 1.28 respectively).

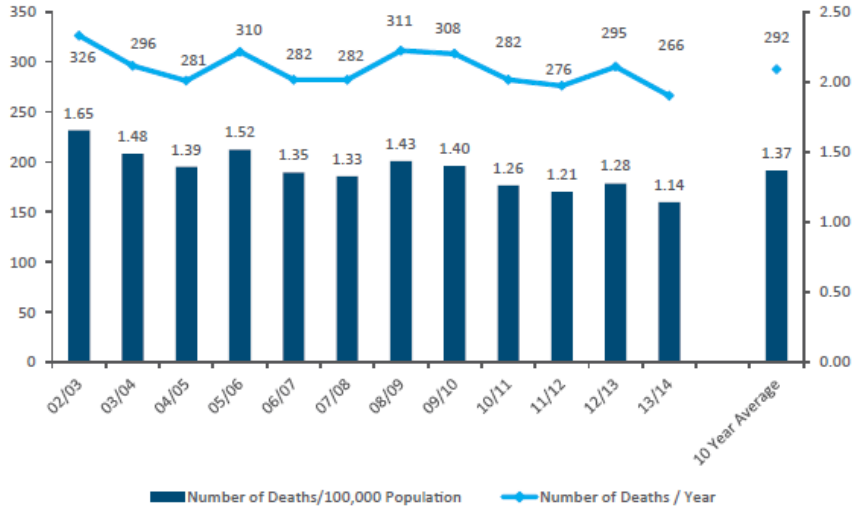
Over the 10 year period the national drowning death rate varied between 1.14 and 1.65 per 100,000 population with a 10 year average of 1.37 per 100,000 population (see Figure 2).[8] A review of NT drowning rates over a 10 year period reflects fluctuating rates with no discernible decrease in the incidence of drowning deaths (see Figure 3).[9]

Figure 1. Drowning deaths by sex and state/territory, drowning death rates, 2013/14



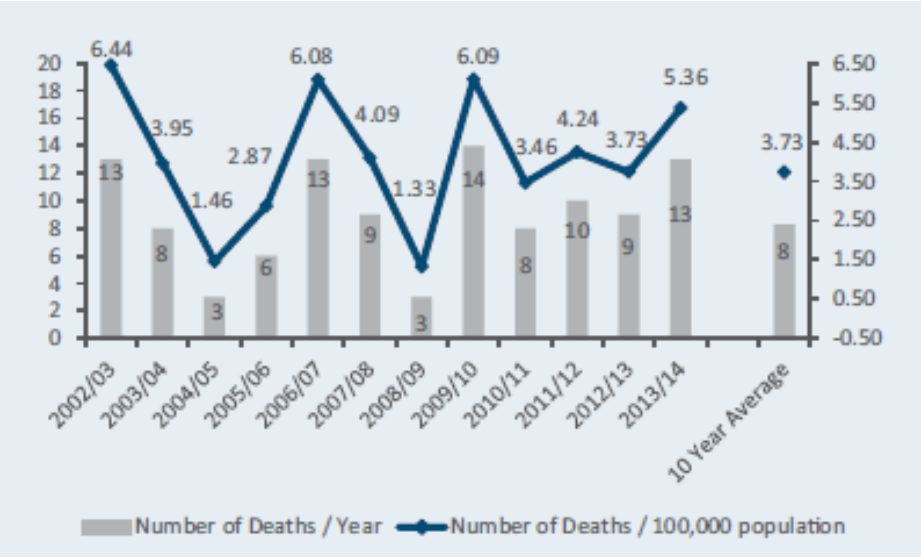
From: RLSS Society-Australia. Royal Life Saving National Drowning Report 2014.[8]

Figure 2. Unintentional drowning deaths and death rates, Australia 2002/03 to 2013/14, 10 year average



From: RLSS-Australia. Royal Life Saving National Drowning Report 2014.[8]

Figure 3. Unintentional drowning deaths and death rates, Northern Territory, 2002/03 – 2013/14, 10 year average



From: RLSS-Australia. Northern Territory Drowning Summary 2014.[9]

The World Health Organisation (WHO) recently released the *Global report on drowning*[1] which states that 372,000 drowning deaths occur each year worldwide making it the world's third leading cause of unintentional injury deaths. Over half the deaths are in people aged less than 25 years with more than twice as many males drowning as females. It is among the 10 leading causes of death of children and young people in every region of the world with children less than 5 years disproportionately at risk. The global drowning death toll is almost two-thirds that of malnutrition and well over half that of malaria. Drowning deaths are most likely vastly under-reported due to limited data collection capacity in many low- and middle-income countries where more than 90% of these deaths occur. Furthermore the data excludes intentional drowning deaths (suicide or homicide) and drowning deaths caused by flood disasters and water transport incidents (including those where vessels carrying migrants or refugees capsize during transport on water).[1]

Drowning deaths by sex and age

Drowning deaths occur most frequently in the young, male population. According to the RLSS review of NT drowning deaths over the period of 1 July 2002 to 30 June 2011,[4] 84% of the 74 drowning deaths were in males. Almost one-quarter of those who drowned were aged 25-34 years all of whom were males. The average age at death was 36 years with females being slightly younger (30 years) compared to males (36 years).

The National Drowning Report for 2014 states that 81% of all drowning deaths were in males.[8] The average age of those who drowned was 41.6 years with females being older (47.6 years) than males (40.1 years). Similar to the NT 9 year drowning report,[4] the 25-34 year age-group had the highest proportion of drowning deaths (16%). The 18-24 year age-group was the only age-group to record an increase in drowning deaths (17%) against the 10 year average. All other age-groups held steady or recorded reductions in drowning deaths against the 10 year average per year.

Drowning deaths by location

In the report on the NT 9 year drowning death data, half of those who drowned lost their lives in rivers/creeks/streams, followed by lakes/ dams/lagoons (18%) then swimming pools (11%).[10] The most common activity prior to drowning was swimming and recreating in the water (39%) followed by falls.[10] Driving accounted for 8% of all drowning deaths with people trying to drive across flooded roads. Watercraft activities combined with fishing accounted for 10% of deaths. Alcohol was found to be present in 51% of people who drowned aged 15 and over in the NT.

In contrast the national report of 2014 states that 30% of drowning deaths occur at rivers/creeks/ streams, followed by swimming pools (15%) and beaches (13%).[1] Swimming and recreating in the water accounted for 24% of drowning deaths followed by falls into the water (21%) and incidents involving watercraft (43%). Positive readings for alcohol in the bloodstream at the time of drowning were found in 18% of people who drowned.

Drowning prevention strategies

The Australian Water Safety Strategy 2012-2015 underpins Government stakeholders, water safety agencies and industry efforts to prevent drowning in Australia.[11] The goal of the strategy is to reduce drowning deaths by 50% by 2020.

The NT Water Safety Strategy 2012-2015 aligns with the Australian Water Safety Strategy and was developed by the NT Water Safety Advisory Council (NTWSAC). The NT Water Safety Strategy focuses on water safety education, research and data collection to minimise the rate of drowning, near drowning and water related injuries in the NT.[12] The NTWSAC is a group of key stakeholders from the NT Government including the Department of Health, water safety organisations, and community groups who help to implement the strategy and provide guidance towards water safety in the NT.

A key element of drowning prevention of children across Australia is legislation requiring fencing of swimming pools. In 2003 the *Swimming Pool Safety Act* (The Act)[13] was implemented in the NT outlining the minimum requirements for swimming pool and spa barriers. Since then, there has been a substantial decline in drowning deaths of children in residential pools. However, the requirement for pool fencing only applies to residential properties smaller than 1.8 hectares and does not apply to commercial properties such as hotels.[14]

The Water Safety Awareness Program was introduced in 2002 and is a Government funded initiative for parents and children less than 5 years of age. The program consists of 5 free sessions providing instruction in emergency care, resuscitation skills and water awareness and is delivered across the NT. School-based water safety and swimming programs have been conducted in many schools across the NT to reach older children.

Although measures have been taken to reduce drowning in the NT, the RLSS in the NT believe that more can be done.[10,15,16] The RLSS recommend addressing several areas of concern which are:

- Pool fencing: A review of the The Act to strengthen pool fencing legislation to address pool fencing for hotels, body corporates and rural blocks. RLSS would like to develop programs to promote checking to ensure that the pool gate is locked.
- Boating safety: Increase the use of personal flotation devices when on the water.
- Social behaviour: Improve safety messages to encourage avoiding alcohol when on or in the water.
- School program: More schools to be involved with the NT school based water safety and swimming program to ensure that all children receive education on water safety.
- Water safety strategy for rivers in rural and remote areas of the NT: Develop a strategy to reduce the drowning rates in regional and remote locations.

The WHO have called for a global strategic prevention effort to target this neglected, highly preventable public health challenge.[1] WHO strategies have a strong focus on non-developed countries given the higher rates of drowning in these locations compared to developed countries. Ten evidence-based actions deemed to be effective, feasible and scalable on a world-wide stage to prevent drowning have been developed by the WHO and are outlined in the *Global report on drowning: preventing a leading killer.* The strategies address community-based action, effective policies and legislation and further research.

Conclusion

The NT has the highest rate of drowning deaths in Australia. Efforts are being made to reduce the drowning rates however more needs to be done. The NT Centre for Disease Control will continue to support the NTWSAC through collaboration and hospital information analysis in its aim to develop a safe and healthy lifestyle in and around the water.

Acknowledgements

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A collaborative public health response to cases of acute post-streptococcal glomerulonephritis around Tennant Creek, 23-25 July 2014

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Abstract

This paper is another in a series of reports published in the Northern Territory Disease Control Bulletin on the public health response to cases of acute post-streptococcal glomerulonephritis (APSGN). It describes the response to the notification of 3 confirmed and 2 probable cases of APSGN in Tennant Creek in July 2014.

Key words: Acute post-streptococcal glomerulonephritis; APSGN; Indigenous; outbreaks; communities

Background

Acute post-streptococcal glomerulonephritis (APSGN) is an inflammatory disease of the kidneys which occurs 2 to 3 weeks after skin or throat infection with a streptococcal bacteria, most commonly Group A streptococcus. In the Northern Territory (NT) scabies infestation is the major predisposing risk factor for infected skin sores caused by streptococcal bacteria.[1]

In the NT, Indigenous children carry the burden of APSGN disease. All notified cases are actively followed up according to the *Northern Territory Guidelines for Acute Post-Streptococcal Glomerulonephritis*[1] to prevent transmission and limit community outbreaks.[1] The public health response includes education and examination of household contacts for skin infection, scabies infestation and APSGN signs and symptoms. Penicillin is offered to all contacts aged 1 to 17 years, the age group most at-risk. Contacts outside this age-range receive education and further investigation and treatment if indicated.[1]

On 1 July 2014 the Centre for Disease Control (CDC) circulated a health alert to primary health care providers to raise awareness of an increase in notifications of APSGN across the Territory. This came after 4 cases of APSGN had been identified from communities in Elliot, Ali Curung, Maryvale and Maningrida between 18 and 27 June 2014.

When there are 4 APSGN cases, probable or confirmed (Box 1), notified from anywhere in the NT within a 2 week period historical data indicates that more cases are likely. A Territory-wide alert to all medical officers and communities to raise awareness for diagnosing and reporting cases of APSGN is issued by CDC.

Clinicians across the NT were requested to be alert to children presenting with puffy faces, sores or dark coloured urine and check the following:

- Weight (look for sudden increase)
- BP (look for increase)
- Urine (look for blood and protein)
- Oedema (puffy face and eyes)

A further 4 cases were identified in Tennant Creek after this alert was issued bringing the total to 5 notified in the area over a 20 day period. None of the cases were contacts of each other. All 5 children were admitted to hospital; 3 of the cases to Alice Springs Hospital and 2 to Tennant Creek Hospital. Laboratory testing confirmed 3 of the cases while 2 remained probable and all were notified accordingly. With the exception of 1 case all recovered and were discharged home. The final case was transferred to Adelaide for investigation of heart failure.

Household screening was undertaken for all 5 cases as per the *Guidelines* and though no further cases were identified the threshold for declaring a community outbreak had been reached (see Box 2 for definition).[1] Local health service providers were contacted and planning commenced for a community screen of all children aged 12 months to <17years.

Methods

Household screening

Household contacts were screened by local CDC and health clinic staff for scabies, skin sores, haematuria and hypertension. Benzathine penicillin (LA Bicillin or LAB) was given to all

Box 1. Case definition for APSGN[1]

Reporting

Both confirmed cases and probable cases should be notified. Possible cases should be reported to CDC but not notified to Northern Territory Notifiable Disease System (NTNDS). (note 1)

Confirmed case

A confirmed case requires either:
1. laboratory definitive evidence
OR
2. laboratory suggestive evidence AND clinical evidence.

Probable case

A probable case requires clinical evidence only.

Possible case

A possible case requires laboratory suggestive evidence only.

Laboratory definitive evidence

Renal biopsy suggestive of APSGN.

Laboratory suggestive evidence

Haematuria on microscopy (RBC >10/µl) (note 2)
AND
Evidence of recent streptococcal infection (positive Group A Streptococcal culture from skin or throat, or elevated ASO titre or Anti-DNase B) (note 3)
AND
Reduced C3 level.

Clinical evidence

At least 2 of the following:

- facial oedema
- >= moderate haematuria on dipstick
- Hypertension (note4)
- peripheral oedema

Notes

1. Possible (subclinical cases) are often found when screening individuals for APSGN but do not present with more than 1 clinical symptom. They do not have oedema or hypertension but on laboratory investigation are found to have haematuria, evidence of a streptococcal infection and a reduced C3. These cases should also be reported to CDC.
2. If microscopy is not available then moderate haematuria on dipstick fulfils this criteria.
3. If all other criteria have been fulfilled but the only evidence of recent streptococcal infection is isolation of Group C or Group G Streptococci from skin or throat, this could be notified as a confirmed case after discussion with CDC or an infectious disease physician.
4. Hypertension as defined in CARPA Standard Treatment Manual.[2]

Box 2. Community outbreak definition

Definition

2 cases, either probable or confirmed, living in the same community and;

- Onset within a week of each other
- At least 1 case has a low C3
- The cases are not contacts of each other

Or

- 1 confirmed case and 2 probable cases living in the same community and;
- Onset within 1 month of each other
- None are contacts of each other

children aged 12 months to <17 years and any others outside that age group with skin sores. Anyone with signs of haematuria or hypertension were referred to a medical officer for further investigation.

The families of these children are highly mobile and, where appropriate, screening also took place in their remote clinics. However, some named contacts were not accessible for screening at the time so their names were flagged in the Primary Care Information System and Communicare databases for opportunistic screening.

Community screening

The first task of planning the screen was to define the parameters of the community. Tennant Creek, however, is a town of

approximately 3500 people and a whole of community screen would be logistically problematic. Therefore the data was assessed to identify a common locale for the presenting cases and 3 'community living areas' (CLAs) were identified as areas of high-risk for screening.

Once the location for the screen had been identified local health services were approached to participate and enter into the planning phase to determine what resources were available and what would need to be sourced before the screen could commence.

Resources identified to conduct the community screen were:

- Transport to access Community Living Areas (CLAs)
- LA Bicillin (LAB) to cover 25% of target group
- Lyclear for scabies treatments
- Resuscitation equipment
- Laptop computer for Communicare access
- Mobile clinic (caravan)
- Maps of the Community Living Areas (CLAs) showing habitable buildings and house numbers[2]
- Population list of target group
- Health staff provided by CDC, Tennant Creek Schools and Anyinginyi Health Aboriginal Corporation (AHAC)
- Aboriginal Health Practitioners and Liaison Officers provided by AHAC and Tennant Creek Hospital.

The timing and extent of the screen was also decided. It was proposed to commence screening on 23 July for 3 days and the screening would take place both in the CLAs and also include the play group and the primary school and high school.

Communication

The first teleconference was held on Friday 18 July among CDC staff across the Territory to determine that an outbreak was in progress, define the parameters of the community and to commence preliminary planning. A second teleconference was held that same day once potential participants had been approached and further data on the potential size of the target group could be accessed.

The first planning teleconference with all participants was held on Monday 21 July. It was determined during this session that CDC staff should take the leadership role primarily because while AHAC fully supported the screen not all residents of the CLAs are clients of AHAC. There followed daily teleconferences to report on preparation and progress of the screen.

Information was disseminated through word of mouth and through contact with the Julalikari local Aboriginal Corporation, general practices and Tennant Creek Hospital. Lack of time prevented dissemination of information through local radio and print media. Julalikari provided detailed Department of Planning and Infrastructure maps of each of the CLAs.[2]

Education and information sharing was an integral part of the screen and a session using the *Healthy Skin Story* was conducted along with the screen at the playgroup. Basic education on hygiene as well as details about APSGN was given during the door to door screening.[4]

The team

The team was drawn from all health service providers in town and consisted of 2 Registered Nurses (RNs), 1 Aboriginal Health Practitioner (AHP) and 1 Aboriginal Liaison Officer (ALO) from AHAC, 1 RN from Tennant Creek Schools, 1 ALO from Tennant Creek Hospital and 2 RNs from CDC. The group was divided into 3 teams on the first day and 2 teams on the second day as the AHP was unable to attend on that day. The school nurse worked from the primary school on day 1 and the high school on day 3. Each smaller team consisted of 1 RN and either 1 AHP or ALO.

Documentation

Population list

As the CLAs form part of Tennant Creek and have a very fluid and highly mobile population there was no complete population list available. The main source of the available information prior to the screen was via the school rolls,

however, these contain both long term and short term residents' names and may not reflect the current population. Obtaining information from Territory Housing may have been possible, but not within the required time frame. Neither Tennant Creek Hospital nor AHAC were able to produce a list of names with addresses in any of the CLAs. This meant that aside from the school rolls information gathered door to door would be the main source of data to determine the target group numbers.

Data recording and entry

It was originally planned that AHAC would have a laptop computer to link to Communicare during the screen in the CLAs however this was not possible due to technical issues. Therefore data was gathered by hand and entered into the database later. This made the issue of identifying the children accurately more difficult as information could not be confirmed at the time of the screen.

Each team was supplied with a clip folder containing community screening forms from the guidelines, a copy of the case definition for APSGN[1], a chart listing BP normal values by age and LA Bicillin (LAB) doses by weight as per the *CARPA Standard Treatment Manual*[3] and also a map of the CLA which indicated the houses the team would screen. A master map was kept of each CLA documenting each team's area. The school nurse had no maps but had consent forms for administering LAB in the parents absence. The schools also provided an administration assistant to help locate parents to obtain consent.

Equipment and medication

As an accurate number for the target group was not available an approximate population number of 200 were assessed and on that basis 50 doses of LAB and 100 tubes of Lyclear were brought from Alice Springs.

AHAC provided a caravan converted to a mobile clinic which could be taken into the CLAs to provide a place for assessing and treatment which offered privacy and shelter. The community members were very familiar and comfortable with the use of these vehicles.

Resuscitation equipment was kept on board the mobile clinic including oxygen, adrenaline and an Oxy-Viva. Cards for the treatment of anaphylaxis including adrenaline doses were placed in clear view in the mobile clinic.

AHAC requested that where possible blood pressures could be taken on the children and though this is not part of the community screen data set each team carried a manometer and small cuffs.

Transport and accommodation

Cars were provided by both CDC and AHAC with a total of 4 available for use to transport both staff and community members as required. Only 1 member of the team had to travel and accommodation was arranged at a local motel.

Results

Household screening

A total of 46 contacts were named over the 5 households with 31 in the 12 months to <17 years age range. The effectiveness of contact tracing was variable between households (Table 1).

Table 1. Household contact tracing results

Household	**1**	**2**	**3**	**4**	**5**
Findings	Contacts				
Total number of contacts named	15	26	4	1	0
Aged 1 to <17 years	7	20	3	1	0
Scabies present	0	0	0	0	0
Skin sores present	1	2	0	0	0
Oedema present	0	0	0	0	0
Haematuria	2	0	0	0	0
Hypertension	0	0	0	0	0
Aged 1 to <17 years given LAB*	7	20	0	0	0
Total LAB*	**8**	**21**	**0**	**0**	**0**

* LAB = LA Bicillin = benzathine penicillin

Community screening

A total of 74 children were identified from the school roll with a further 70 identified during the door to door screen.

The community screening form provided in the NT *Guidelines* was utilised to gather the required data.[1]

The screen coincided with the start of the new school term and so several children who would have been present in the community for the school holiday period during the outbreak had returned to their outstations and bush communities. The largest of these groups was in a single community visited by AHAC and the names were passed to them for opportunistic screening. These numbers were not included in the results of the community screen.

The data collected during the screen was verified and a spreadsheet was kept to be shared with AHAC for data entry to Communicare. The process of confirming data was a long task as the spelling of names, the age and birthdates as well as aliases of several children had to be rechecked with carers and parents in the week following the screen. There were 144 named persons aged 1 to <17 years to be screened. Of these 144 persons, 115 (80%) were screened with the findings shown in Table 2.

Table 2. Community screen results of those named 1 to <17 years old

Findings of the 115 of 144 screened	Yes	No	Not recorded
Scabies present	17	97	1
Skin sores present	12	102	1
Total LAB*	10	105	
Oedema present	2		
Referral to medical officer	2		

*LAB = LA Bicillin = benzathine penicillin

As a group the most difficult to access were those between the age of 12 and 16 years. School attendance was poor and it was members of this age-group that most often slept away from home so were not in the CLA during the screen. It took 2 further school visits after the dates of the screen to capture this group.

There were 2 older children who were found to have facial oedema and they were taken to AHAC clinic for review by a GP as possible cases. After examination it was determined that neither fitted the case definition for APSGN but both were given LAB and had a planned recall for review.

On the final day of the screen a grandmother who had presented her younger grandchildren for screening was alerted to an older child feeling unwell and took him to the hospital. This child had been at home during the school screen and at school during the CLAs screening so was not screened. He has since had laboratory confirmation of an APSGN diagnosis.

A return visit was made the following week to treat those household contacts in the target age group. The children from this household remained part of the community screen results, however the LAB given was not included in the community screen numbers. There have been no further cases from these areas to date.

During the week following the screen a visit was made to the home of each child noted to have scabies during the school screen to provide Lyclear for all the household residents along with information on scabies prevention.

Discussion

This screen was a truly collaborative effort and was successful because of the local knowledge and wide support provided. The use of the mobile clinic in this situation enhanced the team's ability to screen. With multiple families in some houses not all parents were happy to have the screen take place around the house. Also the weather was particularly cold so having a sheltered space was advantageous. The mobile clinic was well known to the community and as a central point of contact added to the relaxed interaction with community members.

Treats in the form of fruit was also available at the mobile clinic and were very well received along with stickers and wristbands kindly supplied by the Trachoma Team.

Conclusion

While no further cases of APSGN have been notified from this community (as of 30/07/14) the screen has raised awareness of scabies, infected sores and the relation to kidney disease within the CLAs and among the community as a whole.

Acknowledgements

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Detection of the Tiger mosquito, *Aedes albopictus,* in Darwin port areas, NT, Australia 28 November and 5 December 2013

Nina Kurucz and William Pettit, CDC, Darwin

Abstract

Incursions of the exotic Asian Tiger mosquito, Aedes albopictus, were detected in Darwin port areas in the Northern Territory on 28 November and 5 December 2013. During both incursions 1 adult female Ae. albopictus was collected in a Biogents sentinel trap at Toll Marine Logistics (TML) and the Darwin East Arm Wharf (EAW) respectively. Both incursions coincided with the berth of international vessels at the TML and EAW port facilities. In response to both incursions all receptacles in the port facilities and adjacent premises were treated with residual insecticide and adult mosquito control (fogging) was carried out. Enhanced exotic mosquito surveillance was established to monitor for exotic mosquitoes. There have been no further detections of Ae. albopictus at TML or EAW.

Key words: Exotic mosquitoes, Ae. albopictus, international vessels, NT ports

Introduction

The Asian Tiger mosquito, *Aedes albopictus,* is a vector for dengue and chikungunya.[1,2] This mosquito is not present on mainland Australia but is established on several islands in the Torres Strait.[2] *Aedes albopictus* poses a real threat to the Northern Territory (NT) with the Darwin and other NT port areas particularly vulnerable to the importation of this vector. Since 2000/01 A*e. albopictus* has been detected on 12 occasions as larvae or adults in the Darwin port area with all detections associated with international cargo vessels.[3] There was an additional detection in a tyre on a barge travelling from Malaysia to Melville Island in January 2005. In 2013 alone, there were a total of 5 exotic mosquito incursions in Darwin port areas with *Ae. albopictus* detected at the Darwin East Arm Wharf (EAW) in August and *Ae. aegypti* detected at Toll Marine Logistics (TML) in April and May 2013. [4]

The NT Department of Health's Medical Entomology (ME) team respond to all incursions following the protocols outlined by the National Arbovirus and Malaria Advisory Committee (NAMAC).[5] This report describes the response to the November and December 2013 incursions.

Detection, Elimination and Surveillance

Detection and identification – November 2013

On 28 November 2013 the Australian Department of Agriculture (DoA) collected and delivered a sample from a routine Biogents (BG) sentinel trap to ME. The trap (BG2) was set at the international quarantine shed of the TML port facility in Darwin on 21 November (Figure 1).

The sample was processed on 28 November and 1 adult female *Ae. albopictus* was identified.

Figure 1. Routine and enhanced adult BG and ovitrap locations at TML 29 November 2013

Survey and control operations – November 2013

Following the positive identification of *Ae. albopictus* ME carried out Ultra Low Volume (ULV) fogging using phenothrin (Twilight®) at TML and Frances Bay Marine (FBM) in the late afternoon on 28 November to eliminate any *Ae. albopictus* adults that might have been present in the area (Figure 2).

On 29 November ME in liaison with DoA carried out a comprehensive larval survey and treatment operation of all receptacles at TML and the adjacent FBM premise. Receptacles

Figure 2. Exotic mosquito interception location 28 November 2013 and adult mosquito ULV fog route at TML

were treated with alpha-cypermethrin (Bestox®) and s-methoprene briquettes (Prolink®). No exotic mosquitoes were detected during the survey.

In addition a cargo of 4 containers of tyres that was unloaded from the international vessel *Kathryn Bay* on 17 November and unpacked on 29 November was preliminarily treated with Bestox® by ME staff. The cargo was later chlorinated by TML staff. Water but no mosquito larvae were found in the tyres.

On 2 December additional exotic larval surveys were carried out by ME at FBM. Following a routine pre-wet season barrier treatment at FBM on 7 November no comprehensive receptacle treatment was carried out at the premise as the earlier applied barrier spray was still active. No exotic mosquitoes were detected.

Enhanced surveillance – November 2013

Ovitraps

ME and DoA constantly maintain 5 ovitraps (egg traps) within TML and the adjacent premise of FBM with 2 sentinel tyre traps also located at TML and maintained by DoA (Figure 1).

There were 4 extra ovitraps set by ME at TML on the 29 November 2013 and all traps were serviced weekly for 4 weeks (Figure 1).

Adult traps

Following the incursion the 2 routine DoA BG traps at TML (BG1 and BG2) were serviced on 29 November with an additional 3 BG traps deployed at TML on the same day (Figure 1). The BG traps were baited with CO_2 gas delivered through a regulator attached to a D size gas bottle and these were serviced daily. Samples were also collected daily until 6 December.

Detection & identification – December 2013

On 5 December 2013 a female adult *Ae. albopictus* was collected in the DoA-serviced BG8 trap at the Darwin EAW (Figure 3). The trap was set on 28 November and collected on 5 December with the specimen identified by ME staff.

Figure 3. Routine and enhanced adult BG, sentinel tyre and ovitrap locations at EAW 6 December 2013

Survey and control operations – December 2013

In response to the EAW incursion ME carried out a fogging operation at EAW in the late afternoon on 5 December using the same insecticide as during the TLM incursion (Figure 4).

Figure 4. Adult mosquito ULV fog route at EAW 5 December 2013

On 6 December ME, in liaison with DoA, carried out a comprehensive exotic larval survey at the wharf with all water-filled and potential receptacles treated with Bestox®. No exotic mosquitoes were found during the survey.

Enhanced surveillance – December 2013

Ovitraps

In addition to the routine DoA ovitraps at EAW (PO1 and PO4) and the 2 sentinel tyre traps, ME established another ovitrap to enhance exotic surveillance (Figure 3). All 3 ovitraps were serviced weekly over the next 4 weeks.

Adult traps

DoA routinely services 2 BG traps at EAW (BG8 and BG4). ME established an additional BG trap (BG9) for enhanced surveillance (Figure 3). All 3 BG traps were serviced daily from 6 to 13 December and then weekly until 3 January 2014.

Discussion and conclusion

The 2 incursions of *Ae. albopictus* at TML and EAW in November and December 2013, in addition to the *Ae. albopictus* incursion at EAW in August (unpublished data), and the *Ae. aegypti* incursions at TML in April and May 2013,[4] clearly demonstrate the vulnerability of the Darwin port area as an entry point for exotic mosquito vectors in the NT. The frequent incursions also emphasise the importance of the routine vector surveillance and control operations in such areas to prevent the establishment of exotic mosquito vectors in the NT.

The international vessel *Kathryn Bay* was most likely associated with the *Ae. aegypti* incursion in April,[4] and has most likely been the source for the female *Ae. albopictus* collected at TML in November. The vessel was unloaded at TML on 17 November with *Ae. albopictus* collected in the trap set from 21 to 28 November.

A BG trap was set on deck of the *Kathryn Bay* during the May incursion, in an attempt to obtain information on the likely source for exotic mosquitoes at NT ports.[4] An attempt was also made with a BG trap set overnight on another international vessel *Team Spirit* that docked at TML on 2 December. However, no exotic mosquitoes were captured during either trapping episode. This might be due to adult mosquitoes harbouring in the cargo hold of the vessel, escaping while the cargo is unloaded.

Therefore, it is suggested that placing of a trap, such as the recently developed Gravid *Aedes* trap should be considered in the cargo hold of the vessel to monitor for exotic adult mosquitoes.[6] Determining the source of exotic mosquitoes detected at NT ports is of high importance. The possibility of pre-emptive barrier treatment of the source, such as high risk vessels could be investigated, which would most likely lead to fewer exotic incursions at NT ports in the future.

Acknowledgements

We thank all ME, DoA, TLM and EAW staff who were part of the survey and control operations, and who assisted by providing access to properties as required. We would also like to thank the Australian Government for providing relevant funding.

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Syphilis outbreak in the NT: 2015 update

Linda Garton,[1] Teem-Wing Yip,[2] Manoji Gunathilake,[1] Jiunn-Yih Su,[1] Mark Russell,[2] Matthew Thalanany[1] on behalf of Syphilis Outbreak Response Group, CDC, [1]Darwin and [2]Alice Springs

In mid-2013, a cluster of cases of infectious syphilis was diagnosed in a central Australian community with an epidemiological link to Queensland. Public Health alerts and enhanced screening initiatives were sent out to all Central Australian Primary Health Care services; however, no further cases were detected.

From January 2014 onwards, a steady increase in number of cases was diagnosed, again in Central Australia, with a link back to cases detected in 2013. The Centre for Disease Control (CDC) determined an outbreak was underway and formed an outbreak response team to plan and implement a public health response. Screening for syphilis in all sexually active individuals aged 35 years or less, was recommended. The outbreak case definition expanded to include cases detected in Katherine and Barkly regions by end of 2014.

In addition to increasing opportunistic testing in primary health care settings, community screens were identified as a rapid response initiative to combat the rise in notifications. Using Syphilis Point of Care test (POCT), community screens were conducted in one Central Australian and one Katherine region community, targeting population aged 12 to 30 years, from September to December 2014. Testing was performed by both CDC and local staff teams, with local clinical and community leaders integrally involved in conducting the activities.

To date, 91 outbreak cases have been identified. The population at highest risk are young people aged 15 to 19 years living remotely; however, cases have also been detected in individuals from 12 to 37 years of age.

In addition to increasing opportunistic sexually transmitted infection (STI) screening, in all people aged less than 35 years living remotely; further community screens are planned or underway in communities located in Central Australia, Katherine and Barkly regions.

To contain the outbreak, CDC continues to advise clinicians of the following recommendations:

- Actively offer STI checks, including syphilis and HIV testing, to all sexually active young people aged less than 35 years presenting to their services.
- Test all patients presenting or diagnosed with an STI for syphilis and HIV.
- Treat symptomatic people immediately (genital ulcer or rash/fever/myalgia).
- Test and empirically treat all sexual partners of people who are diagnosed with confirmed or probable infectious syphilis.
- Test all pregnant women for syphilis at the first visit, at 28 weeks, at 36 weeks, at delivery and at 6 week post-partum.

Syphilis is highly infectious in the early stages but if rapidly treated with intramuscular benzathine penicillin is cured. See the CARPA manual.[1]

Untreated syphilis causes significant adverse outcomes. Importantly syphilis in pregnancy is associated with an increased incidence of in-utero death and congenital syphilis. These outcomes increase during syphilis outbreaks.

CDC continues to provide enhanced surveillance and monitoring of the NT syphilis outbreak to rapidly identify and contain further cases and clusters and to communicate with other jurisdictions to monitor for epidemiological links across borders.

Please contact the Syphilis Register for more information, Alice Springs 8951 7552 or Darwin 8922 7818 or the Sexual health Unit Alice Springs 8517549, Darwin 089228874.

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Report on NT Hepatitis B Action Plan, March 2015

Geoff Stewart, CDC, Darwin

Abstract

The Northern Territory has a high prevalence of hepatitis B virus infection, the majority of which occurs in Aboriginal people. The Sexual Health and Blood Borne Virus Unit and Centre for Disease Control have established a hepatitis B program to implement a Territory- wide plan developed in 2014. This article reports on the progress to date and outlines some of the limiting factors to achieving the objectives of the program.

Key words: hepatitis B, Northern Territory, clinical audit

Introduction

The *2nd National Hepatitis B Strategy*[1] was released in 2014 and was followed by a Northern Territory (NT) Hepatitis B Planning Forum held at Charles Darwin University (CDU) in March 2014 from which was developed the *NT Hepatitis B Action Plan* (*HBAP*). The *HBAP* document is available on request to the author via emailing Geoff.Stewart@nt.gov.au.

A key strength of the *HBAP* is that a range of stake-holders have been involved from the outset. The spectrum of primary care providers, specialists, researchers and community groups has contributed to the plan and there is a high degree of enthusiasm for achieving the stated objectives.

The recently released *Hepatitis B mapping project National Report* of 2012-2013 conducted by the Australasian Society for HIV Medicine (ASHM)[2] provides a timely reminder of the substantial burden of hepatitis B virus (HBV) infection facing the NT. Hepatitis B notification rates in the NT are reported to be the highest in the country at an average of 90 per 100,000 population per year for 1998-2013, almost 3 times the national rate. However, our treatment rate in 2013 (despite a significant increase in the number of viral load tests being performed) is the lowest of all jurisdictions at 2.4% of people infected receiving antiviral medication (national average 5.3%).

The *HBAP* contains 12 key strategies that align with the current National Strategy. The Centre for Disease Control (CDC) has a medical officer working 2 days per week to coordinate the program.

Key strategies and progress

Key strategies of the HBAP and progress against these are summarised below:

Preventing mother to child transmission.

Ensuring antenatal testing of all pregnant women, early identification of chronically infected women, provision of antiviral medication where needed and active and passive vaccination of at-risk infants should collectively prevent new infections of infants in whom the risk of developing chronic infection is highest. Improvements are needed in the follow-up serological testing of these infants. CDC is using records of HBV immunoglobulin use to identify infants in need of testing at 12 months of age. Letters are sent to remote primary health care centres and medical staff for children in remote communities or to community care centres, GPs and parents for urban dwelling infants.

Serostatus codes and clinical audit

A significant undertaking from the March 2014 forum was the decision to conduct a clinical audit of all Indigenous people's primary health care (PHC) records in the NT and to determine their HBV serostatus (approximately 60,000 records). Doing this is a one-off process that will identify people with HBV infection and facilitate directing them into appropriate assessment and referral management pathways, determine the population who remain at risk of infection and require vaccination and prompt clinicians to test those people who have been documented as not being tested. Good infant vaccination rates mean that the majority of under-25 year olds will be immunised, so determining the status of the older population, the majority of whom will not have received vaccinations, is the main objective.

A working group has agreed on 6 serostatus codes with the aim of all Indigenous people in the NT having their serostatus recorded in their PHC record. These codes have been added to both PCIS and Communicare.

The codes are:

- Hepatitis B; immune by exposure
- Hepatitis B; Fully vaccinated
- Hepatitis B; Non-immune
- Hepatitis B; Infected; NOT on treatment
- Hepatitis B; Infected; On treatment
- Hepatitis B; Fully vaccinated; Immuno-compromised

Knowledge of a person's serostatus will allow for unnecessary testing to be avoided and should substantially reduce HBV pathology testing. In line with this, HBV serology is to be removed from the Adult Health Check (AHC) pathology group as well as from the STI pathology group and will no longer be routinely performed as part of these investigations. It is to be replaced with a check box prompt to ensure that HBV serostatus is recorded.

Available resources to support the work of the NT CDC in implementing the *HBAP* are at present quite limited. CDC will utilise existing staff and resources to assist with the audit process, as well as rely more heavily on individual services and clinicians to contribute to this widely agreed on Plan.

Vaccinations

Vaccination of non-immune adults is not currently universally funded, and remains a considerable barrier to health services vaccinating these hepatitis B susceptible adults. Costing for the provision of adult vaccination was included in the unsuccessful submission to the Australian Government. CDC will continue to explore avenues for the provision of vaccine.

Education and upskilling

An educational presentation has been developed for use NT-wide. The Remote Sexual Health Team have commenced providing training in remote health centres and CDC have been working in conjunction with the NT Medicare Local to do so for clinicians in regional centres.

S100 prescribers course

ASHM will be supporting CDC to provide the HBV S100 prescribers training in both Darwin and Alice Springs in coming months. The course is a pre-requisite to prescribing antiviral medication for HBV and is targeted at remote GPs and Rural Medical Practitioners (RMPs). The program incorporates an Aboriginal Health Practitioner and Remote Area Nurse program aimed at patient education and promoting self-management.

Migrant communities

While much of the strategy focuses on the Aboriginal population, CDC has begun work on engaging both migrant communities and their health care providers with education and training around HBV testing and clinical care.

Mailing list

CDC maintains a mailing list of people interested in the *HBAP* and periodically provides updates on progress against the strategies. If you would like your name added to this list please contact Clinic 34 on (08) 8999 2678 or email Geoff.Stewart@nt.gov.au.

Conclusion

The NT is a high prevalence jurisdiction with regard to HBV infection and the *HBAP* sets out a coordinated, systematic and structured response to the disease burden posed by HBV which aligns well with the *2nd National Hepatitis B Strategy*. There is considerable effort being directed towards supporting the primary care sector to better provide HBV care.

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New NHMRC reference guidelines for assessing blood lead levels in Australians

Steven Skov, CDC, Darwin

Lead is everywhere in our environment. Almost anywhere one goes, lead can be found in the air, the soil, water, many of the materials in our housing, many of the things we use in our daily lives and almost all of our foods. Lead serves no biological function in humans and is known to cause harmful effects in many of our organ systems in particular the neurological, renal, cardiovascular, endocrine and haematological systems and is a known cause of cancer. Lead is also present in most people. It is readily absorbed via ingestion and inhalation and is passed from mother to foetus. Once absorbed it is stored mainly in the bones and then can be eliminated from the body, but at a very slow rate.

The National Health and Medical Research Council (NHMRC) provides advice for the general public and health practitioners regarding lead in the environment, the effects of lead and also recommendations for action in relation to particular blood lead levels.[1]

It should be noted, that the recommended level for action is not considered to be a 'safe' level. It is now considered that there is no level of lead in the blood which is not associated with some degree of harm. At the very low levels of lead that are present in most people, these harms will be at a very low level and principally might affect neurocognitive (for example, affecting IQ in children) or renal function. In the vast majority of instances these effects will be extremely difficult to detect and could also be caused by a great many of other influences. Cases where the effects of lead become clinically apparent are rare and are usually associated nowadays with particularly high level exposure such as may occur industrially. At other times eating and drinking utensils, traditional medicines or cosmetics have been known to be harmful sources of lead exposure. In small children, mainly in the past, this has occurred from them eating paint, soil or chewing on or eating other things which contain a lot of lead. Over the past 50 years in industrialised societies a great deal of effort has gone into reducing the public's exposure to lead across society, industry and the environment with the effect that the measured levels of lead in people have greatly reduced over time.

The NHMRC advice is that for blood lead levels above the recommended threshold, action be taken to investigate possible sources of lead exposure in the person and take action to reduce or eliminate that exposure. The current recommended blood lead level for this action is 10mcg/dl of whole blood. There is no specific treatment other than to reduce sources of intake unless blood lead levels are much higher (about 45mcg/dl in children) in which case chelation therapy in hospital is indicated.

In 2012, the US Centres for Disease Control revised their corresponding advice and reduced the threshold blood lead level for action from 10mcg/dl to 5mcg/dl. Following this, the NHMRC appointed an expert committee to review the scientific literature on this subject and has conducted a public consultation on the issue of whether to reduce their recommended threshold to 5mcg/dl. Information on this process and access to the current advice and the technical papers informing the review process can be found at the NHMRC website.[2] It is almost certain that the NHMRC will in the near future, issue new advice and recommend that action be taken to investigate and reduce sources of lead exposure in persons with blood lead levels above 5mcg/dl.

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Key achievements 2014: Centre for Disease Control

- The Dengue mosquito has been eliminated from Tennant Creek…again. The dengue mosquito, *Aedes aegypti*, was detected in Tennant Creek in November 2011. A dengue mosquito elimination program was swiftly established by the Northern Territory Department of Health and elimination was achieved in April 2014. It is the 3rd successful DoH program of its type in the NT following similar dengue mosquito elimination programs in Tennant Creek (2004-2006) and Groote Eylandt (2006-2008).
- The CDC Trachoma Program achieved excellent screening and treatment coverage rates in 2014. All communities requiring trachoma screening in 2014 were screened, with 94% of the target population (5-9 year old Indigenous children living in 'at risk' remote communities) being screened for active trachoma. Treatment rates for active trachoma were also excellent, with 99% of active cases being treated, and 91% of household and community members receiving treatment where required. One of the large remote communities in the NT which has been undertaking 6 monthly community wide treatments with azithromycin for high rates of active trachoma over the past 3 years was screened in 2014. Screening coverage was 100% of 5-9 year olds. There was nil trachoma found, an excellent outcome for this community.
- In 2014 the NT RHD Control Program has reported an increase in secondary prophylaxis rates from 64.8% in 2013 to 69.28% for 2014. There has been a committed effort in working with government and non-government health services across the NT to follow up patients prior 28 days for treatments.
- The establishment of the NT Syphilis Register in 2008 has greatly improved the effectiveness and efficiency in the detection and management of cases of infectious syphilis. The Syphilis Register has proved very useful during the current syphilis outbreak, see page 15.
- In partnership with the Remote Area Health Corps (RAHC), the Sexual Health and Blood Borne Virus Unit have developed a sexual health online orientation module for primary health care staff new to the NT. This is available via the RAHC website and awards CPD points for those who complete the module.
- The Surveillance Section in collaboration with Environmental Health Branch conducted 2 epidemiological cohort studies as part of the investigation into food-borne disease outbreaks and was able to identify the offending food source in both studies.
- A measles outbreak which totalled 54 cases of measles diagnosed in the NT of which 9 were acquired overseas between mid-January and mid-March 2014 was contained through an intensive outbreak response that included follow up of over 2500 contacts.
- The CDC has launched a campaign to promote heightened measles awareness in the community and encourage those under-immunised in the adult population, especially those intending to travel overseas to get the free vaccine.
- Very good mosquito control was achieved in Darwin urban, with average mosquito numbers in the eleven continuous weekly adult monitoring traps lowest since 2008/09.
- In conjunction with DoH memory clinic, the Public Health Physician has developed a discussion paper analysing current issues in services for the aged population and the impact of the ageing population. This will provide information to identify critical areas of need and inform policy development and resource allocation.
- In conjunction with the Poisons Branch, Pharmacy Guild, PSA, Medicare Local and Chief pharmacist, the Section Head of Immunisation Unit has developed a draft paper for the Chief Health Officer which contains recommendations qualifications and education requirements for pharmacists, practice requirements and approved vaccines for pharmacists in the NT administering vaccinations.
- The NT Hepatitis B Action Plan came out of a major planning forum held in March 2014 and has led to a framework for addressing hepatitis B infection in the NT in line with the Second National Hepatitis B Strategy

2014-2017. This means the NT is leading the States and Territories on the public health action planning for hepatitis B. The plan includes auditing the sero-status of all Indigenous people in the NT and redesigning the treatment frameworks of chronic hepatitis B in primary health care settings.

- The NT Cerebral Palsy Register has recently achieved the level of ascertainment of cases needed to be included in the Australian Cerebral Palsy Register reporting. The pre/ perinatally acquired cerebral palsy level of ascertainment for the NT has reached over 1.5/1000 live births. NT cerebral palsy data will now be able to be compared with other Australian jurisdictions in the Australian Cerebral Palsy Register report published every 3 years.

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NT malaria notifications October—December 2014

Elizabeth Stephenson, CDC Darwin

There were 3 cases of malaria notified in the 4th quarter of 2014. 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	Zambia	Refugee	*Plasmodium falciparum*	No	Darwin
2	Indonesia/West Papua	International Student	*Plasmodium vivax*	No	Darwin

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Policy and fact sheet update January-March 2015

The Centre for Disease Control (CDC) fact sheets and guidelines are updated on a regular basis. Below is the single fact sheet updated over January to March 2015.

- HIV (Human Immunodeficiency Virus)

The following fact sheets were translated into Arabic, Burmese, Filipino, Swahili, Somali, Tamil and Vietnamese languages:

- TB Test (Mantoux)
- Treatment of latent tuberculosis infection
- Tuberculosis treatment

They can be found on the CDC website at http://health.nt.gov.au/Centre_for_Disease_Control/ Publications/CDC_Factsheets/index.aspx

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Save the date

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Zika virus infection

What is Zika virus infection?

Zika is a viral disease which causes an acute febrile illness similar to dengue fever, with potential symptoms including rash, inflammation of the joints and conjunctivitis. It is caused by an arbovirus of the flavivirus family, which also includes the Dengue, West Nile and Japanese encephalitis viruses.

Where is it found?

Zika virus was first isolated from a rhesus monkey in Uganda's Zika Forest in 1947. The virus is common in West and Central Africa but also occurs in Pakistan, India, Vietnam, Thailand, the Philippines, Malaysia, Indonesia and Micronesia.

In recent years the virus has spread throughout the Pacific, with outbreaks in the Cook Islands, New Caledonia, French Polynesia and Easter Island.

Only a few imported cases have been reported in Australia, with no locally acquired infections.

How is it spread?

Zika is a disease of monkeys and humans transmitted by mosquitoes. *Aedes africanus* is the vector in forest areas in Africa, while *Aedes aegypti,* the dengue mosquito, is the probable vector in other areas. In Australia, *Ae. aegypti* is present in northern Queensland.

In the Northern Territory (NT), *Ae. aegypti* was briefly established and eliminated on Groote Eylandt from 2006 to 2008 and in Tennant Creek from 2004 to 2006 and 2011 to 2014. The elimination of *Ae. aegypti* from Tennant Creek in April 2014 returned the NT to its dengue vector-free status.

What are the symptoms?

Clinical symptoms last for 4-7 days and may include headache, muscle aches, maculo-papular rash, fever, conjunctivitis, joint pain (mainly joints of the hands and feet) and diarrhoea. Zika is not believed to have long-term health effects in people, and there is no evidence that Zika infection has an adverse effect on pregnant women or their babies.

Symptoms can be very similar to those of dengue, chikungunya and other viral infections including rubella and measles.

Doctors should consider Zika infection in people returning from regions where transmission is known to occur who are unwell with the appropriate symptoms and where other infections such as dengue have been excluded.

What is the treatment?

There is no specific treatment for Zika infection. Medicines such as painkillers and anti-inflammatory drugs can be given to help relieve the symptoms.

How can it be controlled?

There is no vaccine available. The main way to prevent Zika infection in the NT is by preventing the importation and/or establishment of the mosquito that can carry the virus. The Medical Entomology Unit of the NT Department of Health conducts exotic mosquito surveillance and control throughout the NT including in port areas in corporation with the Commonwealth Department of Agriculture.

Ae. aegypti mosquitoes lay eggs in man-made, water filled receptacles such as water tanks, buckets, tyres, machinery, pet water dishes and pot plant drip trays, with mosquito eggs able to survive in dried-out containers for up to 12 months. The carriage of formerly rain filled receptacles from north Queensland, where *Ae. aegypti* mosquitoes exist, could introduce the mosquito into the NT and provide the potential for Zika virus transmission.

CENTRE FOR DISEASE CONTROL

What can be done to prevent mosquito breeding?

Avoid importing or spreading mosquitoes

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

Eliminate potential breeding sites

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

Personal protection

While in Zika affected areas there are measures which should be taken to reduce the risk of mosquito bites including;

- Wear loose, light-coloured protective clothing in outdoor situations, covering feet, legs and arms.
- Use personal repellents containing DEET or picaridin on areas of exposed skin in combination with protective clothing.
- Use electric insecticide impregnated vapour pads in indoor or enclosed areas.
- Avoid scents on the body, such as perfume, deodorants and sweat, since these can attract mosquitoes.
- Avoid being outdoors between dusk and dawn to avoid mosquito bites, particularly in poorly lit areas, rural areas, or the outskirts of large towns.
- If accommodation is not well screened, sleep inside mosquito netting. Use insecticide impregnated bed nets and clothing in high risk areas.3

For more information on protection measures see *Personal protection from mosquitoes and biting midges*

For more information contact your nearest Centre for Disease Control.

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

or www.nt.gov.au/health/cdc

Abstracts from peer reviewed published articles related to the Northern Territory

Pneumococcal conjugate vaccines PREVenar13 and SynflorIX in sequence or alone in high-risk Indigenous infants (PREV-IX_COMBO): protocol of a randomised controlled trial

AJ Leach, EK Mulholland, M Santosham, PJ Torzillo, NJ Brown, P McIntyre, H Smith-Vaughn, S Skull, A Balloch, R Andrews, J Carapetis, J McDonnell, V Krause, PS Morris

BMJ Open 2015;5:e007247 doi:10.1136/bmjopen-2014-007247

Introduction: Otitis media (OM) starts within weeks of birth in almost all Indigenous infants living in remote areas of the Northern Territory (NT). OM and associated hearing loss persist from infancy throughout childhood and often into adulthood. Educational and social opportunities are greatly compromised. *Pneumococcus* and non-typeable *Haemophilus influenzae* (NTHi) are major OM pathogens that densely colonise the nasopharynx and infect the middle ear from very early in life. Our hypothesis is that compared to current single vaccine schedules, a combination of vaccines starting at 1 month of age, may provide earlier, broadened protection.

Methods and analyses This randomised outcome assessor, blinded controlled trial will recruit 425 infants between 28 and 38 days of age and randomly allocate them (1:1:1) to one of three pneumococcal conjugate vaccine (PCV) schedules: Synflorix at 2, 4, 6 months of age, Prevenar13 at 2, 4 and 6 months of age, or an investigational schedule of Synflorix at 1, 2 and 4 months plus Prevenar13 at 6 months of age. The blinded primary outcomes at 7 months of age are immunogenicity of specific vaccine antigens (geometric mean concentration (GMC) and proportion of participants with above threshold GMC of 0.35 μg/L). Secondary outcomes at all timepoints are additional immunogenicity measures and proportion of participants with nasopharyngeal carriage of vaccine-type pneumococci and NTHi, and any OM, including any tympanic membrane perforation. Parental interviews will provide data on common risk factors for OM.

Ethics and dissemination Ethical approval has been obtained from NT Department of Health and Menzies HREC (EC00153), Central Australian HREC (EC00155) and West Australian Aboriginal Health Ethics Committee (WAAHEC- 377-12/2011). Final trial results, data analyses, interpretation and conclusions will be presented in appropriate written and oral formats to parents and guardians, participating communities, local, national and international conferences, and published in peer-reviewed open access journals.

Trial registration numbers ACTRN12610000544077 and NCT01174849.

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Effectiveness of using Grindr to increase syphilis testing among men who have sex with men in Darwin, Australia

JY Su, J Holt, R Payne, K Gates, A Ewing and N Ryder

Australian and New Zealand Journal of Public Health
DOI: 10.1111/1753-6405.12342
Article first published online: 25 FEB 2015

http://onlinelibrary.wiley.com/doi/10.1111/1753-6405.12342/full

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When the party's over

Stay Safe Get Checked

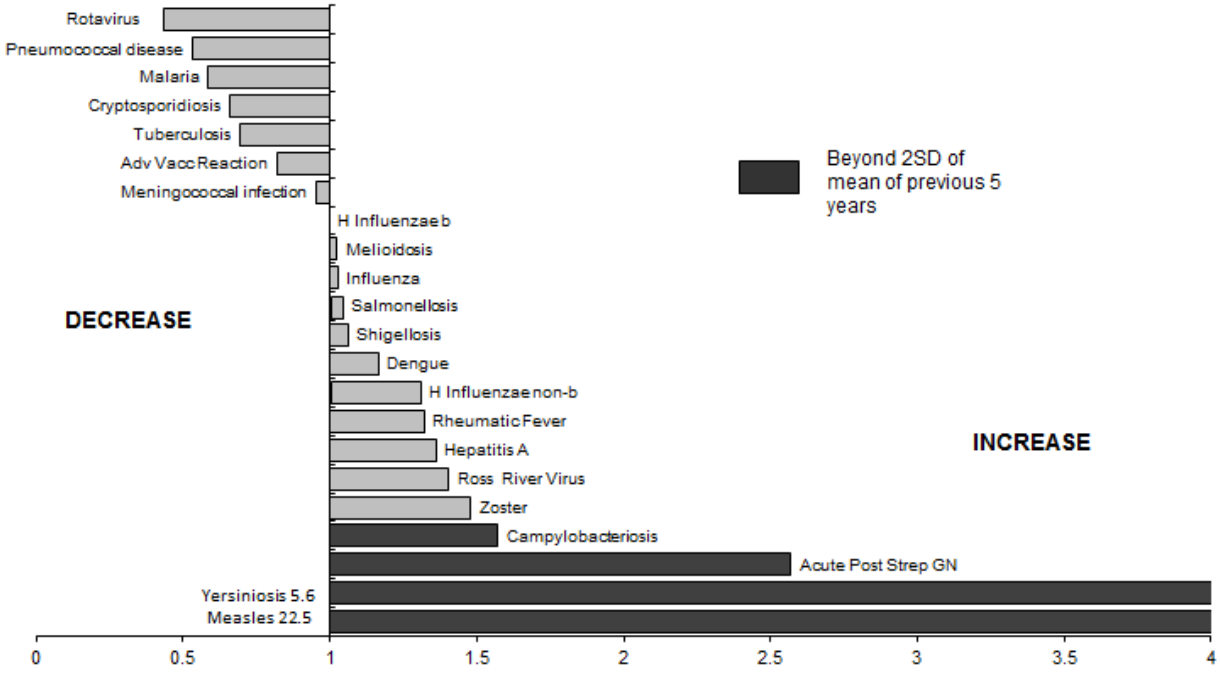
Clinic 34

Darwin	**8999 2678**
Nhulunbuy	**8987 0357**
Katherine	**8973 9049**
Alice Springs	**8951 7549**
Tennant Creek	**8962 4603**

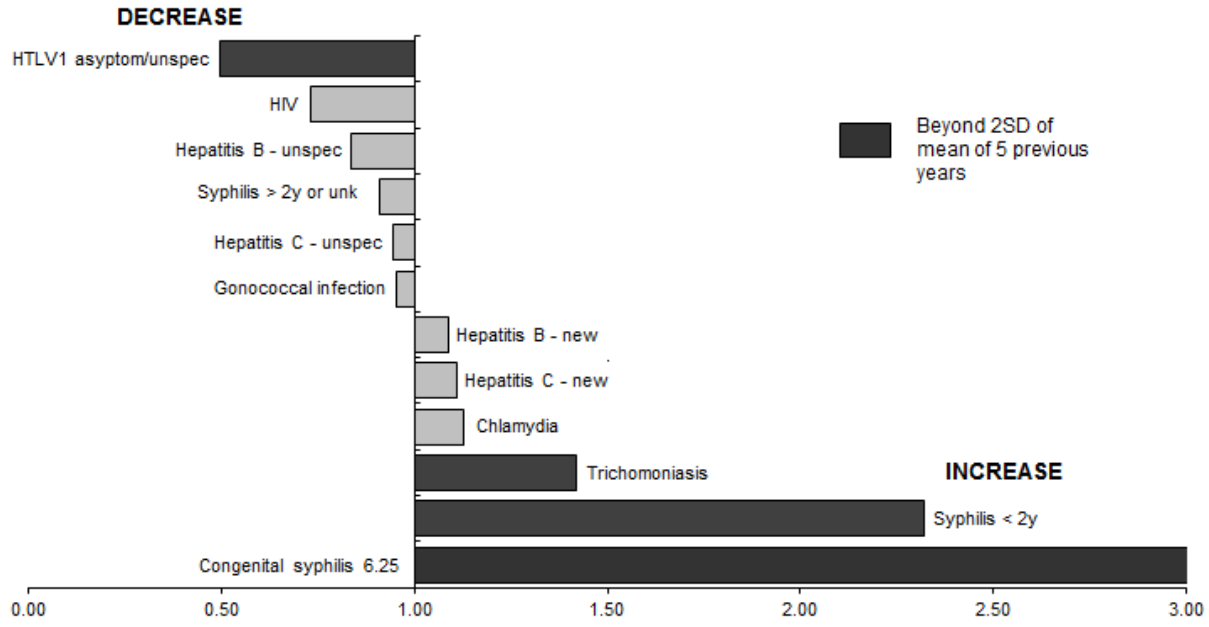
NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
1 January — 31 December 2013 and 2014

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		N T	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
Acute post strep glomerulonephritis	6	18	2	12	5	18	4	13	9	15	26	76
Adverse vaccine reaction	11	10	1	0	35	28	2	4	12	5	61	47
Amoebiasis	0	0	1	0	1	3	0	0	0	1	2	4
Arbovirus - not otherwise specified	0	0	0	0	1	0	0	0	0	0	1	0
Barmah Forest virus	38	0	1	1	331	26	18	2	30	1	418	30
Brucellosis	0	0	0	0	0	1	0	0	0	0	0	1
Campylobacteriosis	68	64	2	4	106	187	8	16	23	27	207	298
Chickenpox	16	14	0	0	67	56	14	5	3	29	100	104
Chikungunya	0	0	0	0	3	0	0	0	0	0	3	0
Chlamydia	967	804	86	111	1517	1570	168	191	309	401	3047	3077
Chlamydial conjunctivitis	2	11	0	5	14	8	0	0	12	1	28	25
Cryptosporidiosis	24	21	9	2	26	43	11	10	21	14	91	90
Dengue	3	1	1	0	60	62	6	2	0	3	70	68
Food/water borne disease	9	0	1	0	49	0	0	0	0	0	59	0
Gastroenteritis - related cases	33	14	0	0	18	0	2	0	0	0	53	14
Gonococcal conjunctivitis	2	2	0	0	2	0	0	0	1	2	5	4
Gonococcal infection	1062	777	67	90	460	476	60	92	364	365	2013	1800
Gonococcal neonatal ophthalmia	0	1	0	0	0	0	0	0	0	0	0	1
Group A streptococcus invasive	21	20	5	3	27	23	8	5	4	10	65	61
Hepatitis A	0	0	0	0	0	3	0	0	0	0	0	3
Hepatitis B - chronic	44	36	2	0	21	17	27	9	1	0	95	62
Hepatitis B - new	1	0	2	0	1	2	0	3	2	0	6	5
Hepatitis B - unspecified	55	32	1	3	258	120	5	3	7	4	326	162
Hepatitis C - new	0	1	0	0	1	1	0	0	0	0	1	2
Hepatitis C - unspecified	25	35	3	2	218	150	1	3	13	13	260	203
Hepatitis D	1	0	0	0	0	1	0	0	0	0	1	1
H Influenzae b	0	1	0	0	0	0	0	0	0	0	0	1
H Influenzae non-b	2	6	0	0	3	3	0	0	1	2	6	11
HIV	1	1	0	1	21	10	0	0	0	2	22	14
HTLV1 asymptomatic/unspecified	85	30	3	2	1	3	0	0	1	1	90	36
Haemolytic uraemic syndrome	0	1	0	0	1	0	0	0	0	0	1	1
Hydatid infection	0	0	0	0	2	0	0	0	0	0	2	0
Influenza	98	326	9	28	230	369	103	86	61	56	501	865
Legionellosis	0	0	0	0	4	5	1	1	1	0	6	6
Leprosy	1	0	0	0	1	0	0	0	0	0	2	0
Leptospirosis	0	0	0	0	6	1	0	0	0	1	6	2
Lymphogranuloma venereum	0	0	0	0	0	1	0	0	0	0	0	1
Listeriosis	0	0	1	0	2	2	0	0	0	0	3	2
Malaria	2	0	0	0	20	10	0	1	0	0	22	11
Measles	0	1	0	0	0	51	0	0	0	2	0	54
Melioidosis	0	2	0	1	35	51	4	9	2	3	41	66
Meningococcal infection	1	0	0	0	1	4	0	0	0	0	2	4
Mumps	2	1	0	0	4	0	0	0	0	0	6	1
Non TB Mycobacteria	0	0	0	0	4	1	0	0	0	0	4	1
Pertussis	15	27	0	1	87	49	6	4	7	2	115	83
Pneumococcal disease (invasive)	30	22	3	3	18	18	2	0	6	3	59	46
Q Fever	0	0	0	0	1	0	0	0	0	1	1	1
Rheumatic fever	33	34	4	3	27	46	19	14	15	20	98	117
Ross River virus	5	23	2	7	267	336	12	21	24	37	310	424
Rotavirus	111	54	8	10	151	24	12	2	30	15	312	105
Salmonellosis	65	90	17	8	257	313	28	23	37	59	404	493
Shigellosis	46	23	19	3	16	48	14	17	18	12	113	103
Syphilis < 2y	13	34	0	1	11	13	0	1	0	22	24	71
Syphilis > 2y or unknown	22	34	4	1	62	24	2	1	5	17	95	77
Syphilis congenital	1	2	0	0	0	0	0	2	0	1	1	5
Trichomoniasis	944	1005	179	213	960	1171	470	572	539	651	3092	3612
Tuberculosis	7	4	0	0	43	21	1	0	4	3	55	28
Typhoid	0	0	0	0	0	1	0	0	0	0	0	1
Typhus	1	0	0	0	0	1	0	0	0	0	1	1
Varicella - unspecified	3	0	0	0	7	1	1	1	0	7	11	9
Vibrio food poisoning	0	0	0	0	0	2	0	0	0	0	0	2
Vibrio invasive	0	0	0	0	0	0	0	1	0	0	0	1
Yersiniosis	0	2	0	0	2	7	0	0	1	0	3	9
Zoster	50	51	3	3	149	166	19	14	34	29	255	263
Total	**3,926**	**3,635**	**436**	**518**	**5,614**	**5,547**	**1,028**	**1,128**	**1,597**	**1,837**	**12601**	**12665**

Ratio of the number of notifications in 2014 to the 5 year mean (2009-13): selected diseases



Ratio of the number of notifications in 2014 to the 5 year mean (2009-13): sexually transmitted diseases



Comments on notifications

Measles

In 2014 there were 54 cases of measles notified, the highest annual number since 1995 and well above the expected number of 2 and 3 cases per year. The majority (48) were part of the initial outbreak in January-March which included 6 imported cases. The others 6 cases occurred in 3 outbreaks of 2, 3 and 1 case each, with each outbreak commencing with an imported case. Of the 9 imported cases 4 were from the Philippines, 3 from Bali and 2 from Singapore.

Yersinosis

The 9 cases of yersinosis reported in 2014 was over 5 times the expected number of 1.6 and the highest annual figure since 1992. This is most likely due to the introduction of laboratory nucleic acid testing for *Yersinia* bacteria which has provided more sensitive testing than in previous years. Each case of yersinosis is investigated and no common associated factors were found.

Campylobacteriosis

In 2014 there were 298 cases of camplyobacteriosis which was 57% more than the 5 year mean of 190. This is likely due to the introduction in 2013 of nucleic acid detection testing for *Campylobacter* species which is a more sensitive test. Other jurisdictions have also reported a similar rise with the introduction of molecular techniques.

Acute post-streptococcal glomerulonephritis

There were 76 cases of acute post-streptococcal glomerulonephritis notified in 2014 compared with an expected 30 based on the 5 year mean. This was the highest annual count since 2005 (102) and the second highest ever. Four alerts were issued during the year. This increase reflects the well documented 4-5 year cycle of APSGN epidemics but interestingly, unlike previous epidemic years, there was little clustering in communities and no communities met the criteria for a community-wide public health response.

Trichomoniasis

The 3508 trichomoniasis notifications in 2014 was a record high, and represented an increase of over 500 cases (an 18% increase) from the number notified in 2013 The bulk of the increase occurred in remote Indigenous communities. The increase was mainly due to increased testing.

Syphilis

There was a small increase of non-Indigenous syphilis cases in 2014 (14 cases, compared with 11 in 2013 and only 1 case in 2012), mostly being in men who have sex with men. The majority of the increase, however, was due to an outbreak occurring in remote Indigenous communities in the Central Australia and Katherine regions. Compared with 11 and 12 Indigenous cases in 2013 and 2012 respectively, there were 53 Indigenous cases in 2014. An outbreak response is being conducted with enhanced contact tracing, community screening and opportunistic testing being undertaken. Overall, there were 67 cases notified in 2014, a more than 3-fold increase over the number for 2013 (22 cases).

HTLV1

The number of HTLV-1 notifications decreased significantly in 2014 compared with the statistics of the previous five years. An investigation into the testing data for HTLV-1 showed that this decrease was caused by a substantial decrease in both the number of tests and the test positivity rate (proportion of tests being positive) in 2014.

Congenital syphilis

There were 5 congenital syphilis cases notified in 2014, compared to only 4 notified for all 5 years 2009-13. This increase is likely to have been due to more stringent and consistent application of the national case definition as a result of an audit of congenital syphilis conducted by the Sexual Health and Blood Borne Virus Unit. The audit also found that there had been significant under-reporting of cases in the years preceding 2014 and these data will be updated once the final audit report has been completed.

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Immunisation coverage for children aged 12-<15 months at 31 December 2014

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% Pneumo	% Fully vaccinated
Darwin	299	92.3%	92.3%	92.3%	92.3%	91.6%	91.6%
Winnellie PO Bag	70	91.4%	91.4%	91.4%	91.4%	91.4%	91.4%
Palm/Rural	245	93.1%	93.1%	93.1%	92.7%	92.2%	91.8%
Katherine	116	84.5%	84.5%	84.5%	85.3%	86.2%	84.5%
Barkly	32	87.5%	87.5%	87.5%	87.5%	87.5%	87.5%
Alice Springs	53	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%
Alice Springs PO Bag	53	92.5%	92.5%	92.5%	92.5%	92.5%	92.5%
East Arnhem	31	77.4%	77.4%	77.4%	77.4%	77.4%	77.4%
NT	899	90.8%	90.8%	90.8%	90.8%	90.5%	90.2%
NT Non-Indigenous	544	93.4%	93.4%	93.4%	93.2%	93.2%	92.6%
NT Indigenous	355	86.8%	86.8%	86.8%	87.0%	86.5%	86.5%
Australia	77227	91.5%	91.4%	91.3%	91.1%	91.1%	90.6%

Immunisation coverage for children aged 24-<27 months at 31 December 2014

Region	Number in District	% DTP	% Polio	% HIB	% Hep B	% MMR	% Men C	% Varicella	% Fully vaccinated
Darwin	282	94.0%	94.0%	94.7%	94.3%	93.6%	96.5%	94.0%	87.9%
Winnellie PO Bag	68	92.6%	92.6%	92.6%	92.6%	89.7%	86.8%	89.7%	83.8%
Palm/Rural	257	96.5%	96.5%	96.1%	96.9%	89.5%	94.6%	90.3%	87.5%
Katherine	86	98.8%	98.8%	100.0%	98.8%	93.0%	95.3%	94.2%	88.4%
Barkly	10	90.0%	90.0%	100.0%	90.0%	80.0%	100.0%	80.0%	80.0%
Alice Springs	105	91.4%	91.4%	91.4%	91.4%	89.5%	90.5%	89.5%	84.8%
Alice Springs PO Bag	41	97.6%	97.6%	100.0%	97.6%	97.6%	100.0%	100.0%	95.1%
East Arnhem	42	92.9%	92.9%	90.5%	92.9%	88.1%	90.5%	88.1%	83.3%
NT	891	94.8%	94.8%	95.2%	95.1%	91.4%	94.3%	91.9%	87.2%
NT Non-Indigenous	556	94.6%	94.6%	94.7%	94.9%	91.5%	94.9%	92.2%	87.8%
NT Indigenous	303	95.4%	95.4%	96.0%	95.4%	91.1%	93.1%	91.4%	86.1%
Australia	78581	95.0%	94.9%	93.4%	94.6%	89.4%	93.3%	91.0%	87.3%

Immunisation coverage for children aged 60-<63 months at 31 December 2014

Region	Number in District	% DTP	% Polio	% MMR	% Fully vaccinated
Darwin	265	87.9%	87.9%	90.2%	87.2%
Winnellie PO Bag	72	98.6%	98.6%	98.6%	98.6%
Palm/Rural	212	92.0%	92.0%	92.5%	92.0%
Katherine	81	98.8%	98.8%	97.5%	97.5%
Barkly	14	92.9%	92.9%	92.9%	92.9%
Alice Springs	107	92.5%	92.5%	93.5%	92.5%
Alice Springs PO Bag	47	93.6%	95.7%	93.6%	91.5%
East Arnhem	46	97.8%	97.8%	97.8%	97.8%
NT	844	92.4%	92.5%	93.2%	91.9%
NT Non-Indigenous	528	90.3%	90.5%	91.7%	89.8%
NT Indigenous	316	95.9%	95.9%	95.9%	95.6%
Australia	78892	92.7%	92.6%	92.7%	92.2%

Immunisation coverage at 31 December 2014

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 27.

Background information to interpret coverage

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

The cohort of children assessed at 12 to <15 months of age on 31 December 2014 were born between 1 July 2013 and 30 September 2013 inclusive. To be considered fully vaccinated, these children must have received 3 valid doses of vaccines containing diphtheria, tetanus, pertussis, and poliomyelitis antigens, either 2 or 3 doses of PRP-OMP Hib or 3 doses of another Hib vaccine, 3 doses of hepatitis B vaccine and 3 doses of pneumococcal vaccine. All vaccinations must have been administered by 12 months of age.

The cohort of children assessed at 24 to <27 months of age on 30 September 2014 were born between 1 July 2012 and 30 September 2012 inclusive. To be considered fully vaccinated, these children must have received meningococcal C vaccination (given at the 12 month schedule point), and dose 2 of measles, mumps, rubella (MMR) and dose 1 varicella vaccination (given in combination as MMRV at the 18 months schedule point). All vaccinations must have been administered by 24 months of age.

The inclusion of these 3 additional immunisations has caused a drop in the reported coverage rates which are measured at 2 years of age. The primary reason for the decrease is that uptake and/or reporting of the 18 month dose of MMRV is lower than for other vaccines. It is expected that these children will catch-up by their fourth birthday when they present for their next scheduled vaccination, if not before. Over time parents and providers will become more familiar with the due date for MMRV and timely coverage should improve.

The cohort of children assessed at 60 to <63 months of age on 31 December 2014 were born between 1 July 2009 and 30 September 2009 inclusive. To be considered fully vaccinated, these children must have received 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens, 4 doses of poliomyelitis vaccine and 2 valid doses of MMR vaccine. All vaccinations must have been administered by 60 months (5 years) of age.

Interpretation and comment

The vaccination coverage rates for children in the NT are comparable with the national average for all age cohorts, with NT children slightly below the national average for all three cohorts: 12 <24 months cohort (NT 90.2%, National 90.6%); 24 to <27 months cohort (NT 87.2%, National 87.3 %); and for the 60 to <63 months cohort (NT 91.9%, National 92.2%).

Indigenous children were less likely (Indigenous 86.5%, Non-Indigenous 92.6%) to be fully immunised than non-Indigenous children in the 12 to <15 month cohort and less likely to be immunised in the 24 to <27 cohort (Indigenous 86.1 %, Non-Indigenous 87.8%) but significantly likely to be fully immunised in the 60 to <63 cohort (Indigenous 95.6%, Non-Indigenous 89.8%).

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

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Disease Control staff updates January—March 2015

Top End

Steven Skov, Public Health Physician returned in February to CDC from the Office of the Chief Health Officer where he held the Chief Health Officer position for 18 months. Steven is due to take sabbatical leave at the end of March.

Congratulations to **Jaana Wenham**, Technical Officer, Medical Entomology who completed her *Bachelor Degree of Science* through Charles Darwin University in January 2015.

Kaylene Prince, Public Health Nurse, previously from Alice Springs CDC, commenced on a 5 month contract with CDC Darwin in January.

Emily O'Kearney, Community Paediatrician Project Officer, resigned in February to work in Cambodia for 12 months.

Holly Carmichael (nee Mclauchlan) has returned to work with the NT Immunisation Register for a fourth time on returning to Darwin with her family. **Raymon Munnich** and **Genevieve Suringha**, both employed with the Immunisation Register have left after their contracts expired.

Edwin Lubari, Sexuality Education Program Coordinator resigned in February to join the Health Promotion Team in Western Australia. **Jessica Light**, Project Officer, Sexuality Education Program will act in the Coordinators role until the end of May and **Tatenda Muridzi**, Project Officer, Sexuality Education Program will act up thereafter.

Carole Duke, Public Health Nurse, Syphilis Register remains on leave till the end of October. **Roxanne Sherry**, Public Health Nurse, Clinic 34 continues to act in her position.

Jiunn-Yih Su, Surveillance Officer, returned from Long Service leave in March.

Joy Pascall, Coordinator CDC Nhulunbuy is to be congratulated on completing her *Masters of Public Health*, Menzies School of Health Research, Charles Darwin University in 2014.

Rebecca Katiforis, Public Health Nurse, joined the Remote Sexual Health team on a 6 month secondment from the Hepatitis C position in Clinic 34.

Gabrielle Watt, Trachoma Program Coordinator completed the *Emerging Clinical Leadership Program* in 2014. Over the course of the program participants underwent a personal leadership development journey, learning to understand and leverage their own leadership potential to have a positive impact within NT Health.

Justine Glover, Senior Policy and Coordination Officer, transferred to the Office of Disability on a 6 month contract in March. **Meredith Neilson** will act in the Senior Policy and Coordination Officer position to 11 September. Justine completed the Department of Health's *Leading the Way Middle Manager Leadership and Management Development Program* and qualified with a Diploma of Management in March 2015.

Central Australia

Eleanor Hooke, Public Health Nurse, officially retired from the Department of Health on 31 December 2014 after 16 years. She managed the hepatitis programme over the past 9 years and her wisdom and experience will be sorely missed.

Rebecca (Bec) Creeper, Administrative Support Officer started with CDC in January. She is originally from Alice Springs but has spent the last few years in north Queensland.

Kylee Redman, Surveillance Data Manager resigned and moved to Melbourne to be closer to her family. **Honor Murphy**, Administration Officer is on a temporary transfer as the Surveillance Data Manager from her position as Clinic 34 receptionist..

Kristy Sanderson, Business Manager also resigned in December and moved to Brisbane to be with her family to pursue different career options. **Helena Casseeram** has joined CDC to replace Kristy. Helena has recently worked at Alcohol and Other Drugs Service of Central Australia. In 2012-2013 Helena was in the same role in CDC to cover maternity leave.

Northern Territory Government
Be Bat Aware
Do NOT touch bats
Australian bat lyssavirus is a virus similar to rabies that can be fatal to humans.
All Australian bats have the potential to carry lyssavirus.
CALL
1. If bitten or scratched by a bat:
Wash wound with soap and water and apply antiseptic
2. Bat saliva in contact with eyes, nose or mouth:
Rinse well with water
3. Contact the Hospital or Centre for Disease Control for treatment.
4. If the bat is sick or injured contact:
Wildcare Inc. on 08 8988 6121
Contact your nearest Centre for Disease Control
DARWIN 8922 8044
ALICE SPRINGS 8951 7549
KATHERINE 8973 9049
EAST ARNHEM 8987 0357
BARKLY 8962 4259
For more information visit:
www.health.nt.gov.au/Centre_for_Disease_Control/Publications/CDC Factsheets