Centre for Disease Control

DISEASE CONTROL BULLETIN

Vol. 26, No. 2, June 2019 ISSN 1440-883X

# Northern Territory meningococcal ACWY vaccination program rollout and coverage, June 2019

*Ros Webby, Centre for Disease Control, Darwin*

The Northern Territory (NT) had an outbreak of meningococcal disease in 2017 due to an emerging serogroup or strain, meningococcal W (Men W), that had been increasing across Australia since 2015. There were 32 cases of confirmed invasive meningococcal disease overall in 2017 in NT residents which included 26 W, 3 Y and 3 B strains. Since 2017, Men W has remained the dominant strain in the NT in 2018 and 2019 year to date (see Figure).

In response to the outbreak, a meningococcal ACWY (Men ACWY) vaccine program was progressively rolled out across the NT, first in the outbreak areas and then to bordering NT areas until the entire NT was included. This vaccine rollout is outlined below.

- From October 2017, people aged 1-19 years in Alice Springs, Barkly and Katherine were offered Men ACWY vaccine.
- In December 2017, the NT introduced the Men ACWY vaccine for 12 month olds NT wide which was subsequently funded by the Australian Government from 1 July 2018.
- In a planned effort to provide protection beyond the outbreak area, from January 2018, people aged 1-19 years in East Arnhem and rural Darwin were offered Men ACWY vaccine.
- From August 2018, urban Darwin 1-19 year olds were included so that all people aged 1-19 years were eligible for free Men ACWY vaccine across the NT.
- From April 2019, the Australian Government has funded a national Men ACWY vaccine for all people aged 15-19 years.
- The NT still provides free vaccine for those 1-14 years so all people in the NT aged 1-19 years are eligible for free Men ACWY vaccine.

## Vaccine coverage

At the end of May 2019, the Men ACWY vaccine coverage in Aboriginal children aged 1-19 years was 76% and in non-Aboriginal children 60%. The Table shows the coverage by age-group and Aboriginal status.

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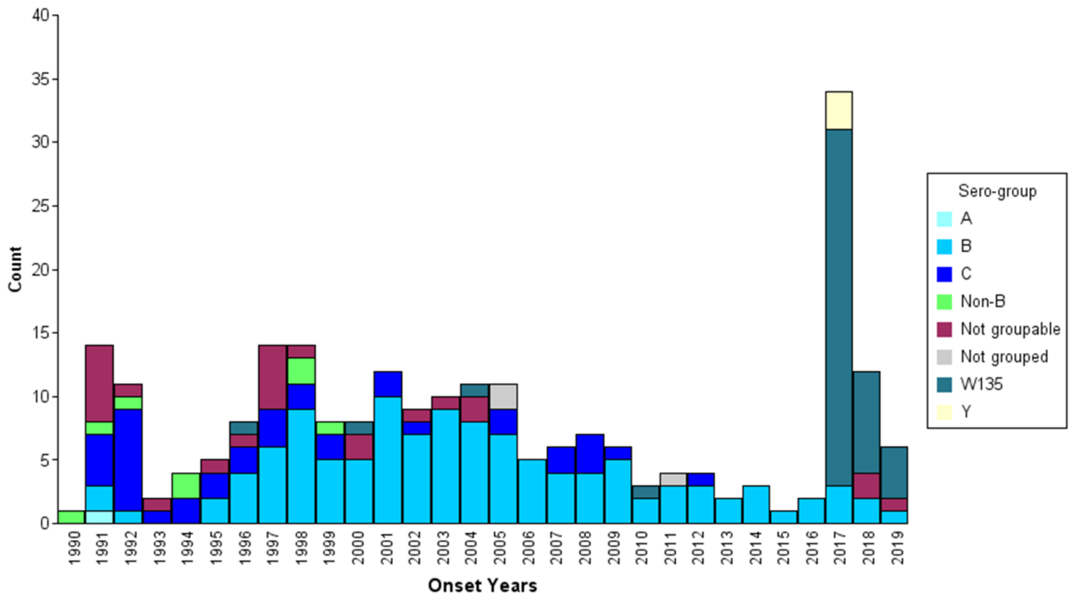


**Figure 1. Notifications for Meningococcal disease 1990-2019 by serogroup NT**

**Table. Men ACWY vaccine coverage by age-group and Aboriginal status as of 31 May 2019**

| Age Group | Aboriginal % (number) | Non-Aboriginal % (number) |
|---|---|---|
| 1-4 years | 74% (5100) | 71% (7319) |
| 5-9 years | 75% (5465) | 49% (4548) |
| 10-14 years | 76% (5311) | 50% (3741) |
| 15-19 years | 78% (5077) | 70% (4885) |
| Total | 76% (20953) | 60% (20493) |

There is an opportunity now for all those in the NT aged 1-19 years old to be covered by the quadrivalent Men ACWY vaccine and to be protected from the serious disease caused by these meningococcal strains.

The aim is to get at least 80% vaccine coverage in all 4 age groups by the end of the year. All 1-19 year olds and particularly non-Aboriginal children 5 to 14 years old need to be made aware of this program and encouraged to make appointments with their vaccine providers for their free Men ACWY vaccine.

GPs and health professionals are encouraged to discuss meningococcal vaccination with their patients, and ensure their patients are aware of the FREE Men ACWY vaccine. The Centre for Disease Control continues to work with stakeholders to increase vaccination coverage, through school vaccination programs and promotion of the vaccine through local and social media, school newsletters, and sporting clubs.

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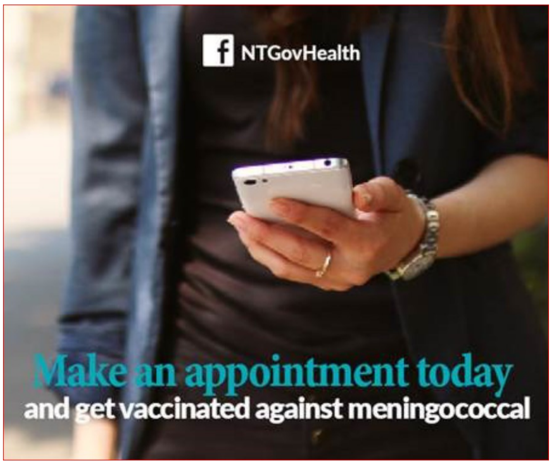


# Darwin measles outbreak 2019…. the first …and only?

*Rowena Boyd, Centre for Disease Control, Darwin*

## Abstract

*With increasing numbers of measles outbreaks worldwide and a globetrotting Northern Territory (NT) population, a measles 'incursion' into the NT was likely. In February 2019 a traveller returned to Darwin from overseas with measles. From this index case, local transmission in the Darwin region resulted in a further 29 cases in March and early April 2019. A public health response was implemented according to the Australian measles guidelines for public health units. A third of cases (9/30) required hospitalisation, two thirds (21/30) were male and the majority (28/30) were non-Aboriginal. From the 30 cases, 1,249 contacts were identified and 831 measles tests were performed. During the months of March to May 2019, measles-mumps-rubella (MMR) vaccine orders and distribution markedly increased and the recommendation for age of first measles-containing vaccine was reduced from 12 to 9 months for the outbreak period. As 2 doses of a measles-containing vaccine provides 99% protection against measles, the ongoing message for all Territorians is to check their measles immunity and receive a FREE measles-containing vaccine if non-immune. The measles virus continues to circulate globally and individuals and the community need to be protected.*

*Key words: measles; Northern Territory; outbreak; index case; vaccination.*

## Introduction

Measles is an infectious disease with a reproduction number of 12 to 18 in susceptible populations, meaning that on average, each person with measles infects up to 18 people in a population who do not have immunity to measles.[1] People considered to be immune to measles include anyone who has had measles disease previously, those born before 1966 (considered the 'pre-vaccination era' and are therefore likely to have had measles disease) and people who have received 2 measles-containing vaccines. As the Australian childhood vaccine schedule prior to 1992 comprised of only 1 measles-containing vaccine, people born between the late 1960s and 1992 may be more at-risk of contracting measles.[2] Their increased risk is explained by the fact that after 1 dose of measles-containing vaccine, 95% of people develop immunity while after receiving 2 doses of measles-containing vaccines 99% of people develop immunity.[3]

With reports of measles outbreaks in Europe, the United States, South-East Asia and other Australian states in early 2019, it was likely that an imported case of measles would occur in the NT.[4]

## Methods

In accordance with the NT Notifiable Disease Act 1981, confirmed and suspected measles cases were notified to the NT Centre for Disease Control (CDC) for investigation and public health response.[5,6] Each case was confirmed by laboratory testing with measles polymerase chain reaction (PCR) detected in a urine sample or nasopharyngeal swab. A public health response was carried out following the Communicable Disease Network of Australia (CDNA) measles guidelines for Public Health Units.[6] 'Contacts,' defined as people in proximity to a measles case were identified from tracing the cases' movements while infectious. Phone numbers for identifiable contacts were obtained from the case, medical practices, Royal Darwin Hospital (RDH) and Palmerston Regional Hospital (PRH) Infection Prevention and Management Units and workplaces. Contacts were sent a text message informing them of their possible measles exposure and requesting they contact CDC for advice. CDC staff confirmed measles contact, identified immune status and provided advice in accordance with the National Guideline. The national outbreak management program, 'NetEpi' was used to manage the large number of contacts. A total of 3 attempts were made to follow-up each contact.

An outbreak team was formed using the outbreak management structure allocating personnel to communications, surveillance and planning, operations, logistics, finance and administration.

Measles testing numbers were supplied by Territory Pathology serology department at RDH, where the majority of measles tests were performed. For timeliness of measles results, private laboratories in the NT transferred measles specimens for testing to RDH.

## Results

On 6 March 2019, the NT CDC was notified of a case of laboratory-confirmed measles. This case had not travelled, alerting CDC to local transmission of measles. Epidemiological trace back from this case identified a contact who had returned from Vietnam and had signs and symptoms consistent with measles in February 2019.

By early April 2019, 30 cases of confirmed measles were notified in the Darwin region. These included the initial imported index case, and 29 subsequent locally acquired cases. Figure 1 shows the epidemic curve of the outbreak. Cases ranged from 7 months to 48 years of age. Males accounted for 21/30 cases of whom 10 were born between 1966 and 1986. Aboriginal status was known for 28 cases and 2 were identified as Aboriginal people. Figure 2 shows vaccine status of cases by age-group with data regarding the vaccine schedule in place at time of birth. Hospitalisation was required for 9 (30%) cases with length-of-stay ranging from 1 to 11 days (median 3 days). Cases were confirmed by PCR testing and genotyping was available for 27 cases of which all were genotype D8. Exact place of acquisition was unable to be determined for 25 cases, however all occurred in the Darwin region including 16 residents of Palmerston as shown in Figure 3. Only the index case reported overseas travel prior to illness; a secondary case was a relative of the index case and 3 cases had contact with measles on a construction worksite.

There were 1249 measles contacts identified, ranging from 3 to 189 contacts per case. Cases with over 100 contacts had not been recognised as possible measles cases while infectious and were sitting in health care waiting room(s) without respiratory precautions. The specific number of people who received a measles-mumps–rubella (MMR) vaccine in response to this outbreak is unknown however an additional 3000 doses of MMR vaccine were distributed to healthcare providers during the outbreak period. Additionally, CDC administered 30 doses of normal human immunoglobulin (NHIG) to provide measles protection to high risk, susceptible contacts where MMR was contra-indicated and these included 4 pregnant women, 19 infants, 6 immunocompromised people and 1 close contact returning to a high risk population.

On 29 March 2019, recommendation was disseminated to health providers to reduce the

**Figure 1. Epidemic curve measles cases Darwin 2019**

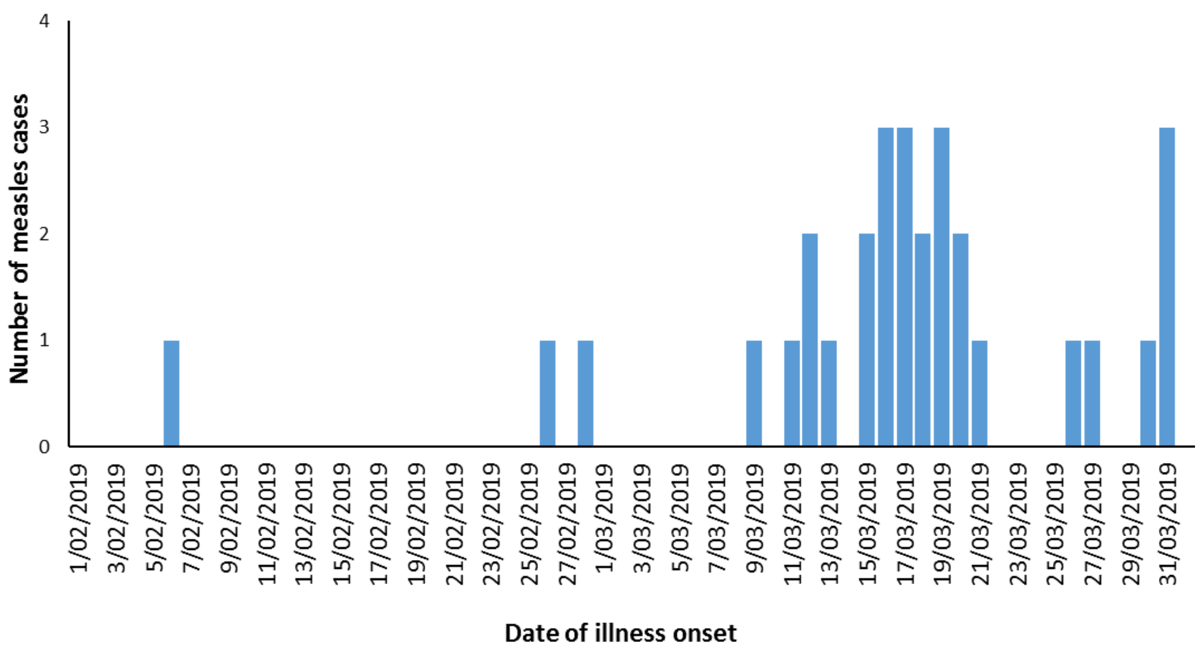
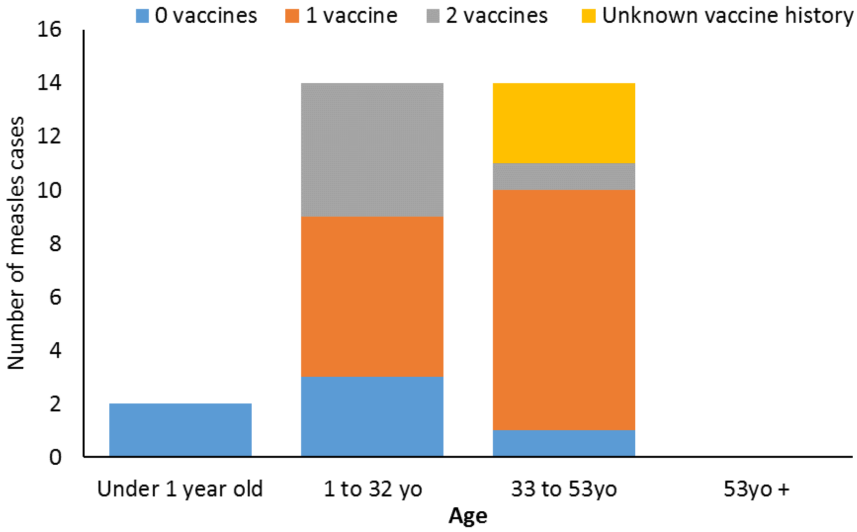
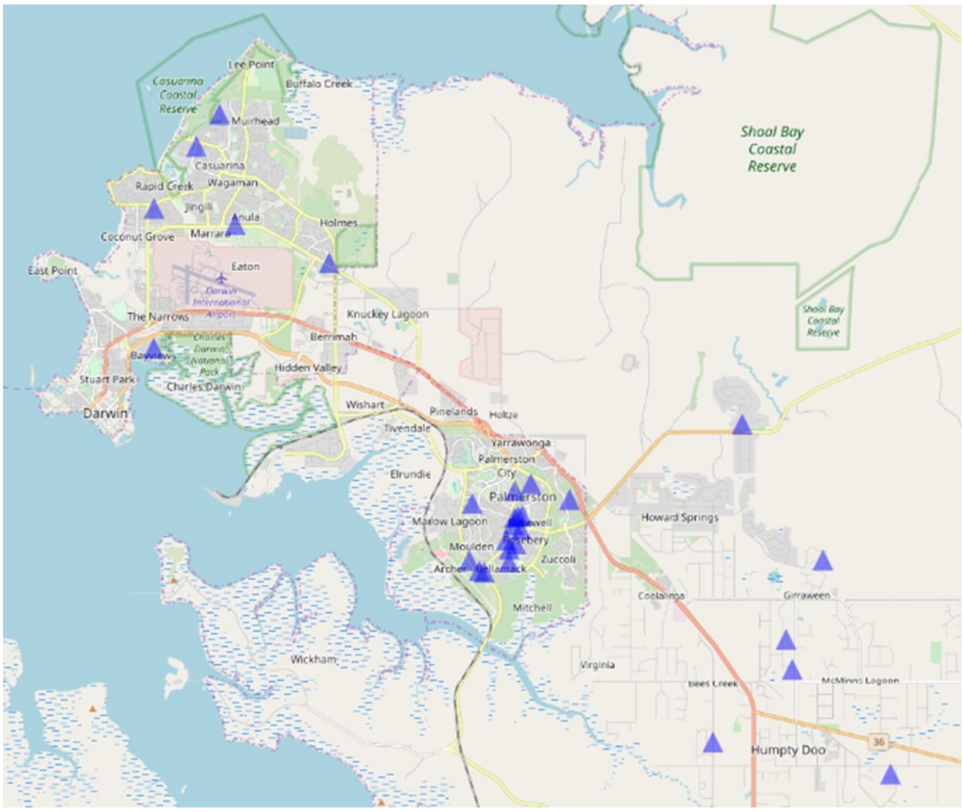


**Figure 2. Measles cases by age-group and previous vaccines received with inclusion of vaccine schedules in place at time of birth**




| **Vaccine schedule at time of birth** | No vaccine, 1st received at 12 months | 2 measles vaccines | 1 measles vaccine | No childhood vaccine, likely immune from measles disease |
|---|---|---|---|---|

**Figure 3. Places of residence for cases of measles outbreak Darwin 2019**




age of first measles-containing vaccine from 12 months to 9 months of age for children residing in the Darwin region as a measure to protect this vulnerable age group when measles was felt to be circulating in Darwin. On 21 May 2019, after 2 incubations periods had elapsed since the last case, CDC advised a return to the routine 12 and 18 month vaccination schedule of measles-containing vaccine. Infants between 6 to 11 months intending to travel overseas continue to be recommended to receive an MMR vaccine prior to travel. Further vaccines are required at 12 and 18 months for any infant receiving their first MMR before 12 months of age to achieve lifelong immunity.

Health care providers and the public were kept updated about measles with alerts specifically for health care providers, media releases, CDC surveillance newsletters and vaccine advisories.

From 6 February to 3 May 2019, Territory Pathology performed 831 measles PCR tests, compared to 16 tests performed in the preceding 3 months.

## Discussion

These 30 measles cases represent the biggest outbreak in the NT since 2014 when 50 cases occurred, with 9 of these being imported cases. The delay in diagnosis in February this year of the imported index case contributed to the size of this outbreak as measles circulation in the NT was not recognised until diagnosis of a second case and public health response to prevent further cases was delayed. While the 'exact' place of transmission was not determined for 25 cases; geographical proximity, common D8 genotype and lack of other known epidemiological links or overseas travel suggested all subsequent 29 cases were generations of the index case in the returned traveller. Healthcare providers are encouraged to consider and test for measles in returned travellers presenting with fever and rash.

For containment of measles outbreaks to occur considerable resources across the public health response sector, public and private health sectors and the community are required. While it is difficult to quantify resources used for this outbreak, indicators such as the number of contacts followed up, additional measles testing performed and vaccinations ordered are a pointer towards the wide-ranging workload and functioning health systems required to contain such an outbreak. Behind every test taken and every vaccine given is a person accessing a health provider, a health consultation and subsequent follow-up. Behind each measles case is a person who suffers from a potentially serious and incapacitating illness that keeps them from usual activities and in a third of cases required hospitalisation. For each case, there is a carry on effect to family, workplaces and community. Due to the high infectivity of measles, a very high but achievable target of 95% vaccine coverage is needed for sufficient herd immunity to prevent outbreaks.[4]

Due to the large number of contacts, this measles outbreak stretched current CDC resources. Staff members followed up cases, spoke with over 1200 contacts, administered NHIG where indicated and MMR vaccines when required. Additionally staff liaised with and informed health care providers and laboratories of events, provided recommendations and engaged media to inform the public. Adequate and well-trained outbreak response staff are required to carry out a timely public health response and to limit measles outbreaks in the manner this recent outbreak was curtailed. Sufficient operational public health unit staff who are familiar with disease control management and communications are the core to successful outbreak responses. Additionally well thought through plans for rapid capacity building, depending on the size and scope of an outbreak, need to be considered. With ongoing measles outbreaks in New Zealand, Australia, Asia, Europe and the United States, it may only be a matter of time until our next case.

Use of NetEpi software enabled centralisation of contact information and generation of reports including listing people who had not responded to the initial text message and required follow up phone calls. In practice, NetEpi facilitated efficient follow up of contacts as staff were able to quickly identify contacts when they rang in, find their individual measles exposure episode and allowed completeness of contact tracing.

This outbreak once again demonstrates measles ability to infect not only close contacts but also susceptible people in the vicinity of someone infectious with measles. Of note, males born in the era of 1 measles-containing vaccine, 1966 to 1986 were over-represented. Their female peers potentially have greater vaccine coverage due to receiving the combined MMR vaccine as a strategy to ensure rubella immunity before pregnancy. Measles' impressive ability to 'pick out' people who are not immune in the community, continues to support the need for ongoing advocacy to alert people 'at risk' of disease, including people aged 33 to 53 years old, and those travelling to areas where measles is circulating. While health messages and media alerts inform people of their risk, individuals need to act by checking their immune status and if non-immune presenting to their health care providers for FREE measles vaccination. Those not immune are generally those born after 1966 with no history of either 2 documented measles vaccinations or no past measles infection. With the global scale of the measles outbreaks currently, it is important for clinicians to continue to consider measles as a possible diagnosis, particularly in those who have travelled overseas and present with fever and rash.

## Acknowledgements

CDC would like to thank all those who contributed to the ending of this recent measles outbreak. Acknowledgement and appreciation for all the hard work and effort of the Royal Darwin and Palmerston Regional Hospitals, laboratory, pharmacy, CDC staff, blood bank, community care, remote health and general practice colleagues whose workload increased exponentially. Without the hard work of all involved as well as support from the public, the outbreak could not have been so well contained and brought to an end so quickly.

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# The Northern Territory Sexually Transmissible Infections and Blood Borne Viruses Strategic and Operational Plan 2019-2023

***David Decolongon, Centre for Disease Control, Darwin***

## Abstract

*The Northern Territory Sexually Transmissible Infections and Blood Borne Viruses Strategic and Operational Plan 2019-2023 (the 'Plan'), the first of its kind in the Northern Territory (NT), was developed by a group of government and non-government stakeholders in sexual health in the NT. The Plan outlines what the sexual health priorities are in the NT, how these are being addressed, and how stakeholders can collaborate to strengthen the NT public health response to achieve the best outcomes for all Territorians.*

*Key Words: Public health; sexually transmitted infection (STI); blood borne virus (BBV); sexual health; priority populations; stakeholder collaboration.*

## Background

The Northern Territory (NT) has the highest notification rates of sexually transmitted infections (STIs) (Figure) including hepatitis B and C in the country. The large geographical area covered by the NT together with a relatively small, dispersed and often mobile population, pose significant challenges for health stakeholders to achieve equitable sexual health outcomes for all Territorians. In addition, the NT is located close to a number of countries that have high prevalence rates of STIs and blood borne viruses (BBVs), including drug resistant infections. People who travel to and from these countries are at risk of transmission and could potentially transmit these infections within Australia if they are undiagnosed and untreated.

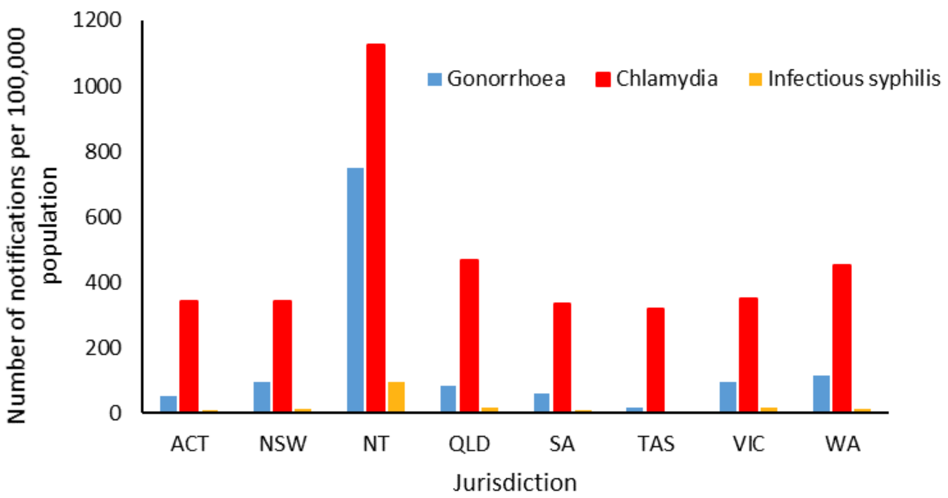
In 2015, the NT Sexual Health Advisory Group (SHAG) identified the need for an NT-specific sexual health strategic document. The SHAG is made up of representatives from government and non-government stakeholder organisations and meets 3 times a year, with 2 of these meetings designated as face to face. The group provides advice on sexual health policy and strategy, facilitates collaboration and coordination among its members to reduce costly program duplication, and promote new initiatives to improve the sexual health and wellbeing of all Territorians.

An ongoing, vigilant and multi-disciplinary public health response is required from sexual health and primary healthcare services to prevent new infections and reduce the high rates of STIs/ BBVs in the NT.

## Method

Between 2015 and 2016, SHAG members were unable to identify resources for a dedicated position or an external consultant to develop the Plan. Subsequently, the Sexual Health and Blood

**Figure. 5 year mean notification rate per 100,000, 2014-2018**



Borne Virus (SHBBV) Unit of the Centre for Disease Control took on the role of driving the development of the Plan in collaboration with the SHAG membership. Consultations were conducted at SHAG meetings and through out-of-session correspondence between mid-2016 and early 2019. These were compiled and edited by the SHBBV Unit, which also had the responsibility for version control of the process. Updated versions were shared with SHAG members for further comment. The SHAG also acted as an expert advisory group to provide oversight throughout the Plan's development. The Plan's development was also a key priority activity of the SHBBV Unit's Business Plans from 2015, and progress on its development was reported in internal meetings and reporting mechanisms.

The framework for the Plan was developed at SHAG meetings, with dedicated time allocated at each meeting. The face-to-face meetings were the most productive method for eliciting stakeholder input, as they were able to facilitate and stimulate discussions and debate on the content of the guiding principles, goals, objectives, priority populations, priority settings, key stakeholders, and oversight of the Plan.

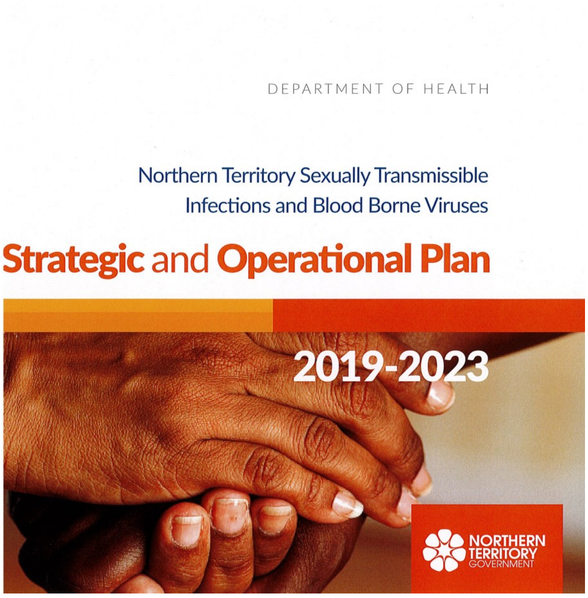
The Plan is aligned with the 5 national STI/BBV strategies that were released at the end of 2018 (*Fifth Aboriginal and Torres Strait Islander BBV and STI strategy, Fourth National STI strategy, Eighth National HIV strategy, Fifth National Hepatitis C strategy, and Third National Hepatitis B strategy*). Each of the priority action areas includes a section that specifically addresses the NT response to the syphilis outbreak, which is also aligned with the *National Action Plan for the Enhanced Response to Addressing STI and BBV in Indigenous Populations*. The Plan's 6 priority action areas are:

1. Education and prevention
2. STI/BBV Testing
3. Early treatment, care and support
4. Creating an enabling environment with equitable access
5. Strengthening workforce and peer-based capabilities
6. Monitoring, evaluation and focussed research

An additional SHAG meeting was convened on 5 February 2019 specifically to progress the content of Plan to its final draft. This final draft was then tabled at the subsequent routine SHAG meeting on 19 March 2019. Some minor edits were agreed on at this meeting and the final version was updated and sent out for endorsement by all members. The Plan was endorsed by SHAG out of session in late March 2019. The Plan is both strategic and operational in scope, and will be periodically updated through SHAG meetings.

## Layout

From late March to mid-May 2019, the SHBBV Unit liaised with the Department of Health's Media and Corporate Communications Unit over the layout of the Plan, including images, graphs, colour, icons, printing costs, number of copies to be ordered, printing timelines, and a media brief. Several drafts were circulated to confirm all content was accurately transcribed, before the final layout, which included the Minister's foreword, was completed in late May 2019.




## Launch

On 30 May 2019, the *Northern Territory Sexually Transmissible Infections and Blood Borne Viruses Strategic and Operational Plan 2019-2023*, which is the first NT-specific sexual health strategic document, was launched at the start of the NT Clinical Senate meeting at Parliament House (information on the NT

Clinical Senate available at: https://health.nt.gov.au/health-governance/northern-territory-clinical-senate). A link to the Plan was added to the NT Health website on the same day to facilitate access and encourage its use as a guiding document for stakeholders:
https://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/7559/1/NT%20STI%20and%20BBV%20Strategic%20and%20Operational%20Plan%202019-2023.pdf

## The Plan

The Plan focuses on reducing the gaps to equitable access to healthcare for STIs/BBVs and improving access to prevention-focussed education and health promotion. The Plan views strong partnerships between organisations, sectors, jurisdictions, national peak bodies and affected individuals and communities as key to improving the broader social determinants of health that impact on the specified priority populations.

The Plan acknowledges that people can experience risk factors such as racism, trauma, poverty, the use of alcohol and other drugs, family violence, mental ill health, and cognitive ability which can adversely affect their ability to make healthy choices about their sexual health and to negotiate healthy sexual relationships. The partnerships and collaboration that have been established through the SHAG will be key to improving the broader social determinants of health that impact on the Territory's priority populations.

## Conclusion

The process involved in developing the Plan is an example of how effective stakeholder collaboration can produce a strategic document that is for, and by, Territorians. The Plan will improve the sexual health of Territorians through its focus on health promotion, prevention, testing, early treatment and preventing the onward transmission of STIs/ BBVs. The Plan outlines a coordinated stakeholder approach to reduce the burden of disease on individuals, families and communities, and over the medium to long term, on hospitals, which will reduce healthcare costs. It will also help guide the public health response for the syphilis outbreak in the NT and guide responses to future STI/BBV public health threats.

## Acknowledgement

Acknowledgement to those who have made The Northern Territory Sexually Transmissible Infections and Blood Borne Viruses Strategic and Operational Plan 2019-2023 a reality.

Much appreciation is extended to all who were involved in developing the Plan. The Plan took 4 years from conceptualisation to completion and required commitment and persistence to ensure it was finalised. Recognition and thanks to the SHBBV Unit Senior Policy Advisors - Katherine Moriarty and David Decolongon, who collated stakeholder input to produce the Plan's drafts, present updates at SHAG meetings and share updates out of session; the SHBBV Unit Section Heads during this time period, Matthew Thalanany, Manoji Gunathilake and Sally Singleton, who provided guidance and liaised with the SHAG members; the SHAG Chair Vicki Krause, who kept the Plan's development as a priority on the SHAG agenda and finally the members of the SHAG for their valuable and insightful contributions.

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NORTHERN TERRITORY GOVERNMENT

Centre for Disease Control

# Hepatitis C

## What is hepatitis C?

Hepatitis is a general term used to describe inflammation of the liver. A variety of viruses and other substances, such as alcohol can cause hepatitis. The hepatitis C virus causes viral hepatitis known as 'hepatitis C'.

## How can someone become infected?

The hepatitis C virus is carried in the blood and is passed on when the blood of an infected person enters the blood-stream of another person.

It only takes a very small amount of infected blood to pass the virus on.

The most common way to get hepatitis C is by sharing equipment used to inject drugs.
Other ways hepatitis C can be passed on include:

- any blood contact before, during, or after a drug injecting episode
- using contaminated equipment for tattooing, body piercing and other beauty procedures
- using other peoples personal items such as razors and toothbrushes
- for women who are hepatitis C positive, there is a small risk of transmission to their babies during pregnancy or birth
- blood transfusions overseas, or in Australia before 1990
- sexual transmission is rare, unless there are cuts or open wounds around the genital area of both people during sex. The risk becomes higher during unprotected anal sex, especially if there are immune system problems or if other sexually transmitted infections (STIs) are present

Hepatitis C is NOT passed on by kissing, shaking hands, coughing, sharing household items or by living in a house with a person who has hepatitis C.

## What are the symptoms?

The first stage of infection (acute hepatitis C) is often mild, lasts less than 6 months and goes unnoticed in most people. If symptoms are experienced they may include nausea, dark urine, tiredness and abdominal discomfort. Jaundice (yellow colouring of skin and eyes) is rare in hepatitis C.

Hepatitis C is cleared from the body without medical intervention in about 25% of people within 2-6 months of being infected.

However, most people develop chronic infection where the virus remains in the blood and liver. While hepatitis C can live in the body for years without causing symptoms, long-term infection may lead to liver damage.

Treatment is available that can cure the infection, so it is important that people with chronic hepatitis C go to a clinic for assessment.

## How can hepatitis C be prevented?

There is no vaccine for hepatitis C and it is possible to become infected with hepatitis C more than once because there are different strains. Antibodies produced by the body to fight the infection do not protect against further infections.

To avoid getting or passing on the virus, the risk of blood-to-blood contact is reduced by:

- safer injecting behaviours and safe disposal of used equipment
- choosing a practitioner who consistently uses sterile equipment and standard infection control procedures for tattooing or piercing
- not sharing any personal items (razor, toothbrush, tweezers, scissors)
- disclosure of past practices and hepatitis C status when donating blood.

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## Testing for hepatitis C

The initial screening blood test looks for antibodies to the virus. Antibodies to hepatitis C are usually present 6 weeks after infection but may take up to 6 months to develop.
A PCR (polymerase chain reaction) blood test looks for the presence of the virus in the blood.

Liver Function Tests (LFTs) are blood tests used to monitor the ongoing condition of the liver.

## Treatment

Hepatitis C can be easily treated with newer medications that specifically target the infection and clear it from the body. There are now new tablet (oral) treatments available that can successfully cure more than 90% of people infected with hepatitis C. These new tablet medications are available and subsidized on the Australian Pharmaceutical Benefits Scheme and can be prescribed by specialists, general practitioners and nurse practitioners. A typical course of these medications involves 1 to 3 tablets per day for 8-12 weeks. The tablets are generally well tolerated and importantly, they do not have the significant side effects that people had reported on treatment with older interferon or injection-based treatments.

**For more information contact Clinic 34 or the Centre for Disease Control in your region**

| | |
|---|---|
| Alice Springs | 8951 7549 |
| Darwin | 8999 2410 |
| Katherine | 8973 9049 |
| Nhulunbuy | 8987 0357 |
| Tennant Creek | 8962 4259 |

or

https://health.nt.gov.au/professionals/centre-for-disease-control/cdc-contacts

# Centre for Disease Control at the Arafura Games

*Emma Childs and Kat Byron, Centre for Disease Control, Darwin*

## History of the event

Darwin hosted the 11th Arafura Games from 26 April to 4 May 2019. The Games began in 1991 under the name Arafura Sports Festival with 1500 athletes competing in 7 sports. From 1998 it became known as the Arafura Games and the event was held every 2 years up until 2011. After an 8 year break the sporting event has returned to Darwin.

The 2019 Arafura Games included 17 sports with over 1500 participants from 33 countries. The event showcased the culture, arts, history, trade and investment opportunities of the Northern Territory (NT).

## Centre for Disease Control (CDC) involvement

As part of the planning process to ensure the health of people both visiting and residing within the NT, CDC staff were invited to be part of the Arafura Games Health Committee, a collaboration of stakeholders including (but not exclusive to) the National Critical Care and Trauma Response Centre, St Johns Ambulance and the NT Department of Health. CDC involvement was important to ensure health protective measures were in place to minimise the risk of transmission of communicable diseases to the population.

Pre-departure, country specific communications were developed and disseminated to prospective visitors. This included immunisation advice (with separate targeted advice for polio prevention requirements in regards to polio-affected countries), encouraging people to know their vaccination status and to ensure they had received adequate vaccinations against measles, mumps, rubella, tetanus, influenza and polio before travelling. Messaging included;

*'Before visiting Australia, the Centre for Disease Control would like you to ensure your vaccinations for measles, influenza and polio are up to date to ensure your health and wellbeing is protected and also to protect others.*

*If you are unwell on arrival please ensure you seek information from your local team attaché, they will be able to advise the services available to you (athlete medical facility will only be open during competition hours).*

*Further information and disease specific fact sheets about some of the diseases that can occur in the Northern Territory, are available on our website here.'*

Extensive disease surveillance planning and risk assessments were undertaken by Dr Peter Markey, CDC Head of Surveillance, to identify potential threats to NT residents and visitors and to ensure outbreak management plans were in place. The main possible threats identified are shown in Table 1.

**Table 1. Disease risks to residents and visitors to the Northern Territory during the 2019 Arafura Games**

| Regional disease risks | Diseases that may emerge in Australian visitors | Diseases which may emerge in overseas visitors | Other diseases of concern - less likely to arise | Outbreak prone conditions |
|---|---|---|---|---|
| • Papua New Guinea: polio<br>• Western pacific region: mumps<br>• Western China: dengue<br>• China: influenza (H5N6) | • sexually transmitted infections<br>• influenza<br>• other viral illnesses | • malaria<br>• dengue<br>• measles<br>• mumps<br>• sexually transmitted infections<br>• influenza<br>• other viral illness | • polio<br>• meningococcal<br>• Middle East respiratory syndrome/coronavirus<br>• avian influenza | • fever<br>• rash<br>• gastro |

A health alert was prepared and sent to local general practitioners and to Royal Darwin and Palmerston Regional Hospital staff to raise awareness of the potential threats to health within the Darwin region during the Arafura Games. Specific messaging highlighted the potential for persons to present with symptoms of malaria, dengue fever and other diseases that are not transmitted in the Top End or are uncommon.

Preparation for the Games required the development of a health safety brochure for the participants and officials to cover Top End diseases or threats from mosquitos, the ocean and water ways, the soil (melioidosis) and information about our climate.

With the Games underway, a daily reporting system through the Arafura Games Medical Lead was established to communicate any concerns. Throughout the 9 days of competition, only 1 notification was received and that was of a participant with varicella. The CDC were also advised of 2 persons with gastro symptoms that were not found to be linked.

The Sexual Health and Blood Borne Virus (SHBBV) Unit at CDC customised the Sexual Health (Clinic 34) resources for the Arafura Games, with each athlete receiving a card in their registration pack to raise awareness of the sexual health services available in Darwin including the hours they were open (Photo).

The message delivered on the card was:

*Playing home or away, always practice safer sex*

*Free condoms are available from:*

- *Arafura Games Athlete Medical Facilities (Marrara stadium and the Darwin Convention Centre)*
- *Clinic 34 Darwin*
- *Northern Territory AIDS and Hepatitis Council*

Safer sex products were made available at the Arafura Games Athlete Medical Facilities which were located at the Marrara Stadium and the Darwin Convention Centre. The numbers of products provided for the event and the number returned (Table 2) reflects a low distribution rate. The distribution points, on reflection, may have been in areas that were not that frequently visited overall during the Games. There was no increase in presentations to Clinic 34 reported throughout the Arafura Games period.


**Photo. Cards provided to athletes for the Arafura Games**

**Table 2. Sexual health resources provided to Arafura Games by the Sexual Health and Blood Borne Virus Unit**

| Product | Quantity provided | Quantity returned | Total distributed |
|---|---|---|---|
| Clinic 34 cards: design for AG | 2000 | 1200 | 800 |
| Condoms | 2000 | 1200 | 800 |
| Lubricant | 2000 | 1300 | 700 |

Public health messages play an important role in raising awareness for clinicians and visitors to the region about potential disease threats and in promoting preventive strategies. The capacity to monitor for disease and communicate risks is also important. There was no increase in number of notifiable diseases reported during or immediately after the Games. Providing suitable health and safety pre departure and arrival advice for future games, as well as ongoing support throughout the event, are appropriate measures to continue for future Games.

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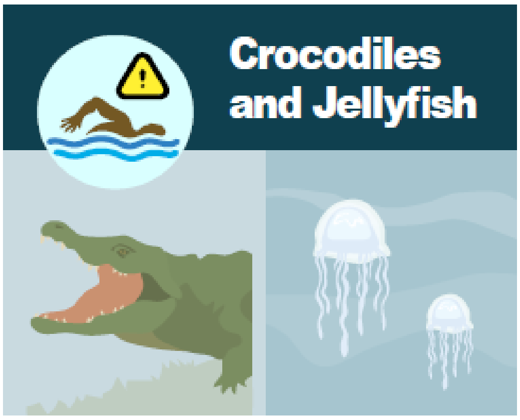
# How to stay healthy and safe
## during the 2019 Arafura Games

Arafura GAMES DARWIN 2019

DEPARTMENT OF HEALTH

## Welcome to the Northern Territory (NT) from the NT Centre for Disease Control

Here are some key health safety points to consider when visiting the NT.



### Melioidosis

For more information on the Northern Territory please search the latest updates from the Centre of Disease Control at www.health.nt.gov.au

EMERGENCY CALL 000

See updates on Facebook /NTGovHealth

NORTHERN TERRITORY GOVERNMENT

## How to stay healthy and safe

during the 2019 Arafura Games

**EMERGENCY CALL 000**

### Crocodiles and jellyfish

The NT has some beautiful beaches, ocean and waterholes.
Please be aware of the dangers within our waters. The NT is home to crocodiles and box jellyfish that are capable of killing a person rapidly.

> ONLY SWIM where there are 'SAFE SWIMMING" signs or in swimming pools
> DO NOT enter the sea during the stinger season – 1 October to 1 June

### Diseases from mosquitoes

Mosquitoes in the NT can carry Murray Valley encephalitis, Kunjin virus, Ross River virus and Barmah Forest virus. These diseases can make you very sick with headaches, fever, confusion, joint swelling and rashes. Please protect yourself.

> Don't get bitten by mosquitoes: Cover up with long sleeved shirts, long pants and socks, particularly early morning and in the evenings

> Use mosquito repellent containing DEET or Picaridin to protect against mosquito bites

If you are travelling from a country known to have malaria, please seek URGENT medical attention through your medical team if you develop symptoms of malaria (fever, night sweats, muscle pains, headache, vomiting).

### Melioidosis

Melioidosis is an infection which can occur anywhere in the body and is caused by a bacteria that can be found in the soil throughout the NT. This bacteria can get into the body through cuts and sores that are exposed to mud and contaminated with infected soil, or by breathing in the bacteria through the air. Those most at risk are people with diabetes, chronic kidney disease or heavy alcohol use. Watch out for signs of chest infection, shortness of breath, cough, fever, pain and difficulty to urinate or infected wounds.

> Protect yourself! Wash off mud and cover cuts and grazes as soon as possible to avoid infection
>
> Always wear footwear when outside and in contact with mud or dirt
>
> Avoid contact with soil if you have open cuts, wounds, diabetes or chronic kidney disease

### NT heat

It is very HOT outside: Temperatures in the NT can be very high so protect yourself against sunstroke and dehydration.

> Drink MORE water, drink LESS caffeine and alcohol
> Wear lightweight, loose fitted clothing and a wide brimmed hat
> Wear sunscreen

## Interactive health messages at High School Healthy Living Expo

*Kat Byron and Alex Roberts, Centre for Disease Control, Darwin*

Alex Roberts and Nadine Copley from Medical Entomology, together with Kat Byron from the Sexual Health and Blood Borne Virus Unit, hosted a stall at the Darwin High School Healthy Living Expo in May 2019. The Expo was attended by over 400 students from years 10, 11 and 12 who had the opportunity to engage with a range of youth, health and sporting organisations. Stall-holders were encouraged to provide interactive and engaging activities for students.

Medical Entomology drew students in with displays of live adult and larval mosquitoes. Students discussed the mosquito life cycle, disease transmission, and measures they could take to protect themselves from bites. The Sexual Health stall had an interactive card game where students had to step through the process of using condoms correctly. The stall also had maps of where free condoms are available in Darwin and promoted the availability of free sexual health checks at Clinic 34.

Year 12 students studying health units were allocated to stalls to help stall-holders promote their message. The students were active in facilitating the condom game and promoting the importance of sexual health checks to their peers. This resulted in higher levels of engagement with students and their teachers. This peer education model has now been recommended to other schools wanting to have Centre for Disease Control (CDC) stalls at their next health expo.

The Darwin High event kicks off the season of health expos at Northern Territory schools. The CDC will have representatives at similar expos coming up at Palmerston College and Taminmin College.


**Photo 1. Sexual Health educational materials**

**Photo 2. Medical Entomology stall**

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# HOTspots

Tracking Antimicrobial Resistance in the Tropical North

***Laura Goddard,[1,2] and Teresa Wozniak[1]***
***1.HOT NORTH, Menzies School of Health Research, Darwin***
***2.National Centre for Epidemiology and Population Health, Australian National University***

HOTspots is an online, antimicrobial resistance (AMR) surveillance tool that has been developed in response to an identified need for more timely and regionally relevant antibiotic susceptibility data in northern Australia. The tool visualises trends in the number, proportion and regional location of resistant bacterial isolates across northern Queensland, Northern Territory (NT) and Western Australia. HOTspots is intended to be an addition to existing resources that facilitate appropriate antibiotic prescribing in both primary and tertiary health care settings.

We are now asking healthcare professionals who prescribe antibiotics to assess the utility of the HOTspots tool by completing a 10-minute online survey and /or a 30-minute interview as part of an evaluation. The results of the evaluation will be used to improve the tool and to inform AMR surveillance in northern Australia more broadly. The survey is anonymous and you will not be asked any information related to the treatment of individual patients. You are free to withdraw from the survey or interview at any stage during the evaluation.

This research has been funded through the program 'Improving Health Outcomes in the Tropical North: A multidisciplinary collaboration (HOT NORTH)', which was awarded to Menzies School of Health Research by the National Health and Medical Research Council (NHMRC) under the Northern Australia Tropical Disease Collaborative Research Programme. The chief investigator is Dr Teresa Wozniak, Research Fellow at the Global and Tropical Health Division at Menzies School of Health Research, and the evaluation is supported by Laura Goddard, Master of Philosophy (Applied Epidemiology) scholar, Australia National University.

The HOTspots evaluation has been approved by the Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research (HREC reference number 2019-3425).

If you would like to be kept informed of the progress of this research please contact us at teresa.wozniak@menzies.edu.au or laura.goddard@menzies.edu.au

To view the HOTspots surveillance tool: [http://amrhotspots.com.au](http://amrhotspots.com.au)

To complete the survey: [https://www.surveymonkey.com/r/hotspots_survey](https://www.surveymonkey.com/r/hotspots_survey)

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# Abstracts from peer reviewed published articles related to the Northern Territory

## Single parasternal-long-axis-view-sweep screening echocardiographic protocol to detect rheumatic heart disease: A prospective study of diagnostic accuracy

***Remenyi B, Davis K, Draper A, Bayley N, Paratz E, Reeves B, Appelbe A, Wheaton G et al***

***Heart, Lung and Circulation. 2019 (online) https://doi.org/10.1016/j.hlc.2019.02.196***

**Background.** Echocardiographic screening in school-aged children can detect rheumatic heart disease (RHD) prior to the manifestation of symptoms of heart failure. The challenge is making this practical and affordable on a global scale. This study aims to evaluate the diagnostic utility of an ultra-abbreviated echocardiographic screening protocol involving a single parasternal-long-axis-view-sweep of the heart (SPLASH) in 2 dimensional (2D) and colour Doppler imaging (index test).

**Methods.** This prospective study of diagnostic accuracy compared the diagnostic utility of the index screening test with a comprehensive reference test (standard echocardiographic screening protocols) as per World Heart Federation (WHF) echocardiographic criteria. School students in Timor-Leste aged 5–20 years were enrolled. Both index and reference test images were acquired by cardiologists on Vivid I or Q machines.

**Results.** A total of 1,365 participants were screened; median age was 11 years. The estimated prevalence of definite and borderline RHD was 35.2 per 1,000. Congenital heart disease was identified in 11 children (0.8%) with 2 needing cardiac surgery. Abnormal SPLASH views were found in 109/1365 (7.99%). No cases of RHD or significant congenital heart disease were missed. Sensitivity and specificity of the abbreviated protocol for detecting RHD were 1.0 and 0.95 respectively.

**Conclusions.** A simplified echocardiography screening protocol using SPLASH is highly sensitive and specific and could significantly improve the efficiency of RHD screening. It has the potential to expedite training of health workers whilst protecting the modesty of students.

## A cluster of acute rheumatic fever cases among Aboriginal Australians in a remote community with high baseline incidence

***Francis JR, Gargan C, Remenyi B, Ralph AP, Draper A, Holt D, Krause V, Hardie K***

***Aust NZ J Public Health 2019 Jun;43 (3):288-293. doi: 10.1111/1753-6405.12893.***

**Objectives:** We report a cluster of acute rheumatic fever (ARF) cases and the public health response in a high-burden Australian setting.

**Methods:** The public health unit was notified of an increase in ARF cases in a remote Australian Aboriginal community. A multi-disciplinary group coordinated the response. Household contacts were screened for ARF or group A Streptococcus (GAS) infection by questionnaire and swab collection, offered an echocardiogram if aged 5-20 years, and intramuscular benzathine benzylpenicillin if aged over 1 year or if less than 1 year with impetigo.

**Results**: Fifteen definite and 7 probable ARF cases were diagnosed in the community in July-December 2014 (all-age incidence of definite ARF: 1,473/100,000). The public health response identified 2 additional cases of ARF. A total of 81 contacts were screened; GAS was detected in 3/76 (4%) throat swabs and 11/24 (46%) skin swabs. Molecular typing revealed high GAS strain diversity.

**Conclusions:** The incidence of ARF during this cluster was very high. Carriage and infection with GAS was observed, but no outbreak strain identified. Implications for public health: A national public health guideline has since been developed that includes advice on the investigation of an ARF outbreak/cluster. Sustained efforts with strong community engagement are required to tackle high ARF rates.

## Environmental deaths in the Northern Territory of Australia, 2003-2018

***Tiemensma M***

***Wilderness and Environmental Medicine 2019; 00(00): 1-9***

**Introduction** The Northern Territory (NT) is sparsely populated with a distinctive climate, geography, and wildlife compared with other states and territories in Australia. Environmental deaths (including drowning, heat-related deaths or environmental exposure, fatal animal attacks or envenomation, and lightning deaths) are reportable to the NT coroner for further investigation.

**Methods** Databases of the NT coroner's office and the Royal Darwin Hospital Forensic Pathology Unit were searched to identify all environmental deaths over a 15-y period (July 1, 2003-June 30, 2018).

**Results** A total of 4535 cases were reported to the NT coroner's office during the studied period, of which 167 (4%) were environmental deaths. Drowning was the most common type of environmental death, followed by heat-related deaths and fatal crocodile attacks. Deaths resulting from lightning and animals other than crocodiles are rare. Local resident, male victims in rural locations were the most commonly affected. Alcohol intoxication played a role in about one-third of cases, and in approximately one-third of cases a known underlying medical condition was identified.

**Conclusions** The NT has a challenging environment that is hot, humid, remote, and isolated. Circumstantial information and thorough police investigations are essential in the medicolegal investigation of environmental deaths.

## Development and field evaluation of a system to collect mosquito excreta for the detection of arboviruses

***Meyer DB, Ramirez AL, van den Hurk AF, Kurucz N, Ritchie SA***

***J Med Entomol. 2019 Apr 4. pii: tjz031. doi: 10.1093/jme/tjz031.***

Mosquito-borne diseases are a major public health concern globally and early detection of pathogens is critical to implement vector management and control strategies. Existing methods for pathogen detection include screening sentinel animals for antibodies and analyzing mosquitoes for pathogen presence. While these methods are effective, they are also expensive, labour-intense and logistically challenging. To address these limitations, a new method was developed whereby mosquito saliva is collected on honey-coated nucleic acid preservation cards which are analyzed by molecular assays for detection of pathogens. However, mosquitoes only expel small amounts of saliva when feeding on these cards, potentially leading to false negatives. Another bodily fluid that is expelled by mosquitoes in larger volumes than saliva is excreta, and recent laboratory experiments have demonstrated that a range of mosquito-borne pathogens can be detected in mosquito excreta. In the current study we have modified light and passive mosquito traps to collect their excreta and assessed their efficacy in field evaluations. From these field-collections, we detected West Nile, Ross River and Murray Valley encephalitis viruses. Our findings suggest that mosquito traps are easily modified to collect excreta and, that this system has the potential to enhance detections of pathogens.

## Arbovirus surveillance using FTA TM cards in modified CO2-baited encephalitis virus surveillance traps in the Northern Territory, Australia

***Kurucz N, Minney-Smith CA, Johansen CA***

***J Vector Ecol. 2019 Jun;44(1):187-194. doi: 10.1111/jvec.12343***.

In 2016, modified CO2-baited encephalitis virus surveillance (EVS) traps were trialled for flavivirus surveillance in the Northern Territory, Australia. The traps were fitted with honey-soaked nucleic acid preservation cards (FTATM) for mosquitoes to expectorate virus while feeding on the cards. Cards were tested for the presence of selected arboviruses, with 2 cards testing positive for Kunjin virus and Alfuy, while sentinel chickens tested in parallel also showed Kunjin virus activity at the same time. The results from the cards and vector mosquito feeding rates indicate that CO2-baited EVS traps coupled with honey-baited FTATM cards are an effective tool for broad scale arbovirus surveillance.

## Arboviral diseases and malaria in Australia, 2014–15: Annual report of the National Arbovirus and Malaria Advisory Committee

*K, Doggett SL, Jansen CC, Johansen CA, Kurucz N, Feldman R, Lynch SE, Hobby MP, Sly A, Jardine A, Bennett S, Currie BJ, and the National Arbovirus and Malaria Advisory Committee*

***Commun Dis Intell 2016;40(3):e401–436***
***https://doi.org/10.33321/cdi.2019.43.14***

This report describes the epidemiology of mosquito-borne diseases of public health importance in Australia during the 2014–15 season (1 July 2014 to 30 June 2015) and includes data from human notifications, sentinel chicken, vector and virus surveillance programs. The National Notifiable Diseases Surveillance System received notifications for 12,849 cases of disease transmitted by mosquitoes during the 2014–15 season. The Australasian alphaviruses Barmah Forest virus and Ross River virus accounted for 83% (n=10,723) of notifications. However, over-diagnosis and possible false positive diagnostic test results for these 2 infections mean that the true burden of infection is likely overestimated, and as a consequence, revised case definitions were implemented from 1 January 2016. There were 151 notifications of imported chikungunya virus infection.Knope There were 74 notifications of dengue virus infection acquired in Australia and 1,592 cases acquired overseas, with an additional 34 cases for which the place of acquisition was unknown. Imported cases of dengue were most frequently acquired in Indonesia (66%). There were 7 notifications of Zika virus infection. No cases of locally-acquired malaria were notified during the 2014–15 season, though there were 259 notifications of overseas-acquired malaria and one notification for which no information on the place of acquisition was supplied. Imported cases of malaria were most frequently acquired in southern and eastern Africa (23%) and Pacific Island countries (20%). In 2014–15, arbovirus and mosquito surveillance programs were conducted in most of the states and territories. Surveillance for exotic mosquitoes at international ports of entry continues to be a vital part of preventing the establishment of vectors of mosquito-borne diseases such as dengue to new areas of Australia. In 2014-15, there was a sharp increase in the number of exotic mosquitoes detected at the Australian border, with 36 separate exotic mosquito detections made, representing a 280% increase from the 2013-14 period where there were 13 exotic mosquito detections.

## Paediatric Active Enhanced Disease Surveillance (PAEDS) annual report 2016: Prospective hospital based surveillance for serious paediatric conditions

*McRae JE, Quinn HE, Saravanos GL, McMinn A, Britton PN, Wood N, Helen Marshall and Kristine Macartney on behalf of the PAEDS network*

***Commun Dis Intell 2019 43 DOI:10.33321/ cdi.2019.43.5***

**Introduction** The Paediatric Active Enhanced Disease Surveillance (PAEDS) network is a hospital-based active surveillance system employing prospective case ascertainment for selected serious childhood conditions, particularly vaccine preventable diseases and potential adverse events following immunisation (AEFI). PAEDS data is used to better understand these conditions, inform policy and practice under the National Immunisation Program, and enable rapid public health responses for certain conditions of public health importance. PAEDS enhances data available from other Australian surveillance systems by providing prospective, detailed clinical and laboratory information on children with selected conditions. This is the third annual PAEDS report, and presents surveillance data for 2016.

**Methods** Specialist nurses screened hospital admissions, emergency department records, laboratory and other data, on a daily basis in 5 paediatric tertiary referral hospitals in New South Wales, Victoria, South Australia, Western Australia and Queensland to identify children with the conditions under surveillance. Retrospective data on some conditions was also captured by an additional hospital in the

Northern Territory. Standardised protocols and case definitions were used across all sites. Conditions under surveillance in 2016 included acute flaccid paralysis(AFP) (a syndrome associated with poliovirus infection), acute childhood encephalitis (ACE), influenza, intussusception (IS; a potential AEFI with rotavirus vaccines), pertussis, varicella-zoster virus infection (varicella and herpes zoster), invasive meningococcal and invasive Group A streptococcus diseases. Most protocols restrict eligibility to hospitalisations; ED only presentations are also included for some conditions.

**Results** In 2016, there were 673 cases identified across all conditions under surveillance. Key outcomes of PAEDS included: contribution to national AFP surveillance to reach World Health Organization (WHO) reporting targets; identification of the leading infectious causes of acute encephalitis which included human parechovirus, influenza, enteroviruses, Mycoplasma pneumoniae, and bacterial meningo-encephalitis; demonstration of high influenza activity with vaccine effectiveness (VE) analysis demonstrating some protection offered through vaccination. All IS cases associated with vaccine receipt were reported to the relevant state health department. Varicella and herpes zoster case numbers increased from previous years associated with suboptimal vaccination in up to 40% of cases identified. Pertussis surveillance continued in 2016 with the addition of test negative controls captured for estimating vaccine effectiveness. Surveillance for invasive meningococcal disease showed predominance for serotype B in absence of immunisation, and new invasive group A streptococcus surveillance captured severe disease in children.

**Conclusions** PAEDS continues to provide unique policy-relevant data on serious paediatric conditions using hospital-based sentinel surveillance. Keywords: paediatric, surveillance, child, hospital, vaccine preventable diseases, adverse event following immunisation, acute flaccid paralysis, encephalitis, influenza, intussusception, pertussis, varicella zoster virus, meningococcal, group A streptococcus.

## Australia's notifiable disease status, 2015: Annual report of the National Notifiable Diseases Surveillance System

***Commun Dis Intell (2018) 2019;43(https://doi.org/10.33321/cdi.2019.43.6)***

***NNDSS Annual Report Working Group***

In 2015, 67 diseases and conditions were nationally notifiable in Australia. States and territories reported a total of 320,480 notifications of communicable diseases to the National Notifiable Diseases Surveillance System, an increase of 16% on the number of notifications in 2014. In 2015, the most frequently notified diseases were vaccine preventable diseases (147,569 notifications, 46% of total notifications), sexually transmissible infections (95,468 notifications, 30% of total notifications), and gastrointestinal diseases (45,326 notifications, 14% of total notifications). There were 17,337 notifications of bloodborne diseases; 12,253 notifications of vectorborne diseases; 1,815 notifications of other bacterial infections; 710 notifications of zoonoses and 2 notifications of quarantinable diseases.

## The Strategic Plan for Control of Tuberculosis in Australia, 2016–2020: Towards Disease Elimination

***The National Tuberculosis Advisory Committee for the Communicable Diseases Network Australia***

***Commun Dis Intell (2018) 2019;43(https://doi.org/10.33321/cdi.2019.43.10)***

### 1. Executive Summary

The rates of tuberculosis (TB) in Australia remain enviably low in a global context. Together with a relatively small number of other countries where TB incidence is <10 per 100,000, Australia is in a position where TB elimination, defined as <1 case per million population, may be feasible by 2050, noting that there is an ongo-ing risk of imported cases from countries with high TB incidence. Following successes in pursuing elimination for other infectious diseases globally, the international TB and public health communities have sought to

shift focus from control of the TB epidemic towards elimination. International efforts for the post-2015 era focus on an ambitious timeline for the elimination of TB worldwide, with Australia now committed to pre-elimination targets (<1 case per 100,000 population) by 2035, which has already been met in the Australian born population, who represent 72% of the total population.[1]

Although Australia has maintained a low and stable TB incidence rate since 1985, indicating effective TB control, there has been little progress in incidence reduction in recent decades, with the absolute number of cases increasing over this period.[2] The key risk factors found in many parts of the world, including poor TB care practices, poverty, political instability and HIV disease are not major contributors to the epidemiology of TB in Australia. Migration, and to a lesser extent short term residency, often from countries of high TB burden, ensures there is an ongoing potential source of new TB cases, including drug resistant ones, in Australia. In addition, although low in case number, the incidence of TB remains 6 times higher in the Indigenous Australian population compared with the non-Indigenous Australian born population. Cross border movements between Papua New Guinea (PNG) and the Torres Strait by traditional inhabitants, under the provision of the Torres Strait Treaty, unavoidably pose some risk of TB spread, including drug resistant strains, in the Torres Strait Protected Zone.

In the 5 years addressed by the previous *Strategic Plan for the Control of TB In Australia, 2011-2015*, Australia has made significant achievements towards TB control including: enhancements to off-shore pre-migration screening, which has stabilised onshore TB rates; attaining greater involvement by govern-mental and non-governmental organisations in TB programs and initiatives; reviewing jurisdic-tional responsibilities and TB risk groupings; and expanding Australia's support of regional and global workforce training, and research endeavours. Over this 5 year period the National Tuberculosis Advisory Committee (NTAC) has published a number of position papers and policy guidelines that have furthered Australia's efforts in TB control.

The new *Strategic Plan for Control of Tuberculosis in Australia, 2016–2020: Towards Disease Elimination* is a plan for the next 5 years, with particular emphasis on local application of the World Health Organization's (WHO's) Priority Action Areas towards TB elimination. As outlined throughout this document, the continuation of current strategies, including maintenance of an appropriately experienced TB workforce, albeit essential, are however insufficient for progressing towards TB elimination. Australia's commitment to TB elimination will require expansion of dedicated and appropriately supported programs, working both within and between jurisdictional TB structures and with the Commonwealth. However, to achieve TB elimination will mean that strategic thinking on TB control must extend beyond health portfolios to other agencies.

While the vision remains to eliminate TB in Australia, this Strategic Plan seeks to lay the foundation for an ongoing reduction in over-all TB occurrence, with the aim of meeting pre-elimination targets by 2035 in the entire Australian population. While current TB control strategies must be maintained, addressing the risks from migration, prior to and after arrival in Australia, from high TB burden countries and continuing to improve cross border TB control are key challenges which must be met to decrease the low incidence of TB even further. Within the Australian born population, addressing vulnerable and hard to reach groups must be further refined.

The goals of this Strategic Plan are to: (i) reduce TB incidence by an average of 10% per annum by 2020, to ensure Australia is on the right path to meet the 2035 target; and (ii) substantially reduce the disparity in TB rates between Indigenous and Australian born non-Indigenous populations by 2020, with the aim of zero disparity by 2035.

This Strategic Plan outlines 33 actions that are detailed individually within the priority action areas of the Strategic Plan. Areas of particular focus include:

- National and jurisdictional assessments of the regulatory and structural requirements and cost analysis of implementing this Strategic Plan in Australia, in order to inform the implementation of other priority actions.

- Evaluate current migrant screening programs, including pre and post-migration management and outcomes to identify opportunities for further targeting and strengthening of the programs.
- Through engagement with representative Aboriginal and Torres Strait Islander groups, determine key challenges to TB elimination within their communities.
- Determine the material effects of TB on individuals and families, including financial, educational, employment, accommodation and housing impact.
- Develop a national strategy on latent TB infection (LTBI) diagnosis and treatment.
- Update the Australian standard for care and prevention of drug resistant TB (DR-TB), including the management of contacts.
- Identify and prioritise questions for scientific and operational research that will enable the development of new tools (diagnosis, treatment, prevention) and identification of optimal models of care and service delivery to achieve a reduction of TB incidence in Australia towards elimination.
- Promote regional activities in TB prevention, detection, management and research including contributing to a coordinated advisory role on complex and DR-TB cases.
- Further develop and maintain a dedicated skilled workforce.

This document has been prepared by NTAC as the Strategic Plan for the control of TB in Australia aiming to lay the foundations towards disease elimination, and will be used as a basis for developing a specific NTAC work plan for 2016-2020. In addition to NTAC, it is acknowledged that there are many other stakeholders contributing to TB control and elimination activities in Australia. As such, this Strategic Plan is directed at all those who must take on the responsibility of improving further TB control in this country. It is intended that this Strategic Plan will assist in informing the future activities of all relevant individuals, government agencies and nongovernment organisations contributing to TB control and with an interest in achieving TB elimination in Australia.

This Strategic Plan should also be seen as a mechanism to inform our regional neighbours, international health agencies and others, of the epidemiology of TB in Australia, the successful achievements to date, the challenges to be met and the strategic direction Australia will take.

## References


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**Several Annual and Quarterly Reports which use NT data are available at the Communicable Diseases Intelligence site.**

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TB is curable

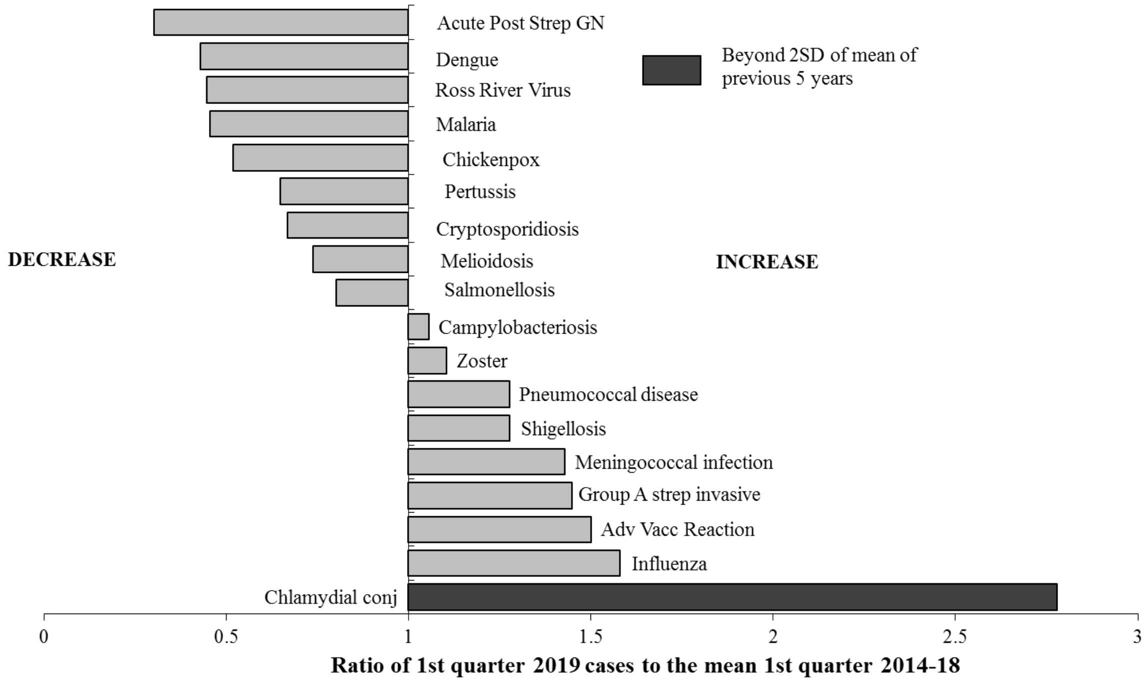
BETTER YET

TB is preventable !!

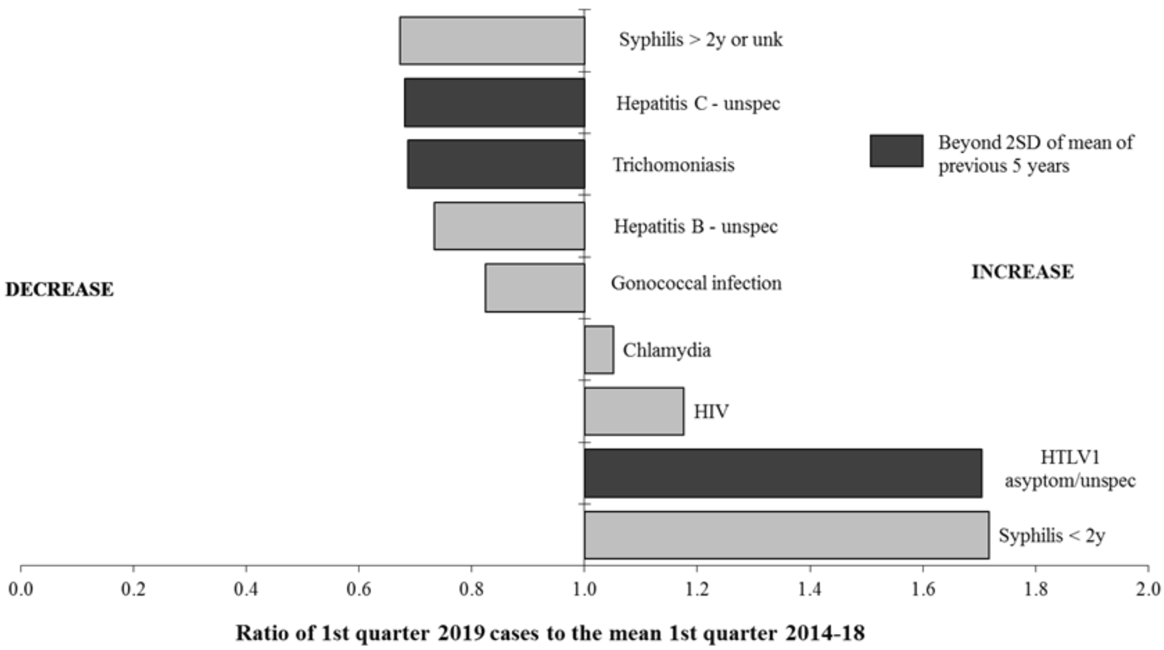
## NT NOTIFICATIONS OF DISEASES BY ONSET DATE & DISTRICTS
### 1 January—31 March 2018 and 2019

| | Alice Springs | | Barkly | | Darwin | | East Arnhem | | Katherine | | NT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 | 2019 | 2018 |
| Acute post-strep glomerulonephritis | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 4 | 3 |
| Adverse vaccine reaction | 1 | 1 | 0 | 0 | 17 | 14 | 0 | 3 | 0 | 2 | 18 | 20 |
| Barmah Forest | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 3 |
| Campylobacteriosis | 32 | 24 | 2 | 5 | 49 | 47 | 6 | 3 | 13 | 7 | 102 | 86 |
| Chickenpox | 2 | 4 | 0 | 0 | 13 | 8 | 0 | 4 | 1 | 1 | 16 | 17 |
| Chlamydia | 249 | 215 | 30 | 25 | 343 | 335 | 59 | 60 | 80 | 100 | 761 | 735 |
| Chlamydial conjunctivitis | 1 | 1 | 7 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 10 | 4 |
| Crusted scabies | 2 | 1 | 1 | 1 | 5 | 6 | 0 | 3 | 0 | 1 | 8 | 12 |
| Cryptosporidiosis | 8 | 24 | 2 | 8 | 15 | 4 | 8 | 2 | 2 | 4 | 35 | 42 |
| Dengue | 0 | 0 | 0 | 0 | 9 | 7 | 0 | 0 | 0 | 0 | 9 | 7 |
| Gastro - related cases | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| Gonococcal conjunctivitis | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 | 0 |
| Gonococcal infection | 227 | 255 | 15 | 28 | 74 | 124 | 43 | 62 | 51 | 90 | 410 | 559 |
| Group A strep invasive | 6 | 11 | 0 | 0 | 12 | 5 | 1 | 1 | 3 | 1 | 22 | 18 |
| Hepatitis A | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Hepatitis B - chronic | 3 | 2 | 0 | 0 | 4 | 4 | 1 | 1 | 0 | 1 | 8 | 8 |
| Hepatitis B - new | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hepatitis B - unspecified | 5 | 5 | 0 | 0 | 20 | 21 | 1 | 0 | 0 | 2 | 26 | 28 |
| Hepatitis C - unspecified | 5 | 8 | 2 | 2 | 27 | 32 | 0 | 0 | 2 | 3 | 36 | 45 |
| Hepatitis E | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| H Influenzae b | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| H Influenzae non-b | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| HIV | 1 | 2 | 1 | 0 | 5 | 6 | 1 | 0 | 0 | 1 | 8 | 9 |
| HTLV1 asymptomatic/unspecified | 14 | 10 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 15 | 11 |
| Influenza | 19 | 17 | 17 | 0 | 188 | 72 | 24 | 4 | 52 | 5 | 300 | 98 |
| Lead - elevated | 1 | 2 | 0 | 0 | 17 | 12 | 9 | 17 | 4 | 2 | 31 | 33 |
| Legionellosis | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Leptospirosis | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 1 | 2 | 5 |
| Malaria | 0 | 0 | 0 | 0 | 2 | 4 | 0 | 0 | 0 | 1 | 2 | 5 |
| Measles | 0 | 0 | 0 | 0 | 30 | 0 | 0 | 0 | 0 | 0 | 30 | 0 |
| Melioidosis | 0 | 0 | 0 | 0 | 21 | 30 | 1 | 5 | 1 | 3 | 23 | 38 |
| Meningococcal infection | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 2 |
| Mumps | 0 | 4 | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 15 | 1 | 24 |
| MVE | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Non TB Mycobacteria | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Pertussis | 1 | 10 | 0 | 1 | 12 | 9 | 1 | 0 | 0 | 5 | 14 | 25 |
| Pneumococcal disease | 9 | 3 | 0 | 0 | 3 | 1 | 0 | 1 | 0 | 1 | 12 | 6 |
| Q Fever | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Rheumatic Fever | 20 | 16 | 3 | 0 | 17 | 10 | 3 | 2 | 3 | 8 | 46 | 36 |
| Rheumatic heart disease | 8 | 0 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 14 | 0 |
| Ross River Virus | 1 | 3 | 2 | 3 | 39 | 28 | 3 | 1 | 8 | 8 | 53 | 43 |
| Rotavirus | 5 | 1 | 1 | 0 | 4 | 13 | 0 | 0 | 1 | 0 | 11 | 14 |
| Salmonellosis | 16 | 29 | 4 | 1 | 72 | 108 | 6 | 12 | 21 | 20 | 119 | 170 |
| Shigellosis | 39 | 69 | 4 | 7 | 22 | 23 | 15 | 8 | 11 | 34 | 91 | 141 |
| STEC/VTEC | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Syphilis < 2years duration | 18 | 17 | 2 | 1 | 39 | 23 | 5 | 16 | 15 | 13 | 79 | 70 |
| Syphilis > 2years or unknown | 3 | 6 | 0 | 2 | 9 | 17 | 1 | 3 | 3 | 2 | 16 | 30 |
| Trichomoniasis | 189 | 311 | 51 | 65 | 193 | 260 | 101 | 160 | 103 | 183 | 637 | 979 |
| Tuberculosis | 0 | 2 | 0 | 0 | 7 | 1 | 0 | 0 | 0 | 0 | 7 | 3 |
| Varicella - unspecified | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Vibrio food poisoning | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Yersiniosis | 0 | 0 | 0 | 0 | 5 | 1 | 0 | 0 | 0 | 0 | 5 | 1 |
| Zoster | 16 | 19 | 2 | 2 | 69 | 88 | 5 | 6 | 12 | 15 | 104 | 130 |
| Sum: | **906** | **1,075** | **147** | **154** | **1,364** | **1,333** | **296** | **378** | **390** | **530** | **3103** | **3470** |

## Ratio of the number of notifications in the 1st quarter to the 5 year mean (2014-18): selected diseases




## Ratio of the number of notifications in the 1st quarter to the 5 year mean (2014-2018): sexually transmitted diseases



## Comments on notifications

### Chlamydial conjunctivitis

There were 10 cases of chlamydial conjunctivitis notified in the 1st quarter compared with 0-6 per quarter over the previous 5 years. All of the notified cases were in children from communities where trachoma is endemic and in areas were conjunctivitis outbreaks occurred which would have promoted increased testing at the time. It is possible that these children had an acute chlamydial conjunctivitis but it is also possible that the swab was identifying children who had an acute viral or non-chlamydial bacterial conjunctivitis, but who also had underlying trachoma.

Trachoma rates have decreased over the NT since the commencement of the Trachoma Control Program.

### Hepatitis C

Notifications of hepatitis C were significantly lower than expected based on the previous 5 years. There were 36 notified hepatitis C cases compared to the mean of 53 cases. Identifying undiagnosed hepatitis C remains important with the advent of newly available oral treatments, and the possibility of elimination of hepatitis C as a major health threat in the future.

### HTLV-1

There were 15 cases of HTLV-1 notified in the 1st quarter compared with the 5-year range being 6-13 cases. Testing for HTLV-1 may have recently increased due to a heightened awareness because of enhanced public awareness about the disease.

### Trichomoniasis

Trichomoniasis notifications were significantly lower in the 1st quarter when there were 637 cases notified, 30% fewer than the 927 expected. Most of this decrease is likely due to a delay in receiving some notifications from the laboratory.

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## A snapshot of immunisation coverage in the Northern Territory, March 2019

*Holly McLauchlan, Centre for Disease Control, Darwin*

### Background information to interpret coverage

Immunisation coverage was reported against Aboriginal status and coverage, and the Northern Territory (NT) coverage was compared to that in Australia as a whole. Immunisation coverage is also reported by the Australian Bureau of Statistics (ABS) Statistical Area Level 3 (SA3). SA3 are ABS standardised geographical areas to which children have been assigned based on their Medicare address as recorded on the Australian Immunisation Register (AIR). The region 'Not Mapped' captures children whose residency could not be mapped to a specific location within the NT, this included post office (PO) box addresses. Maps of these geographic area boundaries can be found at http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/B0AC271BC8160338CA257801000E0692/$File/1270055001_asgs_2011_nt_maps.pdf

The first cohort assessed for coverage was children between 12-15 months of age (assessed on 31 March 2019), born between 30 September 2017 and 31 December 2017 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 second cohort assessed for coverage was children between 24-27 months of age (assessed on the 31 March 2019), were born between 30 September 2016 and 31 December 2016 inclusive. To be considered fully vaccinated, these children must have received meningococcal C vaccination (given at the 12 month schedule point), a second dose of measles, mumps, rubella (MMR) and the first dose of the 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 third cohort assessed for coverage was children 60-63 months of age cohort (assessed on the 31 March 2019), were born between 30 September 2013 and 31 December 2013 inclusive. To be considered fully vaccinated, these children must have received 4 or 5 valid doses of vaccines containing diphtheria, tetanus, pertussis antigens and 4 doses of poliomyelitis vaccine. All vaccinations must have been administered by 60 months (5 years) of age.

## Interpretation and comment

Immunisation coverage rates for NT children by SA3 and Aboriginal status as estimated by the AIR and coverage for all Australian children is provided in the Tables 1 and 2.

Overall the NT coverage was very similar to the Australia-wide coverage. Specifically children in the NT were more likely to be fully immunised in the 12-15 month age cohort (NT 95.6% coverage) compared to the Australia wide cohort (94.3% coverage). There was little difference in immunisation coverage for the 24-27 month age group. The coverage rates for the 60-63 month age group was similar for the NT (94.7%) and Australia wide (95%).

**Table 1. NT and Australia immunisation coverage**

| Age group | NT (% coverage) | Australia (% coverage) |
|---|---|---|
| 12-15 months of age | 95.6% | 94.3% |
| 24-27 months of age | 91.4% | 91.5% |
| 60-63 months of age | 94.7% | 95% |

Coverage by SA3 in Table 2 shows variation between high and low coverage areas by Aboriginal status.

CDC are reviewing the reasons for lower coverage in certain areas and working with the Australian Immunisation Register to review data quality and processing of vaccine recording.

Further information about the Australian Immunisation Register coverage may be found at http://ncirs.org.au/health-professionals/coverage-data-and-reports

**Table 2. Areas with lowest and highest immunisation coverage by Aboriginal status at 31 March 2019**

| Immunisation coverage by SA3 | Age Cohort | Area with lowest coverage (% coverage) | Area with highest coverage (% coverage) |
|---|---|---|---|
| Aboriginal | 12-15 months | Palmerston 86.96% | Darwin Suburbs 100% |
| Non-Aboriginal | 12-15 months | Litchfield 94.34% | Darwin City 98.65% |
| Aboriginal | 24-27 months | Alice Springs 78.95% | Darwin City 100% |
| Non-Aboriginal | 24-27 months | Litchfield 82.26% | Palmerston 95.68% |
| Aboriginal | 60-63 months | Katherine 93.75% | Darwin City 100% |
| Non-Aboriginal | 60-63 months | Katherine 92.59% | Palmerston 97.71% |

*SA3 area needs to have population >20 to be included in able

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# Northern Territory malaria notifications January to March 2019

***Liz Stephenson, CDC Darwin***

There was 2 cases of malaria notified in the 1st quarter of 2019. 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. of cases | Origin of infection | Agent | Chemoprophylaxis | NT Region |
|---|---|---|---|---|
| 1 | Uganda | *P. falciparum* | No | Darwin |
| 1 | Liberia | *P. vivax* | No | Darwin |

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