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Editor's Note:

The 1 July Territory Day fireworks and celebrations were cancelled in 2020 due to the evolving COVID-19 pandemic. This year the event was postponed from the traditional 1 July date to 29 August 2021 in response to community transmission pressures of COVID-19. The firework-related injury (FWRI) survey that has been carried out annually since 1998 was conducted again in 2021. A total of 31 people presented to participating Northern Territory (NT) health care facilities with FWRI. For more information see the report on page 3.

Two of the routinely produced COVID-19 Situational Reports are provided in this edition of *The Bulletin* with the 'SitRep' for 1 September 2021 reporting a total of 203 cases of COVID-19 to date in the NT. Of these cases 13 were locally acquired with known contacts, 4 acquired their disease interstate and 188 were overseas acquired cases. To date all cases have been non-Indigenous people. On 1 September 37 close contacts were being monitored and a total of 4,748 close contacts had

been followed up in the NT since the start of the pandemic.

An NT Health Alert went out in September 2021 highlighting an increase in cases of acute rheumatic fever (ARF) in the East Arnhem region of the NT. The Alert prompts clinicians to be on the look-out for signs and symptoms of ARF and to ensure those patients identified as requiring penicillin prophylaxis are receiving it.

A Notice also went out to NT clinicians and colleagues announcing that Respiratory Syncytial virus (RSV) infection has been made notifiable in the NT and nationally. It is a laboratory notifiable disease only, meaning positive results are sent in to the NT Centre for Disease Control (CDC) by the laboratory for data collection (i.e.notification) and clinicians do not need to notify cases. This information will help inform the burden of RSV disease in the NT and guide future preventive measures. Additionally, Invasive Group A Streptococcal (iGAS) disease, which has been notifiable in the NT since 2011, has now been made nationally notifiable.

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Firework-related injury survey 2021 in the Northern Territory

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ABSTRACT

The Northern Territory (NT) Centre for Disease Control (CDC) firework-related injury (FWRI) survey has been conducted annually since 1998, with the exception of 2020. The survey is undertaken yearly to coincide with the public sale and use of fireworks as part of yearly Territory Day celebrations.

The survey is conducted to determine the number of FWRI presentations to participating health care facilities in the NT, in the 7 day period surrounding Territory Day celebrations.

During the 2021 FWRI survey period, 28 August to 3 September, surveys were sent to 8 participating health care service providers. For those not consenting to surveys, baseline demographics were collected by survey coordinators.

In 2021, 31 people presented to participating health care facilities, with a total of 34 injuries. Of the 31 people, 32.3% were children and 67.7% were adults; 67.7% people identified as male and 32.3% identified as female. Of the people injured, 58.1% were bystanders, 38.7% operated the fireworks and one individual's status was unknown. Burns were the most commonly suffered injury (73.5%), with the remaining 26.5% made up of lacerations, eye injuries, blunt trauma and fractures. Of the injuries, 38.7% were mild, 51.6% were moderate, 3.2% were severe and 6.5% were unknown.

Despite many legislative changes to ensure firework safety, there were a higher number of presentations in 2021 (n=31) compared to the previous 5 years (average 26.6). This highlights the ongoing need for firework safety messages, burns first aid education and firework health promotion. Education at schools and further research into the benefits of firework free zones would be beneficial.

BACKGROUND

Territory Day or 'cracker night' has been a long celebrated tradition in the Northern Territory (NT). The Commonwealth government conferred self-governance of the NT from 1 July 1978, and Territory Day recognises NT independence from the Commonwealth Government.¹ Territory Day is celebrated with community events involving concerts and fireworks, as well as the use of fireworks by the general public.

Prior to 1980, there was a 'cracker night' that was celebrated on 5 November, Guy Fawkes Day. In 1980, the NT Government determined 1 July, to be a more appropriate date for NT residents to celebrate in addition to Guy Fawkes Day.² In 1982, cabinet banned fireworks from public sale and public firing except for 1 July and empowered the Chief Inspector of Explosives to regulate fireworks use based on safety.³

Excluding Tasmania and the NT, all Australian states and territories have prohibited the possession and discharge of fireworks by the general public. In Tasmania, cracker night is held on 24 May, and if not a Saturday, the following Saturday.⁴ To hold a firework display, a permit is required from WorkSafe Tasmania, with anyone over the age of 18 able to apply.⁴

On Territory Day, shopgoods fireworks with a pyrotechnic content of 100g or less and with a sound level of less than 115 decibels, are able to be purchased by the general public over the age of 18.⁵ On Territory Day, firework sales are permitted from 9am to 9pm, the use of fireworks from 6pm to 11pm and possession of fireworks till 12 noon the day after Territory Day.⁶

Due to the COVID-19 pandemic, Territory Day celebrations and fireworks were cancelled in 2020. In 2021, Territory Day was postponed from 1 July to Sunday 29 August due to community transmission of COVID-19.

Since 1998, the Darwin Centre for Disease Control has conducted a survey to determine the number of presentations to emergency departments (ED) and primary health care (PHC) clinics around the NT.^{7,8}

METHODS

A total of 8 EDs and PHC clinics agreed to participate in the 2021 FWRI survey. Participating sites were the Royal Darwin Hospital ED and Burns Unit (RDH), Palmerston Regional Hospital ED (PRH), Gove District Hospital ED (GDH), Katherine Hospital ED (KDH), Tennant Creek Hospital ED (TCH), Alice Springs Hospital ED (ASH), Defence Health Clinics and the Palmerston GP Super Clinic.

All participating sites had a nominated firework injury survey coordinator. Participating sites were provided with a clinical information sheet, FWRI survey form, fireworks cover letter, patient information sheet and a running sheet (FWRI survey summary sheet).

The running sheet collected information on the hospital/health service, presentation date, patient's name, DOB/age, sex, anatomical site/s of injury, type of injury, severity of injury, location of injury, suburb/community where the injury occurred, bystander status and NT visitor status.

Injury severity was classified mild if one review by a health practitioner was required, moderate if 2 or more reviews by a health practitioner was required or severe if hospitalisation was required. In addition to the information collected on the running sheet, the FWRI survey form collected consent, unique patient identifier (if admitted), time of injury, injury chart, awareness of publicised firework safety and burns first aid information, alcohol status within the prior three hours and

qualitative questions on how the injury occurred and first aid administered.

The survey period commenced at 00:01am on Saturday 28 August and ended at 11:59pm on Friday 3 September 2021 with Territory Day being celebrated on Sunday 29 August. The running sheet or an oral handover of the number of presentations were collected from all participating sites on Monday 30 August for release to the media. All running sheets and FWRI surveys were returned from all participating sites at the end of the survey period.

Descriptive statistical analysis was undertaken using Microsoft Excel 2016.

RESULTS

During the FWRI survey period, 31 people presented to participating health care facilities with a total of 34 injuries in 43 locations across the body. The total number of presentations were higher than the median (19.5) and mean (20.9) for the past 22 surveys and the mean for the past 5 surveys, 2015-2019 (26.6).⁷⁻¹²

Of the 31 people who presented, the majority of FWRI occurred in males, adults, bystanders and people who were not visiting the NT (Table 1). Of the people who presented, 64.5% (20) presented on Territory Day, and the remaining 35.5% (11) presented in the proceeding 5 days. The date of presentation for 1 person was unknown (Table 2).

Table 1. Demographics of patients presenting with FWRI to participating NT health care facilities during the survey period in 2021

| Baseline characteristics | n | % | |
|--------------------------|------------|----|------|
| Age | < 18 years | 10 | 32.3 |
| | ≥ 18 years | 21 | 67.7 |
| Gender | Male | 21 | 67.7 |
| | Female | 10 | 32.3 |
| Bystander | Yes | 18 | 58.1 |
| | No | 12 | 38.7 |
| | Unknown | 1 | 3.2 |
| NT Visitor | Yes | 1 | 3.2 |
| | No | 28 | 90.3 |
| | unknown | 2 | 6.5 |

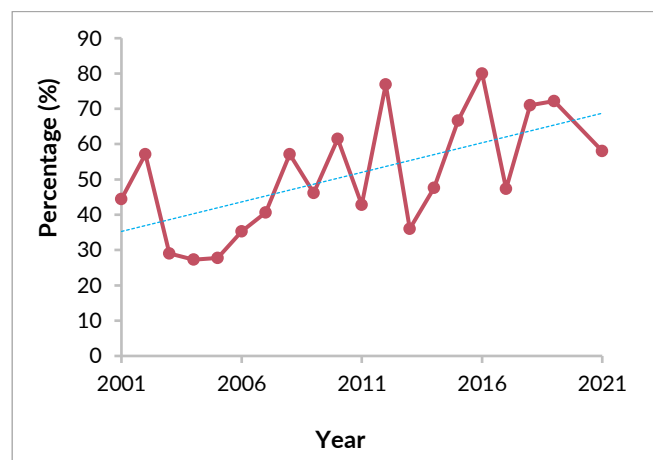
Table 2. Date of presentation to participating health care facilities, facility name, location where injury occurred and type of firework related to the FWRIs in during the NT survey period in 2021

| | | n* | % | |
|------------------------------|------------------------|-----------------------|------|------|
| Presentation date | 29/08/2021 | 20 | 64.5 | |
| | 30/08/2021 | 3 | 9.7 | |
| | 31/08/2021 | 2 | 6.5 | |
| | 1/09/2021 | 0 | 0 | |
| | 2/09/2021 | 2 | 6.5 | |
| | 3/09/2021 | 3 | 9.7 | |
| | Unknown | 1 | 3.2 | |
| | Health facility | Royal Darwin Hospital | 15 | 48.4 |
| Palmerston Regional Hospital | | 6 | 19.4 | |
| Katherine District Hospital | | 5 | 16.1 | |
| Alice Springs Hospital | | 3 | 9.7 | |
| Defence Health Centre | | 2 | 6.5 | |
| Gove District Hospital | | 0 | 0 | |
| Tennant Creek Hospital | | 0 | 0 | |
| Palmerston Super Clinic | | 0 | 0 | |
| Injury Location | | Street | 8 | 25.8 |
| | | Park | 8 | 25.8 |
| | Backyard | 6 | 19.4 | |
| | Indoors | 5 | 16.1 | |
| | Beach | 2 | 6.5 | |
| | Other | 1 | 3.2 | |
| | Unknown | 1 | 3.2 | |
| | Balcony | 0 | 0 | |
| | Professional display | 0 | 0 | |
| Firework type | Unknown | 19 | 61.3 | |
| | Spinner/flyer | 4 | 12.9 | |
| | Multishot | 4 | 12.9 | |
| | Other | 3 | 9.7 | |
| | Skyrocket | 1 | 3.2 | |
| | Sparkler | 0 | 0 | |
| | Fountain/candle | 0 | 0 | |
| | Wheel | 0 | 0 | |
| | Homemade | 0 | 0 | |

*n = number.

Bystander status is collected each year and Figure 1 shows there has been increasing trend in the percentage of bystanders injured since 2001.^{13,14}

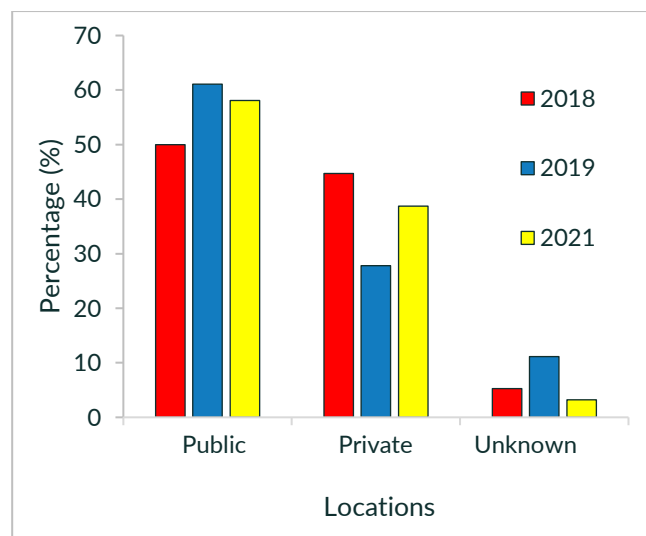
Figure 1. Percentage of bystanders injured by fireworks per year in the Northern Territory, and linear trendline



The majority of injuries, 74.2% (23), occurred in the Darwin and Palmerston region, 16.1% (5) in the Katherine region and 9.7% (3) in Central Australia. The street or park made up 51.6% (16) of the locations where people were injured, followed by the backyard 19.4% (6) and indoors 16.1% (5) (Table 2).

Since 2018, the number of injuries at public locations (50 - 61%) have been consistently higher than those at private locations (27 - 44 %) (Figure 2). Backyards, private residences, indoors, and other were considered private locations, and the remainder were considered public locations.

Figure 2. Percentage of FWRIs occurring at public, private or unknown locations in the NT from 2018



The majority of FWRI were burns and of moderate severity. The hand was the most injured area of the body, followed by the face and legs (Table 3).

Table 3. FWRI characteristics by severity, type and area of injury over the NT 2021 survey period

| Injury Characteristics | | n* | % |
|---|--------------------|----|------|
| <i>31 people presented with 34 injuries in 43 locations</i> | | | |
| Injury Severity | Mild | 12 | 38.7 |
| | Moderate | 16 | 51.6 |
| | Severe | 1 | 3.2 |
| | Unknown | 2 | 6.5 |
| Type of injury | Burn | 25 | 73.5 |
| | <1% TBSA** | 13 | |
| | <5% TBSA** | 5 | |
| | >5% TBSA** | 0 | |
| | Unspecified TBSA** | 7 | |
| | Lacerations | 4 | 11.8 |
| | Eye injuries | 3 | 8.8 |
| | Blunt trauma | 1 | 2.9 |
| | Fracture | 1 | 2.9 |
| | Ear injuries | 0 | 0 |
| Areas of injury | Head and neck | 1 | 2.3 |
| | Face | 10 | 23.3 |
| | Hand | 11 | 25.6 |
| | Arm | 4 | 9.3 |
| | Trunk | 4 | 9.3 |
| | Legs | 10 | 23.3 |
| | Feet | 3 | 7 |

*n = number.

**TBSA = total body surface area.

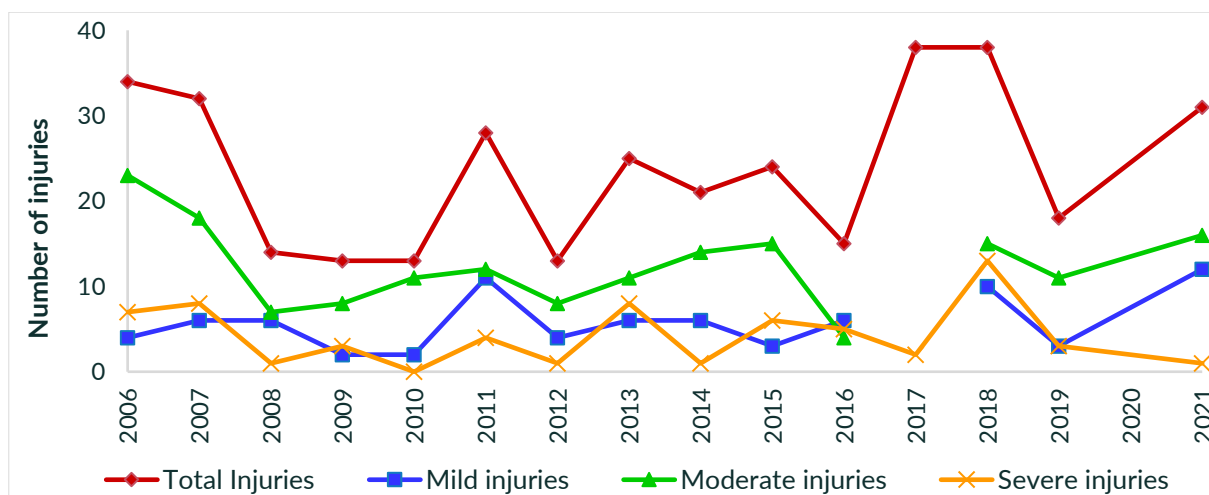
Since 2006 less than 10 people have suffered severe injuries per year, less than 20 people have

suffered moderate injuries per year and less than 12 people have suffered mild injuries per year. 2018 was an exception when 17 suffered severe injuries and 2006 when 23 suffered moderate injuries. No trend in mild, moderate or severe injuries since 2006 can be appreciated, with numbers fluctuating each year (Figure 3).

Of the 31 people presenting with injuries, 11 people completed the FWRI survey. Of these, 90.9% (10) of survey respondents were injured on Territory Day, with 9.1% (1) of survey respondents injured in the proceeding days. Over 50% (6) of survey responders were aware of publicised firework safety information, 36.4% (4) not aware and for 9.1% (1) of respondents the question was not applicable. With regards to alcohol consumption, 36.4% (4) of respondents had consumed alcohol in the 3 hours prior to the injury, 54.5% (6) had not and 1 (9.1%) had a status unknown.

Of the survey responders, all but one individual practiced first aid. Of the 8 survey responders that suffered burns, 37.5% (3) undertook recommended burns first aid by applying running water for 20 minutes after the injury, 37.5% (3) respondents applied running water however the duration was < 20 minutes, unknown or not immediately after the injury. Of the 8 people who suffered burns, only 50% (4) were aware of publicised firework safety and for 12.5% (1) it was not applicable due to age.

Figure 3. Number and severity of FWRI in the NT 2006 - 2021



DISCUSSION

The CDC FWRI survey has been conducted since 1998, with the exception of 2020. The COVID-19 pandemic led to the cancellation of the 2020 Territory Day firework celebrations, and the postponement of the 2021 celebration from 1 July to 29 August. To date, the NT community has endured lockdowns during 2021, restrictions in their ability to travel domestically, internationally and at times within the Territory, and experienced ongoing anxiety and uncertainty due to the COVID-19 pandemic. The COVID pandemic and a decrease in health promotion activities in 2021 were all likely to have led to an increase in the number of FWRI.

Prior to Territory Day celebrations each year, firework safety and burns first aid health promotion activities are undertaken. The RDH burns unit holds a burns awareness week in the week preceding Territory Day and CDC uses social media, radio interviews and media releases to promote firework safety and burns first aid. This is in addition to firework safety campaigning that is undertaken by NT Police, Fire and Emergency Services, NT WorkSafe and other areas of the NT Government. Due to the change in date of the Territory Day fireworks, the ongoing risk of COVID-19 community transmission and other factors, fireworks-related health promotion was limited to social media in 2021. An increasing trend in bystander injuries since 2001 highlights the need for an enhancement of health promotion campaigns.

In 2021 a higher proportion of males than females were injured which is consistent with firework injury research.¹⁵⁻²⁰ Many studies reported that hands or upper limbs were the most common injury location and burns the most common type of injury.^{16-19,21,22} As expected, hands are most commonly injured as they are used to hold and light fireworks. Safer firework lighting techniques need to be promoted as noted by Ricciardello et. al., it is not just the acute injury that affects

individuals, but the immobilisation and ongoing rehabilitation.²³

Since 2018, there have been a higher number of injuries occurring in public locations compared to private locations (Figure 2). In the NT, fireworks can be used in public spaces and on private property, with Mindil Beach in Darwin and Territory Day community events the only locations where the personal use of fireworks was banned.²⁴ In 2021, injuries occurred most commonly in public areas, with 58.0% of injuries occurring in public locations. This worrying trend raises the need for greater discussion on how to keep public areas safe and whether legislation is needed to restrict firework use in certain areas.

In public areas, safety and first aid messaging through temporary signage could be erected in public areas known to be frequented by firework users e.g. the Esplanade, East Point, Nightcliff Foreshore in Darwin and Anzac Oval in Alice Springs. Public areas where fireworks are banned or 'firework free zones' could be introduced, which has been undertaken in Berlin and Munich; however, anecdotal evidence from Dutch police have said such areas do not reduce the number of people using fireworks, it just moves them to different locations.²⁵ If this shift occurred to other public places, there could be benefit in the focal redistribution of resources. Further research is required to determine whether restricting the use of personal fireworks to designated public spaces has led to a decrease in the number of FWRI in other countries before considering that in the NT.

Due to multiple reasons described above, health promotion on firework safety and firework first aid were not able to be undertaken as extensively in 2021 as they have in previous years. The benefits of community education programs are known to be effective in decreasing the number of firework injuries. With the NT undertaking a harm minimisation approach to Territory Day fireworks, yearly education campaigns at schools should be implemented prior to Territory Day, so that children are aware of the dangers of fireworks and

burns first aid. In 2021, 32% of people injured were children. A survey respondent reported “found a firecracker at school, took it home and lit up in room”. This one statement highlights the importance of firework safety education for children.

The American Public Health Association encourages school-based educational efforts as a way to inform children of the hazards associated with the use of fireworks.²⁶ Denmark has undertaken yearly education campaigns for school children since 1988, where children are taught about the dangers of igniting fireworks and encouraged to wear protective eye wear when in the vicinity of fireworks.²⁷ Over the 1991-1992 New Year period, Denmark saw a significant increase in yearly injuries from fireworks. Amongst other initiatives, education campaigns including videos were targeted at children, to highlight the dangers of fireworks. An additional video was released to schools in time for the 1993-1994 New Year period. The number of patients with firework-related burns were significantly lower in 1992-1993 and 1993-1994. The authors note that it is not possible to know the effectiveness of the campaign, however all the children who presented with firework injuries were younger than the target group indicating the education campaign may have worked.²⁷ Italy introduced an intervention program, *Capodanno Senza Danno*, which included multiple components, one of those being informing children and the public about the risk of firework-related injuries, which included circulating a memo to teachers responsible for health education suggesting that they inform students about the dangers and correct use of fireworks.²⁸

Education campaigns in schools are recommended in multiple studies and by the American Public Health Association.^{15,20,23} Anecdotal evidence from NT parents and teachers suggests a firework safety and education program is not currently undertaken at schools in the NT which is a

significant gap in the current distribution channels of health promotion material.

LIMITATIONS

The FWRI survey captures individuals who seek medical attention at the 6 major public hospitals in the NT as well as the Palmerston Super Clinic and Defence Health Clinics. The survey does not capture individuals who present to other primary health care clinics e.g. private GP practices, Aboriginal Community Controlled Health Services within the territory, or travel interstate soon after Territory Day, thus it is likely the FRWIs, especially mild injuries, are underestimated.

The FWRI survey methodology is currently unable to capture the impact on the health services. Future surveys could cost injuries or a retrospective costing analysis would be beneficial to determine the financial impact on health services.

CONCLUSION

In 2021, 31 people suffered from FWRI. To continue a harm minimisation approach towards Territory Day, community health promotion needs to occur and be inclusive of children. Further research needs to be undertaken to determine whether firework-free zones would be beneficial in reducing the number of FWRI.

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Immunisation coverage in the Northern Territory, 1 October 2020 to 30 September 2021

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BACKGROUND

The National Immunisation Strategy for Australia 2019–2024 has 8 strategic priorities. Strategic priority 1 is improving immunisation coverage. Key actions to align with this strategic priority include working towards immunisation coverage rates of 95% for all children aged 1, 2 and 5 years as well as achieving and maintaining immunisation coverage rates of 95% for Aboriginal and Torres Strait Islander children aged 1, 2 and 5 years.

Reaching this aspirational target will give enough herd immunity to stop the spread of measles and other vaccine-preventable diseases.

Immunisation coverage in NT

Data was obtained from Australian Immunisation Register-Coverage Report

<https://www.health.gov.au/health-topics/immunisation/childhood-immunisation-coverage/immunisation-coverage-data-surveys-and-reports>

Table 1. Immunisation coverage for children aged 12 to < 15 months

| | % DTP | % Polio | % HIB | % HEP | % Pneumo | % Fully |
|---------------------------|--------|---------|--------|--------|----------|---------|
| Not mapped | 97.66 | 97.66 | 97.66 | ≥99.00 | ≥99.00 | 97.66 |
| Darwin City | 97.49 | 97.49 | 97.49 | 97.49 | 98.61 | 97.21 |
| Darwin Suburbs | 95.39 | 95.26 | 95.26 | 95.26 | 96.97 | 95.13 |
| Litchfield | 95.63 | 95.63 | 95.63 | 95.63 | 97.57 | 95.63 |
| Palmerston | 95.30 | 95.30 | 95.15 | 95.45 | 97.50 | 95.01 |
| Alice Springs | 94.02 | 93.85 | 94.02 | 94.38 | 97.89 | 93.85 |
| Barkly | 92.22 | 92.22 | 92.22 | 92.22 | ≥95.00 | 92.22 |
| Daly - Tiwi - West Arnhem | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 |
| East Arnhem | 94.57 | 94.57 | 94.57 | 95.35 | 98.45 | 94.57 |
| Katherine | 93.28 | 93.28 | 93.28 | 94.78 | 97.76 | 93.28 |
| NT | 95.19 | 95.13 | 95.13 | 95.43 | 97.69 | 94.97 |
| AUS | 95.12 | 95.11 | 95.07 | 95.15 | 96.43 | 94.76 |
| NT Aboriginal | | | | | | 92.92 |
| AUS Aboriginal | | | | | | 92.90 |

Table 2. Immunisation coverage for children aged 24 to < 27 months

| | % DTP | % Polio | % HIB | % HEP | % MMR | % Pneumo | % MenC | %Varic. | % Fully |
|---------------------------|-------|---------|--------|--------|--------|----------|--------|---------|---------|
| Not mapped | 93.66 | ≥99.00 | 95.07 | ≥99.00 | 94.37 | 97.89 | 97.89 | 93.66 | 91.55 |
| Darwin City | 95.35 | 97.38 | 95.06 | 97.38 | 95.06 | 96.51 | 96.22 | 95.35 | 94.48 |
| Darwin Suburbs | 93.10 | 96.04 | 93.49 | 95.91 | 93.10 | 94.51 | 94.89 | 93.10 | 91.19 |
| Litchfield | 95.88 | 97.65 | 98.24 | 97.65 | 96.47 | 98.24 | 97.65 | 96.47 | 95.29 |
| Palmerston | 93.18 | 98.81 | 94.07 | 98.81 | 93.62 | 97.63 | 97.77 | 93.77 | 92.73 |
| Alice Springs | 93.31 | 98.46 | 94.00 | 98.28 | 92.80 | 97.77 | 97.60 | 92.28 | 91.25 |
| Barkly | 92.96 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | ≥95.00 | 91.55 |
| Daly - Tiwi - West Arnhem | 91.67 | ≥95.00 | 91.67 | 94.79 | 91.67 | ≥95.00 | ≥95.00 | 91.67 | 90.63 |
| East Arnhem | 93.75 | ≥99.00 | 94.64 | ≥99.00 | 94.64 | 98.21 | 97.32 | 94.64 | 93.75 |
| Katherine | 91.76 | 97.65 | 92.55 | 97.65 | 91.76 | 97.65 | 97.65 | 92.55 | 90.20 |
| NT | 93.42 | 97.71 | 94.16 | 97.62 | 93.51 | 96.85 | 96.85 | 93.51 | 92.06 |
| AUS | 93.72 | 96.8 | 94.48 | 96.80 | 93.93 | 95.77 | 95.77 | 94.06 | 92.56 |
| NT Aboriginal | | | | | | | | | 90.06 |
| AUS Aboriginal | | | | | | | | | 91.50 |

Table 3. Immunisation coverage for children aged 60 to < 63 months

| | % DTP | % Polio | % Fully |
|---------------------------|--------|---------|---------|
| Not mapped | 93.48 | 93.48 | 93.48 |
| Darwin City | 93.30 | 93.30 | 93.30 |
| Darwin Suburbs | 94.33 | 94.33 | 94.20 |
| Litchfield | 94.59 | 94.59 | 94.59 |
| Palmerston | 95.17 | 94.75 | 94.75 |
| Alice Springs | 95.34 | 95.16 | 94.80 |
| Barkly | ≥95.00 | ≥95.00 | ≥95.00 |
| Daly - Tiwi - West Arnhem | ≥95.00 | ≥95.00 | ≥95.00 |
| East Arnhem | 96.83 | 96.83 | 96.83 |
| Katherine | 94.60 | 94.60 | 94.60 |
| NT | 94.79 | 94.63 | 94.54 |
| AUS | 95.33 | 95.26 | 95.12 |
| NT Aboriginal | | | 96.43 |
| AUS Aboriginal | | | 97.02 |

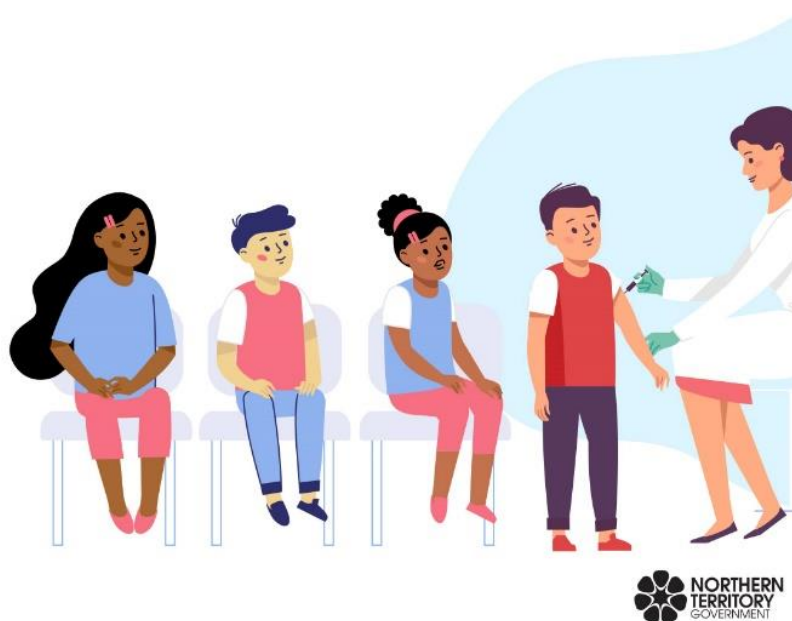
Comments

Immunisation coverage for the 3 age groups; 12 to <15 months, 24 to <27 months and 60 to <63 months is outlined in Tables 1-3. Immunisation coverage for Aboriginal and Torres Strait Islander in 5 year olds in the NT exceeds the 95% coverage target (Table 3). The coverage target is not achieved amongst all 5 year olds in NT nor in the other two age cohorts (1 year and 2 year olds)

(Tables 1-3). Three states and territories (Australian Capital Territory, South Australia and Victoria) had coverage rates for 5 year olds at or above the 95% target. Four states and territories (Australian Capital Territory, South Australia, Tasmania and Victoria) had coverage rates for 1 year olds above the 95% target. No states or territories had coverage rates for 2 year olds above the policy target of 95%.



**Have you had your flu shot yet?
Make sure you have the best protection this flu season**



Kids need the flu vaccine too!

[Top of the Document](#)

COVID-19 Epidemiological Situation Report – 12 July 2021

CDC NT COVID-19 NT Mine Outbreak SitRep

**Coronavirus
(COVID-19)**

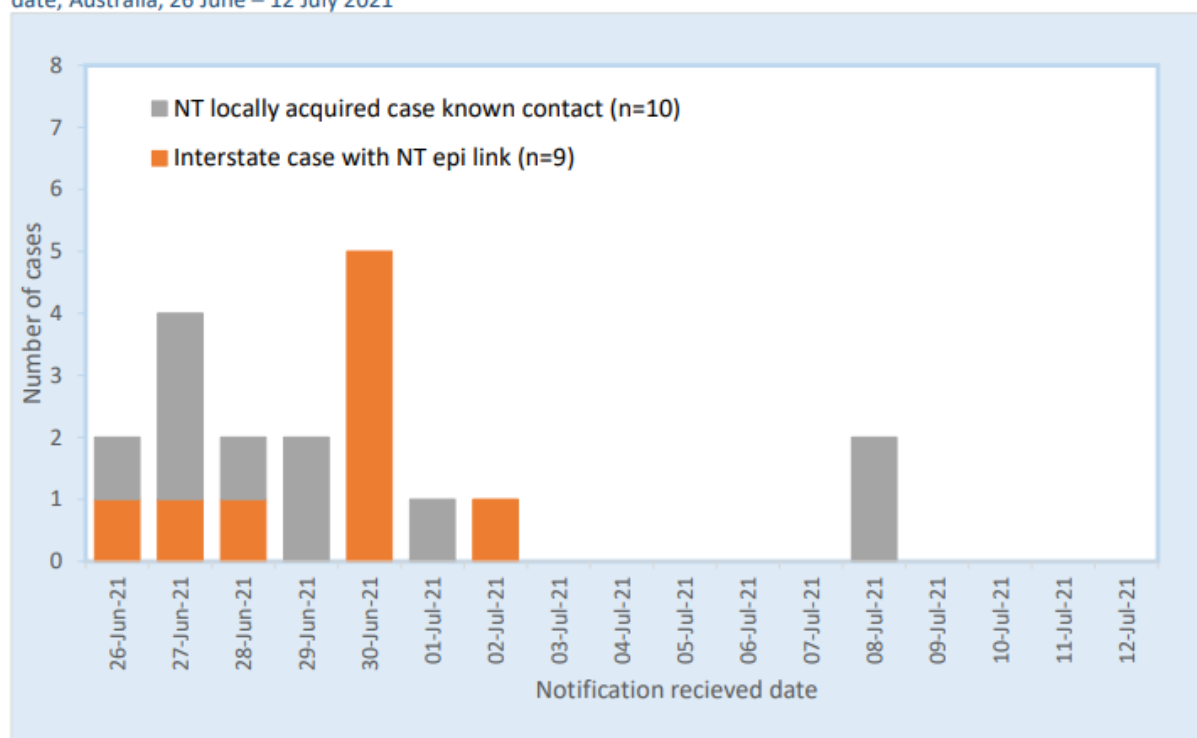
| | | | |
|----------------------|------------|------------------------------|----------------------|
| Outbreak name | NT mine | Report Number | 7 |
| Start Date | 25/06/2021 | Date/time of report | 12/07/2021 @ 1700hrs |
| | | Date/time last report | 09/07/2021 |

Summary of case investigation

| | |
|---|----|
| Total outbreak cases in the NT | 10 |
| New outbreak cases in the since last report | 0 |

As at 1700hrs, 12 July 2021, there were a total of 19 confirmed cases linked to the NT mine site outbreak nationwide (Figure 1; Table 1). Of these 19 cases, 10 were notified in the Northern Territory (NT) and include 8 mine workers and 2 household contacts. The remaining 9 cases were notified interstate comprising of 4 mine workers and 5 household contacts (Table 2). The index case was a NT miner notified in the NT on the 26 June 2021. Whole genome sequencing analysis confirms that this person likely acquired COVID-19 at the Brisbane Novotel Airport Hotel on 17 June 2021, and was deemed infectious from the 18 June 2021. From viral genome sequencing, 10 cases have been diagnosed with a SARS-CoV-2 **Delta Variant of Concern**.

Figure 1. Epidemic curve of COVID-19 cases linked to the NT mine site outbreak by source and notification received date, Australia, 26 June – 12 July 2021



CDC NT COVID-19 Surveillance SitRep

Table 1. Number and description of epidemiological linked interstate cases to the NT mine site outbreak, Australia, 12 July 2021

| Jurisdiction | Number of mine worker cases | Number of household cases |
|--------------------|-----------------------------|---------------------------|
| South Australia | 1 | 5 |
| Queensland | 2 | 0 |
| New South Wales | 1 | 0 |
| Northern Territory | 8 | 2 |

Summary of close contacts

As at 12 July 2021, there were 1,242 close contacts from the NT mine site outbreak in the NT. All staff at the mine site were classified as close contacts. All close contacts from the NT mine site outbreak have now completed quarantine. Close contacts at a managed quarantine facility are recommended to undertake a COVID-19 test three days after their quarantine has ended (day 17). The tables below provide the number of close contacts by place of quarantine and exposure site (Tables 2 and 3).

Table 2. Number of current close contacts linked to the NT mine site outbreak in the NT, by place of quarantine, 12 July 2021

| Place of quarantine | Completed quarantine | Total number of close contacts* |
|--------------------------------|----------------------|---------------------------------|
| NT mine site | 743 | 743 |
| Centre for National Resilience | 141 | 141 |
| Home/private residence | 341 | 341 |
| Alice Springs Todd Facility | 9 | 9 |
| Alternative venue | 8 | 8 |
| Total | 1,242 | 1,242 |

*Revised figures due to ongoing data cleaning

Table 3. Number of close contacts in the NT linked to the NT mine outbreak by exposure site, 12 July 2021[^]

| Exposure Site | Exposure date | Completed quarantine | Total number of close contacts* |
|-----------------------------|---------------|----------------------|---------------------------------|
| NT mine site | 18-25/06/2021 | 1,000 | 1,000 |
| Buff Club | 25/06/2021 | 200 | 200 |
| Zumba class | 26/06/2021 | 23 | 23 |
| Alice Springs Airport Café | 26/06/2021 | 14 | 14 |
| Stuart Park Friendly Grocer | 27/06/2021 | 3 | 3 |
| Household | 22-26/06/2021 | 2 | 2 |
| Total | - | 1,242 | 1,242 |

*Revised figures due to ongoing data cleaning

Summary of casual contacts

As at 12 June 2021, there were 15 casual contact exposure sites. There are currently no casual contacts. The list of case exposure sites is available at <https://coronavirus.nt.gov.au/stay-safe/case-location-alerts-and-public-exposure-sites>.

COVID-19 Epidemiological Situation Report – 1 September 2021

CDC NT COVID-19 Surveillance SitRep

**Coronavirus
(COVID-19)**

01 September 2021

Summary

Cases:

- There have been **2** new cases of COVID-19 notified in the NT since the last Sit Rep. Of these, **1** is an international repatriate and **1** is another overseas arrival. Both remain active.
- To date, there have been **203** cases reported in the NT. Of these, **11** were locally acquired cases (known contact), **4** acquired COVID-19 interstate and **188** were overseas acquired. All cases have been non-Indigenous.

Close contacts:

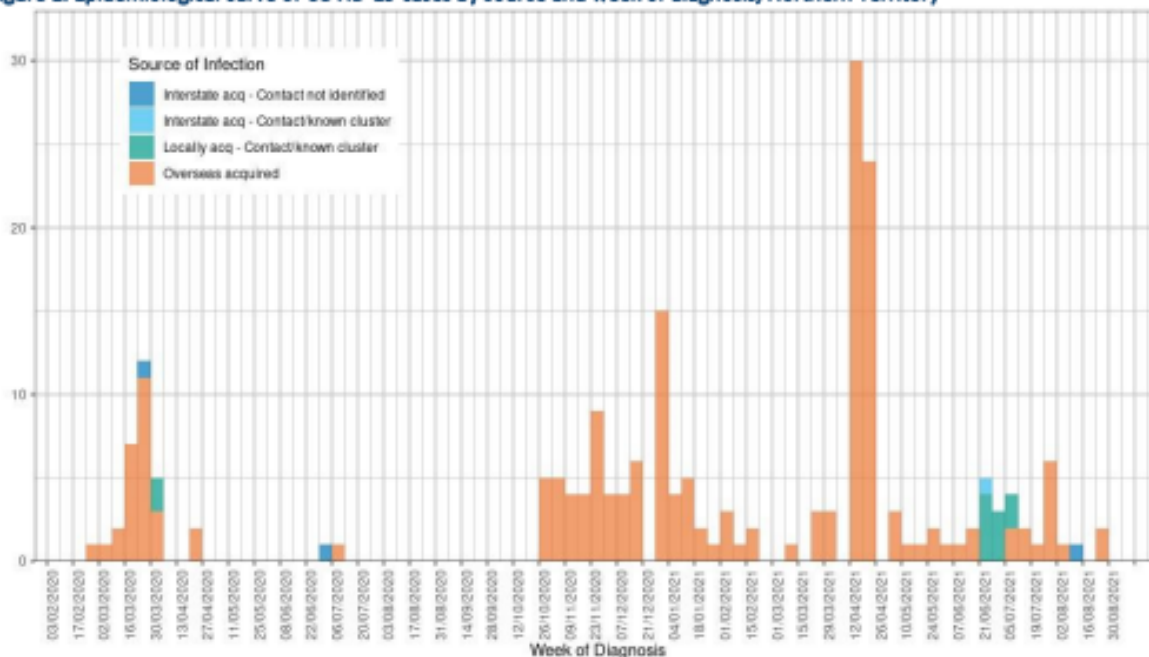
- There are currently **37** close contacts undergoing monitoring in the NT. To date, a total of **4,748** close contacts have been followed up in the NT.

NT COVID-19 health hotline:

- For the week ending **31 August 2021**, the call volume for the NT COVID-19 health hotline was **688** calls, of which **155** were call back requests.

Confirmed cases

Figure 1. Epidemiological curve of COVID-19 cases by source and week of diagnosis, Northern Territory



CDC NT COVID-19 Surveillance SitRep

Figure 2. COVID-19 cases by age group and sex (n =113 males, 90 females)

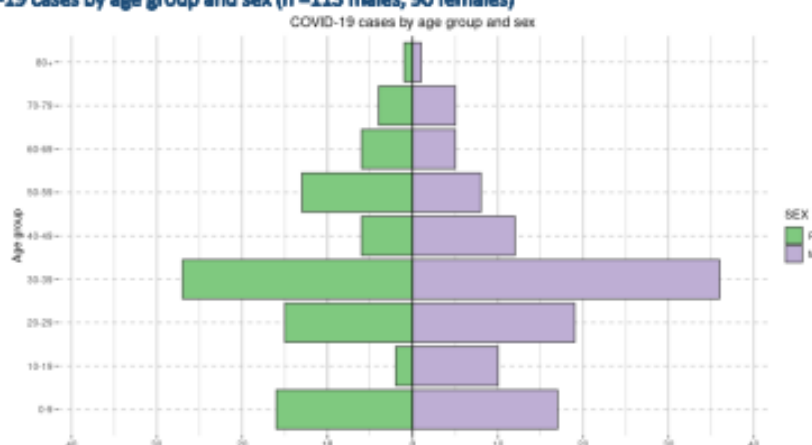


Table 1: Variants of concern, NT COVID-19 confirmed cases

| Pangolin lineage | Number of samples |
|-------------------|-------------------|
| B.1.1.7 (Alpha) | 9 |
| B.1.351 (Beta) | 1 |
| B.1.617.1 (Kappa) | 10 |
| B.1.617.2 (Delta) | 50 |
| Total | 70 |

Table notes
 In Australia, variants B.1.1.7 (Alpha), B.1.351 (Beta), P.1 (Gamma), B.1.617.1 (Kappa) and B.1.617.2 (Delta) are classified VOCs. These classifications differ slightly to the WHO variant classifications, where Kappa is a Variant of Interest (VOI). Further discrimination of the B.1.617 sub-lineages into different classifications may occur in Australia and New Zealand as new information emerges.

International repatriate cases

There has been **1** new case among international repatriates since the last Sit Rep. The positivity rate among international arrivals continues to decrease, reducing to **1.0%** since 23 October 2020. This suggests pre-departure screening processes are working well.

Table 2. COVID-19 cases by departure ports for international repatriation flights to the NT since 23 Oct 2020

| Departure port | Cases | Passengers | Proportion positive |
|----------------|------------|---------------|---------------------|
| New Delhi | 75 | 5,471 | 1.4% |
| Chennai | 39 | 515 | 7.6% |
| London | 11 | 4,487 | 0.2% |
| Frankfurt | 7 | 1,581 | 0.4% |
| Paris | 2 | 149 | 1.3% |
| Vancouver | 0 | 137 | 0.0% |
| Los Angeles | 0 | 96 | 0.0% |
| Johannesburg | 1 | 354 | 0.3% |
| Istanbul | 3 | 482 | 0.6% |
| Denpasar | 0 | 184 | 0.0% |
| Total | 138 | 13,456 | 1.0% |

CDC NT COVID-19 Surveillance SitRep

Table 3. COVID-19 cases by departure ports for repatriation flights to the NT since 1 July 2021

| Flight | Arrival date | Flight origin | Cases | Total passengers | Proportion positive |
|--------|--------------|---------------|-------|------------------|---------------------|
| 54 | 6/07/21 | NEW DELHI | 2 | 180 | 1.1% |
| 55 | 11/07/21 | NEW DELHI | 0 | 194 | 0.0% |
| 56 | 13/07/21 | FRANKFURT | 0 | 178 | 0.0% |
| 57 | 16/07/21 | NEW DELHI | 0 | 196 | 0.0% |
| 58 | 18/07/21 | NEW DELHI | 0 | 194 | 0.0% |
| 59 | 21/07/21 | NEW DELHI | 0 | 196 | 0.0% |
| 60 | 22/07/21 | LONDON | 1 | 175 | 0.6% |
| 61 | 24/07/21 | LONDON | 0 | 151 | 0.0% |
| 62 | 26/07/21 | NEW DELHI | 5 | 189 | 2.6% |
| 63 | 30/07/21 | ISTANBUL | 2 | 181 | 1.1% |
| 64 | 1/08/21 | NEW DELHI | 0 | 192 | 0.0% |
| 65 | 2/08/21 | LONDON | 0 | 173 | 0.0% |
| 67 | 4/08/21 | LONDON | 0 | 188 | 0.0% |
| 69 | 10/08/21 | NEW DELHI | 0 | 186 | 0.0% |
| 70 | 11/08/21 | NEW DELHI | 0 | 195 | 0.0% |
| 71 | 12/08/21 | LONDON | 0 | 183 | 0.0% |
| 72 | 13/08/21 | FRANKFURT | 0 | 186 | 0.0% |
| 73 | 18/08/21 | DENPASAR | 0 | 184 | 0.0% |
| 74 | 19/08/21 | JOHANNESBURG | 0 | 169 | 0.0% |
| 75 | 20/08/21 | LONDON | 0 | 172 | 0.0% |
| 76 | 21/08/21 | NEW DELHI | 0 | 183 | 0.0% |
| 77 | 22/08/21 | LONDON | 0 | 158 | 0.0% |
| 78 | 27/08/21 | NEW DELHI | 0 | 176 | 0.0% |
| 79 | 28/08/21 | NEW DELHI | 0 | 174 | 0.0% |
| 80 | 29/08/21 | ISTANBUL | 0 | 178 | 0.0% |
| 81 | 30/08/21 | LONDON | 1 | 165 | 0.6% |

Contact tracing

There are currently 37 close contacts undergoing daily monitoring in the NT.

Table 4. Close contacts of COVID-19 cases by district of quarantine

| District | Darwin Urban | Darwin Rural | Katherine | East Arnhem | Barkly | Alice Springs Urban | Alice Springs Rural | Other | All |
|----------|--------------|--------------|-----------|-------------|--------|---------------------|---------------------|-------|-------|
| Current | 37 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| Total | 3,521 | 43 | 28 | 14 | 4 | 107 | 894 | 173 | 4,784 |

Table notes
1. Alice Springs Rural includes the Tanami Mine
2. Other includes those who have travelled interstate and unknown

CDC NT COVID-19 Surveillance SitRep

Testing trends

Following a case in the NT community during August, testing in the Katherine and Darwin regions increased significantly. Testing rates across the NT community are now decreasing, as indicated by the ratio comparing the total number of tests conducted in the last 7 days compared with the preceding 7 days.

Table 5. Number and rate (per 100,000 population) of Individuals tested in the NT, by region, to 31 August 2021

| Region | Count last 24 hrs | Count last 7 days | Rate per 100,000 population last 7 days | Ratio compared to the previous 7 days |
|---------------|-------------------|-------------------|---|---------------------------------------|
| Darwin | 727 | 3,001 | 1,827 | 0.58 |
| East Arnhem | 30 | 110 | 727 | 0.60 |
| Katherine | 38 | 151 | 768 | 0.17 |
| Barkly | 1 | 26 | 428 | 0.38 |
| Alice Springs | 140 | 660 | 1,690 | 0.67 |
| Total | 936 | 3,948 | 1,088 | 0.54 |

Table notes

1. Darwin includes NT Government pandemic clinics & outreach, routine staff testing, Howard Springs NT Government supervised quarantine plus other inpatient, outpatient and primary health care services.
2. 'Total' includes conventional PCR, semi-rapid PCR and rapid PCR tests performed by Territory Pathology; Point of care (POC) tests for clients tested in remote communities from 23/05/20 (Table 9 provides district breakdown for POC testing)
3. 'Total' does not include 19,563 results for International and Australian defence force members and US Marines or 36,885 results for international repatriates testing at the National Centre for Resilience, Howard Springs.
4. POC testing data (which are de-identified) and missing data are assumed to be individuals, therefore the number of individuals tested may be slightly overestimated
5. Total cumulative tests since the start of the pandemic are 342,918

Table 6. Point of care testing counts performed in primary health care by region since 23 Oct 2020

| Region | Week ending | | Total | Rate per 100,00 |
|---------------|-------------|------------|---------------|-----------------|
| | 31/08/21 | 24/08/21 | | |
| Darwin | 23 | 57 | 1,990 | 1,196 |
| East Arnhem | 64 | 99 | 3,052 | 19,861 |
| Katherine | 14 | 94 | 1,459 | 7,337 |
| Barkly | 1 | 3 | 494 | 8,018 |
| Alice Springs | 76 | 94 | 3,778 | 9,552 |
| Total | 178 | 347 | 10,773 | 4,356 |

Table notes

1. There have been 17 false positive COVID-19 point of care test results followed up in the NT

Figure 2. Daily count of negative tests by date since 5 April 2021

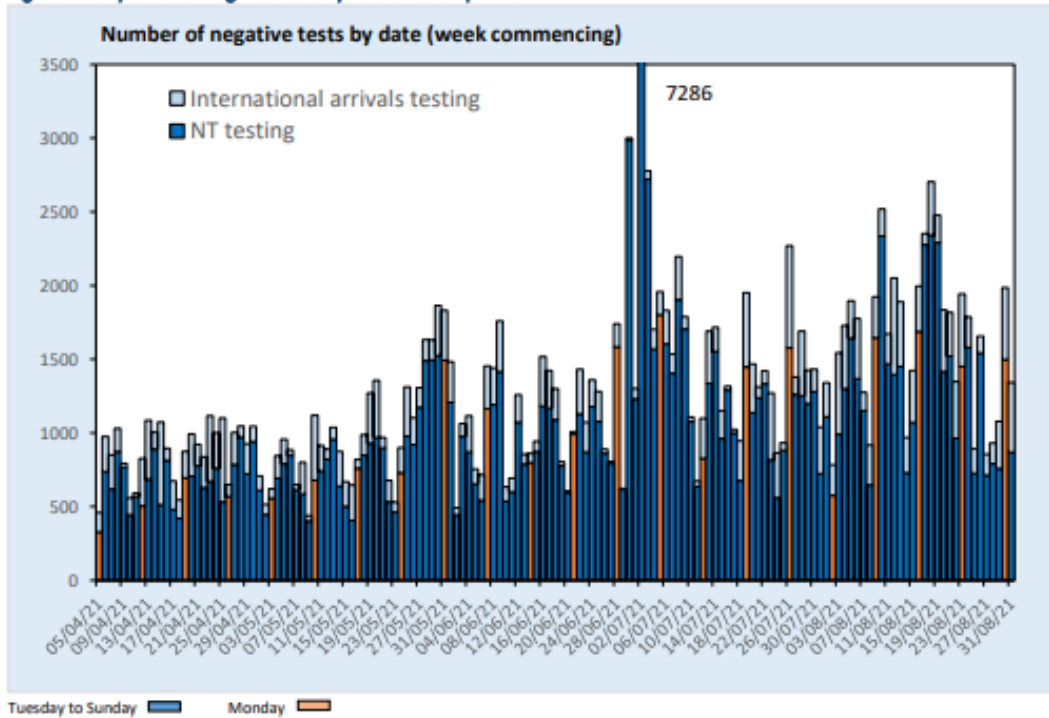
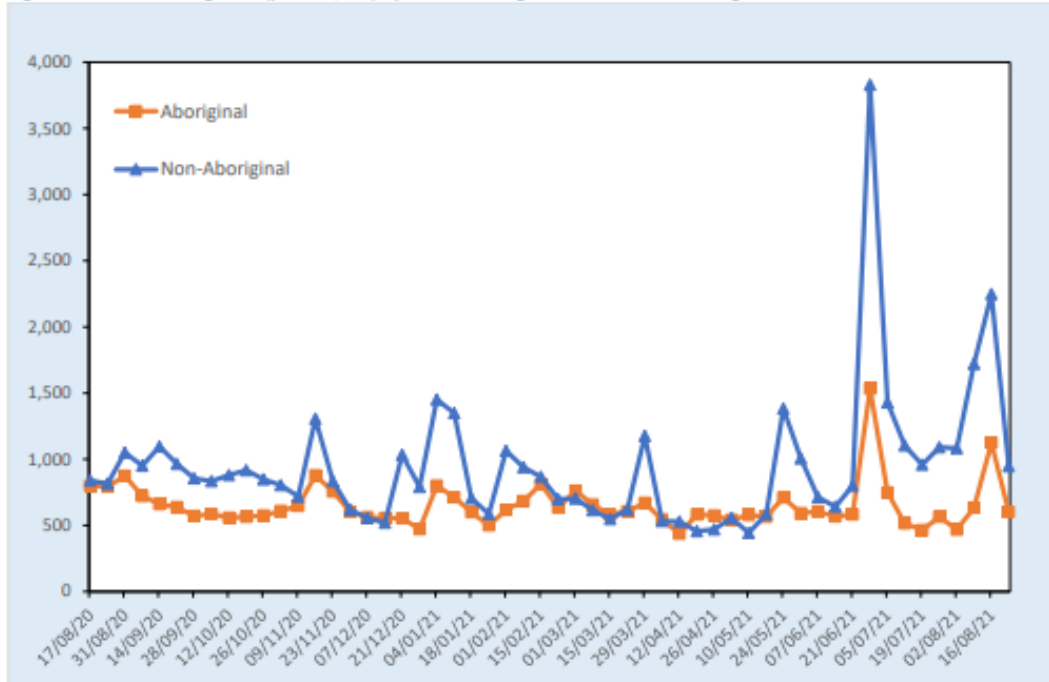


Figure 3. NT total testing rates (per 100,000) by date and Indigenous status since 17 August 2020*



* excludes testing in international arrivals and staff

CDC NT COVID-19 Surveillance SitRep

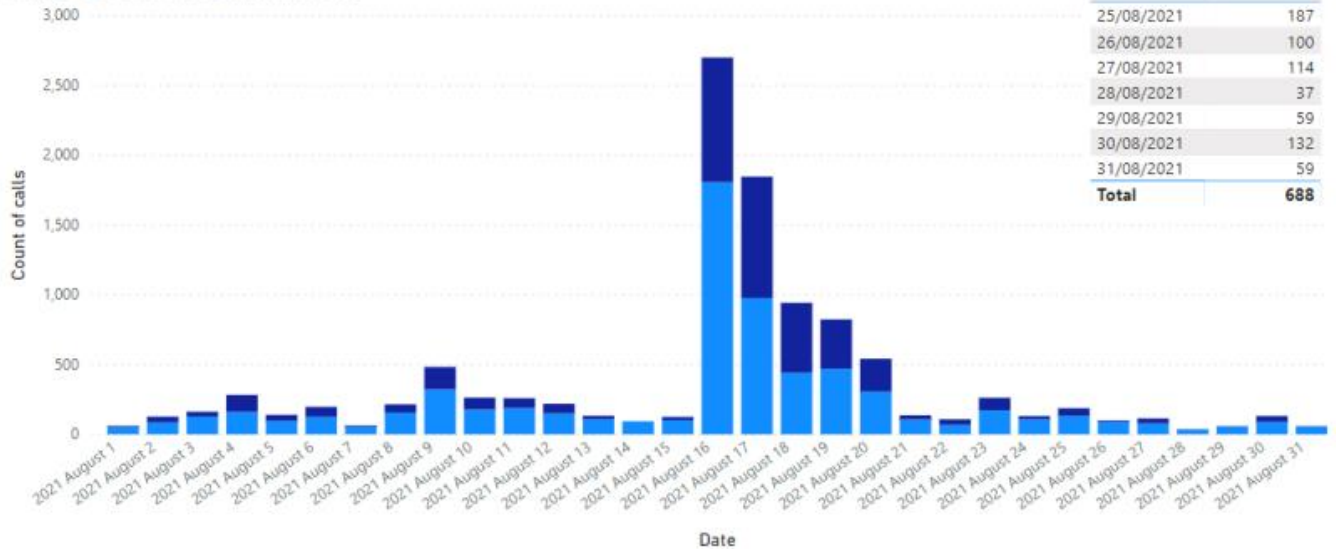
NT COVID-19 health hotline managed by Darwin Centre for Disease Control

For the week ending 31 August, 2021, the call volume for the NT COVID-19 health hotline was 688 calls, of which 155 were call back requests. CDC call numbers by date can be viewed on the [CDC dashboard](#)

Figure 4. Darwin CDC COVID-19 hotline calls per day since 1 August 2021

CDC - Darwin hotline calls

Call type ● All other calls ● Callback requests



Callback request = the caller has left a callback message, either by pressing the star key (*) when prompted by the system or when forced to leave a callback after 5 minutes of being in the queue.
 Other calls includes callback attempts (when an agent accepts a callback and attempts to call the customer back - may be multiple times), abandoned calls (when the caller has reached the queue and for whatever reason ended the call prior to being answered by an agent and not choosing to leave a callback), hang-ups (when the system terminates the call, i.e. outside of office hours) and calls that go straight through the queue (when a "live" call is answered by an agent).

Health Alert and Notifiable Disease notice issued July to September 2021

Increase in Acute Rheumatic Fever



Department of HEALTH

Ground Floor, Block 4 Royal Darwin Hospital
Rocklands Drive, Tiwi NT 0810

Postal address
GPO Box 40596
Casuarina, NT, 0811

ECDCSurveillance.DARWIN@nt.gov.au

T 08 8922 8044
File reference
EDOC2021/303173

02/09/2021

Dear Colleague,

Health Alert:

Increase in Acute Rheumatic Fever (ARF) in East Arnhem region prompts heightened awareness for recognising signs and symptoms of ARF in your practice and ensuring those in your care requiring penicillin prophylaxis for ARF/RHD are receiving it.

In the past 28 days there has been an increase in Acute Rheumatic Fever (ARF) cases in the East Arnhem region. This is an unusual pattern of ARF and while Acute Rheumatic Fever is not usually known to occur in outbreaks, it warrants a public health response to rule out a potentially virulent strain and to reduce any potentially higher than normal background level of Group A Streptococcus (GAS).

It is recommended that all health services in the Top End follow these actions:

- All regional and primary and specialist clinical staff should be advised of the increase in ARF in the community with a heightened clinical suspicion for pursuing for investigation
- Urgency should be applied to ensure *all* patients who are prescribed secondary prophylaxis with benzathine penicillin in your community or practice are up to date.
- Clinical priority should be given to primary prevention: treat all sore throats and skin sores as per CARPA. [Sore throat CARPA p407](#); [Skin Infections CARPA p387](#)
- All suspected cases of ARF in the next month (4 weeks) should be notified as soon as possible to the NT RHD Register

Acute Rheumatic Fever (ARF)

Acute Rheumatic Fever (ARF) is an illness caused by an autoimmune response following infection with GAS of the skin or throat. Acute episodes occur 2-3 weeks after exposure to GAS.

Be alert for signs and symptoms of ARF including:

- fever
- painful or swollen joints
- chorea (up to 6 months post exposure)
- new murmur
- shortness of breath
- signs of heart failure
- prolonged PR interval on ECG

Hospitalisation is recommended within 24-72 hours for all cases of suspected ARF for clinical assessment and confirmation of diagnosis.

Local protocols can be accessed at [ARF CARPA p294](#)

Additional resources

- The ARF Diagnosis App for iOS and Android available: <http://www.rhdaustralia.org.au/apps>
- Online clinical modules available on the RHDA website: <http://www.rhdaustralia.org.au/resources>.
- Further information can be found at: <http://www.rhdaustralia.org.au/arf-rhd-guideline>
- [NT RHD Rheumatic Heart Disease Control Program](#) -Top End Region 8922 8454 rhddarwin@nt.gov.au

Thank you for being alert to ARF. Early diagnosis allows for best management and public health actions to reduce further transmission of GAS. It is very important, now and always, to be a champion for promoting good hygiene and healthy skin practices.

Yours sincerely,

Dr Pasqualina Coffey
Public Health Physician
Centre for Disease Control, Darwin
NT Health

Changes to notifiable diseases



Department of HEALTH

Ground Floor, Block 4 Royal Darwin Hospital
Rocklands Drive, Tiwi NT 0810

Postal address
GPO Box 40596
Casuarina, NT, 0811

ECDCSurveillance.DARWIN@nt.gov.au

T 08 8922 8044
File reference
EDOC2021/267857

Dear Colleague

New Notifiable Diseases

There has been a recent change to the disease schedules under the Northern Territory Notifiable Disease Act in relation to respiratory syncytial virus infection. In addition invasive group A streptococcal infection has become a nationally notifiable disease.

Respiratory Syncytial virus (RSV) infection

RSV has become a nationally notifiable disease and been added to the notifiable disease list of the NT. It is laboratory notifiable only, meaning that any patients' results showing RSV infection will be copied to the NT Centre for Disease Control (CDC) and clinicians do not need to notify cases to the CDC.

RSV most often affects young children and can cause bronchiolitis. Symptoms are usually mild and include runny nose, cough and fever. Some cases can be serious and require hospitalisation.

Case definition and testing for RSV

Only confirmed cases are notifiable. A confirmed case requires laboratory evidence of:

1. Isolation of RSV by cell culture
OR
2. Detection of RSV by nucleic acid testing
OR
3. Detection of RSV antigen
OR
4. Seroconversion, or a significant increase in antibody level such as a fourfold or greater rise in titre, to RSV between paired sera of immunoglobulin G (IgG) or total antibody.

As RSV symptoms can overlap with COVID-19, all patients presenting with respiratory symptoms should be tested for COVID-19, but please be alert to the possibility of RSV among these cases and ensure nasopharyngeal swabs are tested for RSV and COVID-19 where clinically appropriate.

Invasive Group A Streptococcal (GAS) infection

Invasive GAS infection has also become a nationally notifiable disease. However, as it has been a notifiable disease in the NT since 2011, no changes will be required by your practice. Updated invasive GAS infection guidelines will be released by CDC soon.

If you have any questions or would like further information regarding these conditions please do not hesitate to contact your local CDC unit or email CDCSurveillance.DARWIN@nt.gov.au.

Yours sincerely

Dr Vicki Krause
Director, Centre for Disease Control – Environmental Health Public Health Unit Darwin
6 August 2021

Northern Territory disease notifications by onset date and district, 2nd quarter, 1 April to 30 June (2020 vs. 2021)

| | Alice Springs | | Barkly | | Darwin | | East Arnhem | | Katherine | | NT | |
|-------------------------------|---------------|------|--------|------|--------|------|-------------|------|-----------|------|------|------|
| | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 |
| Acute Post Strep GN | 3 | 5 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 1 | 8 | 8 |
| Adv Vacc Reaction | 2 | 60 | 0 | 4 | 16 | 261 | 0 | 17 | 0 | 19 | 18 | 361 |
| Barmah Forest | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 2 |
| Campylobacteriosis | 19 | 12 | 3 | 0 | 40 | 44 | 5 | 3 | 5 | 5 | 72 | 64 |
| Chickenpox | 3 | 4 | 0 | 0 | 6 | 13 | 0 | 0 | 0 | 0 | 9 | 17 |
| Chlamydia | 183 | 176 | 14 | 12 | 273 | 321 | 46 | 40 | 90 | 47 | 606 | 596 |
| Chlamydial conj | 33 | 1 | 1 | 0 | 2 | 1 | 0 | 0 | 24 | 0 | 60 | 2 |
| COVID-19 | 0 | 2 | 0 | 0 | 6 | 109 | 0 | 0 | 0 | 1 | 6 | 112 |
| Crusted scabies | 1 | 3 | 1 | 1 | 9 | 6 | 4 | 1 | 1 | 2 | 16 | 13 |
| Cryptosporidiosis | 2 | 0 | 3 | 0 | 4 | 71 | 1 | 1 | 0 | 2 | 10 | 74 |
| Dengue | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Gastro - related cases | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Gonococcal conj | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Gonococcal infection | 131 | 177 | 20 | 14 | 78 | 116 | 23 | 26 | 39 | 40 | 291 | 373 |
| Gonococcal neon ophth | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Group A strep invasive | 6 | 9 | 1 | 0 | 2 | 14 | 0 | 0 | 2 | 1 | 11 | 24 |
| Hepatitis B - chronic | 0 | 1 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 5 | 2 |
| Hepatitis B - unspec | 1 | 0 | 0 | 0 | 18 | 11 | 0 | 1 | 0 | 0 | 19 | 12 |
| Hepatitis C - new | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Hepatitis C - unspec | 6 | 2 | 0 | 0 | 17 | 27 | 0 | 0 | 3 | 1 | 26 | 30 |
| H Influenzae b | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| H Influenzae non-b | 0 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 6 |
| HIV | 1 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 6 | 2 |
| HTLV1 asyptom/unspec | 7 | 15 | 1 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 11 | 17 |
| Influenza | 6 | 0 | 0 | 0 | 7 | 8 | 4 | 0 | 2 | 0 | 19 | 8 |
| Lead - elevated | 0 | 0 | 0 | 0 | 140 | 73 | 11 | 10 | 1 | 0 | 152 | 83 |
| Legionellosis | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Listeriosis | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Malaria | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Melioidosis | 0 | 0 | 0 | 0 | 13 | 4 | 1 | 1 | 2 | 1 | 16 | 6 |
| Mumps | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| Non TB Mycobacteria | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 3 |
| Pertussis | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Pneumococcal disease | 5 | 6 | 0 | 1 | 5 | 4 | 0 | 0 | 0 | 0 | 10 | 11 |
| Rheumatic Fever | 8 | 29 | 7 | 1 | 10 | 10 | 13 | 4 | 6 | 6 | 44 | 50 |
| Rheumatic heart disease | 6 | 12 | 2 | 0 | 6 | 8 | 2 | 4 | 7 | 3 | 23 | 27 |
| Ross River Virus | 1 | 1 | 1 | 0 | 19 | 19 | 4 | 2 | 2 | 0 | 27 | 22 |
| Rotavirus | 4 | 2 | 1 | 0 | 3 | 6 | 0 | 0 | 0 | 1 | 8 | 9 |
| RSV infection | 0 | 11 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| Salmonellosis | 7 | 13 | 4 | 0 | 75 | 91 | 9 | 7 | 8 | 16 | 103 | 127 |
| Shigellosis | 15 | 4 | 3 | 0 | 12 | 10 | 3 | 3 | 4 | 3 | 37 | 20 |
| STEC/VTEC | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Syphilis < 2y duration | 20 | 25 | 8 | 2 | 33 | 17 | 6 | 10 | 9 | 6 | 76 | 60 |
| Syphilis > 2y or unk duration | 2 | 10 | 0 | 1 | 6 | 9 | 0 | 0 | 1 | 1 | 9 | 21 |
| Syphilis congenital | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| Trichomoniasis | 201 | 193 | 57 | 23 | 216 | 254 | 92 | 75 | 105 | 90 | 671 | 635 |
| Tuberculosis | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 1 | 1 | 4 | 4 |

| | Alice Springs | | Barkly | | Darwin | | East Arnhem | | Katherine | | NT | |
|-----------------------|---------------|------|--------|------|--------|-------|-------------|------|-----------|------|-------|-------|
| | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 | 2020 | 2021 |
| Varicella - unspec | 0 | 6 | 0 | 0 | 15 | 31 | 0 | 1 | 0 | 2 | 15 | 40 |
| Vibrio food poisoning | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Yersiniosis | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 |
| Zoster | 14 | 14 | 3 | 3 | 65 | 63 | 6 | 2 | 6 | 9 | 94 | 91 |
| Sum: | 690 | 800 | 135 | 64 | 1,121 | 1,619 | 232 | 209 | 323 | 259 | 2,501 | 2,951 |

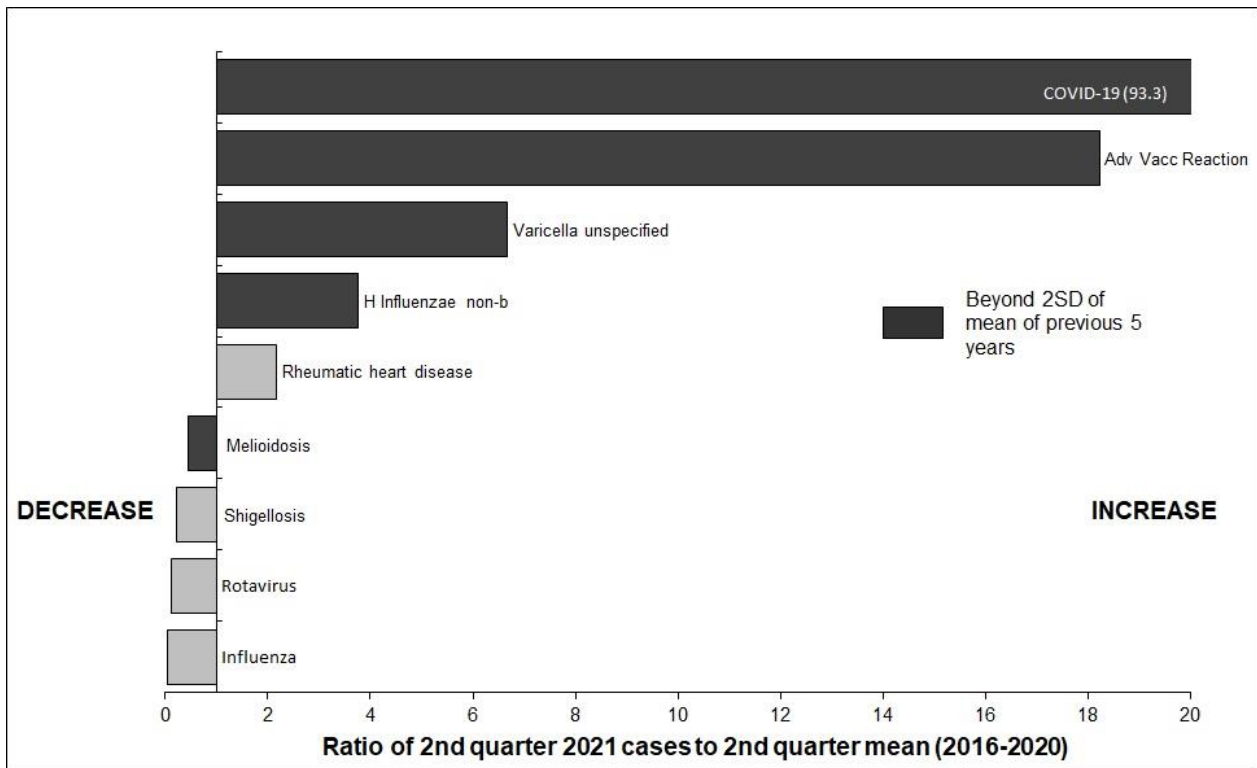
Malaria notifications for 2nd quarter, 1 April to 30 June 2021

| Number of cases | Origin of infection | Agent | Chemoprophylaxis | NT Region |
|-----------------|---------------------|-------|------------------|-----------|
| 0 | n/a | n/a | n/a | n/a |

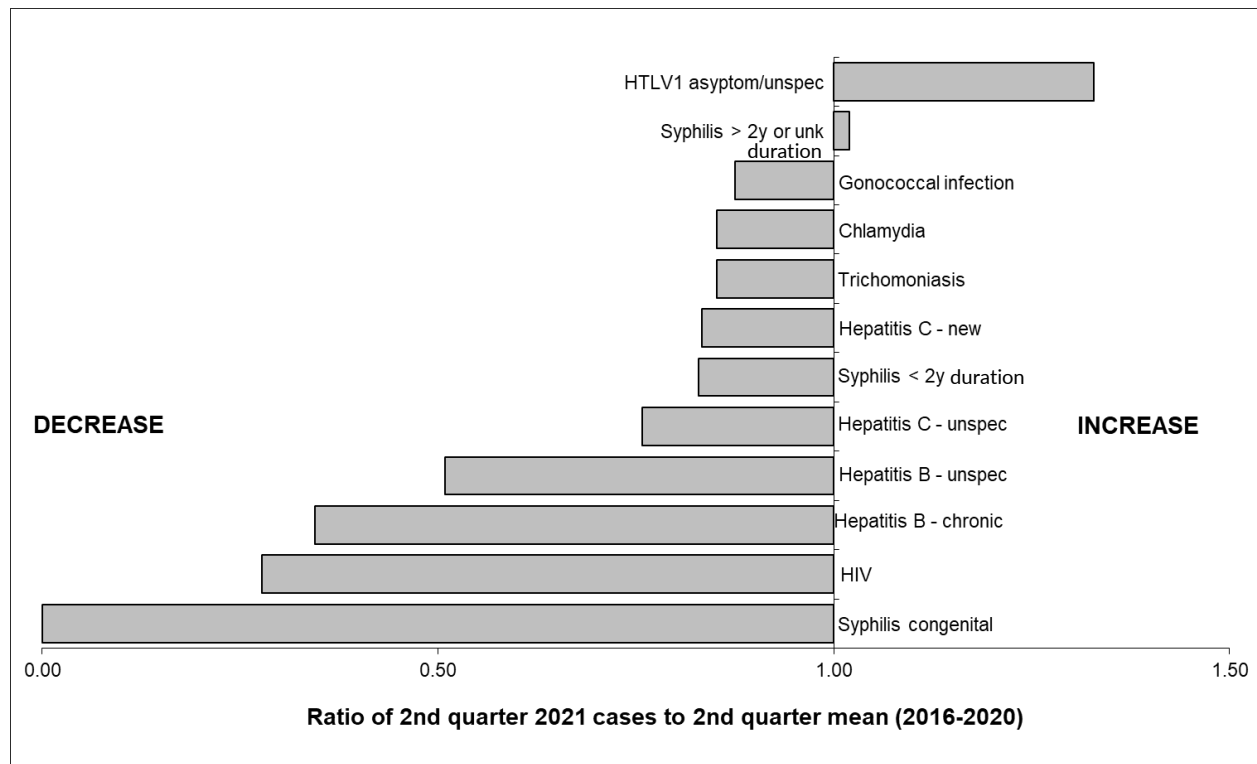
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Graphs of selected diseases and STIs – 2nd quarter, 2021

Ratio of the number of notifications in 2nd quarter of 2021 to 2nd quarter, 5 year mean (2016–2020): Selected diseases



Ratio of the number of notifications in 2nd quarter of 2021 to 2nd quarter, 5 year mean (2016–2020): Sexually transmitted infections (STIs)



Comments on selected disease notifications – 2nd quarter 2021

COVID-19

There were 112 cases of COVID-19 notified in the 2nd quarter of 2021 which was 18.7 times the number of notifications received in the same quarter in 2020. COVID-19 was only made a notifiable in the 1st quarter of 2020, hence the 2nd quarter notifications were 93 times the 5 year mean. There was no community transmission of COVID-19 in the 2nd quarter of 2021.

Adverse vaccine reactions

There were 361 adverse vaccine reactions notified in the quarter compared to the 5 year 2nd quarter mean of 19.8 cases. This was due to the sensitive reporting associated with the roll out of COVID-19 vaccines which began in the NT in February 2021 and expanded to further target groups during the 2nd quarter of 2021.

Melioidosis

There were only 6 melioidosis notifications in the 2nd quarter of 2021 which was less than half the 5 year 2nd quarter mean of 13.4 cases.

Varicella unspecified

There were 40 notifications of varicella (unspecified) in the 2nd quarter of 2021 which was 8.3 times greater than the 5 year 2nd quarter mean of 4.8 cases. The increase was due to the change in public health response to notifications of varicella (unspecified). Previously, intense public health activity was undertaken to determine whether the varicella infection was classified as 'chickenpox', or 'shingles' however this has become less intense with a resulting increase in non-classified varicella virus infection.

Haemophilus influenzae (non-B)

There were 6 cases of invasive *Haemophilus influenzae* (non-B) infection notified in the 2nd quarter of 2021 which was 3.8 times the 5 year 2nd quarter mean of 1.6 cases.

Rheumatic Heart Disease

Rheumatic heart disease (RHD) is damage to the heart valves caused by acute rheumatic fever (ARF).

RHD requires ongoing management and recurrences of ARF may cause further damage to the heart valves

Who is most at risk

People with a streptococcal (strep) infection of the throat or skin are at greater risk of developing RHD.

Management and prevention

People with RHD require regular clinical follow-ups with specialists, and four-weekly penicillin injections to prevent recurrences of ARF.

RHD register

The Northern Territory (NT) RHD program supports people with RHD and works to reduce recurrences of ARF. One of the important ways it does this is through monitoring a register of people with RHD in the NT.

To join the register fill out the [rheumatic heart disease register access application form](#).

If you are already signed up, go to the [NT rheumatic heart disease register](#) to login.

Contact the register

For more information contact the RHD Register coordinator through the [Centre for Disease Control contacts](#).

Rheumatic Heart Disease Endgame Strategy: What it means for you

Watch the video [here](#)



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Abstracts from peer reviewed published articles related to the Northern Territory

Detection of the Japanese encephalitis vector mosquito *Culex tritaeniorhynchus* in Australia using molecular diagnostics and morphology

Lessard BD, Kurucz N, Rodriguez J, Carter J, Hardy CM

Parasites & Vectors. 2021;14:411

<https://doi.org/10.1186/s13071-021-04911-2>

Background: *Culex (Culex) tritaeniorhynchus* is an important vector of Japanese encephalitis virus (JEV) affecting feral pigs, native mammals and humans. The mosquito species is widely distributed throughout Southeast Asia, Africa and Europe, and thought to be absent in Australia.

Methods: In February and May, 2020 the Medical Entomology unit of the Northern Territory (NT) Top End Health Service collected *Cx. tritaeniorhynchus* female specimens (n=19) from the Darwin and Katherine regions. Specimens were preliminarily identified morphologically as the Vishnui subgroup in subgenus *Culex*. Molecular identification was performed using cytochrome c oxidase subunit 1 (COI) barcoding, including sequence percentage identity using BLAST and tree-based identification using maximum likelihood analysis in the IQ-TREE software package. Once identified using COI, specimens were reanalysed for diagnostic morphological characters to inform a new taxonomic key to related species from the NT.

Results: Sequence percentage analysis of COI revealed that specimens from the NT shared 99.7% nucleotide identity to a haplotype of *Cx. tritaeniorhynchus* from Dili, Timor-Leste. The phylogenetic analysis showed that the NT specimens formed a monophyletic clade with

other *Cx. tritaeniorhynchus* from Southeast Asia and the Middle East. We provide COI barcodes for most NT species from the Vishnui subgroup to aid future identifications, including the first genetic sequences for *Culex (Culex) crinicauda* and the undescribed species *Culex (Culex) sp. No. 32* of Marks. Useful diagnostic morphological characters were identified and are presented in a taxonomic key to adult females to separate *Cx. tritaeniorhynchus* from other members of the Vishnui subgroup from the NT.

Conclusions: We report the detection of *Cx. tritaeniorhynchus* in Australia from the Darwin and Katherine regions of the NT. The vector is likely to be already established in northern Australia, given the wide geographical spread throughout the Top End of the NT. The establishment of *Cx. tritaeniorhynchus* in Australia is a concern to health officials as the species is an important vector of JEV and is now the sixth species from the subgenus *Culex* capable of vectoring JEV in Australia. We suggest that the species must now be continuously monitored during routine mosquito surveillance programmes to determine its current geographical spread and prevent the potential transmission of exotic JEV throughout Australia.

Keywords: *Culex Vishnui subgroup, DNA barcoding, Phylogenetics, Northern Territory, Taxonomy, Japanese Encephalitis Virus*

Single-View Echocardiography by Nonexpert Practitioners to Detect Rheumatic Heart Disease: A Prospective Study of Diagnostic Accuracy

Francis JR, Whalley GA, Kaethner A, Fairhurst H, Hardefeldt H, Reeves B, Auld B, Marangou J, Horton

A, Wheaton G, Robertson T, Ryan C, Brown S, Smith G, dos Santos J, Flavio R, Embaum K, da Graca Noronha M, Lopes Belo S, Madeira Santos C, dos Santos MG, Cabral J, do Rosario I, Harries J, Francis LA, Draper ADK, James CL, Davis K, Yan J, Mitchell A, da Silva Almeida I, Engelman D, Roberts KV, Ralph AP, Remenyi B

Circ Cardiovasc Imaging. 2021;14(8):e011790

<https://doi.org/10.1161/CIRCIMAGING.120.011790>

Background: Echocardiographic screening can detect asymptomatic cases of rheumatic heart disease (RHD), facilitating access to treatment. Barriers to implementation of echocardiographic screening include the requirement for expensive equipment and expert practitioners. We aimed to evaluate the diagnostic accuracy of an abbreviated echocardiographic screening protocol (single parasternal-long-axis view with a sweep of the heart) performed by briefly trained, nonexpert practitioners using handheld ultrasound devices.

Methods: Participants aged 5 to 20 years in Timor-Leste and the Northern Territory of Australia had 2 echocardiograms: one performed by an expert echocardiographer using a GE Vivid I or Vivid Q portable ultrasound device (reference test), and one performed by a nonexpert practitioner using a GE Vscan handheld ultrasound device (index test). The accuracy of the index test, compared with the reference test, for identifying cases with definite or borderline RHD was determined.

Results: There were 3111 enrolled participants; 2573 had both an index test and reference test. Median age was 12 years (interquartile range, 10–15); 58.2% were female. Proportion with definite or borderline RHD was 5.52% (95% CI, 4.70–6.47); proportion with definite RHD was 3.23% (95% CI, 2.61–3.98).

Compared with the reference test, sensitivity of the index test for definite or borderline RHD was 70.4% (95% CI, 62.2–77.8), specificity was 78.1% (95% CI, 76.4–79.8).

Conclusions: Nonexpert practitioners can be trained to perform single parasternal-long-axis view with a sweep of the heart echocardiography. However, the specificity and sensitivity are inadequate for echocardiographic screening. Improved training for nonexpert practitioners should be investigated.

Keywords: echocardiography; rheumatic heart disease; screening.

Tuberculosis in Australia's tropical north: a population-based genomic epidemiological study

Meumann EM, Horan K, Ralph AP, Farmer B, Globan M, Stephenson E, Popple T, Boyd R, Kaestli M, Seemann T, Vandellannoote K, Lowbridge C, Baird RW, Stinear TP, Williamson DA, Currie BJ, Krause VL

Lancet Reg Health West Pac. 2021;Jul 31:15:100229

[10.1016/j.lanwpc.2021.100229](https://doi.org/10.1016/j.lanwpc.2021.100229)

Background: The Northern Territory (NT) has the highest tuberculosis (TB) rate of all Australian jurisdictions. We combined TB public health surveillance data with genomic sequencing of *Mycobacterium tuberculosis* isolates in the tropical 'Top End' of the NT to investigate trends in TB incidence and transmission.

Methods: This retrospective observational study included all 741 culture-confirmed cases of TB in the Top End over three decades from 1989–2020. All 497 available *M. tuberculosis* isolates were sequenced. We used contact tracing data to define a threshold pairwise SNP distance for hierarchical single linkage clustering, and examined putative transmission clusters in the context of epidemiologic information.

Findings: There were 359 (48%) cases born overseas, 329 (44%) cases among Australian First Nations peoples, and 52 (7%) cases were Australian-born and non-Indigenous. The annual incidence in First Nations peoples from 1989–

2019 fell from average 50.4 to 11.0 per 100,000 ($P < 0.001$). First Nations cases were more likely to die from TB (41/329, 12.5%) than overseas-born cases (11/359, 3.1%; $P < 0.001$). Using a threshold of ≤ 12 SNPs, 28 clusters of between 2-64 individuals were identified, totalling 250 cases; 214 (86%) were First Nations cases and 189 (76%) were from a remote region.

The time between cases and past epidemiologically and genomically-linked contacts ranged from 4.5 months to 24 years.

Interpretation: Our findings support prioritisation of timely case detection, contact tracing augmented by genomic sequencing, and latent TB treatment to break transmission chains in Top End remote hotspot regions.

Active case detection methods for crusted scabies and leprosy: A systematic review

Glennie M, Gardner K, Dowden M, Currie BJ

PLoS NTD 2021;15(7):e0009577

<https://doi.org/10.1371/journal.pntd.0009577>

Background

Crusted scabies is endemic in some remote Aboriginal communities in the Northern Territory (NT) of Australia and carries a high mortality risk. Improvement in active case detection (ACD) for crusted scabies is hampered by a lack of evidence about best practice. We therefore conducted a systematic review of ACD methods for leprosy, a condition with similar ACD requirements, to consider how findings could be informative to crusted scabies detection.

Methods and principle findings

We conducted systematic searches in MEDLINE, CINAHL, Scopus and the Cochrane Database for Systematic Reviews for studies published since 1999 that reported at least one comparison rate (detection or prevalence rate) against which the

yield of the ACD method could be assessed. The search yielded 15 eligible studies from 511. Study heterogeneity precluded meta-analysis. Contact tracing and community screening of marginalised ethnic groups yielded the highest new case detection rates. Rapid community screening campaigns, and those using less experienced screening personnel, were associated with lower suspect confirmation rates. There is insufficient data to assess whether ACD campaigns improve treatment outcomes or disease control.

Conclusion

This review demonstrates the importance of ACD campaigns in communities facing the highest barriers to healthcare access and within neighbourhoods of index cases. The potential benefit of ACD for crusted scabies is not quantified, however, lessons from leprosy suggest value in follow-up with previously identified cases and their close contacts to support for scabies control and to reduce the likelihood of reinfection in the crusted scabies case. Skilled screening personnel and appropriate community engagement strategies are needed to maximise screening uptake. More research is needed to assess ACD cost effectiveness, impact on disease control, and to explore ACD methods capable of capturing the homeless and highly mobile who may be missed in household centric models.

The Darwin Prospective Melioidosis Study: a 30-year prospective, observational investigation

Currie BJ, Mayo M, Ward LM, Kaestli M, Meumann EM, Webb JR, Woerle C, Baird RW, Price RN, Marshall CS, Ralph AP, Spencer E, Davies J, Huffam SE, Janson S, Lynar S, Markey P, Krause VL, Anstey NM

Lancet Infect Dis 2021;21:1737-1746

[https://doi.org/10.1016/S1473-3099\(21\)00022-0](https://doi.org/10.1016/S1473-3099(21)00022-0)

Background

The global distribution of melioidosis is under considerable scrutiny, with both unmasking of endemic disease in African and Pacific nations and evidence of more recent dispersal in the Americas. Because of the high incidence of disease in tropical northern Australia, The Darwin Prospective Melioidosis Study commenced in October, 1989. We present epidemiology, clinical features, outcomes, and bacterial genomics from this 30-year study, highlighting changes in the past decade.

Methods

The present study was a prospective analysis of epidemiological, clinical, and laboratory data for all culture-confirmed melioidosis cases from the tropical Northern Territory of Australia from Oct 1, 1989, until Sept 30, 2019. Cases were identified on the basis of culture-confirmed melioidosis, a laboratory-notifiable disease in the Northern Territory of Australia. Patients who were culture-positive were included in the study. Multivariable analysis determined predictors of clinical presentations and outcome. Incidence, survival, and cluster analyses were facilitated by population and rainfall data and genotyping of *Burkholderia pseudomallei*, including multilocus sequence typing and whole-genome sequencing.

Findings

There were 1148 individuals with culture-confirmed melioidosis, of whom 133 (12%) died. Median age was 50 years (IQR 38–60), 48 (4%) study participants were children younger than 15 years of age, 721 (63%) were male individuals, and 600 (52%) Indigenous Australians. All but 186 (16%) had clinical risk factors, 513 (45%) had diabetes, and 455 (40%) hazardous alcohol use. Only three (2%) of 133 fatalities had no identified risk. Pneumonia was the most common presentation occurring in 595 (52%) patients. Bacteraemia occurred in 633 (56%) of 1135 patients, septic shock in 240 (21%) patients, and 180 (16%) patients required mechanical

ventilation. Cases correlated with rainfall, with 80% of infections occurring during the wet season (November to April). Median annual incidence was 20.5 cases per 100 000 people; the highest annual incidence in Indigenous Australians was 103.6 per 100 000 in 2011–12. Over the 30 years, annual incidences increased, as did the proportion of patients with diabetes, although mortality decreased to 17 (6%) of 278 patients over the past 5 years. Genotyping of *B pseudomallei* confirmed case clusters linked to environmental sources and defined evolving and new sequence types.

Interpretation

Melioidosis is an opportunistic infection with a diverse spectrum of clinical presentations and severity. With early diagnosis, specific antimicrobial therapy, and state-of-the-art intensive care, mortality can be reduced to less than 10%. However, mortality remains much higher in the many endemic regions where health resources remain scarce. Genotyping of *B pseudomallei* informs evolving local and global epidemiology.

Sexual health service adaptations to the coronavirus disease 2019 (COVID-19) pandemic in Australia: a nationwide online survey

Phillips, T.R., Fairley, C.K., Donovan, B., Ong, J.J., McNulty, A., Marshall, L., Templeton, D.J., Owen, L., Ward, A., Gunathilake, M., Russell, D., Langton-Lockton, J., Bourne, C., Martin, S. and Chow, E.P.F.

Australian and New Zealand Journal of Public Health, 45: 622-627

<https://doi.org/10.1111/1753-6405.13158>

Objective: Examine the changes in service delivery Australian public sexual health clinics made to remain open during lockdown.

Methods: A cross-sectional survey designed and delivered on Qualtrics was emailed to 21 directors

of public sexual health clinics across Australia from July-August 2020 and asked about a variety of changes to service delivery. Descriptive statistics were calculated.

Results: Twenty clinics participated, all remained open and reported service changes, including suspension of walk-in services in eight clinics. Some clinics stopped offering asymptomatic screening for varying patient populations. Most clinics transitioned to a mix of telehealth and face-to-face consultations. Nineteen clinics reported delays in testing and 13 reported limitations in testing. Most clinics changed to phone consultations for HIV medication refills (n=15) and

eleven clinics prescribed longer repeat prescriptions. Fourteen clinics had staff redeployed to assist the COVID-19 response.

Conclusion: Public sexual health clinics pivoted service delivery to reduce risk of COVID-19 transmission in clinical settings, managed staffing reductions and delays in molecular testing, and maintained a focus on urgent and symptomatic STI presentations and those at higher risk of HIV/STI acquisition. Implications for public health: Further research is warranted to understand what impact reduced asymptomatic screening may have had on community STI transmission.

Key words: service delivery, public health

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