NORTHERN TERRITORY GOVERNMENT
Centre for Disease Control
DISEASE CONTROL BULLETIN
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Fast facts about nontuberculous mycobacteria (NTM) in the Nothern Territory

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Non-tuberculous mycobacteria (NTM) are organisms found worldwide in the natural environment to which people are regularly exposed. In most individuals they pose little to no risk of disease and the NTM are readily eliminated.

Lung disease caused by NTM is the most common NTM disease process in the NT, however skin and soft tissue disease, lymph node disease and disseminated disease also occur. NTM disease at any site in the body is notifiable in the Northern Territory (NT).

The majority of people who are colonised in the lung with NTM do not develop disease. However disease may occur, mainly, in some higher-risk individuals such as patients with pre-existing chronic lung conditions or those who are immunosuppressed. Making a diagnosis of NTM disease can be challenging and often takes several weeks or months.

NTM lung disease diagnosis requires that 3 criteria are met: 1) progressive clinical symptoms, 2) progressive radiological changes and 3) repeated microbiological findings of the same NTM species.

In 2020 there were 9 clients on multi drug treatment for NTM disease.

The NT NTM Guidelines are available in the NT Health ePublications library: Nontuberculosis mycobacteria (NTM): Guidelines for health professionals in the Northern Territory (2014).

Figures 1, 2 and 3 on the following pages graph all the NTM that were notified in the NT from 2015 to 2020 by year, then also by NT region and by the causative NTM organism identified, respectively.

Contents

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Figure 1. Number of all NTM cases notified in the Northern Territory by year, 2015 to 2020

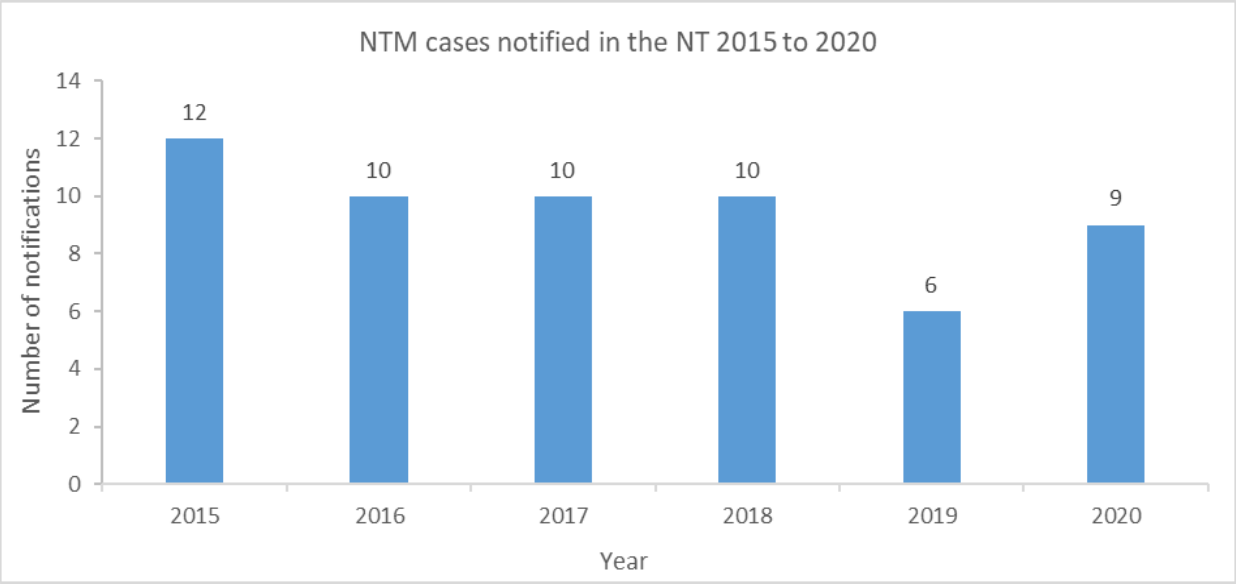


Figure 2. Number of all NTM cases notified in the Northern Territory by region and by year, 2015 to 2020

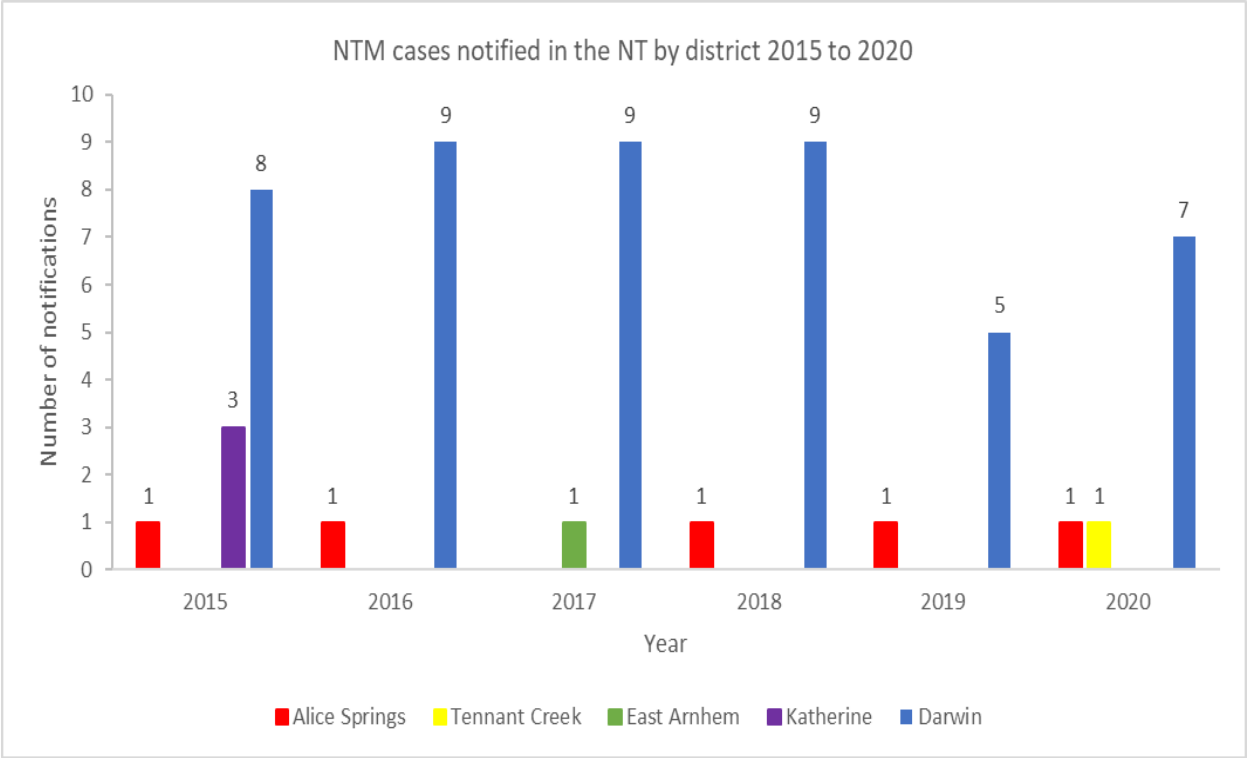


Figure 3. Number of all causative NTM organisms notified as NTM disease in the Northern Territory by year, 2015 to 2020

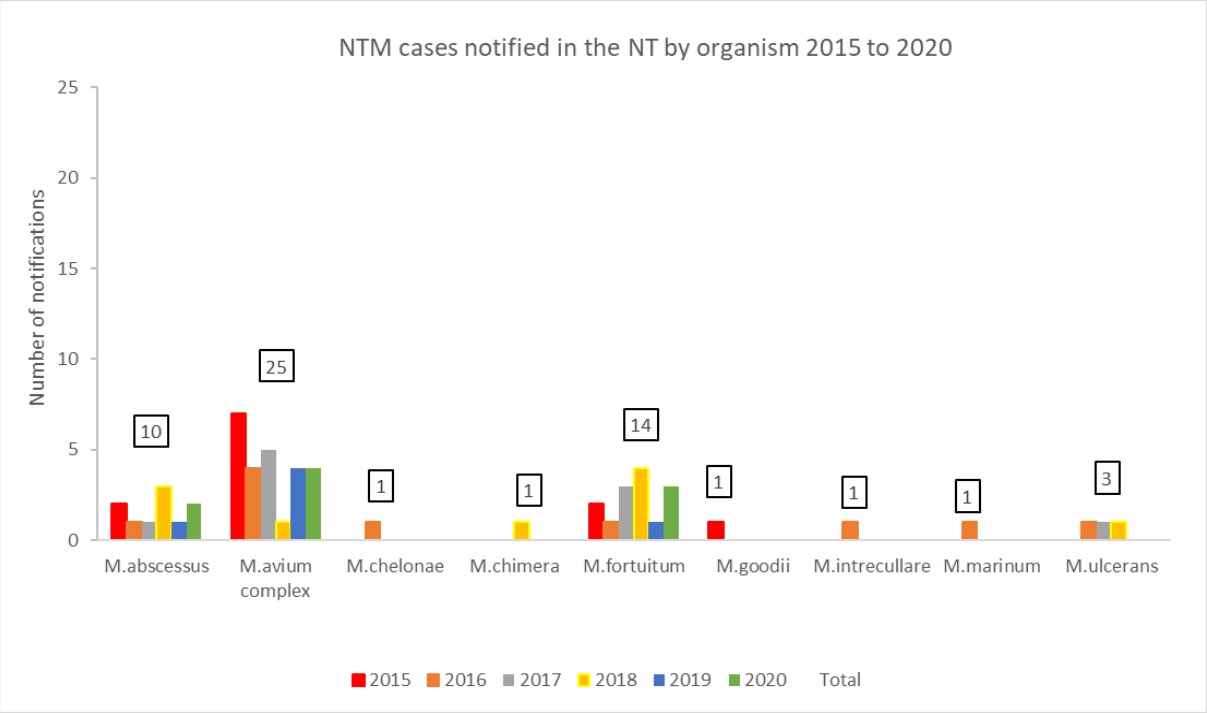
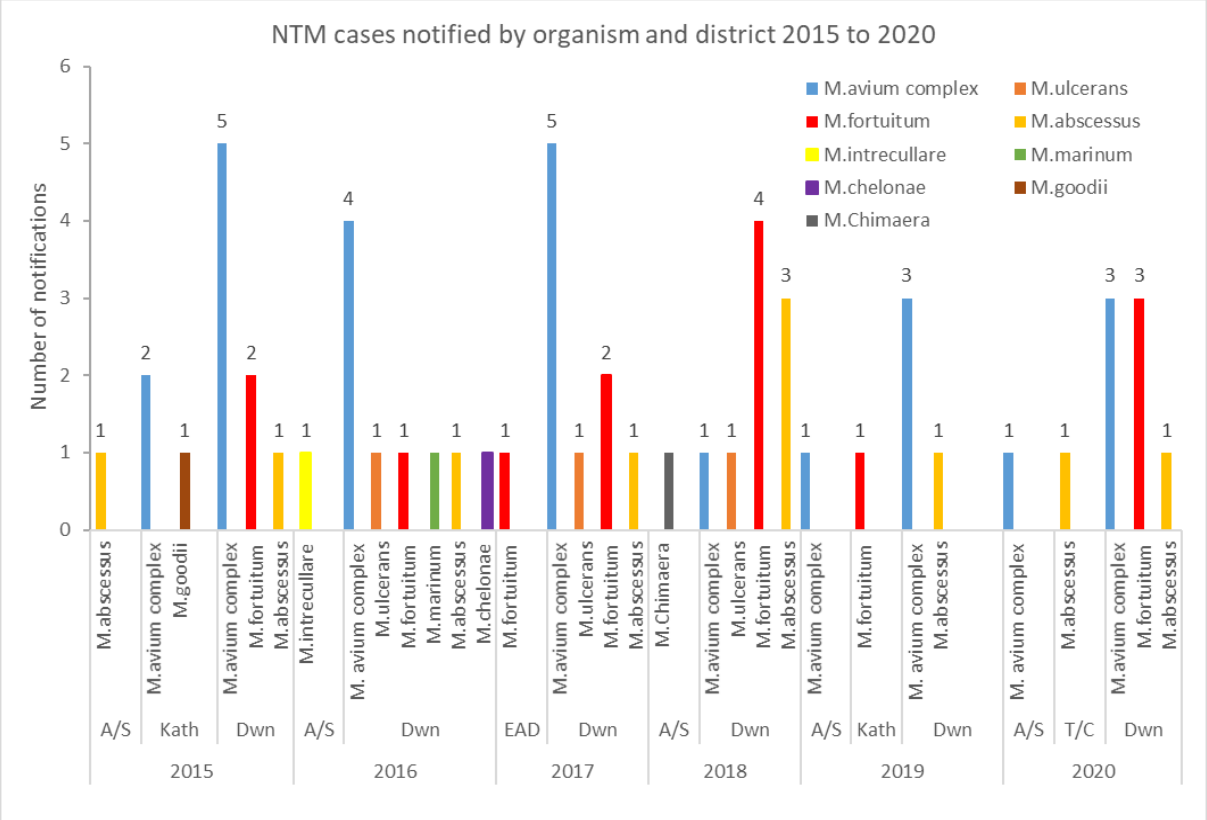


Figure 4 graphs the causative NTM organisms by region. The climatic description for the regions is as follows; Alice Springs incorporates a southern arid and desert-like region, East Arnhem and Darwin regions are hot, tropical and humid and Katherine region incorporates some hot tropical, subtropical and arid climates.

Figure 4. Number of all causative NTM organisms notified as NTM disease in the Northern Territory by region and by year, 2015 to 2020



NORTHERN TERRITORY GOVERNMENT
Centre for Disease Control

Non-healing ulcers including those that are caused by nontuberculosis mycobacteria (NTM)

There are many causes of non-healing (chronic) ulcers and they include:

- problems with blood supply or drainage
- nerve damage
- excess pressure
- cancer
- infection.

When determining the cause of a non-healing ulcer, it is always important to assess the blood supply and nerve function to the area. If cancer or unusual infection is suspected, a skin biopsy may be required. It is important to seek medical attention early for non-healing ulcers, so that appropriate diagnostic testing can be done and treatment commenced at an early stage. Ulcers that are not healing or improving in a 2 week period should be assessed by a clinician.

Vascular disease

Chronic leg ulcers are commonly due to poor drainage of blood from the legs (venous insufficiency) and/or poor blood supply to the legs (peripheral vascular disease). Older people, particularly smokers and ex-smokers, may have narrowing of the blood vessels leading to decreased blood flow to the lower legs and feet. This can lead to symptoms of cold feet and pain with walking. Minor trauma to the lower limbs can become a non-healing ulcer. The poor blood supply reduces the body's ability to heal following an injury. Rarely, blood vessels can become inflamed as part of an autoimmune disease. This can cause a rash, and chronic ulcers can form.

Diabetes

Non-healing ulcers commonly occur in people with diabetes, particularly if their blood sugar levels are too high or there is a history of smoking. Poorly controlled diabetes is a risk factor for narrowing of the large arteries that supply blood to the legs (see above). It also leads to damage of much smaller blood vessels. This can damage nerves and leads to loss of sensation in the feet making the feet vulnerable to trauma. Poor wound healing may be an indication to check for elevated blood sugar levels.

Pressure areas

Poor mobility, due to frailty or spinal cord damage, may lead to excess pressure on the sacrum, heals and other parts of the body. This can lead to skin breakdown and formation of a non-healing ulcer. Ill-fitting shoes or casts or splints may also cause ulcers. Unless the pressure point is relieved, the wound will not heal. Sometimes a skin graft is required to close the wound.

Skin cancer

Skin cancers can present as a non-healing, sometimes ulcerated lesion, and early medical attention is particularly important. Skin cancers treated at an early stage are often curable. A delay in treatment may result in the need for more extensive surgery or in spread to other parts of the body.

Underlying infection of the bone

Chronic ulcers can become deep and extend to the bone. This allows bacteria to infect the bone. Once this is established, the ulcer will not heal unless the bone infection is treated (often with a combination of surgery and antibiotics). Sometimes infection spreads to the bone through the bloodstream. Pus can build up and drain through the skin; this can also present as a non-healing skin lesion.

Centre for Disease Control

Melioidosis

Melioidosis is a disease caused by a tropical, soil-dwelling, bacterium found across the Top End of the Northern Territory (NT) and Northern Australia. It is much more common during the rainy season. Skin and soft tissue infections usually occur following breaks in the skin due to injury. The bacteria can then also enter the bloodstream and cause disease in other parts of the body, which can be life-threatening. Wearing gloves and shoes to prevent injury and exposure to soil is important. Diagnosis is made by growing the bacterium from clinical specimens (such as a swab). Treatment involves intravenous antibiotics followed by a long course of oral antibiotics. Infectious Diseases specialist involvement is required.

Nontuberculous mycobacteria (NTM)

NTM are found in soil and water in tropical and temperate parts of Australia and infect the lungs and lymph nodes, and can cause non-healing skin ulcers. NTM skin and soft-tissue disease occur when NTM enter through a break in the skin from trauma or as a complication of a surgical procedure. There are sometimes geographical clusters of cases, however the causes of this clustering remains unclear.

Mycobacterium ulcerans skin lesions typically start as a painless, small spot similar in appearance to a mosquito bite that increases in size and then the skin breaks down and an ulcer forms. *M. ulcerans* skin lesions usually remain painless and have edges that are often rolled. If untreated, the lesion continues to increase in size and can extend down to tendons, ligaments and bone.

Other NTM that cause skin and soft tissue infections include the rapidly growing mycobacteria and *M. marinum*.

NTM skin and soft tissue infections are diagnosed by the presence of acid fast bacilli on microscopy, culture and/or PCR from an ulcer swab or biopsy. Treatment of NTM depends on the type of NTM and involves antibiotic treatment, sometimes in combination with surgery. Surgery is sometimes required depending on the extent of infection. In the NT treatment of NTM is usually under the management of the Centre for Disease Control.

Leprosy

Leprosy is a chronic mycobacterial infection of the skin and peripheral nerves. Leprosy is now uncommon in the NT, however it still needs to be considered especially in skin and neurologic disease in Aboriginal or overseas born people. Damage to nerves can lead to loss of sensation in the hands and lower limbs. People with leprosy are more prone to trauma of these non-feeling areas, which may lead to non-healing ulcers.

Other infections

Non-healing ulcers can be caused by other infections, including sporotrichosis and other fungi, *Nocardia*, actinomycosis and chromoblastomycosis. Some of these are environmental organisms, and should be suspected if there is exposure to soil, mulch, hay or other plant material. The diagnostic laboratory should be made aware so that clinical samples can be set up for appropriate testing. If confirmed, involvement of an Infectious Diseases specialist is advised.

For more information contact the TB Clinic in your region

Alice Springs	8951 7548
Darwin	8922 8804
Katherine	8973 9049
Nhulunbuy	8987 0282
Tennant Creek	8962 4259

or

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

NT COVID-19 Surveillance Situation Report 30 October 2020

CDC NT COVID-19 Surveillance SitRep

Coronavirus (COVID-19)

30 October 2020

COVID-19 Cases

There are currently 5 active cases of COVID-19 in the NT, all occurring in repatriated international arrivals in Howard Spring quarantine facility. There have been no new case notifications today. In total, 39 people have been diagnosed with COVID-19 in the NT. There has been no community transmission in the NT.

Figure 1 Confirmed COVID-19 cases by source and date of symptom onset

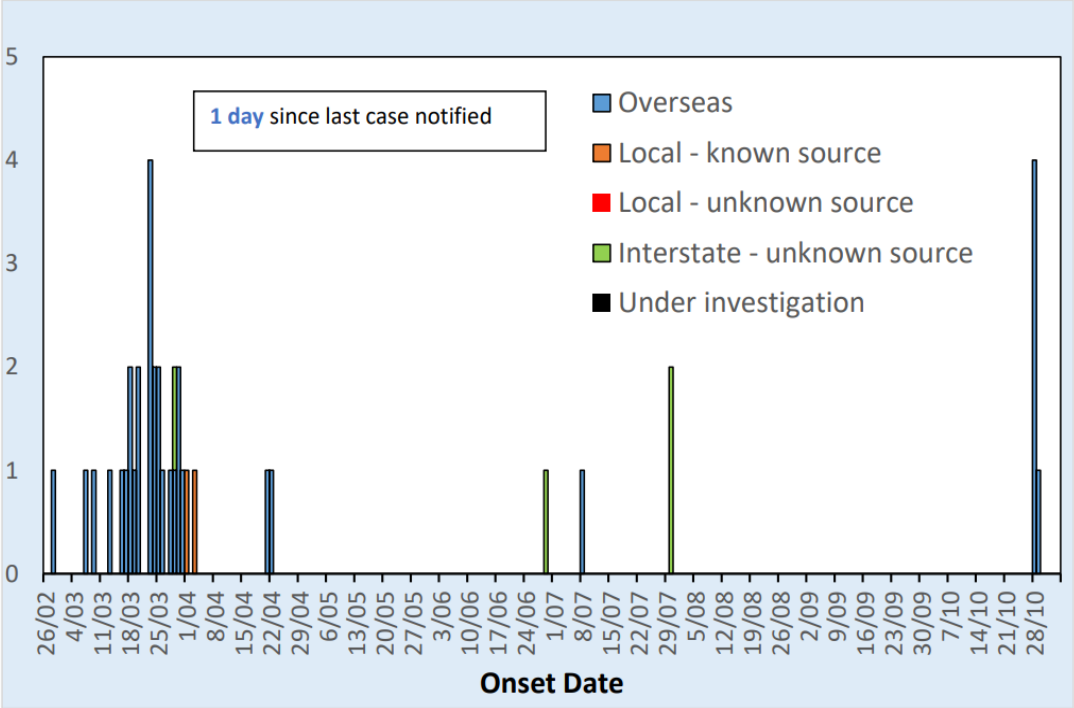


Table 1 COVID-19 cases by source of acquisition and Indigenous status

Source of acquisition	Indigenous	Non-Indigenous	Total
Overseas	0	33	33
Interstate	2	2	4
NT - known source			
NT healthcare setting	0	0	0
NT aged care setting	0	0	0
NT household setting	0	2	2
NT other setting	0	0	0
NT - unknown source	0	0	0
Total	**2**	**37**	**39**

Table notes:
1) Changes from previous NT SitRep are shown in red text.
2) In national counts, number of NT cases numbers differ by 1 case due to a change in reporting definition on 18/05/2020.

Contacts undergoing active daily monitoring

There are currently 85 close contacts undergoing daily monitoring in the NT

District	Darwin Urban	Darwin Rural	East Arnhem	Katherine	Barkly	Alice Springs Urban	Alice Springs Rural	Other	All
Current	85	0	0	0	0	0	0	0	**85**
Total	**488**	**24**	**20**	**5**	**3**	**68**	**2**	**85**	**695**

Note: Other includes Interstate n=57, Overseas n=2 and Not Stated n=26

Exposure setting	Household	Cruises	Flights	Healthcare	Aged care	Other	All
Current	5	0	80	0	0	0	**85**
Total	**64**	**61**	**525**	**4**	**1**	**40**	**695**

Testing trends

Table 2 Testing counts & rates by region

Region	29/10/2020	Last 7 days	Previous 7 days	Total	Rate per 100,000
Darwin total*	277	2,046	1,684	41,253	24,799
RDH Pandemic Clinic	*44*	*260*	*261*	*8,968*	
HSQF - Domestic NT Government zone	*79*	*745*	*599*	*9,510*	
HSQF - Repatriated International zone	*4*	*353*	-	*353*	
East Arnhem	3	42	82	1,494	9,722
Katherine	8	94	77	2,013	10,123
Barkly	5	19	41	1,004	16,296
Alice Springs	74	294	278	9,753	24,659
Todd Facility Drive Through	*11*	*59*	*94*	*646*	
Todd Facility Supervised Quarantine	*16*	*26*	*23*	*296*	
Unknown	0	0	0	71	
Total [1,2,3]	**367**	**2,495**	**2,162**	**55,588**	**22,448**

Table notes

* Darwin total includes RDH pandemic clinic & outreach, Howard Springs drive through, Howard Springs supervised quarantine plus other inpatient, outpatient and primary health care services.

Acronyms

RDH Royal Darwin Hospital

HSQF Howard Spring quarantine facility

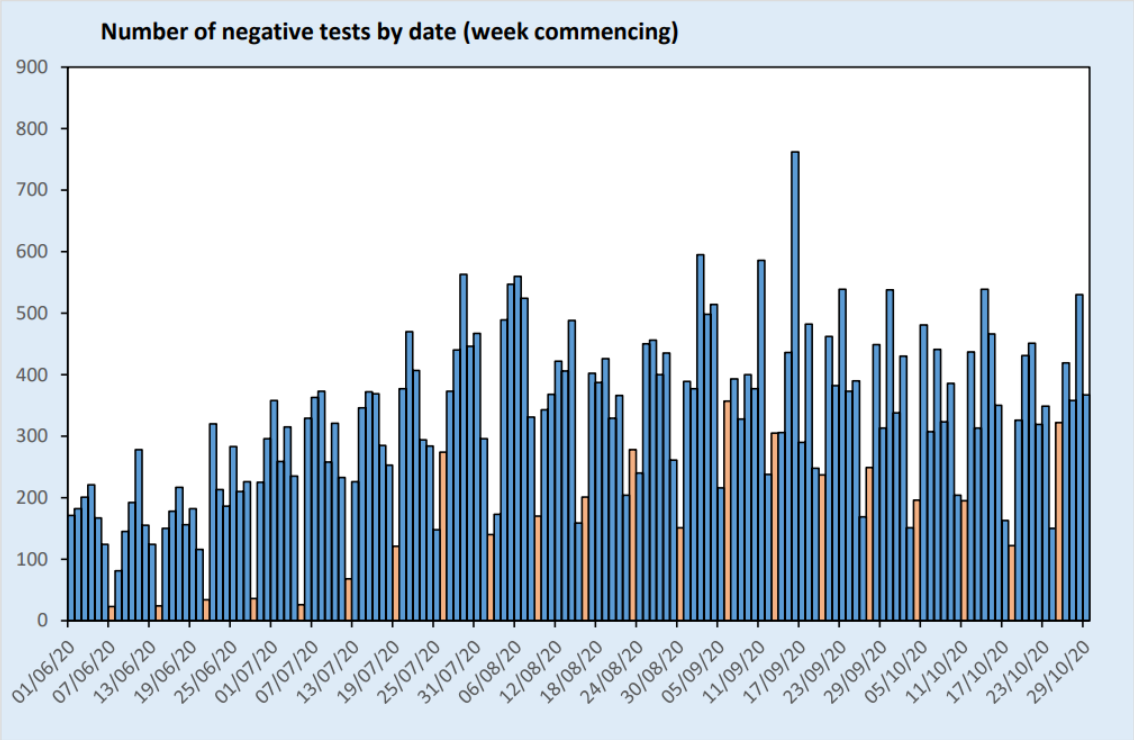
Total includes:

1. Rapid tests performed by Territory Pathology.
2. Point of care tests (POCT) for clients tested in remote communities from 23/05/20 (Table 3 provides district breakdown for POCT).
3. Does not include 2,714 results for International defence force members.

Table 3 Point of care testing counts performed in primary health care by region since 23/05/2020

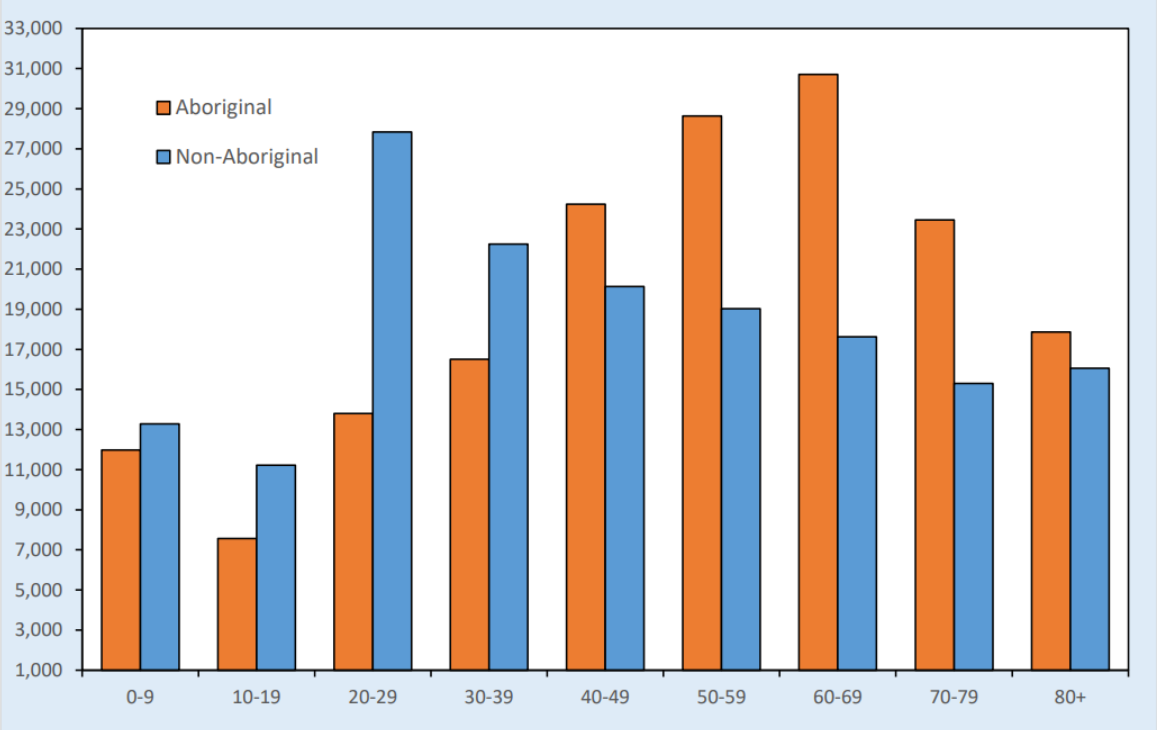
Region	29/10/2020	Last 7 days	Previous 7 days	Total	Rate per 100,000
Darwin	8	53	50	540	325
East Arnhem	2	15	16	407	2,649
Katherine	0	24	13	197	991
Barkly	0	3	13	228	3,701
Alice Springs	13	64	29	607	1,535
Total	**23**	**159**	**121**	**1,979**	**800**

Figure 2 Daily count of negative tests



Note: Daily counts of COVID-19 tests prior to 01/06/2020 are available on request

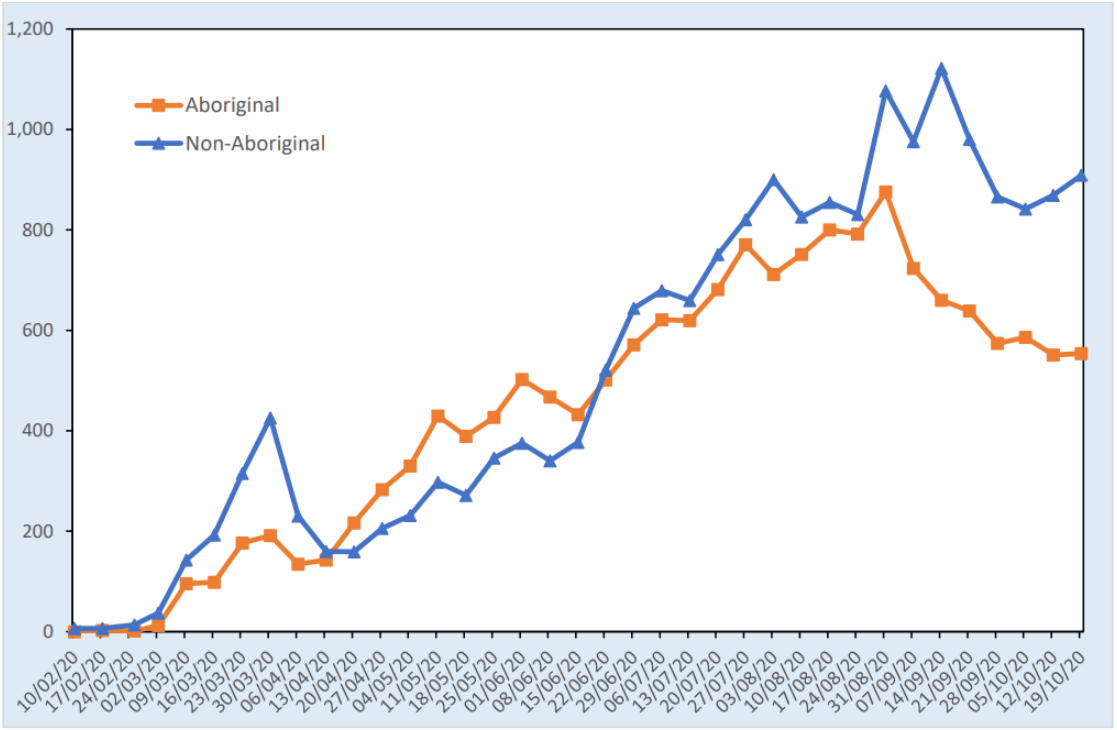
Figure 3 Testing rates (per 100,000) by age-group and Indigenous status*



Note: * Indigenous status not stated in 16% of those tested

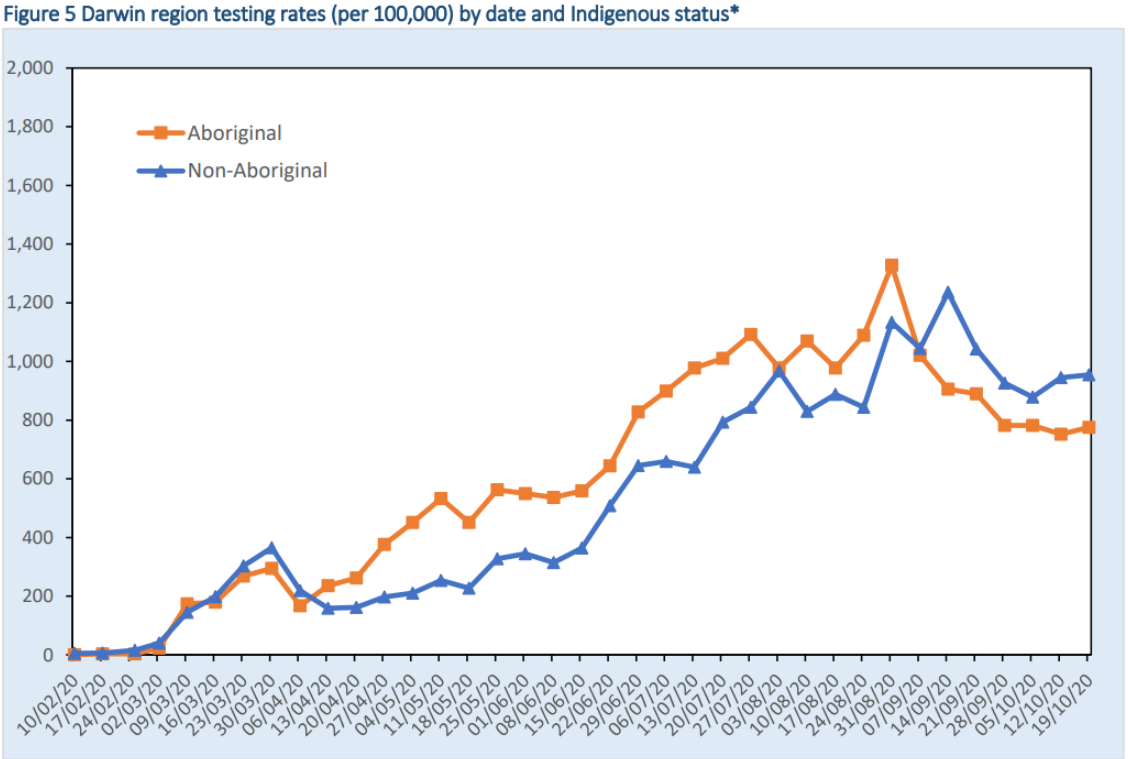
CDC NT COVID-19 Surveillance SitRep

Figure 4 NT total testing rates (per 100,000) by date and Indigenous status*



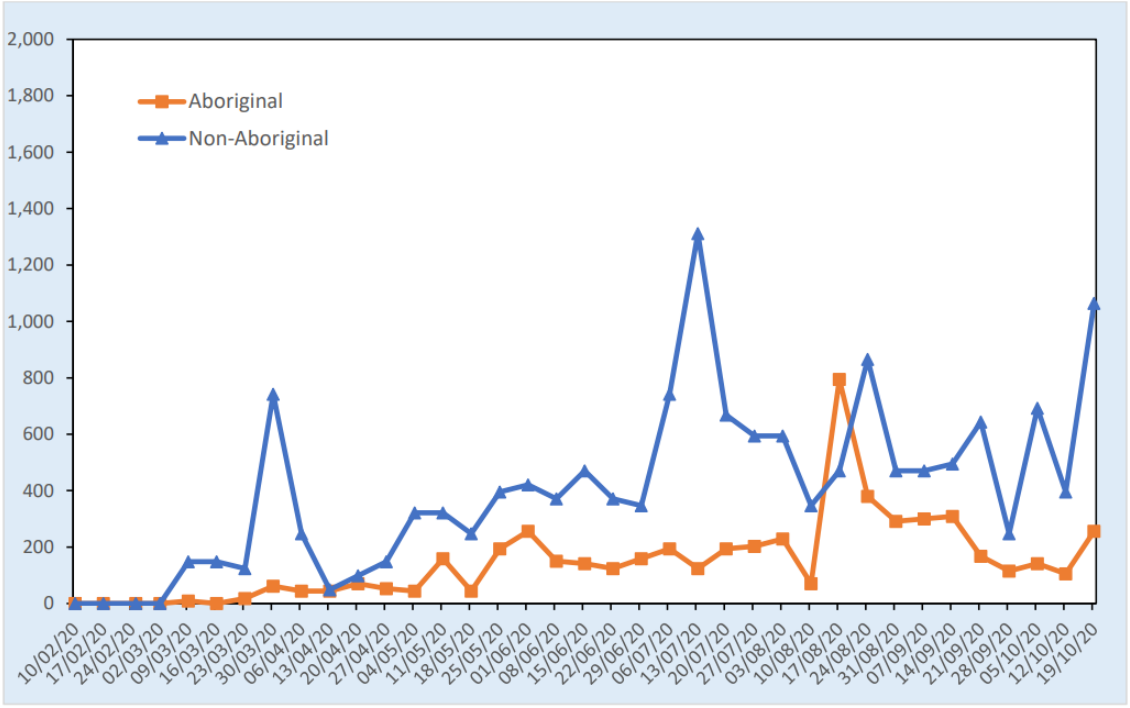
Note: * Indigenous status not stated in 16% of those tested

Figure 5 Darwin region testing rates (per 100,000) by date and Indigenous status*



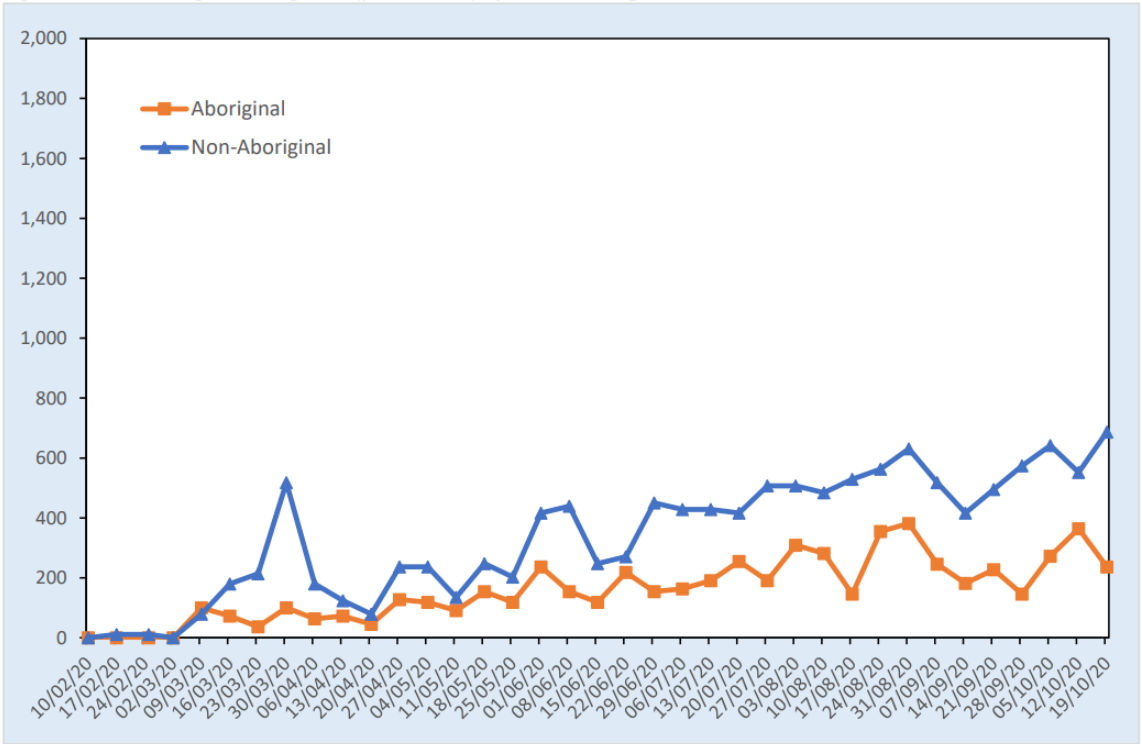
Note: * Indigenous status not stated in 16% of those tested

Figure 6 East Arnhem region testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 16% of those tested

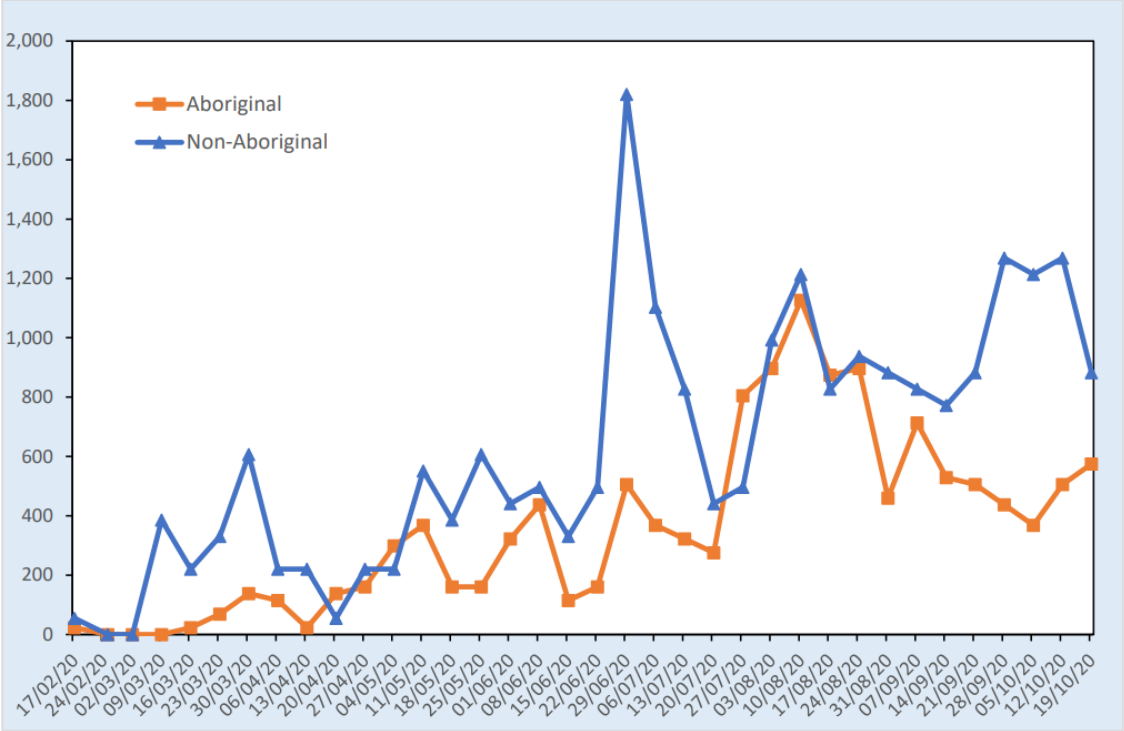
Figure 7 Katherine region testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 9% of those tested

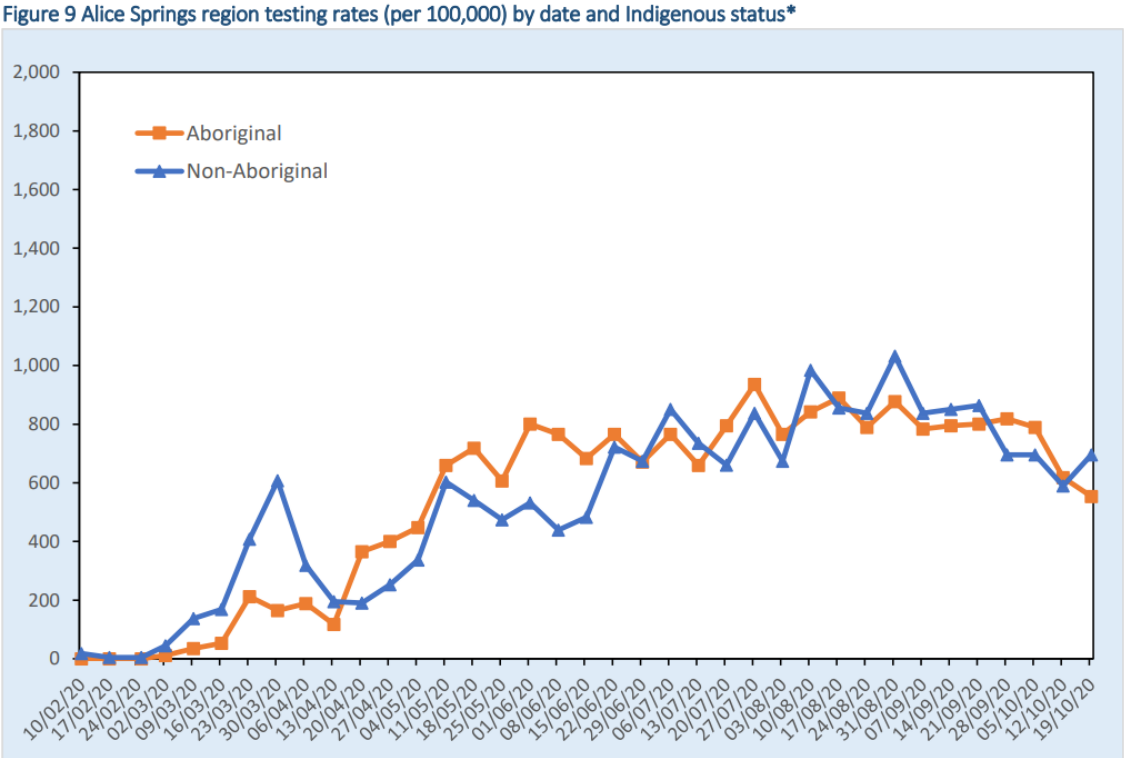
CDC NT COVID-19 Surveillance SitRep

Figure 8 Barkly region testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 2% of those tested

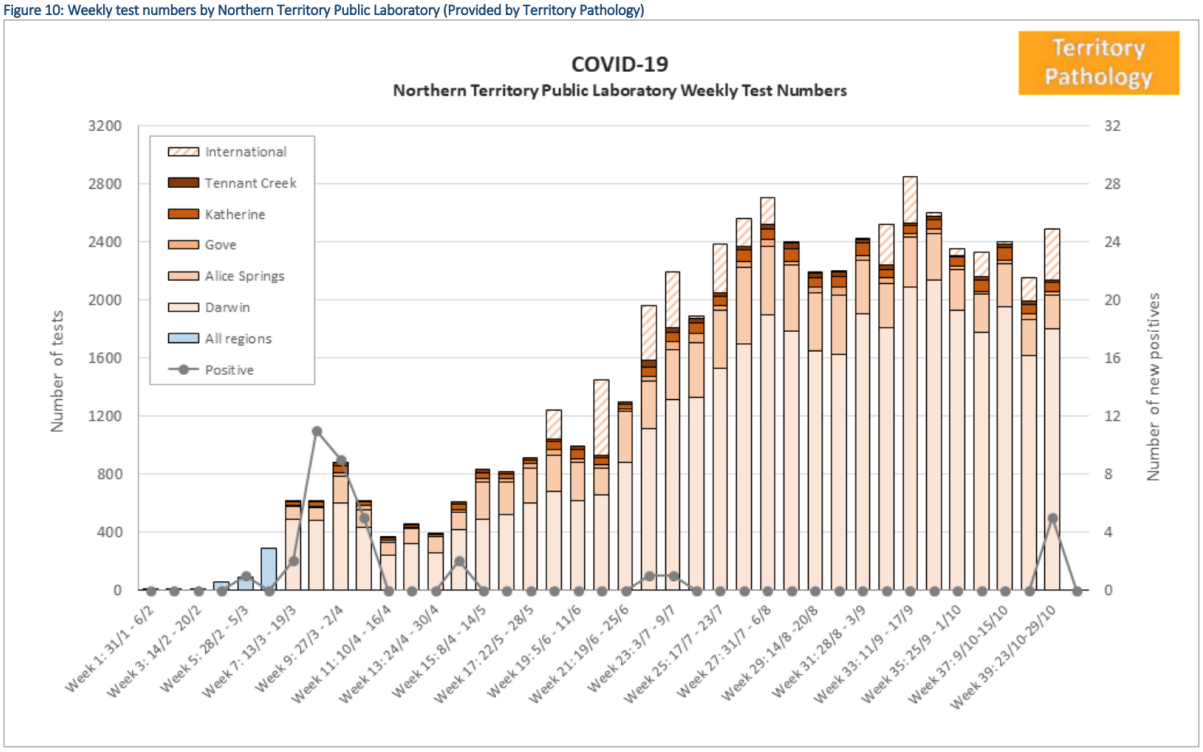
Figure 9 Alice Springs region testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 17% of those tested

CDC NT COVID-19 Surveillance SitRep

Figure 10: Weekly test numbers by Northern Territory Public Laboratory (Provided by Territory Pathology)

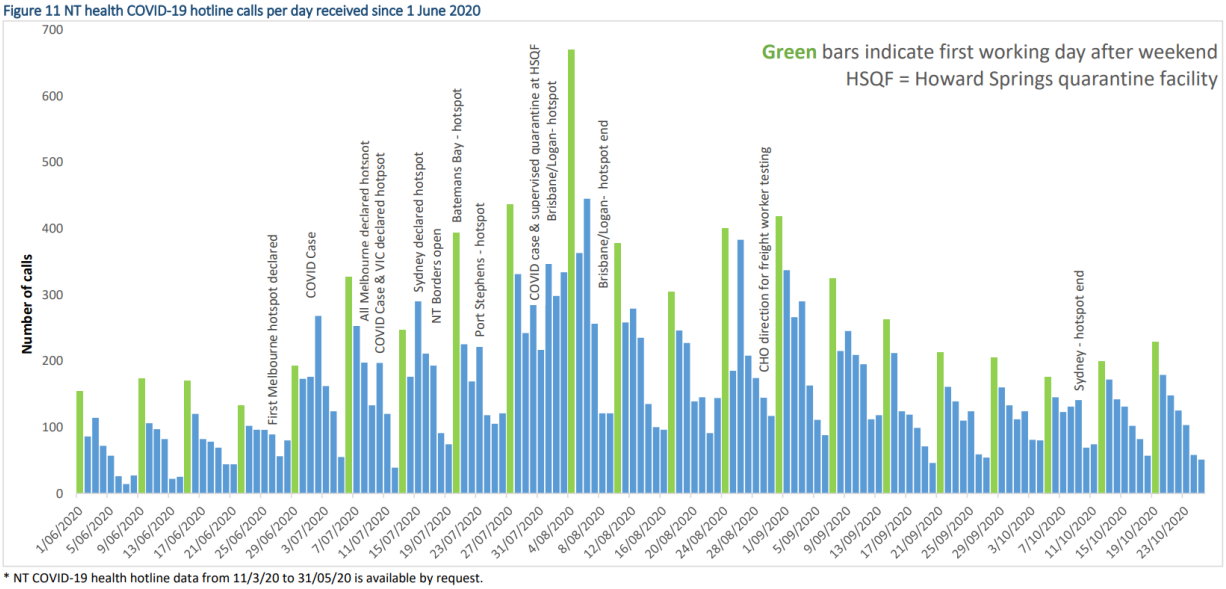


CDC NT COVID-19 Surveillance SitRep

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

For the week ending 25 October 2020, the NT COVID-19 health hotline received between 51 and 229 calls per day. Median wait time for health care staff was 31 seconds with 90% of calls answered within 4 minutes and 30 seconds. For the general public, median wait time was 1 minute, 30 seconds with 90% of calls answered within 48 minutes. The hotline requires staffing capacity and flexibility to respond to changing events as call volume increases significantly following NT COVID case and hotspot announcements as shown in Figure 11. Highest call numbers are received on Mondays (or Tuesdays following a public holiday Monday) and trend downwards as the week progresses.

Figure 11 NT health COVID-19 hotline calls per day received since 1 June 2020



* NT COVID-19 health hotline data from 11/3/20 to 31/05/20 is available by request.

NT COVID-19 Surveillance Situation Report 31 December 2020

CDC NT COVID-19 Surveillance SitRep

Coronavirus (COVID-19)

31 December 2020

COVID-19 Cases

There have been 76 people diagnosed with COVID-19 with 1 case notified since last SitRep. Of the 76 cases, 4 remain active and are in isolation. The most recent 2 cases were international maritime arrivals from Indonesia and is in isolation. There have been 40 cases among repatriated international arrivals in Howard Springs quarantine facility including 32 repatriates from India, 3 from the United Kingdom and 5 from Europe. There has been no community transmission in the NT.

Figure 1 Confirmed COVID-19 cases by source and date of case confirmation

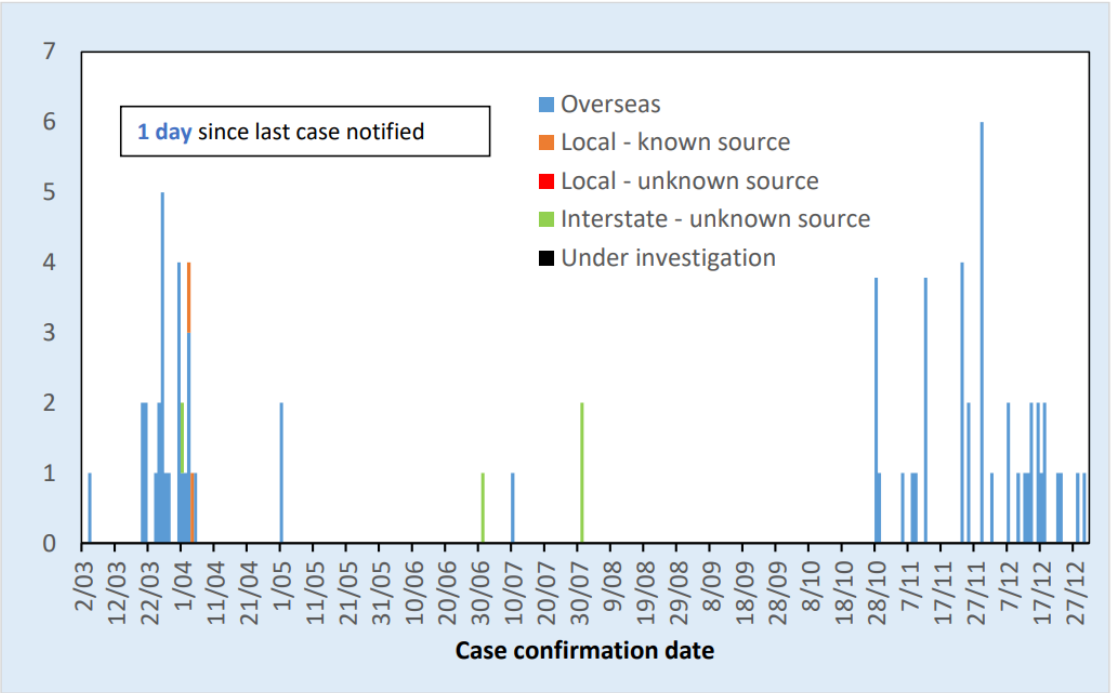


Table 1 COVID-19 cases by source of acquisition and Indigenous status

Source of acquisition	Indigenous	Non-Indigenous	Total
Overseas	0	70	70
Interstate	2	2	4
NT - known source			
NT healthcare setting	0	0	0
NT aged care setting	0	0	0
NT household setting	0	2	2
NT other setting	0	0	0
NT - unknown source	0	0	0
Total	**2**	**74**	**76**

Table notes:
1) Changes from previous NT SitRep are shown in red text.
2) In national counts, number of NT cases numbers differ by 1 case due to a change in reporting definition on 18/05/2020.

Figure 2 COVID-19 cases diagnosed in the NT by age group and gender

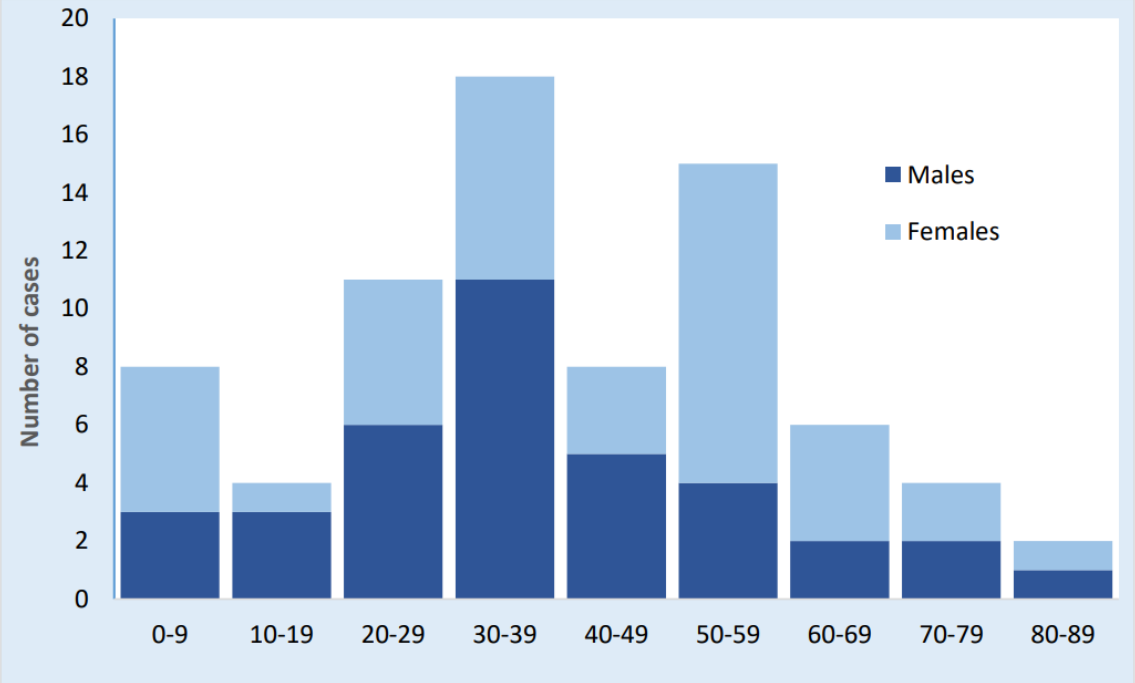


Table 2 COVID-19 cases by departure ports for repatriation flights to the NT since 23 Oct 2020

Departure port	Cases	Total passengers	Proportion positive
New Delhi	28	671	4.2%
Chennai	4	175	2.3%
London	3	525	0.6%
Frankfurt	3	200	1.5%
Paris	2	175	1.1%
Total	**40**	**1746**	**2.3%**

Contacts undergoing active daily monitoring

There are currently 83 close contacts undergoing daily monitoring in the NT.

District	Darwin Urban	Darwin Rural	Katherine	East Arnhem	Barkly	Alice Springs Urban	Alice Springs Rural	Other	All
Current	83	0	0	0	0	0	0	0	**83**
Total	1035	24	20	5	3	72	2	84	**1245**

Note: Other includes Interstate n=57, Overseas n=2 and Not Stated n=25

Exposure setting	Flights	Aged care	Cruises	Healthcare	Household	Quarantine facility	Other	All
Current	52	0	27	0	4	0	0	**83**
Total	997	1	90	4	100	4	49	**1245**

CDC NT COVID-19 Surveillance SitRep

Testing trends

Table 3 Testing counts & rates by region

Region	30/12/20	Week ending		Total	Rate per 100,000
		30/12/20	23/12/20		
Darwin total*	428	2,003	2,061	55,743	33,510
RDH Pandemic Clinic	*67*	*386*	*663*	*12,811*	
HSQF – NT quarantine facility	*31*	*743*	*244*	*11,715*	
East Arnhem	8	43	65	2,209	14,375
Katherine	16	62	97	2,847	14,317
Barkly	42	4	15	1,332	21,620
Alice Springs	3	230	371	13,160	33,273
Todd Facility Drive Through	*0*	*15*	*88*	*1,409*	
Todd Facility Supervised Quarantine	*0*	*16*	*5*	*697*	
Unknown	0	1	0	71	
Total [1,2,3]	**497**	**2,343**	**2,609**	**75,362**	**30,444**

Table notes
* Darwin total includes NT Government pandemic clinics & outreach, Howard Springs NT Government supervised quarantine plus other inpatient, outpatient and primary health care services.

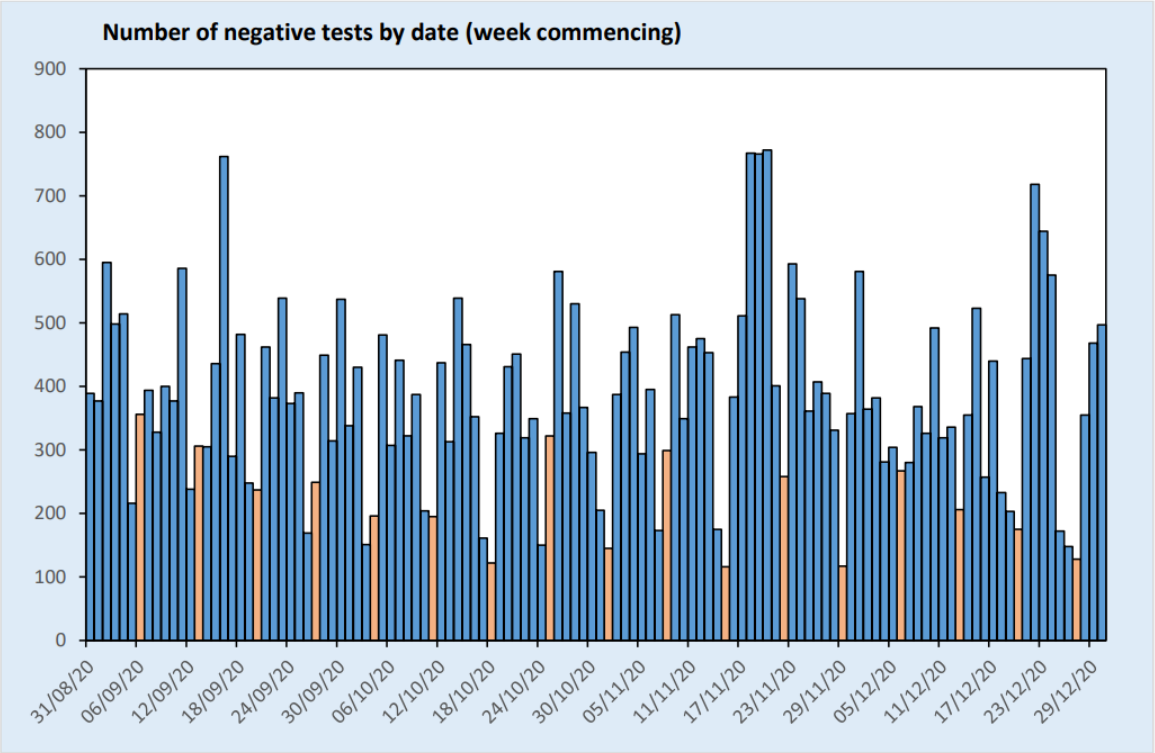
Acronyms
RDH Royal Darwin Hospital
HSQF Howard Spring quarantine facility

Total includes:
1. Rapid tests performed by Territory Pathology.
2. Point of care tests (POCT) for clients tested in remote communities from 23/05/20 (Table 3 provides district breakdown for POCT).
3. Does not include 3,020 results for International defence force members or 4,228 international repatriates and staff tested at the National Centre for Resilience, Howard Springs.

Table 4 Point of care testing counts performed in primary health care by region since 23/05/2020

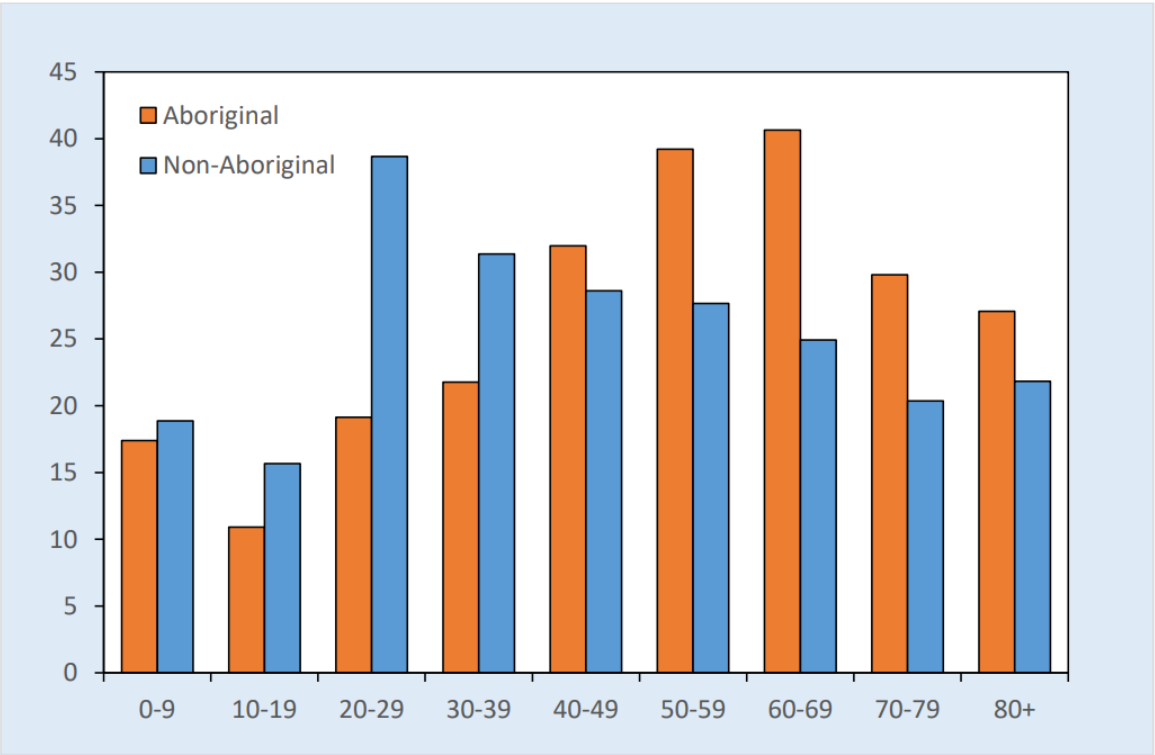
Region	30/12/20	Week ending		Total	Rate per 100,000
		30/12/20	23/12/20		
Darwin	7	21	41	662	398
East Arnhem	6	27	37	705	4,588
Katherine	3	4	11	370	1,861
Barkly	0	4	15	363	5,892
Alice Springs	9	24	83	1,218	3,079
Total	**25**	**80**	**187**	**3,318**	**1,342**

Figure 3 Daily count of negative tests by date *



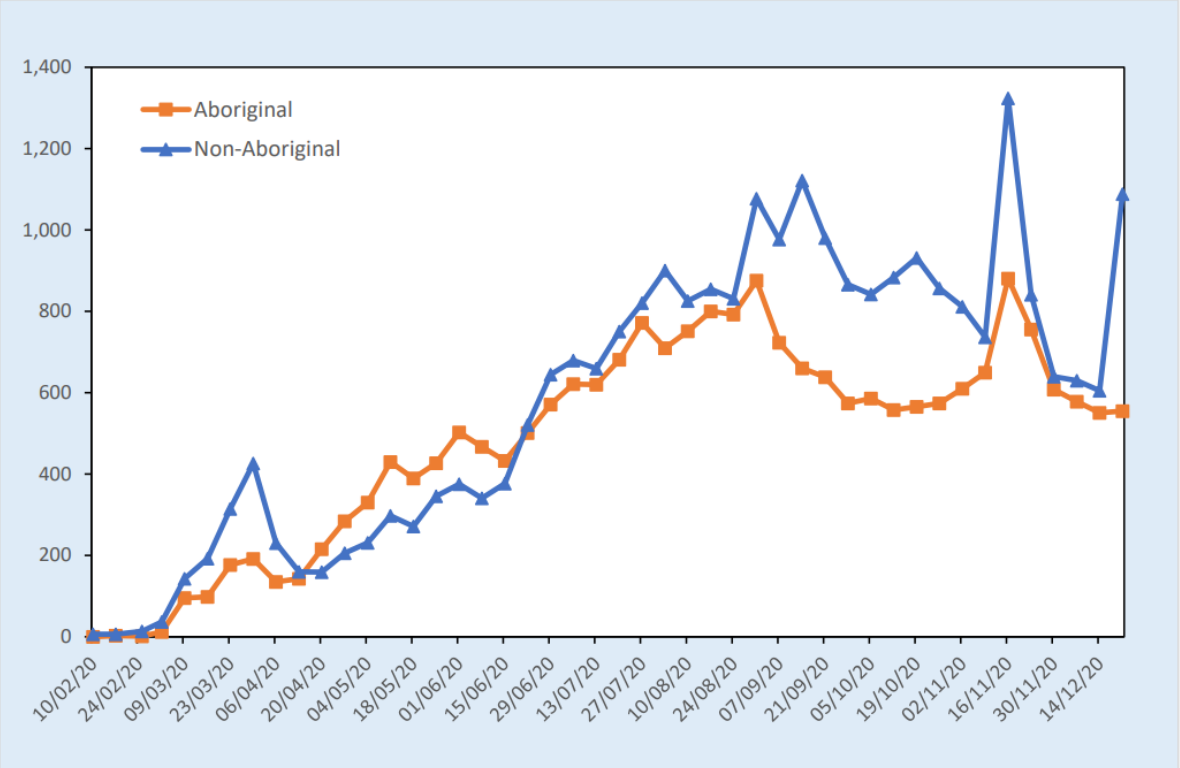
Weekdays and Saturday Sunday *Excludes international repatriates and staff tested at the National Centre for Resilience

Figure 4 Testing rates (per 1000 population) by age-group and Indigenous status*



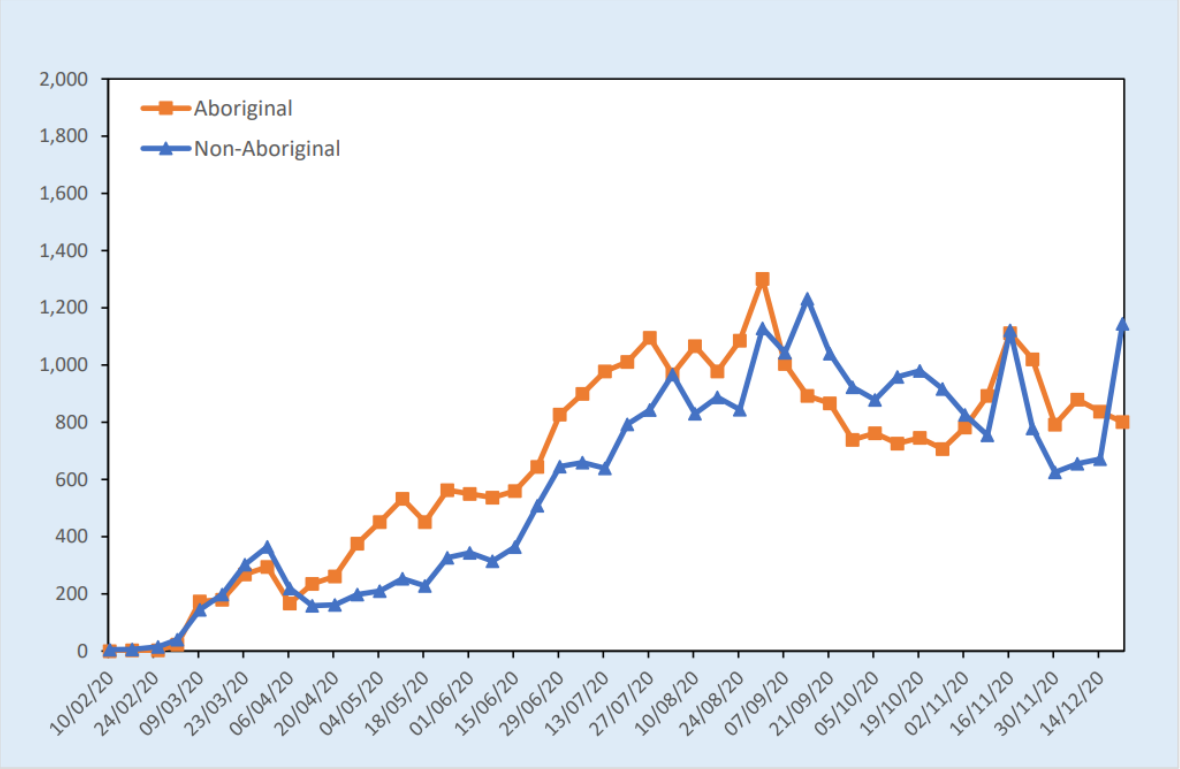
Note: * Indigenous status not stated in 19% of those tested

Figure 5 NT total testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 20% of those tested. Includes international repatriate testing at the National Centre for Resilience

Figure 6 Darwin region testing rates (per 100,000) by date and Indigenous status*



Note: * Indigenous status not stated in 16% of those tested. Includes international repatriate testing at the National Centre for Resilience

Figure 7 Testing rates (per 100,000) by date and Indigenous status for specified regions

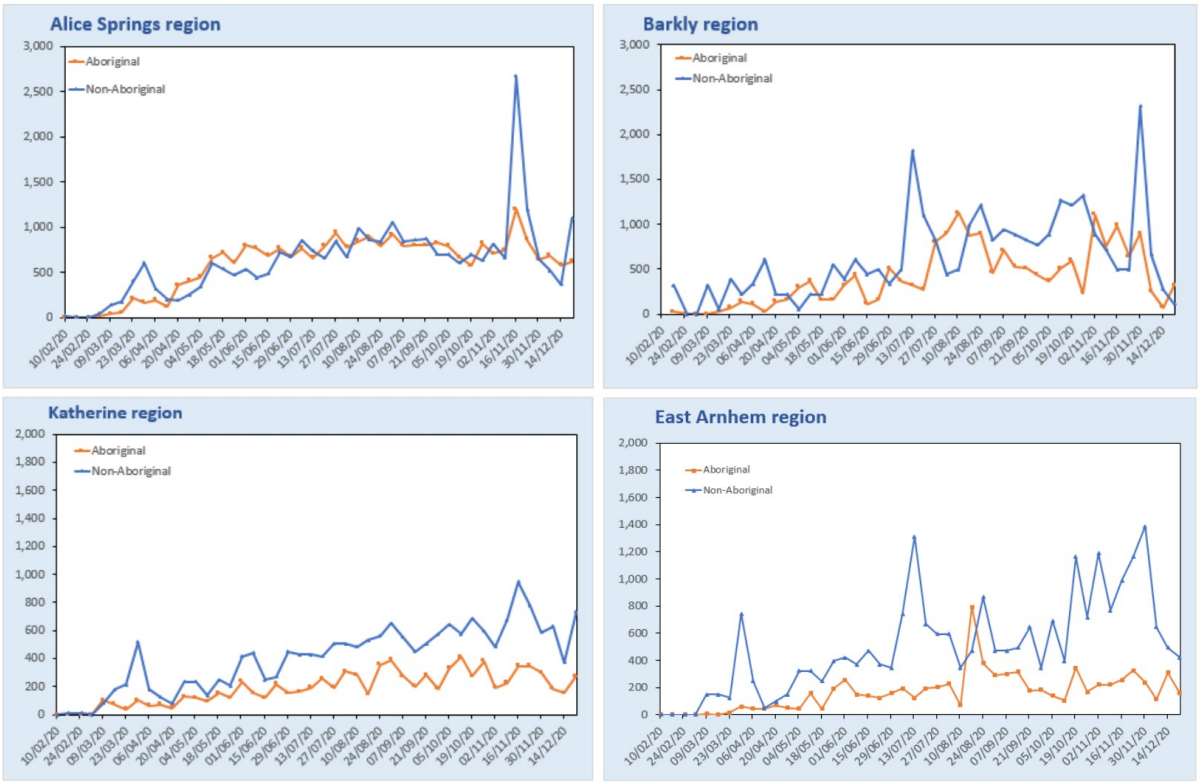
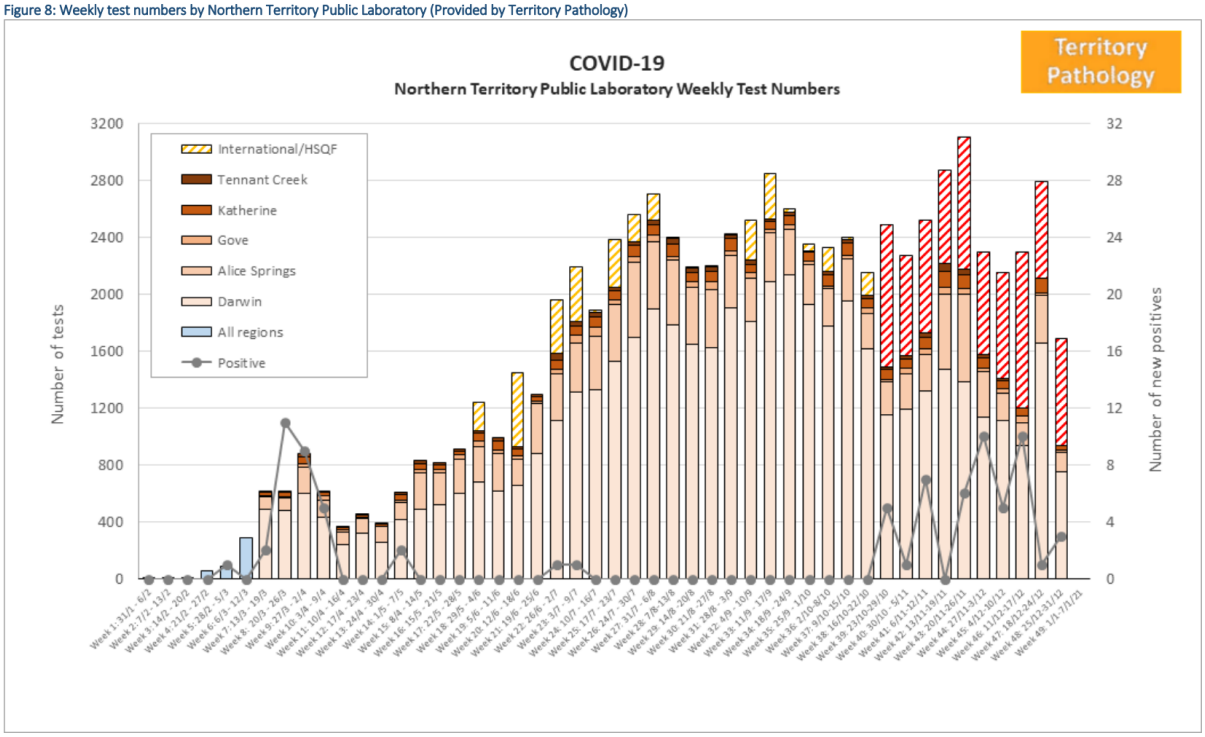


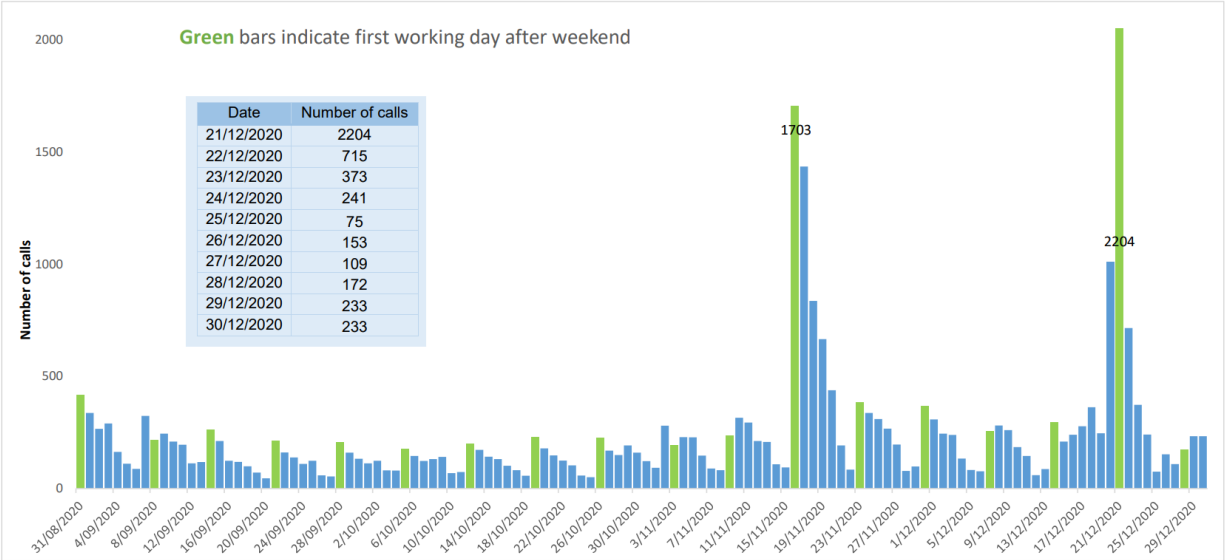
Figure 8: Weekly test numbers by Northern Territory Public Laboratory (Provided by Territory Pathology)



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

For the week ending 27 December 2020, the NT COVID-19 health hotline received a total of 3,870 calls. Following the declaration of greater Sydney as a hotspot there were 2,204 calls on Monday 21st December, during which the median wait time for health care staff was 1 minute, with 90% of calls answered within 6 minutes. For the general public, the median wait time was 5 minutes with 90% of calls answered within 3 hours. Wait times include those that left messages for 'call backs'. Calls decreased over the following days as shown in Figure 9.

Figure 9 NT health COVID-19 hotline calls per day received since 31 August 2020



Date	Number of calls
21/12/2020	2204
22/12/2020	715
23/12/2020	373
24/12/2020	241
25/12/2020	75
26/12/2020	153
27/12/2020	109
28/12/2020	172
29/12/2020	233
30/12/2020	233

Abstracts from peer reviewed published articles related to the Northern Territory

Neurosyphilis: Still prevalent and overlooked in an at risk population

Ramachandran PS, Baird RW, Markey P, Singleton S, Lowe M, Currie BJ, Burrow JN, Price RN

PLOS ONE 15(10): e0238617
https://doi.org/10.1371/journal.pone.0238617

Background: Neurosyphilis (NS) presents with a variety of clinical syndromes that can be attributed to other aetiologies due to difficulties in its diagnosis. We reviewed all cases of NS from the 'Top End' of the Australian Northern Territory over a ten-year period to assess incidence, clinical and laboratory manifestations.

Methods: Patient data (2007–2016) were extracted from hospital records, centralised laboratory data and Northern Territory Centre for Disease Control records. Clinical records of patients with clinically suspected NS were reviewed. A diagnosis of NS was made based on the 2014 US CDC criteria. Results were also recategorized based on the 2018 US CDC criteria.

Results: The population of the 'Top End' is 185,570, of whom 26.2% are Indigenous. A positive TPPA was recorded in 3126 individuals. A total of 75 (2.4%) of TPPA positive patients had a lumbar puncture (LP), of whom 25 (35%) were diagnosed with NS (9 definite, 16 probable). Dementia was the most common manifestation (58.3%), followed by epilepsy (16.7%), psychosis (12.5%), tabes dorsalis (12.5%) and meningovascular syphilis (8.3%). 63% of probable NS cases were not treated appropriately due to a negative CSF VDRL. Despite increased specificity of the 2018 US CDC criteria, 70% of patients in the probable NS group were not treated appropriately.

The overall annual incidence [95%CI] of NS was 2.47[1.28–4.31] per 100 000py in the Indigenous population and 0.95 [0.50–1.62] in the non-Indigenous population (rate ratio = 2.60 [1.19–5.70];p = 0.017).

Conclusion: Neurosyphilis is frequently reported in the NT, particularly in Indigenous populations. Disturbingly, 60% of probable neurosyphilis patients based on the 2014 criteria, and 70% based on the 2018 criteria were not treated appropriately. It is critical that clinicians should be aware of the diagnosis of NS and treat patients appropriately.

Successful containment to date of SARS-CoV-2 transmission in the Northern Territory

Douglas NM, Meumann EM, Krause VL, Davies J, Northern Territory COVID-19 Response Group

Medical Journal of Australia 2021 Mar;214 (5):218-219
10.5694/mja2.50840

Summary: This article describes the epidemiology, clinical and virological aspects of the first 28 cases of COVID-19 in the Northern Territory, 4 March to 2 April 2020. All cases were linked to overseas or interstate travel. The mean age of patients was 45 years (range 1.5-75 years) with 2 patients requiring oxygen, 1 intubation and no deaths. Viral RNA was detected via PCR testing for a median of 25 days after symptom onset. Strict isolation to achieve viral containment for patients with COVID-19 was the priority in a time when data on duration of viral transmission was scarce. No community transmission occurred during this period.

Crusted scabies; a 2-year prospective study from the Northern Territory of Australia

Hasan T, Krause VL, James C, Currie BJ

PLoS Negl Trop Dis. 2020 Dec 18;14 (12):e0008994.
10.1371/journal.pntd.0008994

Background: Scabies is listed as a neglected tropical disease by the World Health Organization. Crusted scabies affects vulnerable and immunosuppressed individuals and is highly contagious because of the enormous number of *Sarcoptes scabiei* mites present in the hyperkeratotic skin. Undiagnosed and untreated crusted scabies cases can result in outbreaks of scabies in residential facilities and can also undermine the success of scabies mass drug administration programs.

Methods and principal findings: Crusted scabies became a formally notifiable disease in the Northern Territory of Australia in 2016. We conducted a 2-year prospective study of crusted scabies cases notified between March 2016 and February 2018, with subsequent follow up for 22 months. Demographics, clinical and laboratory data, treatment and outcomes were analysed, with cases classified by severity of disease.

Over the 2-year study period, 80 patients had 92 episodes of crusted scabies; 35 (38%) were Grade 1 crusted scabies; 36 (39%) Grade 2 and 21 (23%) Grade 3. Median age was 47 years, 47 (59%) were female, 76 (95%) Indigenous Australians and 57 (71%) from remote Indigenous communities. Half the patients were diabetic and 18 (23%) were on dialysis for end-stage kidney failure. Thirteen (16%) of patients had no comorbidities, and these were more likely to have Grade 3 disease. Eosinophilia was present in 60% and high immunoglobulin E in 94%. Bacteraemia occurred in 11 episodes resulting in one fatality with methicillin-susceptible *Staphylococcus aureus* bacteraemia; two other deaths occurred during admission and 10 others died subsequent to discharge consequent to comorbidities. Treatment generally followed the recommended guidelines, with 3, 5 or 7 doses of oral ivermectin depending on the documented grade of crusted scabies, together with daily alternating topical scabicides and topical keratolytic cream. While response to this therapy was usually excellent, there were 33 episodes of recurrent crusted scabies with the majority attributed to new infection subsequent to return to a scabies-endemic community.

Conclusions: Crusted scabies can be successfully treated with aggressive guideline-based therapy, but high mortality remains from underlying comorbidities. Reinfection on return to community is common while scabies remains endemic.

Epidemiological trends in notified influenza cases in Australia's Northern Territory, 2007-2016

Weinman AL, Sullivan SG, Vijaykrishna D, Markey P, Levy A, Miller A, Tong SYC

Influenza Other Respir Viruses. 2020 Sep;14 (5):541-550
10.1111/irv.12757

Background: The Northern Territory (NT) of Australia has a mix of climates, sparsely distributed population and a large proportion of the populace are Indigenous Australians, and influenza is known to have a disproportionate impact upon this group. Understanding the epidemiology of influenza in this region would inform public health strategies.

Objectives: To assess if there are consistent patterns in characteristics of influenza outbreaks in the NT.

Methods: Laboratory confirmed influenza cases in the NT are notified to the NT Centre for Disease Control. We conducted analyses on notified cases from 2007-2016 to determine incidence rates (by age group, Indigenous status and area), seasonality of cases and spatial distribution of influenza types. Notified cases were linked to laboratory datasets to update information on influenza type or subtype

Results: The disparity in Indigenous and non-Indigenous notification rates varied by age group, with rate ratios for Indigenous versus non-Indigenous people ranging from 1.58 (95% CI:1.39, 1.80) for ages 15-24 to 5.56 (95% CI: 4.71, 6.57) for ages 55-64.

The disparity between Indigenous and non-Indigenous notification rates appeared higher in the Central Australia region. Indigenous versus non-Indigenous hospitalisation and mortality rate ratios were 6.51 (95% CI: 5.91, 7.18) and 5.46 (95% CI: 2.40, 12.71) respectively. Inter-seasonal peaks during February and March occurred in 2011, 2013 and 2014, and were due to influenza activity in the tropical north of the NT.

Conclusions: Our results highlight the importance of influenza vaccination across all age groups for Indigenous Australians. An early vaccination campaign targeted against outbreaks in February-March would be best focused on the tropical north.

Trends in Bacteremia Over 2 Decades in the Top End of the Northern Territory of Australia

Douglas NM, Hennessy JN, Currie BJ, Baird RW

Open Forum Infect Dis. 2020 Oct 17;7 (11):ofaa472
10.1093/ofid/ofaa472

Background: Information on the local distribution of bloodstream pathogens helps to guide empiric antibiotic selection and can generate hypotheses regarding the effectiveness of infection prevention practices. We assessed trends in bacterial blood culture isolates at Royal Darwin Hospital (RDH) in the Northern Territory of Australia between 1999 and 2019.

Methods: Species identification was extracted for all blood cultures first registered at RDH. Thirteen organisms were selected for focused analysis. Trends were examined graphically and using univariable linear regression.

Results: Between 1999 and 2019, 189 577 blood cultures from 65 276 patients were processed at RDH. Overall, 6.72% (12 747/189 577) of blood cultures contained a bacterial pathogen. *Staphylococcus aureus* was the most common cause of bacteremia during the first decade, with an estimated incidence of 96.6 episodes per 100 000 person-years (py; 95% CI, 72.2-121/100 000 py) in 1999. Since 2009, *S. aureus* bacteremia has declined markedly, whereas there has been an inexorable rise in *Escherichia coli* bacteremia (30.1 to 74.7/100 000 py between 1999 and 2019; $P < .001$), particularly in older adults. Since 2017, *E. coli* has been more common than *S. aureus*; rates of *Streptococcus pneumoniae* bacteremia have reduced dramatically in children, while *Burkholderia pseudomallei* remained the fourth most common bloodstream isolate overall.

Conclusions: The incidence of *S. aureus* bacteremia, though high by international standards, is declining at RDH, possibly in part due to a sustained focus on both community and hospital infection prevention practices. Gram-negative bacteremia, particularly due to *E. coli,* is becoming more common, and the trend will likely continue given our aging population.

RHD elimination: action needed beyond secondary prophylaxis

Hardie K, Ralph AP, de Dassel JL

Aust N Z J Public Health. 2020; Oct44(4):427
10.1111/1753-6405.13002

Summary: The highest number and rate of people living with acute rheumatic fever (ARF) and/or rheumatic heart disease (RHD) in Australia are in the NT. The NT Register records 3,333 patients alive with a diagnosis of ARF and/or RHD, with 2015 patients prescribed secondary prophylaxis.

76% of people diagnosed with RHD between 2014 and 2018 had no previous ARF diagnosis recorded and therefore had no opportunity for secondary prophylaxis (long-term intramuscular benzathine penicillin G (BPG)) to prevent progression to RHD.

Preventative measures should therefore also focus on staff training, community education and action on the social and environmental determinants of health.

NORTHERN TERRITORY GOVERNMENT

Centre for Disease Control

Influenza and its prevention

What is influenza?

Influenza (often called flu) is a respiratory infection caused by the influenza virus of which there are 3 types; A, B and C, each with many subtypes or strains. Types A and B cause most of the disease in humans. Influenza viruses are characterised by the way they mutate overtime thereby forming new strains and evading the immune system. Because of this, vaccine is formulated annually to best match the strains predicted for the coming influenza season.

How is it spread?

Influenza is spread from person to person through respiratory droplets produced during coughing and sneezing. It may also be spread when others touch surfaces contaminated by the droplets and then transfer the infection to their mouth and eyes, where the virus can enter the body. The incubation period is short, usually 1-3 days.

What are the symptoms?

The presentation of influenza illness often has an abrupt onset with symptoms including; tiredness, fever, headache, chills, sore throat, loss of appetite and muscle aches. There may be an associated cough, nasal discharge and sneezing.

How serious is influenza?

The severity of influenza depends on the strain, the patient's age, previous exposure to the strain and the presence of other medical conditions. Those at increased risk for severe disease or dying from influenza are listed in the groups recommended for annual vaccination.

What is the infectious period?

Adults are infectious from the day prior to and up to 7 days after the onset of symptoms while children may remain infectious for 10 days. Immunosuppressed people may shed the virus for weeks. The ability to transmit the virus is higher when cough and fever are present.

What is the treatment?

Treatment for influenza includes rest, increased fluids and pain relief. Anti-viral medications such as Tamiflu® and Relenza® can shorten the duration of symptoms and lessen the severity of the illness but are most effective if given within 48 hours of onset.

How can it be prevented?

Annual vaccination is recommended especially for those most at risk of serious disease or poor outcomes. The influenza vaccine is a safe and effective vaccine that protects against 4 strains of influenza. It does not contain any live virus, so people cannot catch influenza from having the vaccine. However, it does take about 2 weeks before the body is protected after vaccination. If you are exposed to someone with influenza infection during this time you may still become sick because your protective immune response has not yet fully developed.

To stop the spread of disease, people should cough into their upper arm or cover their mouths, with a tissue if possible, when coughing and wash their hands regularly. Regular hand-washing and disposing of tissues into the bin immediately, even when not coughing, may also help to prevent influenza. People with flu symptoms should stay at home and seek medical treatment as needed.

Annual influenza vaccination recommendations

Who is eligible for FREE influenza vaccine?

1. All Indigenous children 6 months to <5 years.
2. All Indigenous people aged 15 years and older.
3. All non-Indigenous people aged 65 years and older.
4. All pregnant women.
5. People aged 6 months and over with conditions predisposing them to complications from influenza including:
   - chronic heart disease (including congenital heart disease, coronary artery disease and valvular rheumatic heart disease)

Centre for Disease Control

- chronic liver disease
- chronic kidney disease
- chronic lung disease (including, bronchiectasis, emphysema and cystic fibrosis)
- severe asthma (requiring frequent hospital visits and multiple medications)
- diabetes and other chronic metabolic diseases requiring regular medical follow-up
- chronic neurological conditions that can affect respiratory function
- haemoglobinopathies
- children <10 years old on long-term aspirin therapy
- immunosuppression, immunodeficiency or are receiving high dose immunosuppressive therapy.

NB Children 6 months to <9 years of age and immunocompromised people who are receiving influenza vaccine for the first time should get 2 doses of vaccine given at least 4 weeks apart. Thereafter 1 dose is sufficient.

Influenza vaccination is recommended but not funded for the following groups

1. People with obesity (BMI ≥40Kg/m2).
2. Contacts of high risk patients including staff of nursing homes, long-term care facilities, all health care providers, carers of immunocompromised patients and household contacts of those in high-risk groups.
3. People travelling during the influenza season, especially if to a region where influenza is circulating.
4. Residents of nursing homes and other long-term care facilities (may be eligible for FREE vaccine if included in the groups above).
5. Homeless people and those persons providing care to this group.
6. People working with poultry and pigs.
7. Staff working in early childhood education and care and those who provide essential community services.

These people (or anyone else) can access the vaccine:

- by prescription through their GP
- from some pharmacies
- through employer funded vaccination programs.

When to vaccinate?

The vaccine should be administered every year, as soon as it becomes available (usually early April). Get your vaccine early in the year even if you were vaccinated late in the previous year.

Side effects

- local tenderness at the injection site is common
- fever and malaise occur less frequently (1-10%).

There is a small increased risk of fever and febrile convulsions in children 6 months to <5 years of age who receive influenza vaccine and Prevenar13® at the same time.

People with egg allergy, including anaphylaxis, can be vaccinated in facilities where staff can recognise and treat anaphylaxis.

Further information about vaccines and funding for influenza vaccination is available from your local doctor, health centre or Centre for Disease Control.

Information is also available from the Immunise Australia Program website at:

http://www.immunise.health.gov.au

For more information contact your nearest Centre for Disease Control.

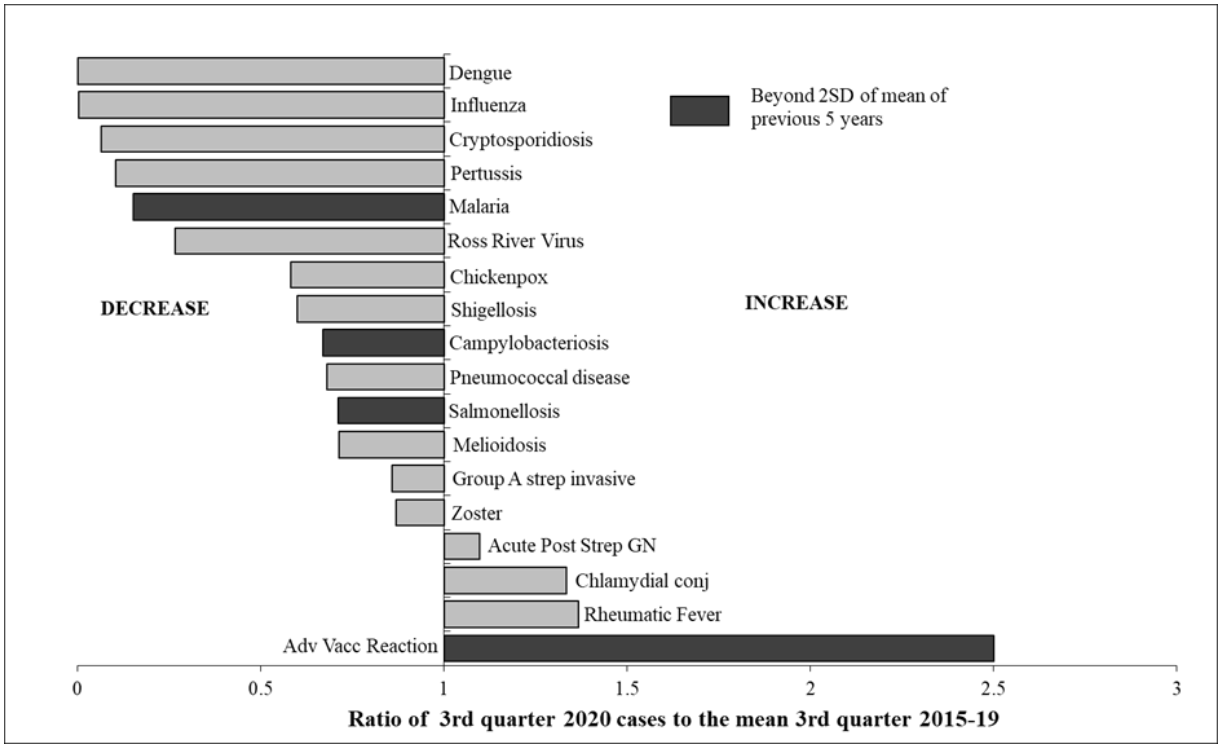
Alice Springs	8951 7548
Darwin	8922 8804
Katherine	8973 9049
Nhulunbuy	8987 0282
Tennant Creek	8962 4259

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

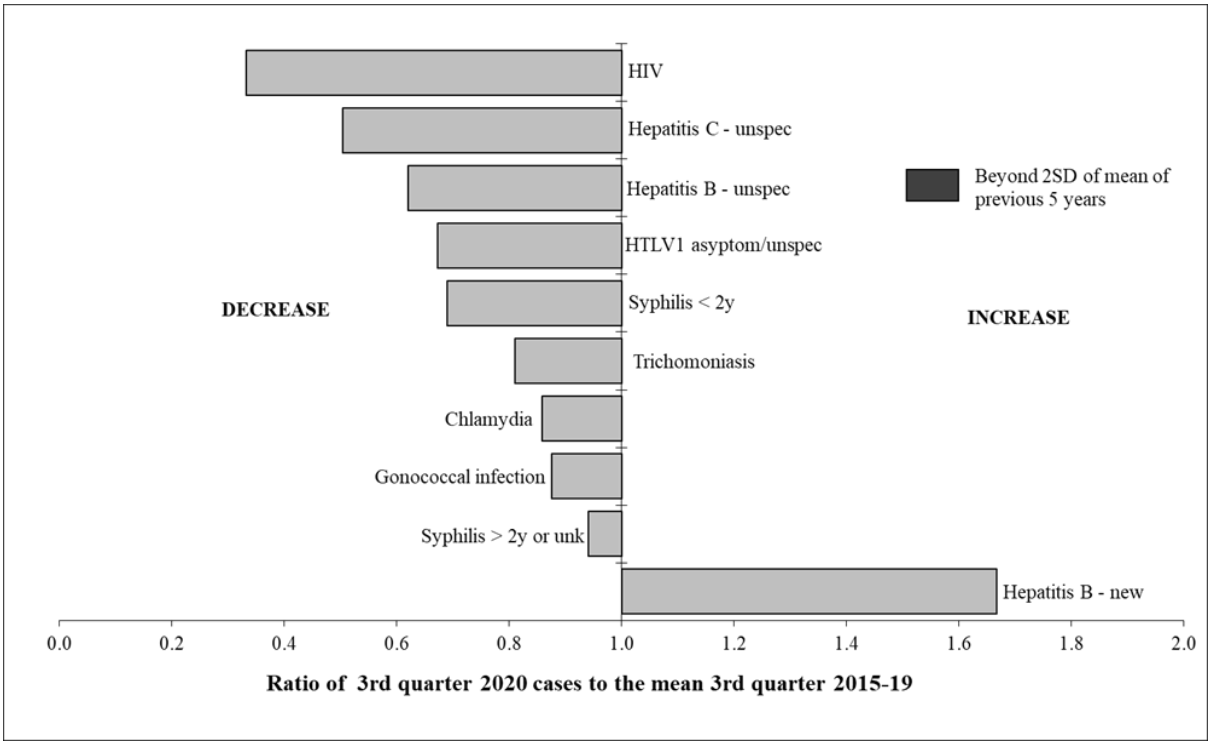
NORTHERN TERRITORY NOTIFICATIONS BY ONSET DATE AND DISTRICT
1 July—30 September (2019 and 2020)

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		N T	
	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019
Acute Post Strep GN	1	0	0	0	5	1	0	0	3	0	9	1
Adv Vacc Reaction	3	1	0	0	18	6	0	0	1	0	22	7
Barmah Forest	0	0	0	0	2	1	0	1	0	0	2	2
Campylobacteriosis	9	19	0	5	54	76	4	3	7	11	74	114
Chickenpox	2	12	1	0	11	17	0	1	1	4	15	34
Chlamydia	185	259	21	36	313	369	47	29	45	83	611	776
Chlamydial conj	3	3	0	7	0	0	0	0	5	0	8	10
Coronavirus - pandemic potential	1	0	0	0	1	0	0	0	0	0	2	0
Crusted scabies	1	9	1	1	7	10	4	4	3	3	16	27
Cryptosporidiosis	0	3	0	4	0	16	0	0	1	0	1	23
Dengue	0	0	0	0	0	7	0	0	0	0	0	7
Gonococcal conj	2	0	0	0	0	0	0	0	1	0	3	0
Gonococcal infection	189	140	21	22	79	87	32	19	55	48	376	316
Group A strep invasive	3	4	4	2	6	9	1	0	4	0	18	15
Hepatitis B - chronic	0	0	0	1	4	3	0	0	0	0	4	3
Hepatitis B - new	1	0	0	0	1	0	0	0	0	0	2	0
Hepatitis B - unspec	1	2	0	0	10	12	4	0	2	0	17	14
Hepatitis C - new	0	1	0	0	0	0	0	0	0	0	0	1
Hepatitis C - unspec	3	5	0	0	17	24	1	2	0	1	21	32
Hepatitis D	0	0	0	0	0	1	0	0	0	0	0	1
H Influenzae b	0	0	0	0	1	0	0	1	0	0	1	1
H Influenzae non-b	0	0	0	0	1	2	0	0	0	0	1	2
HIV	0	3	0	0	2	8	1	0	0	0	3	11
HTLV1 asyptom/unspec	7	10	0	2	0	0	0	0	0	0	7	12
Influenza	0	34	0	14	0	351	0	28	1	54	1	481
Lead - elevated	0	1	3	0	63	14	5	3	3	1	74	19
Legionellosis	0	0	0	0	1	0	0	0	0	0	1	0
Leptospirosis	0	0	0	0	0	1	0	0	1	0	1	1
Malaria	0	1	0	0	1	9	0	0	0	0	1	10
Melioidosis	0	0	0	0	1	5	0	0	2	0	3	5
Mumps	0	0	0	0	0	0	0	0	1	0	1	0
Non TB Mycobacteria	0	1	0	0	1	1	0	0	0	0	1	2
Pertussis	0	0	0	0	1	7	0	1	1	0	2	8
Pneumococcal disease	10	8	0	3	4	4	0	0	3	1	17	16
Q Fever	1	0	0	0	0	0	0	0	0	0	1	0
Rheumatic Fever	27	33	6	4	14	14	11	9	6	8	64	68
Rheumatic heart disease	10	8	5	0	7	9	6	2	7	6	35	25
Ross River Virus	1	1	0	1	8	22	1	1	0	5	10	30
Rotavirus	2	7	0	1	1	5	0	0	0	0	3	13
Salmonellosis	5	9	4	2	54	64	6	0	2	9	71	84
Shigellosis	3	15	7	6	19	19	1	7	8	9	38	56
STEC/VTEC	0	1	0	0	0	0	0	0	0	1	0	2
Syphilis < 2 y	19	25	7	3	16	45	5	19	11	12	58	104
Syphilis > 2 y or unknown	3	10	1	1	9	9	1	2	2	4	16	26
Syphilis congenital	0	0	1	0	0	0	0	0	0	0	1	0
Trichomoniasis	191	216	48	61	228	120	81	16	92	35	640	448
Tuberculosis	0	0	1	0	5	6	0	0	1	0	7	6
Typhoid	0	1	0	0	0	0	0	0	0	0	0	1
Varicella - unspec	2	0	2	0	14	3	2	0	2	0	22	3
Vibrio food poisoning	0	0	0	0	1	0	0	0	0	0	1	0
Yersiniosis	0	0	0	0	1	2	0	0	0	0	1	2
Zika	0	0	0	0	0	0	0	0	0	1	0	1
Zoster	12	13	4	0	75	87	1	4	6	14	98	118
Sum:	697	855	137	176	1,056	1,445	214	152	277	310	2,381	2,938

Ratio of the number of notifications in the 3rd quarter of 2020 to the 5 year mean (2015-2019): Selected diseases



Ratio of the number of notifications in the 3rd quarter of 2020 to the 5 year mean (2015-2019): Sexually transmitted diseases



Comments on notifications

Malaria

There was only 1 case of malaria notified in the 3rd quarter of 2020 compared with the expected number of 6.6 (5 year mean). This is no doubt due to the restrictions on international travel due to the pandemic as all of the Northern Territory's malaria cases are acquired overseas.

Campylobacteriosis

The number of notified cases of campylobacteriosis was 33% fewer than expected in the 3rd quarter based on the 5 year mean (74 vs 110) and very similar to the 2nd quarter of 2020. The decrease was thought to be due to the restrictions on movement put in place due to the COVID-19 pandemic. The restrictions may have also meant that fewer specimens were being sent from remote communities to the laboratories for testing.

Salmonellosis

Cases of salmonellosis were also down much like campylobacter and likely due to similar reasons. There were 71 notified cases which was 71% of the expected number (100) for the same quarter 2015-2019.

Adverse event following immunisation (AEFIs)

There were 22 AEFIs notified in the 3rd quarter which was 13 more than the 9 expected. Most of the increase was due to AEFIs from the flu vaccine – perhaps reflecting an increased uptake of flu vaccine due to the COVID-19 pandemic. Also the administration of the vaccine may have been delayed due to Covid-19 restrictions meaning the adverse events appeared in the 3rd quarter rather than the usual 2nd quarter.

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NT malaria notifications July to September 2020

Liz Stephenson, Clinical Nurse Manager, TB/Leprosy Clinic, CDC Darwin

There was 1 case of malaria notified in the 3rd quarter of 2020.

No. cases	Origin of infection	Agent	Chemoprophylaxis	NT region
1	Nigeria	*Plasmodium ovale*	No	Darwin