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The effect of social distancing and border control measures on rates of influenza, influenza-like illness and lower respiratory tract infection in the Northern Territory

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ABSTRACT

Introduction

The COVID-19 pandemic introduced social distancing and border control measures (both international and domestic) to limit the introduction and transmission of the virus in the Northern Territory (NT).

Syndromic surveillance was established prior to the pandemic by the Centre for Disease Control (CDC) to monitor influenza-like illness (ILI) in NT hospitals' Emergency Departments (ED) and NT government run remote clinics. For the pandemic, a 3rd surveillance system was established to monitor cases of lower respiratory tract infection (LRTI) diagnosed in EDs.

Methods

Comparisons before and after the interventions were made for the 3 syndromic surveillance systems together with the laboratory-confirmed influenza notifications. Comparisons were made between 12 weeks prior to the intervention and 11 weeks following (week of intervention excluded). The number of ED presentations and proportion of ED attendances with either ILI or LRTI were compared. For ILI in remote communities, total syndromic cases before and after rather than proportions were compared. In addition, a comparison was made of laboratory-confirmed influenza notifications NT-wide.

Results

Syndromic cases of ILI at EDs declined from 317 per week to 174 in the 11 weeks after (Relative Risk (RR) 0.55; 95%CI 0.52-0.58; $p<10^{-5}$), and the proportion of total ILI presentations fell from 9.7% to 6.8% (RR 0.70; 95%CI 0.66-0.74; $p<10^{5}$).

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In remote communities ILI presentations fell from 208 per week to 111 (RR 0.53; 95%CI 0.50-0.57; $p<10^{5}$). ED proportion of presentations with LRTI fell from 1.93% to 1.26% (RR 0.65; 95%CI 0.57-0.74; $p<10^{-5}$). Laboratory-confirmed influenza cases fell from 21 per week to 1.7 (RR 0.08; 95%CI 0.05-0.13; $p<10^{5}$).

Discussion/Conclusion

Cases of ILI, LRTI and laboratory-confirmed influenza fell significantly in the weeks after the introduction of social distancing and travel restrictions. ILI and LRTI are useful additions to laboratory-confirmed influenza notifications to monitor respiratory infection in the community.

INTRODUCTION

The arrival of the COVID-19 pandemic heralded the introduction of social distancing and border control measures to help curb transmission and control the outbreak. From 14 March 2020, all international arrivals to the Northern Territory (NT) were required to undertake quarantine for 14 days at a location of their choice. On 26 March, the Federal Health Minister issued a determination under the national *Biosecurity Act* putting restrictions on travel to designated areas in the NT, which meant that travel in and out of many remote NT communities was not possible without quarantining.

On 28 March 2020, all overseas arrivals were required to undertake their quarantine in a hotel. Ultimately, from 3 April 2020, all arrivals to the NT, including residents, were required to undertake quarantine in hotels.

Prior to the pandemic, as part of both routine influenza surveillance and pandemic planning, the Centre for Disease Control (CDC) had established syndromic surveillance systems to monitor influenza-like illness (ILI) both in the NT hospitals' Emergency Departments (ED) (2007), and in NT government run remote clinics (2016).[1,2]

Syndromic surveillance refers to surveillance of a collection of symptoms or clinical diagnoses that are made without reference to confirmatory laboratory testing or strict case definitions. It also often means surveillance on existing data collections rather than relying on the establishment of new systems.

The 2 syndromic surveillance systems used different parameters and different definitions to measure ILI, each tailored to best correlate with laboratory confirmed influenza notifications.[1,2] In addition, in response to the pandemic in February 2020, the CDC established a third system to monitor cases of lower respiratory tract infection (LRTI) diagnosed in EDs. This system looked at all the possible ICD-10 (International classification of diseases, 10th revision) diagnoses related to LRTI as defined in Table 1.

Table 1. ICD-10 diagnoses included in the lower respiratory tract infection surveillance established on Emergency Department discharges from February 2020

Bronchopneumonia	Pneumonia, bacterial
Bronchopneumonia, not aspiration	Pneumonia, lobar
Lower respiratory tract infection	Pneumonia, not aspiration
Pneumonia, atypical	Pneumonia, viral

Because of the inherent error with case ascertainment in syndromic surveillance, it is the trend in the data which is most important rather than the absolute case numbers. To monitor trends, we use a simplified "CuSum" statistic, which is the cumulative sum of the exceedances (observed counts minus expected).

This borrows from the technique used in industry to monitor production processes.[3] The CuSum statistic can be negative, if the observed numbers are consistently lower than the expected.

METHODS

Before and after comparisons were made for the 3 syndromic surveillance systems together with the laboratory-confirmed influenza notifications. Comparisons were made between the 12 weeks prior to the intervention week (weeks 1 to 12; 30 December 2019 to 22 March 2020) and the 11 weeks following (weeks 14 to 24; 30 March 2020 to 14 June 2020). The week of the intervention was excluded (week 13; 23 to 29 March 2020).

To adjust for the possibility of a decrease in ED attendances due to a restriction-induced fall in tourist numbers, we compared not just the number of ED presentations but also the proportion of ED attendances who had either ILI or LRTI. Before and after ratios were calculated and confidence intervals were estimated using immediate commands in STATA® v13. For influenza-like illness in remote communities we only compared total syndromic cases before and after rather than proportions of the total because total presentations were not available for the PCIS (NT Primary Care Information Systems) data.

We plotted the cumulative observed-minus-expected counts (a simplified CuSum[4,5]) for ILI in a view to determining the dates when changes may have occurred. No statistical analysis was performed on the CuSum data – it was simply observed for any sudden changes. Again, to adjust for any decline in total ED attendances due to border closures or other trends, weekly expected counts were defined as the total ED attendance count for the week (T_w) multiplied by the proportion of total cases with ILI or LRTI historically for that same week over the previous 5 years (2015-19; Obs_{w5}/T_{w5}). In other words, the expected number was the mean number of cases for that week over the previous 5 years adjusted for the total 2020 ED presentations (T_{w5}):

$$Exp_w = T_w(Obs_{w5}/T_{w5})$$

where Obs_{w5} and T_{w5} are the syndromic cases and total cases respectively for the same week for the last 5 years.

The weekly simplified CuSum for week (w), C_w is given as:

$$C_w = C_{w-1} + (Obs_w - Exp_w)$$

For remote PCIS data we plotted the observed-minus-expected counts using the count for the same week in 2019 as the expected value, ie; $Exp_w = Obs_{w-52}$.

RESULTS

Emergency Department influenza-like illness presentations

Following border closures and social distancing, the number of syndromic cases of ILI declined from 317 per week before the restrictions to 174 per week in the 11 weeks after (Relative Risk (RR) 0.55; 95%CI 0.52-0.58; $p<10^{-5}$), while the proportion of total presentations that were ILI fell from 9.7% to 6.8% (RR 0.70; 95%CI 0.66-0.74; $p<10^{5}$).

The simplified CuSum plot showed an increase in the cumulative sum before week 13 and then a sharp direction change at week 14 with a subsequent gradual decrease. The ILI numbers, expected numbers and the CuSum are illustrated in Figure 1.

Emergency Department lower respiratory tract infection presentations (LRTI)

In the 11 week period following border closures and social distancing measures the number of cases of LRTI diagnosed fell from a mean of 63.0 per week to 32.2 per week (RR 0.51; 95%CI 0.45-0.58; $p<10^{-5}$). The proportion of presentations with LRTI diagnosed on discharge was 1.93% before the intervention compared to 1.26% after (RR 0.65; 95%CI 0.57-0.74; $p<10^{-5}$).

The proportions and the CuSum plot (cumulative observed-minus-expected counts) are illustrated in Figure 2 and show that the proportion of cases with LRTI in 2020 tracks just below the 2015-2019 mean but then falls after week 14.

Figure 1. Weekly count of influenza-like illness cases presenting to Emergency Departments (blue line), the 5 year mean (grey dotted line) and the CuSum based on expected values (red dashed line; see text)

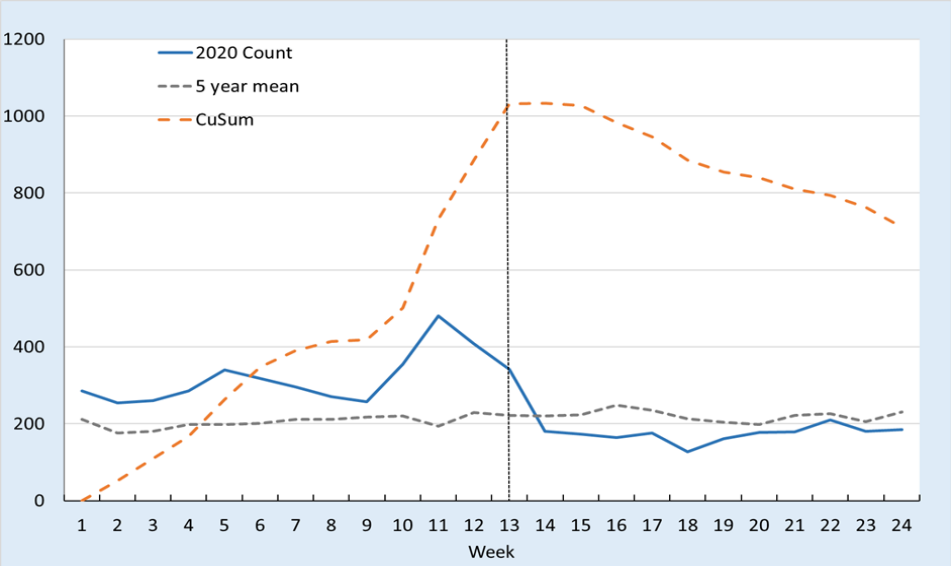
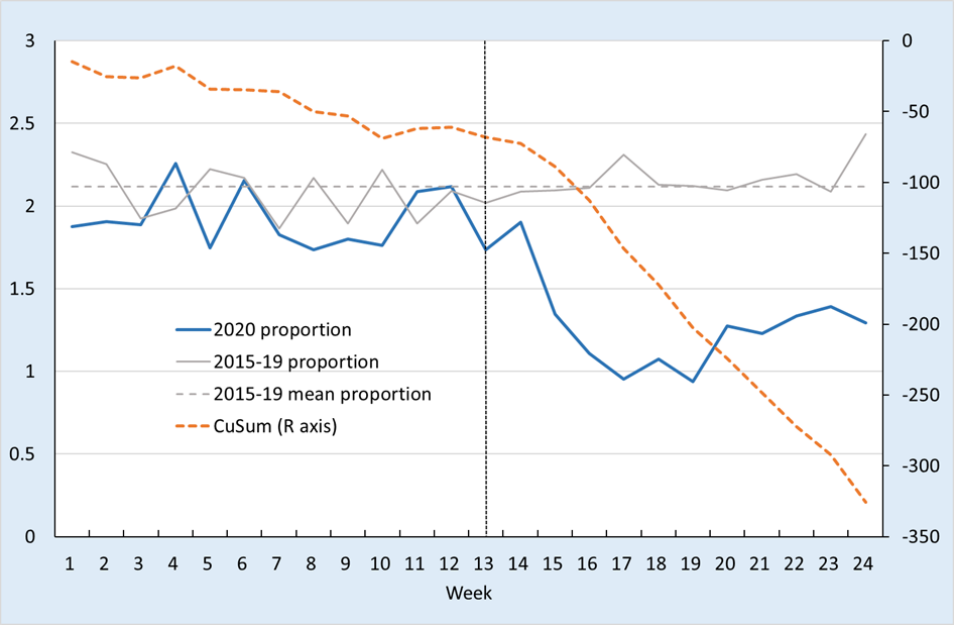


Figure 2. The weekly proportion of total ED presentations that were diagnosed as lower respiratory tract infections for 2020 (blue line), 2015-19 proportion (light grey line) and the mean for weeks 1-24 2015-19 (dotted grey line) all plotted on the left axis; the CuSum (dotted red line) plotted on right axis based on expected values (see text)



Remote community influenza-like illness presentations

In the remote communities using PCIS, the weekly ILI presentations went from 208 per week before the restrictions to 111 per week in the 11 weeks after (RR 0.53; 95%CI 0.50-0.57; p<105). Comparing the weeks 14 -24 with the same weeks in 2019, the average weekly count in 2019 was 218 (RR 0.51; 95%CI 0.74-0.54; p<105). Comparing the weeks 14-24 with the same weeks in 2019, the average weekly count in 2019 was 218 (RR 0.51; 95%CI 0.74-0.54; p<105). The weekly counts for both years and the 2020 CuSum, with expected values being the cases in the same week in 2019, are plotted in Figure 3. There is a sharp divergence of the lines at week 13 and a concomitant decrease in the CuSum.

Laboratory-confirmed influenza cases

Laboratory-confirmed influenza cases fell precipitously from 21 per week before the restrictions were introduced to 1.7 per week in the weeks after (RR 0.08; 95%CI 0.05-0.13; p<10[5]; Figure 4).

Figure 3. The weekly number of ILI cases presenting to PCIS communities in 2019 (light blue line) and 2020 (blue line) and the 2020 CuSum (red dashed line; R axis) based on expected values being the number of cases in same week in 2019

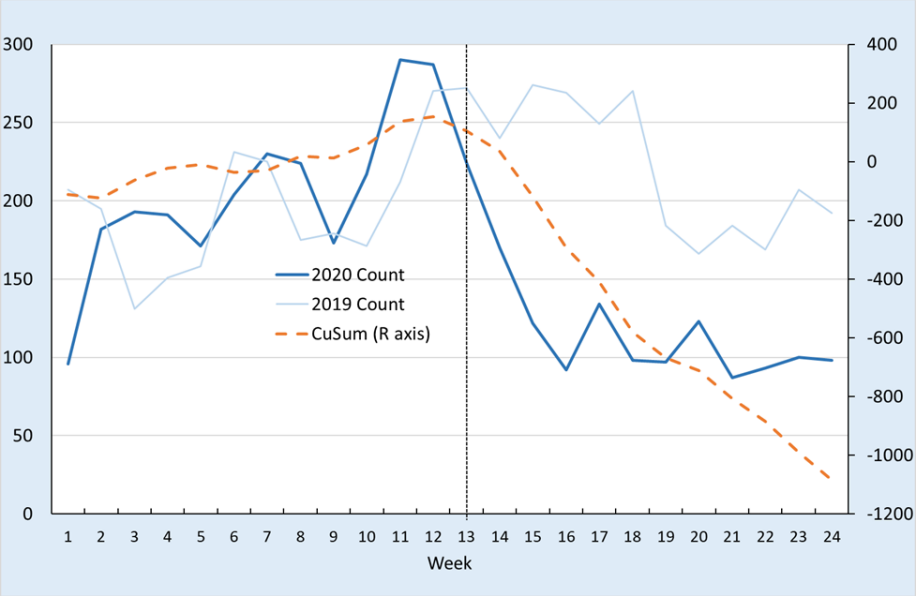
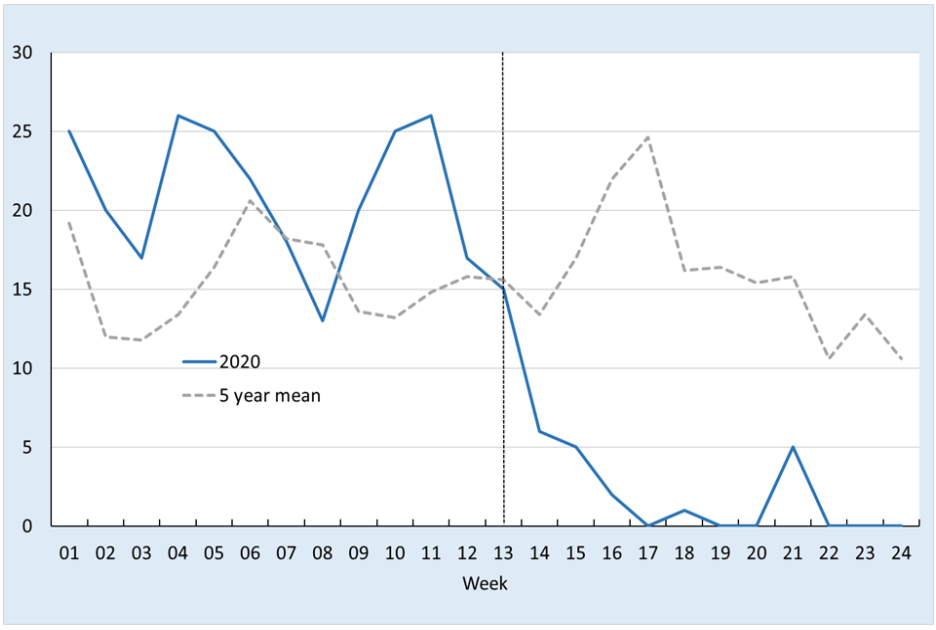


Figure 4. Laboratory-confirmed influenza cases by week NT-wide; 2020 (dark blue line) and the 5 year mean (grey dotted line)



DISCUSSION

We have shown that cases of ILI, LRTI and laboratory-confirmed influenza all fell significantly in the weeks after the introduction of social distancing and travel restrictions in the NT. Supporting evidence that it was the restrictions themselves which triggered the fall, is illustrated in the CuSum graphs which demonstrate a turning point in week 13 or 14, for both the ED and remote community ILI.

Counts of syndromic respiratory infection all fell by about a half. When adjusted for total attendances, the decline was about one third. Influenza notifications fell to a twelfth of the pre-restriction figure. While this evidence is based purely on a natural experiment, it gives some reassurance that policies relating to social distancing and restricting movement and mixing, indeed have an impact on reducing the transmission of respiratory infections. Nationally, laboratory-confirmed influenza notifications were at historical lows[6] during that timeframe suggesting the effect has been seen nation-wide.

Data derived from syndromic surveillance are inherently at risk of bias due to the subjective nature of symptom measurement and diagnosis. That is, much of what is measured as 'influenza-like illness' won't be influenza. However, as long as this error is random and stable, valid conclusions can be drawn, particularly in analysis of trends. Nevertheless, other factors may influence trends, such as reporter bias, where staff turnover or training may influence the choice of syndrome entered on the system and lead to misleading changes in syndromic numbers.

The sudden change in the CuSum curve at weeks 13 to 14 for the syndromic data is interesting, with the restriction of movement having an almost immediate effect. This might suggest that some of the reduction is simply due to fewer presentations to health services due to the community being in 'lockdown' and/or fewer travellers in the community.

For the ED data this possible confounding was adjusted for by comparing the proportion of total ED presentations who had ILI rather than the total number. Although the effect was less, there was still a significant 30% reduction. Likewise, even when the expected value was adjusted for total presentations, the CuSum still showed a marked reduction after the 13th week.

The opening of pandemic clinics may have also attracted those with ILI away from EDs and explained some of the decrease. However, the pandemic clinics opened later, did not accept walk-in clients and only slowly increased their numbers, so it is unlikely to explain the sudden decrease.

Total presentations were not available for the PCIS data, so some of the immediate effect seen in remote communities may well have been due to a drop in total presentations. It might have been the case that community members stayed home, either through fear of being in contact with others or of being stigmatised through testing if they had a respiratory infection.

Laboratory-confirmed cases of influenza, like all notifications, are subject to variations in testing. However, influenza PCR was included on the panel used for COVID testing done in the RDH laboratory at an early stage so the amount of testing for influenza has been maintained at a high level. Hence the fall off in laboratory-confirmed notifications is not likely to be a result of a decline in testing.

We have shown that the surveillance of ILI and LRTI is a useful addition to laboratory-confirmed influenza notifications to monitor respiratory infection in the community. In the future this monitoring might be valuable as an indirect indicator of the level of adherence to social distancing and movement restrictions.

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NORTHERN TERRITORY GOVERNMENT

TOP END **HEALTH** SERVICE

ALERT #19
Coronavirus disease 2019 (COVID-19)
Expanded testing criteria for frontline workers and new key messages
02 April 2020

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File Ref: EDOC2020/118050

Dear Clinicians,

There have now been 21 patients diagnosed in the NT with COVID-19 (see the attached daily Surveillance Sit Rep 2 April 2020). All NT cases have acquired their disease overseas or interstate. Contact tracing is continuing with close contacts being quarantined and undergoing daily monitoring.

The information below is for identifying COVID-19 in the NT with newer additions shown in red. It differs in minor ways from the National Guidelines because there is currently no evidence of community transmission in the NT and we do not yet need to use a 'Probable case' definition as is now included in the National Guidelines. All NT suspect cases are still tested to confirm infection. Additionally, the testing criteria in the NT have been expanded to include symptomatic frontline workers. As there is currently no community transmission demonstrated in the NT this expansion is a method to identify possible covert transmission.

See Advice for clinicians below on appropriate use of PPE and collecting sputum samples for diagnosis.

Key Messages:

- Have you visited https://coronavirus.nt.gov.au? The website has a lot of useful information regarding travel, number of NT cases and number of people tested in the NT. Should a patient ask you about NT flights affected by COVID-19 you will find them listed at https://coronavirus.nt.gov.au/contact-tracing.
- Due to a number of recent cases of COVID-19 identified in workers at Adelaide airport, people who have passed through the Adelaide airport in the previous 14 days should have raised awareness for symptoms of COVID-19 and seek testing should symptoms develop. Saying that, *all* people coming into the NT from interstate are meant to be self-quarantining and self-monitoring for symptoms of COVID-19 disease.
- The case definition for a suspect case in Category (C) according to the announcement on 27/03/2020 includes frontline workers (police, emergency workers, correctional officers, educators, child care, aged care and disability workers) as well as healthcare workers.
- Test according to the case definition and remind people to stay in self-isolation until test results are back (results may take up to 72hrs depending on time and location of test) or if in quarantine, they must complete the 14 days in quarantine.
- Do NOT test ASYMPTOMATIC people for COVID-19.
- Call Darwin CDC on 8922 8044, Alice Springs on 8951 7540 or email to cdc.covid@nt.gov.au to report all patients tested providing:
    a. Name
    b. Date of birth
    c. Patient phone number
    d. Reason for test (travel or contact and symptoms)
- ALL people returning from overseas after midnight 15 March 2020 **and people returning from interstate after 4pm on 24 March, 2020 must remain in quarantine for the full 14 days after returning, regardless if they have tested negative to COVID-19 within this time period**.
- The CDC alerts are now online at www.health.nt.gov.au.
- Support all in the NT to do the right thing by social distancing and where indicated, quarantine and self-monitor for disease.

Case Definition in the NT

Confirmed case

A person who tests positive to validated specific SARS-CoV-2 NAT or has virus identified by electron microscopy or viral culture.

Suspect case:

A. If the patient satisfies and epidemiological and clinical criteria, they are classified as a suspect case.

Epidemiological criteria

- Any international or interstate travel in the 14 days before the onset of illness.
  OR
- Close contact in 14 days before illness onset with a confirmed case of COVID-19.

AND

Clinical criteria

- Fever (≥38°C) or history of fever (e.g. night sweats, chills)
  OR
- Acute respiratory infection (e.g. shortness of breath, cough or sore throat) with or without fever.

B. If the patient has severe bilateral community-acquired pneumonia (critically ill*) and no other cause is identified, with or without recent international travel, they are classified as a suspect case.

C. If any healthcare worker with direct patient contact or frontline worker (police, emergency workers, correctional officers, educators, childcare, aged care and disability workers) has a fever (≥38°C) or history of fever (eg. night sweats, chills) OR an acute respiratory infection (e.g. shortness of breath, cough, sore throat) they are classified as a suspect case.

*requiring care in ICU/HDU, or for patients in which ICU care is not appropriate, respiratory or multiorgan failure. Clinical judgement should be exercised considering the likelihood of COVID-19.

Advice for clinicians

1) The current recommendation for PPE use for people in quarantine, with no COVID-19 symptoms, is a surgical mask on the patient and examine patient in surgical mask, gown, gloves and goggles or face shield.
2) A single use surgical mask is now recommended rather than a P2 mask for taking a nose and throat swab, along with the other contact and droplet precaution PPE of a gown, gloves, goggles or face shield. A national expert review has determined this is the appropriate advice for taking a nose and throat swab in a patient with an acute respiratory infection. P2 masks should be reserved for aerosol generating procedures in hospitals (page 9 of the National Guidelines). See attached poster for donning and doffing of PPE.
3) Sputum samples are very appropriate specimens for diagnosing COVID-19 in patients who are coughing and able to produce sputum. A sputum sample can be obtained in place of a nose and throat swab. Ask the patient to step outside the clinic and away from other people or they can go to their car with the windows down and collect their sputum. This will save on PPE and flocked swabs. The patient should expectorate a deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container.

For more information:

- Visit the Northern Territory Government website https://coronavirus.nt.gov.au for local level information.
- Visit the Australian Government Department of Health webpage at https://www.health.gov.au.
- The general public who want more information or are concerned about their health can call the COVID-19 health direct line on 1800 020 080 or visit https://www.healthdirect.gov.au/coronavirus.

Yours sincerely

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ALERT #24 Coronavirus disease 2019 (COVID-19)
Testing, testing, testing
24 June 2020

Dear Clinicians,

There were 30 cases of COVID-19 diagnosed in the NT between 2 March and 1 May 2020. All cases have now recovered with the final case clearing the virus on 20 May 2020. All cases in the NT acquired their disease overseas, interstate or from a known close contact and no NT community transmission has been demonstrated to date (see latest NT CDC Surveillance Sit Rep attached).

Together the people of the NT have achieved an amazing outcome in stopping the spread of COVID-19. As the nation and the NT move through this pandemic some of the successful physical distancing measures are being reduced in a stepwise fashion. During this time it is vital that testing is prioritised to meet the goal of minimising any disease transmission. **A high testing rate for COVID-19 is essential so that COVID-19 cases can be rapidly identified, successfully managed with thorough contact tracing and further spread contained.**

The primary approach for identifying people with active disease is based on testing all those who present with characteristic clinical symptoms who also have epidemiological criteria that put them at increased risk of having the disease, followed by groups likely to reveal undetected community transmission (e.g. frontline workers) and those in congregate settings. This risk based approach defines people meeting our NT *suspect case* definition and is the highest priority group for testing. However looking to detect all cases requires moving beyond this and testing all those with symptoms consistent with COVID-19 where no alternative explanation of the patient's illness is evident (*enhanced testing*).

So the focus at this time is to test, test, test for early identification of acute, infectious COVID-19 cases. The number of patients you have presenting with acute respiratory infection (ARI) should roughly equal the number you are testing for COVID-19.

People with symptoms have a much higher probability of testing positive for COVID-19 disease than those without symptoms and also present a higher risk of transmission to others. However, there are circumstances for testing asymptomatic people such as close contacts of confirmed cases, those in outbreak settings and people in increased risk populations as assessed by the local CDC.

While increased testing and case management will take us forward, it is important to recognise that to date the main tactic for reducing the spread of COVID disease and saving lives has been physical distancing (restriction to travel, gatherings, visiting and maintaining 1.5m personal space in addition to isolation for cases and quarantine for 14 days for those at increased risk of the disease) and practising good personal hygiene (e.g. covering coughs, frequent hand washing). As some of the restrictions are being reduced, continuing 1.5 m personal space wherever possible and promoting covering coughs, providing for and encouraging frequent hand washing and staying home when unwell are essential as is maintaining case isolation and quarantine for those at heightened risk of COVID-19 disease.

The NT case definition still differs slightly from the National Guidelines (SoNG) as the NT *suspect case* definition for the frontline worker group (B) is wider and some high risk settings (C) are also identified. Additionally the NT does not use a '*probable case*' definition as all *suspect cases* in the NT are tested by PCR to rule them in or out as acute COVID-19 disease. The *confirmed case* definition in both the SoNG and the NT now includes "a person who undergoes a seroconversion to /or has a significant rise in SARS-C0V2 neutralising or IgG antibody level". However, serology does not currently have a role in the diagnosis during acute illness, which is the focus of our response to COVID-19. Serology has utility in diagnosing past SARS-CoV-2 infection and at this time serologic testing should be undertaken with advice from IFD or CDC-PHU consultants. **Therefore, the emphasis remains on testing for acute COVID-19 disease and that is by PCR testing.** Additionally in the SoNG and the NT the *suspect case* and the *enhanced testing* clinical criteria have reverted to a fever being defined as ≥37.5°C and also the "loss of smell or loss of taste with or without fever" has been added to presenting symptoms.

Case Definition in the NT

Confirmed case

A person who:

I. tests positive to validated specific SARS-CoV-2 nucleic acid test

OR

II. has the virus isolated in cell culture, with PCR confirmation using a validated method

OR

III. Undergoes a seroconversion to or has a significant rise in SARS-CoV-2 neutralising or IgG antibody level (e.g. four-fold or greater rise in titre

Suspect case

If the patient satisfies ***Epidemiological*** A, B, C, or D and ***Clinical criteria***, they are classified as a *suspect* case.

Clinical criteria

- Fever (≥37.5°C) or history of fever (e.g. night sweats, chills)

OR

- Acute respiratory infection (e.g. shortness of breath, cough or sore throat) with or without fever

OR

- Loss of smell or loss of taste with or without fever

A. *Epidemiological criteria* - highest risk

- Any international or interstate travel in the 14 days before the onset of illness.

OR

- Close contact in 14 days before illness onset with a confirmed case of COVID-19.

AND

Clinical criteria as above

B. *Epidemiological criteria* - lesser risk

- Any frontline healthcare worker with direct patient contact or other frontline workers (police, emergency workers, correctional officers, educators, childcare workers, aged care and disability workers, phlebotomists, retail pharmacists and pharmacy assistants)

AND

Clinical criteria as above

C. *Epidemiological criteria* - lesser risk

- Any person in the following settings
  a. aged care and residential (including disability and psychiatric) care facilities
  b. military - in group residential settings
  c. remote industrial sites with accommodation (e.g. mine sites)
  d. boarding schools
  e. correctional or detention facilities for those newly detained in previous 14 days
  f. people who live, have lived in or travelled through a geographically localised area with elevated risk of community transmission as defined by the local public health authorities.

AND

Clinical criteria as above

D. *Epidemiological criteria* - lesser risk

- Any hospitalised patient

AND

Clinical criteria as above, unless there is fever only and no respiratory symptoms and the fever is explained by another cause (e.g. cellulitis, appendicitis)

Enhanced testing

- Testing beyond the *suspect* case definition should be undertaken on patients with the *clinical criteria*:
  - fever (≥37.5°C) or history of fever (e.g. night sweats, chills) where no other clinical focus of infection or alternate explanation of the patient's illness is evident. **OR** acute respiratory infection (e.g. cough, shortness of breath, sore throat) **OR** loss of smell or loss of taste.
- It is recognised that without any other epidemiological risk factors, the risk of persons having COVID-19 is low. Any symptomatic persons should stay home until their symptoms have resolved.
- Respiratory specimens should be collected in accordance with the appropriate guidelines. Refer to Guidance on use of personal protective equipment (PPE) in non-inpatient healthcare settings, during the COVID-19 outbreak . Good hand washing, surgical mask, gloves and goggles/face shield are recommended for taking a throat and deep nasal swab.
- It is not necessary to contact CDC to report cases for enhanced testing and the requesting doctor will need to inform the patient of negative results. Patients seen in RDPH ED should be advised to call Darwin CDC on 8922 8044 24-48 hours after being tested. Those seen in ASH ED should call 8951 7540 for their results 48-72 hours after being tested. CDC will alert the requesting doctor and the patient if the test is positive. Include the patient's phone number on the laboratory request form to assist.

Key Messages:

- Being as vigilant, informed and prepared for the next steps in responding to COVID-19 in our community is essential.
- To inform a step by step process of reducing physical distancing measures, **continued testing of *suspect* cases** and commitment to ***enhanced testing*** are required.
- Call Darwin CDC on 8922 8044, Alice Springs on 8951 7540 or email to cdc.covid@nt.gov.au to report all ***suspect* cases**, providing:
    a. Name
    b. Date of birth
    c. Patient phone number (or where appropriate, the remote health service contact)
    d. Reason for test (travel or contact and symptoms)
- For ***enhanced testing*** the requesting doctor will need to inform the patient of negative results. Patients seen in RDPH ED should be advised to call Darwin CDC on 8922 8044 24-48 hours after being tested. Those seen in ASH ED should call 8951 7540 for their results 48-72 hours after being tested.

Further advice and information for clinicians:

1) Ensure that your practice setting supports physical distancing by providing 1.5 metre floor markings and adequate distance between waiting room chairs. Provide for adequate means of handwashing/hand hygiene.
2) For an upper respiratory tract collection first swab the tonsillar beds and back of the throat and then insert the same swab 2-3 cm (or until resistance is met) into the nostril (deep nasal) and rotate several times against the nasal wall and repeat the process in the other nostril.
3) For a ***suspect* case** throat and deep nasal collection use a single use surgical mask, gloves, goggles/face shield**.** The need for gown or apron is based on risk assessment. *Suspect* cases are to self-isolate until result of test is known and further advice given.
4) For ***enhanced testing* collection** of a throat and deep nasal swab, a surgical mask, gloves and goggles/face shield are recommended and the patient is to stay at home until symptoms resolve.
5) **Sputum samples are very appropriate specimens for diagnosing COVID-19 in patients who are coughing** and able to produce sputum. A sputum sample can be obtained in place of a throat and deep nasal swab and saves on PPE and flocked swabs. Ask the patient to step outside the clinic and away from other people or they can go to their car with the windows down and collect their sputum. The patient should expectorate a deep cough sputum directly into a sterile, leak-proof, screw-top dry sterile container.
6) Self-collected throat and deep nasal swabs are an alternative collection method that save on time and PPE. This is a useful method for healthcare workers. Patients will be directed by public health staff when this is an appropriate specimen collection method. A self-swabbing video and instructions are supplied. Call your local CDC for guidance and advice. Details below.
7) As influenza season approaches, we are fortunate in the NT to have all respiratory specimens collected for COVID-19 also being tested for a respiratory panel of viruses which include influenza.
8) Promote the 2020 influenza vaccine for your patients now.
9) TEHS Primary Health Care hosts a teleconference every Thursday at 3PM for all NT clinicians to provide COVID-19 updates and an opportunity for Q and A with CDC PH physicians. Email jane.thomas@nt.gov.au for details.

For more information:

- These CDC Alerts are online at www.health.nt.gov.au
- Visit the NT Government website https://coronavirus.nt.gov.au for local level information.
- Visit the Australian Government Department of Health webpage at https://www.health.gov.au.
- The general public who want more information or are concerned about their health can call the COVID-19 health direct line on 1800 020 080 or visit https://www.healthdirect.gov.au/coronavirus.

Yours sincerely

Dr Vicki Krause

Director, Centre for Disease Control-Environmental Health, Public Health Unit, TEHS, Darwin

Centre for Disease Control	Darwin	Nhulunbuy	Katherine	Alice Springs	Tennant Creek
Phone	08 89228044	08 89870357	08 89739049	08 89517540	08 89624259
Fax	08 89228310	08 89870500	08 89739048	08 89517900	08 89624420

NT COVID-19 Surveillance Situation Report (Sit Rep) 2 April 2020

CDC NT COVID-19 Surveillance Sit Rep 2 April 2020

Covid-19 Cases

	NT residents	Interstate/overseas residents	Total		Indigenous	Non-Indigenous
Diagnosed in NT	19	2	**21**		0	21
Diagnosed interstate	1	-	**1**		0	1
Total	20	2	**22**		0	22
Cleared	0	1	**1**			
	Note: In national reporting the NT figures reflect NT residents only, including those diagnosed elsewhere					

Contacts undergoing active monitoring by health district

District	Darwin Urban	Darwin Rural	East Arnhem	Katherine	Barkly	Alice Springs Urban	Alice Springs Rural	All
Current	125	5	4	5	0	25	2	**166**
Total	**172**	**7**	**4**	**9**	**3**	**39**	**4**	**290**

Note: Total includes Not Stated n=34 and Interstate n=18

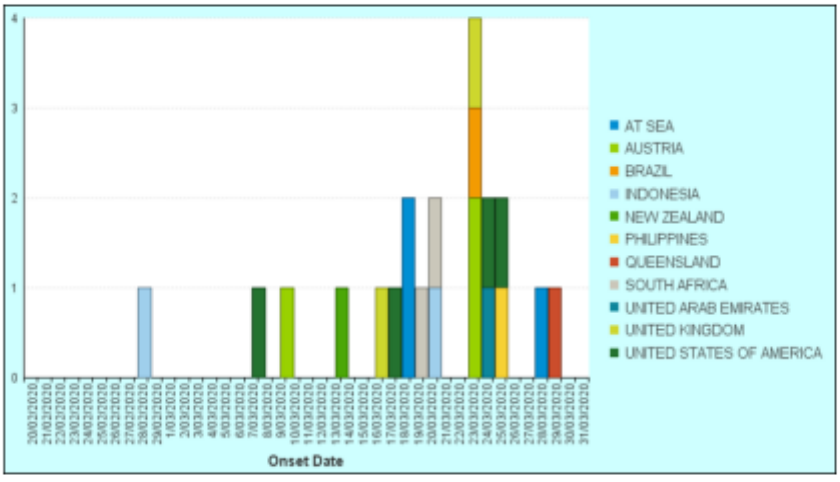
Contacts undergoing active monitoring by exposure setting

Location	Household	Cruises	Flights	Health care	Other	All
Current	25	14	116	1	10	**166**
Total	**26**	**61**	**176**	**4**	**23**	**290**

Testing

Negative tests	Alice Springs	Darwin	East Arnhem	Katherine	Barkly	All
RDH 01/4	37	133	10	6	5	**191**
Other labs 01/4						**2**
Total to date						**2466**

Prepared by CDC Surveillance Unit with assistance from RDH laboratory.



NT COVID cases by onset date and place of infection

NT COVID-19 Surveillance Situation Report (Sit Rep) 24 June 2020

CDC NT COVID-19 Surveillance Sit Rep 24 June 2020

COVID-19 Cases

There have been 30 cases diagnosed in the NT to date. Of these cases, 27 were acquired overseas, 1 was acquired interstate and 2 were acquired from household transmission in the NT. There has been no community transmission in the NT.

	NT residents	Overseas residents	Interstate residents	Total	Indigenous	Non-Indigenous
Diagnosed in NT	27	1	2	**30**	0	30

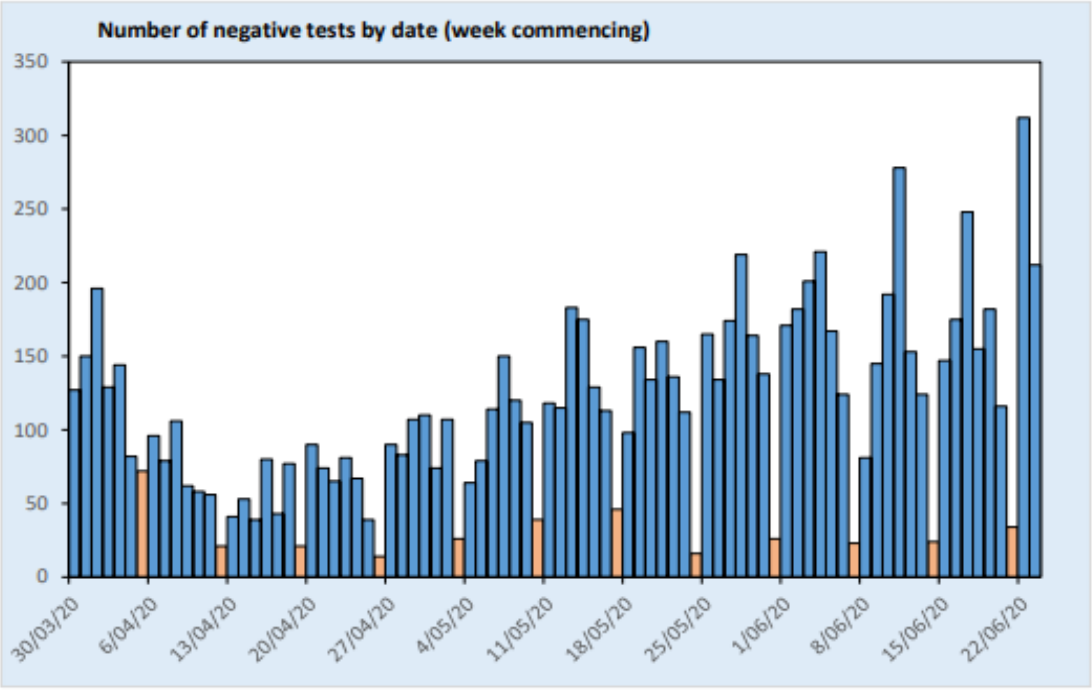
Note: National reporting was amended on 18/5. Cases are now assigned to the jurisdiction which does the public health response, rather than the jurisdiction of residence.

The last case in the NT was cleared on 20 May 2020.

Days since last case was cleared: **35**

Testing

Testing trends are shown on the graph below. There were 212 negative tests completed on 23 June 2020.



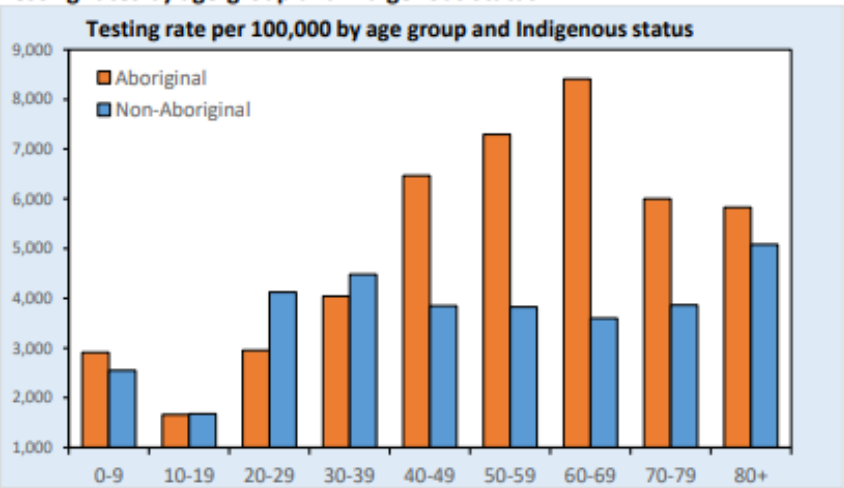
NOTE: Figure includes 57 point of care (POC) results for clients tested in remote communities from 12/06/2020 but does not include 712 test results for US marines tested on arrival and exit from 3/6/20

Testing rates by district

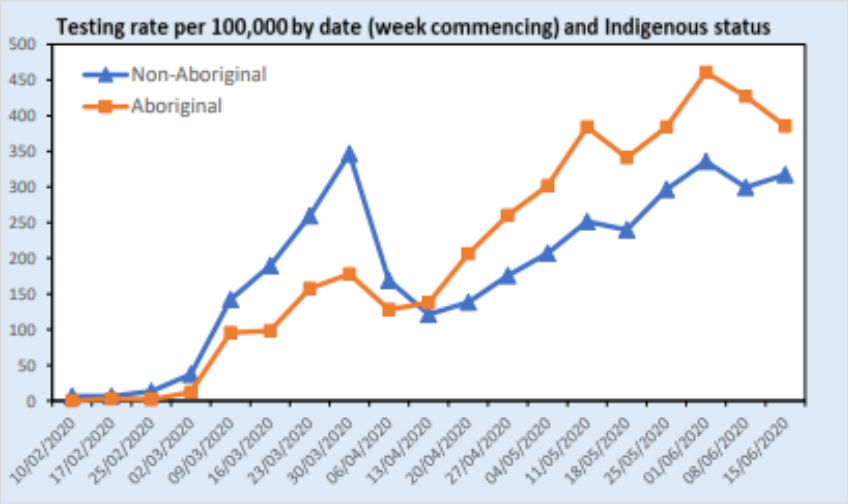
	Tests 23/06/20	Last 7 days	Previous 7 days	Total	Rate per 100,000
Darwin	125	830	743	8,072	4,853
East Arnhem	2	43	44	347	2,258
Katherine	8	36	64	512	2,575
Barkly	0	17	20	216	3,506
Alice Springs	77	332	221	2,655	6,713
Unknown	0	1	1	19	
Total	**212**	**1,259**	**1,093**	**11,821**	**4,772**

NOTE: Table includes 57 point of care (POC) results for clients tested in remote communities from 12/06/2020 but does not include 712 test results for US marines tested from 3/6/20

Testing rates by age-group and Indigenous status*

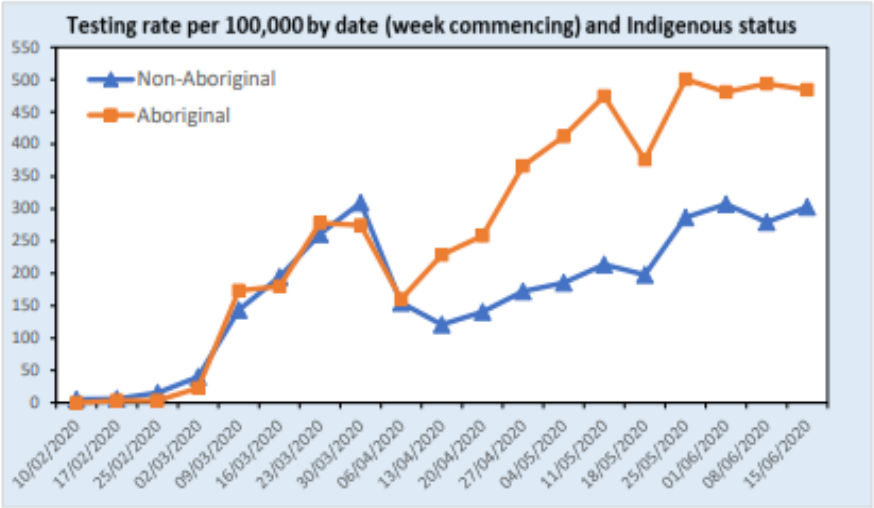


NT testing rates by date and Indigenous status*



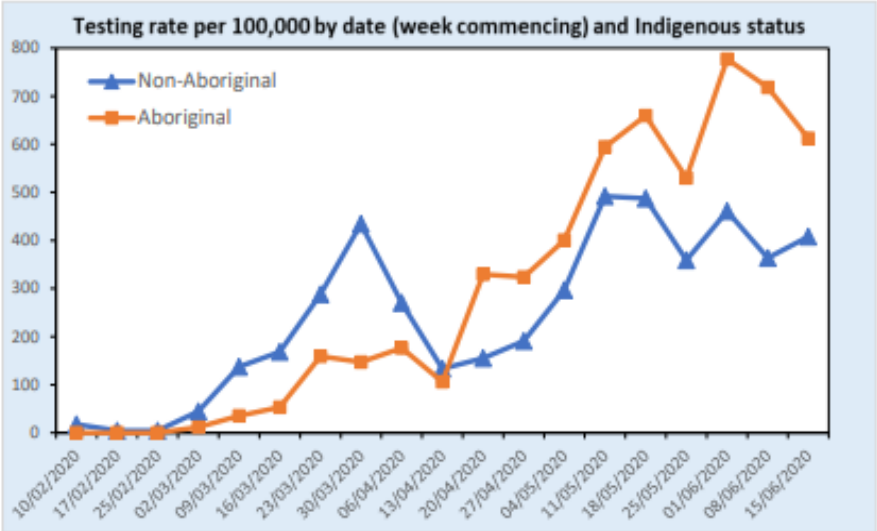
Note: * Indigenous status not stated in 20% of those tested

Darwin Region testing rates by date and Indigenous status*



Note: * Indigenous status not stated in 21% of those tested

Alice Springs Region testing rates by date and Indigenous status*



Note: * Indigenous status not stated in 21% of those tested

NORTHERN TERRITORY GOVERNMENT

Centre for Disease Control

Pertussis information for general practitioners (GPs)

Background

Pertussis is a highly infectious respiratory disease which can cause severe sequelae and death, particularly in those aged less than 12 months. Fortunately, there is an effective public health response, meaning preventive measures can be taken to reduce the spread from cases to those at high risk of severe disease. This involves isolation and education of patients and sometimes prescribing prophylactic antibiotics to their contacts.

It is important for GPs to;

- investigate and treat pertussis cases
- identify high risk contacts
- be aware of the public health response which may require the prescription of prophylactic antibiotics to at risk contacts.

The Northern Territory (NT) Centre for Disease Control (CDC) is guided by the Pertussis Communicable Disease Network Australia (CDNA) national guidelines for the public health response

Testing

Testing is best done by PCR on nasopharyngeal swab/aspirate in the first 4 weeks of any cough onset. Thereafter blood testing for (IgA) serology is recommended.

There is no benefit in testing contacts who are asymptomatic or persons who have completed 5 days of appropriate antibiotic therapy (see Table for recommended treatment).

Case management

It is recommended that the clinical management of infants <6 months of age be discussed with a paediatrician.

Treatment

Antibiotics reduce the infectivity of the patient and when given early may reduce symptoms. If given more than 3 weeks after onset, antibiotics will not reduce transmission and are unlikely to change the course of the illness.

Azithromycin is the treatment of choice. Other options are clarithromycin and trimethoprim-sulfamethoxazole. Erythromycin is effective for prophylaxis but is not recommended due to poor tolerability and therefore should not be prescribed.

DO NOT use roxithromycin (Rulide®, Biaxig®, Roxar®) as it has not been shown to be effective against pertussis.

Table. Recommended antibiotic treatment and post exposure prophylaxis for pertussis

Age group	Azithromycin	Clarithromycin	Trimethoprim-sulfamethoxazole (TMP-SMX)
<1 month	10mg/kg orally daily for 5 days	Not recommended	Not recommended
1-5 months	10mg/kg orally daily for 5 days	7.5mg/kg/dose (up to 500mg) twice daily for 7 days	Child ≥1 months TMP/SMX: 4 + 20mg/kg (max 160mg/800mg) twice daily for 7 days
(≥6 months) and children	10mg/kg (max 500mg/day) single dose on day 1, then 5mg/kg (max 250mg/day) single dose for days 2–5	7.5mg/kg/dose (up to 500mg) twice daily for 7 days	TMP/SMX: 4mg + 20mg/kg (max 160mg/800mg 12-hourly) twice daily for 7 days
Adults	500mg single dose on day 1, then 250mg single dose for days 2–5	500mg twice daily for 7 days	TMP/SMX: 160mg/800mg twice daily for 7 days

Notification

Pertussis is a laboratory or doctor notifiable disease in the NT. CDC staff will contact the clinician who ordered the test as per the public health management below.

Public health management

PCR positive cases: After checking with the GP and obtaining information to contact the patient, CDC follows up the patient to ascertain whether there are any close contacts that require prophylaxis and to explain exclusion periods.

IgA (serology) positive cases: A fax is sent to the GP to obtain information on clinical symptoms and close contacts. If the GP identifies close contacts or is unsure, CDC will follow up the patient to ascertain whether there are any close contacts that require prophylaxis and to explain exclusion periods.

All cases should be excluded from work, childcare facilities and school until they are non-infectious, which is 5 days after appropriate antibiotic treatment or 21 days after onset of the cough.

A close contact is defined as a household member or a person with contact of <1 metre for >1 hour during the cases infectious period (within 3 weeks after cough onset).

Antibiotic prophylaxis is recommended for specified close contacts according to national guidelines. These *may* include;

- Household contacts where a child <6 months of age or a women in the last month of pregnancy is present
- People who work in a healthcare or childcare setting
- Children who attend a childcare centre or playgroup where one or more pertussis cases have attended while infectious.

Antibiotics for prophylaxis can be provided by CDC free of charge.

If contacts are unwell, CDC will usually refer them back to their GP for assessment. If the case attended school while infectious, CDC will send a letter to the school for distribution to the parents of all members of the same class.

Vaccination

Immunisation is the mainstay of pertussis control. Please ensure that children have been vaccinated according to the NT Childhood Vaccination Schedule. Please ensure pregnant women are vaccinated between 20 and 32 weeks gestation.

Immunity following early childhood vaccination is not life-long and the following groups should be offered free adult diphtheria, tetanus and pertussis (dTpa) vaccine (Boostrix®, Adacel®);

- All children at 12 years of age (in the NT this is usually given via a school-based program in year 7).
- If vaccine is not received at age 12 years, a single dose of free dTpa vaccine can be given up until 19 years of age.
- Pregnant women – the best time to administer the dTpa vaccine is between 20 and 32 weeks of pregnancy but can be given anytime from 20 weeks of pregnancy up to and immediately after delivery. Pertussis vaccine needs to be given to women with every pregnancy.
- Encourage all people caring for young children to be vaccinated every 10 years e.g. family members, childcare and healthcare workers and any others who wish to be vaccinated. These groups will require a prescription to purchase the vaccine privately unless funded by their employer.

For more information contact the Centre for Disease Control in your region

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

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

Abstracts from peer reviewed published articles related to the Northern Territory

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 and other respiratory viruses. 2020;14(5):541-550
https://doi.org/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 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, 2.71) 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.

KEYWORDS: epidemics, epidemiology, influenza, Northern Territory

Hyperendemic rheumatic heart disease in a remote Australian town identified by echocardiographic screening

Francis JR, Fairhurst H, Hardefeld H, Brown S, Ryan C, Brown K, Smith G, Baartz R, Horton A, Whalley G, Marangou J, Kaethner A, Draper ADK, James CL, Mitchell AG, Yan J, Ralph A, Remeny B

Med J Aust. 2020; 213(3):118-123
https://doi.org/10.5694/mja2.50682

Objectives: Using echocardiographic screening, to estimate the prevalence of rheumatic heart disease (RHD) in a remote Northern Territory town.

Design: Prospective, cross-sectional echocardiographic screening study; results compared with data from the NT rheumatic heart disease register.

Setting, participants: People aged 5–20 years living in Maningrida, West Arnhem Land (population, 2610, including 2366 Indigenous Australians), March 2018 and November 2018.

Intervention: Echocardiographic screening for RHD by an expert cardiologist or cardiac sonographer.

Main outcome measures: Definite or borderline RHD, based on World Heart Federation criteria; history of acute rheumatic fever (ARF), based on Australian guidelines for diagnosing ARF.

Results: The screening participation rate was 72%. The median age of the 613 participants was 11 years (interquartile range, 8–14 years); 298 (49%) were girls or women, and 592 (97%) were Aboriginal Australians. Definite RHD was detected in 32 screened participants (5.2%), including 20 not previously diagnosed with RHD; in five new cases, RHD was classified as severe, and three of the participants involved required cardiac surgery.

Borderline RHD was diagnosed in 17 participants (2.8%). According to NT RHD register data at the end of the study period, 88 of 849 people in Maningrida and the surrounding homelands aged 5–20 years (10%) were receiving secondary prophylaxis following diagnoses of definite RHD or definite or probable ARF.

Conclusion: Passive case finding for ARF and RHD is inadequate in some remote Australian communities with a very high burden of RHD, placing children and young people with undetected RHD at great risk of poor health outcomes. Active case finding by regular echocardiographic screening is required in such areas.

The RECARDINA Study protocol: diagnostic utility of ultra-abbreviated echocardiographic protocol for handheld machines used by non-experts to detect rheumatic heart disease

Francis JR, Fairhurst H, Whalley G, Kaethner A, Ralph A, Yan J, Cush J, Wade V, Monteiro A, Remenyi B

***BMJ Open. 2020*;10(5)**
http://dx.doi.org/10.1136/bmjopen-2020-037609

Introduction: Rheumatic heart disease (RHD) causes significant morbidity and mortality in young people from disadvantaged populations. Early detection through echocardiography screening can facilitate early access to treatment. Large-scale implementation of screening could be feasible with the combination of inexpensive standalone ultrasound transducers and upskilling non-expert practitioners to perform abbreviated echocardiography.

Methods and analysis: A prospective cross-sectional study will evaluate an abbreviated echocardiography screening protocol for the detection of latent (asymptomatic) RHD in high-risk populations. The study will evaluate the diagnostic accuracy of health worker conducted single parasternal long axis view with a sweep using handheld devices (SPLASH) (Philips Lumify S4-1 phased array transducer).

Each participant will have at least one reference test performed on the same day by an expert echocardiographer. Diagnosis of RHD will be determined by a panel of three experts, using 2012 World Heart Federation criteria. Sensitivity and specificity of the index test will be calculated with 95% CIs, to determine diagnostic accuracy of a screen-and-refer approach to echocardiography screening for RHD.

Remote review of SPLASH images obtained by health workers will facilitate evaluation of the sensitivity and specificity of an alternative approach, using external review of health worker obtained SPLASH images to decide onward referral.

Ethics and dissemination: Ethics approval was obtained from the Human Research Ethics Committee of the Northern Territory Department of Health and Menzies School of Health Research, for the project to be carried out in Timor-Leste (HREC 2019-3399), and in Australia, following review by the Aboriginal Ethics subcommittee (HREC 2019-334). Ethical and technical approval was granted in Timor-Leste by the Institute National of Health Research Ethics and Technical Committee (1073-MS-INS/GDE/VII/2019). Study results will be

disseminated in the communities involved in the study, and through peer-reviewed publications and conference abstracts.

Trial registration number The Australia New Zealand Clinical Trials Registry (ACTRN1262000).

Elimination of Aedes aegypti in Northern Australia

Whelan P, Kurucz N, Pettit WJ, Krause V

Journal of Vector Ecology. 2020;45(1):118-126.
https://doi.org/10.1111/jvec.12379

The Northern Territory (NT) of Australia is currently free of the dengue mosquito *Aedes (Stegomyia) aegypti* (L). However, on 17 February 2004, two *Ae. aegypti* adults were captured in two routine CO2-baited encephalitis virus surveillance traps in Tennant Creek, located 990 km south of Darwin in the NT. The detection triggered an immediate survey and control response undertaken by the NT Department of Health and Community Services, followed by a Commonwealth of Australia-funded *Ae. aegypti* elimination program.

This report details the methods and results of the detection and subsequent elimination activities that were carried out between 2004 and 2006, returning the NT to its dengue vector-free status. There have been very few successful *Ae. aegypti* elimination programs in the world. This purposeful mosquito elimination for Australia was officially declared on 5 April 2006.

Keywords: Australia, mosquito surveillance, elimination, vector control, Aedes aegypti, mosquito-borne disease.

The first 2 months of COVID-19 contact tracing in the Northern Territory of Australia

Draper AD, Dempsey KE, Boyd RH, Childs EM, Black HM, Francis LA, Markey PG, Krause KL

Communicable Diseases Intelligence.
2020;44
https://doi.org/10.33321/cdi.2020.44.53

The Northern Territory (NT) Centre for Disease Control (CDC) undertook contact tracing of all notified cases of coronavirus disease 2019 (COVID-19) within the NT. There were 28 cases of COVID- 19 notified in the NT between 1 March and 30 April 2020. In total 527 people were identified as close contacts over the same period; 493 were successfully contacted; 445 were located in the NT and were subsequently quarantined and monitored for disease symptoms daily for 14 days after contact with a confirmed COVID-19 case. Of these 445 close contacts, 4 tested positive for COVID-19 after developing symptoms; 2/46 contacts who were cruise ship passengers (4.3%, 95% CI 0.5–14.8%) and 2/51 household contacts (3.9%, 95% CI 0.5 –13.5%). None of the 326 aircraft passengers or 4 healthcare workers who were being monitored in the NT as close contacts became cases.

Keywords: Coronavirus disease 2019; COVID-19; contact tracing; Northern Territory; Australia.

Acute lower respiratory infections in Indigenous infants in Australia's Northern Territory across three eras of pneumococcal conjugate vaccine use (2006-15): a population-based cohort study

Binks MJ, Beissbarth J, Oguoma V, Pizzutto S, Leach AJ, Smith-Vaughan HC, McHugh L, Andrews R, Webby R, Morris PS, Chang AB

Lancet Child Adolesc Health. 2020 Jun;4 (6):425-434
10.1016/S2352-4642(20)30090-0

Background: The burden of acute lower respiratory infection (ALRI) in Indigenous children of Australia's Northern Territory is among the highest globally. No published data exists on the effect of pneumococcal conjugate vaccine (PCV) introduction on ALRIs in this population beyond 2005. The aim of this study was to describe the rates of ALRI admissions to hospital in Indigenous infants in the Northern Territory from 2006 to 2015, across three periods of different PCV use. We hypothesised that broader valency PCVs would be more effective against hospitalisations for pneumonia.

Methods: We did a retrospective population-based cohort study of Indigenous infants born in the Northern Territory followed up until age 12 months. Data were from administrative hospital and perinatal datasets. International classification of diseases codes (tenth revision, Australian modification; ICD-10AM) were used to identify respiratory hospitalisations of interest: all-cause ALRI, all-cause pneumonia, bacterial pneumonia, viral pneumonia, influenza-like illness (ILI), respiratory syncytial virus ALRI (RSV-ALRI), and pneumococcal ALRI. Incidence rates were compared between PCV eras (7-valent PCV [PCV7], 2006-09; 10-valent PCV [PCV10], 2009-11; and 13-valent PCV [PCV13], 2011-15) using interrupted time trend analysis and negative binomial regression.

Findings: For children born between Jan 1, 2006, and Dec 31, 2015, 4138 ALRI episodes (31% of all hospitalisations) occurred among 2888 (20%) of the 14 594 infants. The overall ALRI hospitalisation rate was 29·7 episodes per 100 child-years. Prominent risk factors associated with ALRI hospitalisation were living in a remote community or the Central desert region, being born preterm or with low birthweight. ALRI rates were lowest in the PCV13 era, in association with a significant reduction in bacterial pneumonia hospitalisations in the PCV13 era compared with the PCV10 (incidence rate ratio 0·68, 95% CI 0·57-0·81) and PCV7 (0·70, 0·60-0·81) eras. In contrast, RSV-ALRI rates were 4·9 episodes per 100 child-years in each era.

Interpretation: A 30% reduction in bacterial -coded pneumonia hospitalisations in the Northern Territory during the era of PCV13 immunisation supports its ongoing use in the region. Despite the reduction, one in five Indigenous infants born in the region continue to be hospitalised with an ALRI in their first year of life. Future gains require multifaceted environmental and biomedical approaches.

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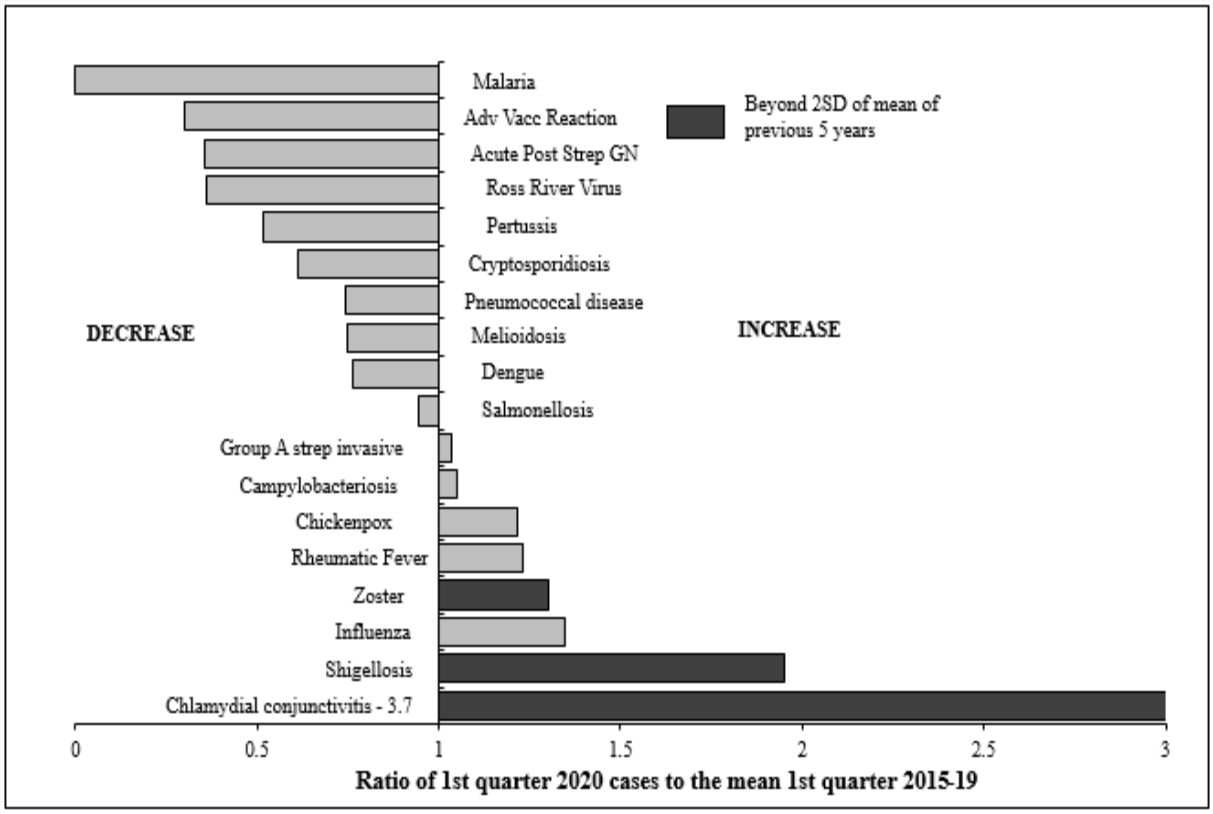
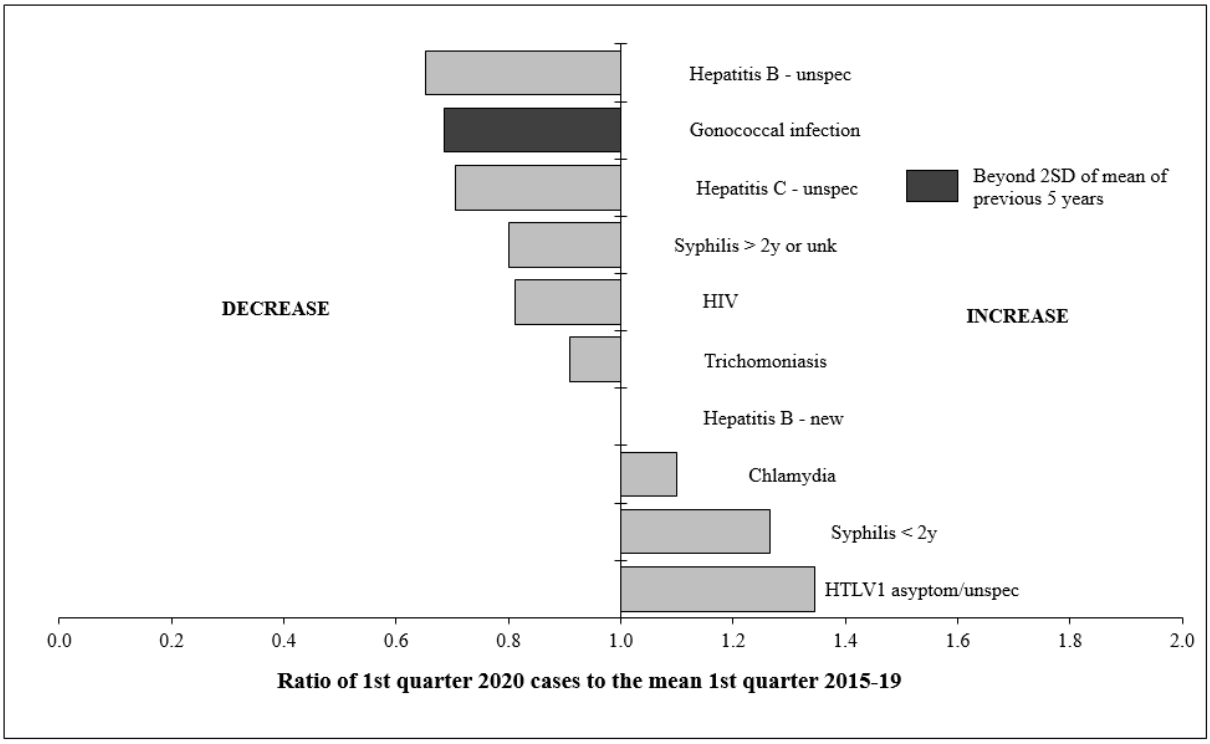
NORTHERN TERRITORY NOTIFICATIONS BY ONSET DATE AND DISTRICT
1 January—31 March (2019 and 2020)

	Alice Springs		Barkly		Darwin		East Arnhem		Katherine		N T	
	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020	2019
Adv Vacc Reaction	0	1	1	0	3	17	0	0	0	0	4	18
Barmah Forest	0	0	0	0	2	1	1	0	1	0	4	1
Campylobacteriosis	45	33	2	2	51	49	1	6	8	12	107	102
Chickenpox	9	2	0	0	22	13	2	0	0	1	33	16
Chlamydia	249	247	16	30	389	344	57	58	94	81	805	760
Chlamydial conj	14	1	2	7	1	2	0	0	0	0	17	10
Coronavirus - pandemic potential	4	0	0	0	29	0	0	0	2	0	35	0
Crusted scabies	0	2	0	1	11	5	1	0	5	0	17	8
Cryptosporidiosis	18	8	0	2	9	15	4	8	1	2	32	35
Dengue	0	0	0	0	12	9	0	0	1	0	13	9
Gastro - related cases	0	0	0	0	1	0	0	0	0	0	1	0
Gonococcal conj	2	1	0	0	0	0	1	0	0	0	3	1
Gonococcal infection	154	226	12	15	103	78	26	43	40	50	335	412
Group A strep invasive	9	6	3	0	4	12	1	1	0	3	17	22
Hepatitis A	0	0	0	0	0	2	0	0	0	0	0	2
Hepatitis B - chronic	0	3	0	0	2	4	0	1	0	0	2	8
Hepatitis B - new	1	0	0	0	0	0	0	0	0	0	1	0
Hepatitis B - unspec	5	5	0	0	14	20	0	1	2	0	21	26
Hepatitis C - unspec	8	4	0	2	24	27	1	0	2	2	35	35
Hepatitis E	0	0	0	0	0	1	0	0	0	0	0	1
H Influenzae b	0	1	0	0	1	0	0	0	0	0	1	1
H Influenzae non-b	2	1	0	0	1	1	0	0	0	1	3	3
HIV	0	1	0	1	6	5	0	1	0	0	6	8
HTLV1 asyptom/unspec	13	14	0	1	0	0	1	0	0	0	14	15
HTLV1 adult TCL	1	0	0	0	0	0	0	0	0	0	1	0
Influenza	25	19	25	17	125	188	72	24	23	52	270	300
Lead - elevated	1	1	0	0	287	17	6	14	2	5	296	37
Legionellosis	0	0	0	0	2	2	0	0	0	0	2	2
Leptospirosis	0	0	0	0	1	2	0	0	0	0	1	2
Malaria	0	0	0	0	0	2	0	0	0	0	0	2
Measles	0	0	0	0	0	30	0	0	0	0	0	30
Melioidosis	0	0	0	0	20	12	1	1	1	1	22	23
Meningococcal infection	0	0	0	0	0	1	0	0	0	1	0	2
Mumps	0	0	0	0	1	1	0	0	0	0	1	1
Non TB Mycobacteria	0	0	0	0	2	0	0	0	0	0	2	0
Pertussis	3	1	0	0	8	13	0	1	0	0	11	15
Pneumococcal disease	3	9	1	0	2	3	0	0	1	0	7	12
Q Fever	0	1	0	0	0	0	0	0	0	0	0	1
Rheumatic Fever	13	21	7	3	13	19	4	4	8	3	45	50
Rheumatic heart disease	6	8	0	0	15	5	14	2	11	0	46	15
Ross River Virus	3	1	0	2	18	39	6	3	6	8	33	53
Rotavirus	17	5	2	1	9	4	0	0	1	1	29	11
Salmonellosis	19	16	4	4	93	72	8	6	17	21	141	119
Shigellosis	110	39	6	4	28	22	7	15	14	11	165	91
STEC/VTEC	1	0	0	0	0	0	0	0	0	0	1	0
Syphilis < 2 y	19	18	3	2	35	39	6	6	14	15	77	80
Syphilis > 2 y or unknown	3	3	0	0	14	9	1	1	2	3	20	16
Trichomoniasis	236	189	54	51	296	198	115	117	110	104	811	659
Tuberculosis	1	1	0	0	8	6	0	0	0	0	9	7
Typhoid	0	0	0	0	2	0	0	0	0	0	2	0
Typhus	0	0	0	0	1	0	0	0	0	0	1	0
Varicella - unspec	0	0	0	0	10	0	0	0	0	0	10	0
Vibrio food poisoning	0	0	0	0	2	0	0	0	0	0	2	0
Yersiniosis	1	0	0	0	2	6	0	0	0	0	3	6
Zoster	21	16	3	2	96	69	6	5	9	12	135	104
Sum:	1,017	905	142	147	1,776	1,374	342	318	377	391	3,654	3,135

Ratio of the number of notifications in the 1st quarter 2020 to the 5 year 1st quarter mean (2015—2019): Selected diseases



Ratio of the number of notifications in the 1st quarter 2020 to the 5 year 1st quarter mean (2015—2019): Sexually transmitted infections



Comments on notifications

Chlamydial conjunctivitis

In the 1st quarter of 2020 there were 17 cases of chlamydial conjunctivitis which was 3.7 times the 5 year mean for the 1st quarter. Notified cases of chlamydial conjunctivitis have continued to increase in the 2nd quarter (71 cases year-to-date as of 30 June) and the increase is now the subject of an investigation. It is possible that the detection of chlamydia in eye swabs is due to background trachoma and the outbreak of conjunctivitis is due to other causes.

Shigellosis

There were 164 cases of shigellosis in the 1st quarter, almost twice the expected number of 85 based on the 5 year mean. Shigellosis case numbers had been declining following an outbreak of *Shigella flexneri* 2b in 2017. This recent increase was due to an outbreak of *Shigella sonnei* biotype a, which started in Central Australia in January 2020. There were 81 cases of this biotype notified in the 1st quarter. Outbreak measures, such as promoting hygiene and treatment of cases and symptomatic contacts were put in place. The outbreak was investigated and the results will be published in a later edition.

Zoster

There were 135 cases of zoster notified during the 1st quarter which was 31 more than the expected 104 based on a 5 year mean. The rise in zoster cases is likely due to a rise in testing… or due to stressful times.

Gonococcal infection

Case numbers of gonococcal infection were down in the 1st quarter reflecting a trend which has been occurring since the last half of 2018. There were 335 cases, almost one third fewer (154 or 31%), than the expected 489 based on the 5 year mean. This fall is encouraging but the cause is unknown and still being investigated.

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NT Malaria Notifications January to March 2020

Author: Liz Stephenson, CDC Darwin

There were no cases of malaria notified in the 1st quarter of 2020.

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