END OF MISSION

DEPLOYMENT REPORT

Howard Springs International Quarantine Facility at the Centre for National Resilience, Australia

23 October 2020 - 25 May 2021

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AUSMAT

NATIONAL CRITICAL CARE AND TRAUMA RESPONSE CENTRE

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AUTHORS

Kath McDermott, Acting Director Disaster Preparedness and Response, NCCTRC

Karen Were, Education Nurse Manager, NCCTRC

Nick Walsh, Public Health Physician and Epidemiologist, NCCTRC

Stephanie Curtis, Senior Research Officer and Epidemiologist, NCCTRC

ACKNOWLEDGEMENTS

Abigail Trewin, Howard Springs International Quarantine Facility Mission Lead October 2020-March 2021

Deirdre Logie, Deputy Director National Partnerships, NCCTRC

Hollie Sekulich, Operations Manager, NCCTRC

Michelle Foster, Senior Director Operational Support, NCCTRC

Ronnie Taylor, Director Telehealth HSIQ,Manager Strategic Programs NCCTRC

Lynette Perry, Telehealth Manager HSIQ,AUSMAT Database Coordinator, NCCTRC

Matthew Schobben, AUSMAT Workforce Development Officer, NCCTRC

David Crowne, Warehouse Logistics Officer, NCCTRC

All AUSMAT personnel deployed at HSIQF

All members of the NCCTRC operational support team

DARWIN INTERNATIONAL AIRPORT
5 Lancaster Road, Eaton, NT 0820

ROYAL DARWIN HOSPITAL
Rockland Drive, Tiwi, NT 0810
PO Box 41326 Casuarina, NT 0811

October 2020
www.nationaltraumacentre.nt.gov.au

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abbreviations

ADF	Australian Defence Force
AFP	Australian Federal Police
AUSMAT	Australian Medical Assistance Team
CDC	Centre for Disease Control (Northern Territory)
CHO	Chief Health Officer
CNR	Centre for National Resilience
COVID-19	Coronavirus disease
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DFAT	Department of Foreign Affairs and Trade
HSIQF	Howard Springs International Quarantine Facility
IPC	Infection Prevention and Control
NCCTRC	National Critical Care and Trauma Response Centre
NT	Northern Territory
NTG	Northern Territory Government
NTP	Northern Territory Police
PCR	Polymerase Chain Reaction
PPE	Personal Protective Equipment
RAAF	Royal Australian Air Force
RDH	Royal Darwin Hospital
RDT-Ag	Rapid Diagnostic Antigen Test
SOP	Standard Operating Procedure
WHO	World Health Organisation

Forward from NCCTRC Executive Director

In October 2020 the Australian Medical Assistance Team (AUSMAT) under the auspices of the National Critical Care and Trauma Response Centre stood up the international quarantine facility at the Howard Springs Centre for National Resilience, just outside Darwin in the Northern Territory. The quarantine program was funded by the Australian Government for repatriated Australians, residents and visa holders arriving on repatriation flights facilitated by the Commonwealth Department of Foreign Affairs and Trade. The initial capacity was for 500 residents per fortnight increased in January 2021 to 850 returning per fortnight. The operation at Howard Springs demonstrated AUSMAT's ability to respond to a public health emergency caused by a novel severe acute respiratory syndrome coronavirus 2 (COVID-19) while sustaining the longest deployment period since the establishment of AUSMAT. The program demonstrated the unique ability of the AUSMAT national EMT capability to pivot from a sudden onset disaster to a public health national emergency. The outdoor quarantine model developed and implemented by AUSMAT ensured the safe passage of returned travellers to Australia and set the benchmark nationally for a quarantine operational model. The success of the gold standard Howard Springs facility included no leakage of COVID-19 to the community and the commissioning of additional similar quarantine facilities in Queensland and Victoria based on the success of the Howard Springs facility.

The lessons learnt and the best practices from the Howard Springs international Quarantine Program informed AUSMAT deployments across the Asia-Pacific during the response to the COVID-19 pandemic. The Howard Springs operation allowed for the development and refinement of the AUSMAT Infectious Disease Preparedness and Response program and provided the opportunity to develop integrated response to emerging infectious diseases and other public health emergencies beyond sudden onset disaster. It has also had an enduring legacy in Australia and internationally with the experience informing guidelines for AUSMAT deployment across the Asia Pacific including the Olympics and Paralympics and the development of the national capability Rapid Response Teams. Protocols in the management of COVID-19 endure today as a result of the work undertaken by AUSMAT and the NCCTRC including wastewaster surveillance and the widespread ongoing use of rapid antigen testing.

Professor Len Notaras AO
Executive Director

key observations, recommendations and lessons learnt

Given the dynamic nature of the coronavirus disease (COVID-19) pandemic and response, including in Australia, practice has changed since the initiation of the Howard Springs International Quarantine Facility (HSIQF) at the Centre for National Resilience (CNR) in October 2020. We encourage the reader to view the report in the context of the information that was available at the time, early in the pandemic, and in the pre-vaccination phase when Australia had very limited COVID-19 cases and few COVID-19 related deaths, while other countries, including the United States and the United Kingdrom, as well as much of Europe, were experiencing health system strain and thousands of COVID-19 related deaths daily.

1. The operation at HSIQF at the CNR demonstrated Australian Medical Assistance Team's (AUSMAT's) ability to rapidly respond to the public health emergency of COVID-19 caused by the novel severe acute respiratory syndrome coronavirus 2 (hereforth refered to as 'COVID-19') virus whilst sustaining performance for the longest deployment period completed since the establishment of AUSMAT. The operation was also a demonstration of the AUSMAT Emergency Medical Team (EMT) pivoted from sudden onset disaster response, to the a novel infectious disease public health national emergency.

2. HSIQF at the CNR was the first outdoor COVID-19 quarantine model in Australia. At the time we believe it was the first purposed such facility internationally. This quaratine model successfully prevented COVID-19 transmission to staff and the community. The outdoor component enhanced effectiveness as it was not vulnerable to issues faced by central business district hotels used for quarantine in other Australian capital cities, and internationally [1,2]. High-level government officials and the media, including by Prime Minister Scott Morrison, referred to the operation as "gold standard" [3]. This success led to the Australian Government commissioning the construction of additional quarantine facilities together with State Governments in other jurisdictions in 2021, based on the HSIQF model [4].

3. The AUSMAT led command-and-control structure enabled effective collaboration with local contractors, police and federal agencies. Although non-AUSMAT personnel had very limited infection prevention and control (IPC) experience, all personnel completed AUSMAT IPC training, monitoring activities, which resulted in high adherence to prescribed IPC practices, and no major Protective Personal Equipment (PPE) breaches across the workforce during the deployment.

4. The operation emphasised the critical importance of iterative policy and procedure development, as well as innovative practices, which were adapted according to risk, rapidly changing international evidence regarding COVID-19 and the very dynamic nature of the pandemic response globally. AUSMAT policies and procedures extended beyond national minimum requirements for COVID-19 prevention and management to minimize risk. Those implemented were drawn from the latest international evidence and data in real-time, meaning operations were ahead of the stand practice curve. This is likely to have contributed to the success of the operation. For example, AUSMAT implemented Antigen Rapid Diagnostic Tests (RDT-Ag) for staff in late 2020, almost a full year before their implementation in other high-risk settings across Australia. Additionally, AUSMAT safety standards always took the airborne transmission of COVID-19 as axiomatic and implemented safety measures as such, for example enforcing universal N95 mask only usage. This was in contrast to the differentiation between droplet transmission and aerosolization procedures which led to the continued use of surgical masks in healthcare settings during 2020 into early 2021 around Australia. Ultimately all jurisdictions accepted that SARS-CoV2 transmission was commonly airborne [5].

5. HSIQF at the CNR required management of compounding hazards with competing safety challenges, including frequent new staff, inexperienced personnel, heat management in the tropical savannah environment, and preventing SARS-CoV-2 transmission during the early COVID-19 response phase where national policy aimed for suppression and elimination and vaccination was unavailable. The iterative policies and procedures were fundamental to managing these hazards successfully.

6. The operation prioritised the preservation of local resources and successfully minimised the burden on local health services through strategic telehealth collaborative care and onsite clinical operations.

7. The operation was essential to support vulnerable repatriated Australians to return, who would not have otherwise been able to return to Austrllia due to national and international travel restrictions.

8. Quarantine and isolation for 14 days (at the time the prescribed period) has negative psychological effects on individuals, therefore maintaining resident morale and wellbeing were central to all activities [6]. Residents frequently expressed gratitude for quality care including high quality food, which catered for dietary requirements, daily telehealth call and special packs provided to children and residents for birthday and other special occasions. In addition, the availability of an outdoor space on each resident's veranda provided great benefit in a safe infection control manner. Furthermore, residents were able to seek psychological support through telehealth operations, and face-to-face clinical AUSMAT support, including a psychiatrist.

9. The hybrid workforce model of combining highly skilled specialists and trained AUSMAT experts to supervise surge capacity workforce was a success in providing the ability to flexible expand and meet the required workforce requirements for the operation.

10. AUSMAT rostered members are highly-skilled professionals drawn from all jurisdictions in Australia. Many AUSMAT members deployed to HSIQF at the CNR and were provided their first opportunity to be involved with quarantine management. The high-level training and experience enabled these AUSMAT clinicians and logisticians to translate the knowledge gained onwards to their home jurisdiction workplaces on completion of their deployment.

11. The lessons learnt and best practices from HSIQF at the CNR informed AUSMAT deployments across the Asia-Pacific, including to Papua New Guinea, Fiji, Kiribati, the Solomon Islands and Vanuatu as well as a number domestic deployments, National Critical Care and Trauma Response Centre (NCCTRC) direct support to Fiji and Vanuatu, the Summer and Winter Olympics and Paralympics of Tokyo2020 and Beijing2022, the Wallabies Rugby Tour of the United Kingdom and the development of NCCTRC's domestic Rapid Response Teams which supported outbreaks in several communities in the Northern Territory. The role of a Public Health specialist within the NCCTRC has been critical to the continual gathering of current evidence and translation of lessons learnt to future operations to optimise the effectiveness of deployments outcomes and personnel safety. The continued development and refinement of AUSMAT's Infectious Disease Preparedness and Response will enable AUSMATs to continue beyond immediate standing orders disaster response, to provide integrated responses to emerging infectious disease and other public health emergencies.

12. The real-time nature of the AUSMAT operation at the HSIQF at the CNR was exemplified by the Delta variant surge in April 2021. The HSIQF at the CNR received repatriation flights on April 15, 2021 from Chennai, India and 17 April 2021 from New Delhi, India. As a result of the explosive case surge in COVID-19 cases across India, the HSIQF at the CNR recorded a sharp increase in numbers of repatriation arrivals testing positive to COVID-19 (10-15% pasengers on each flight) along with a number of suspect cases and associated close contacts. On the same day as this information was received, AUSMAT implement a series of real-time (within hours) measures to further mitigate risk, which resulted in no transmission of the Delta variant to staff or the community in Darwin, with HSIQF at the CNR the only quarantine facilty to achieve this across Australia. The immediate measure impleneted were:

- Only staff who have fully completed COVID-19 vaccination (2 doses) permitted to work in the dedicated Isolation cohort (that is; confirmed, suspect and close contacts);
- Increased Registered Nurse numbers to the dedicated isolation cohort team;
- Reiterated with all team members the importance of strict and non-negotiable adherence to all AUSMAT IPC practices and procedures;
- Reiterated to all personnel the importance of staying home if they were unwell;
- Reiterated compliance with daily staff COVID-19 testing: antigen and PCR;
- Reiterated compliance with QR scan and use of NCCTRC app
- Reiterated that staff are to wear masks inside offices and maintain physical distancing at all times;
- Increased messaging to resident cohorts via text and internal Facebook group re quarantine rules, safety and report any signs of illness;
- Further restricted access of personnel to the two flight cohorts.
- Urgently requested the Program Director, CNR for use of another block for close contact rooms and likelihood of more cases.


AZ 3D

executive summary

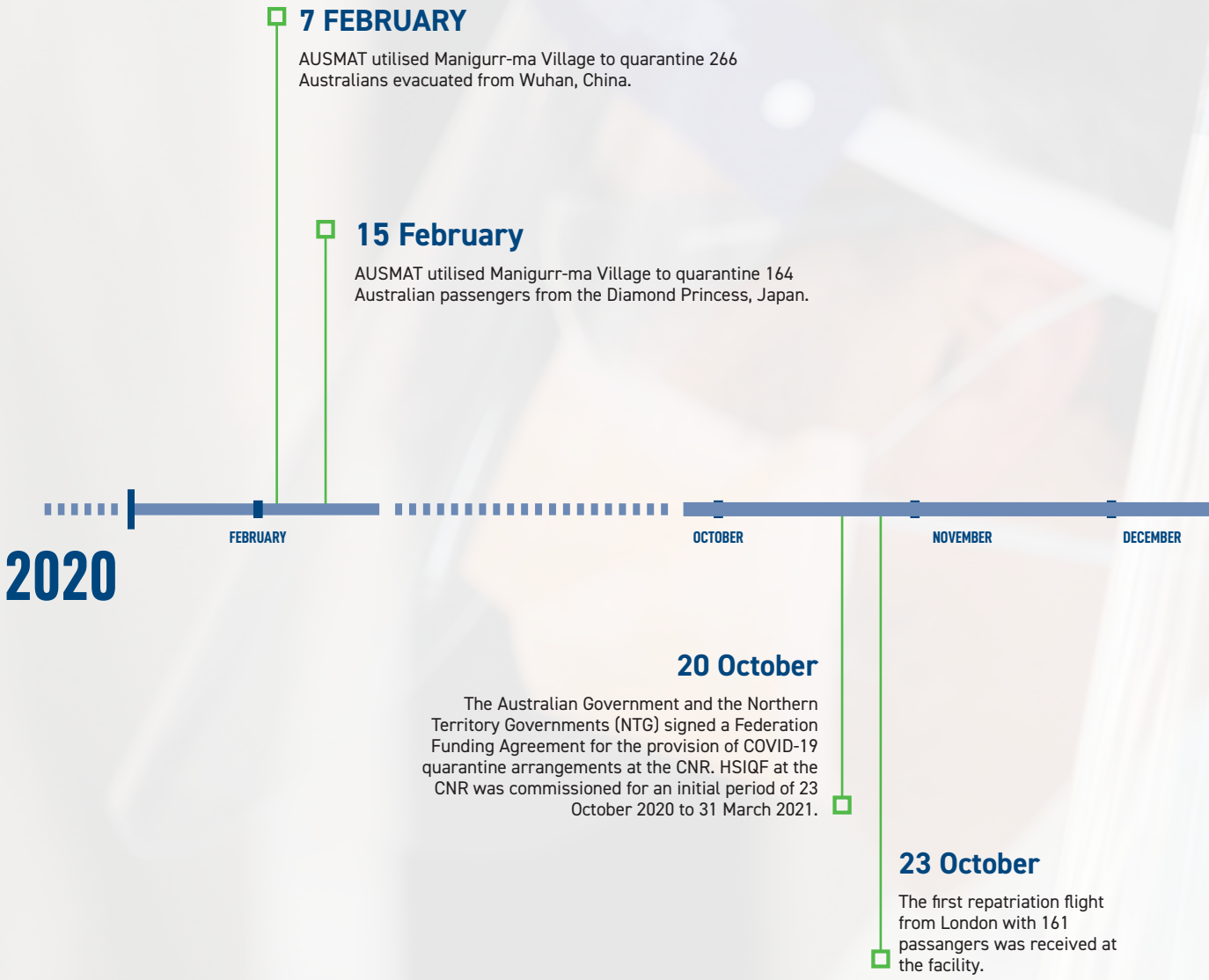
In Australia, the first confirmed case of COVID-19 was identified on 25 January 2020. In March 2020, the Australian government declared a human biosecurity emergency in response to the COVID-19 outbreak and shortly after Australian borders were closed to all non-residents on 20 March 2020. From 27 March 2020, returning residents were required to spend two weeks in supervised quarantine hotels. The implementation of non-pharmaceutical interventions by the Australian Government, including mandatory hotel quarantine, led to an initial containment of COVID-19, however a hotel quarantine breach led to a second wave of COVID-19 in Victoria throughout May and June 2020. During this period, AUSMAT had deployed several times to successfully manage quarantine operations across Christmas Island, Howard Springs, Western Australia and Victoria.

In October 2020, the Australian Government requested the NCCTRC to deploy AUSMAT to establish Australia's first national quarantine facility for Australian citizens and permanent residents returning from overseas. Within a week, HSIQF at the CNR was established at Manigurr-ma Village, located in Howard Springs, around 25km from Darwin, Northern Territory (NT). Australian Government funded AUSMAT were deployed to manage HSIQF at the CNR for an initial period from 23 October 2020 until 31 March 2021. In February 2021, the operation was extended and handover of management to the Northern Territory Government was announced. The handover commenced 3 May 2021, with the final demobilisation of AUSMAT personnel on 25 May 2021. Overall, AUSMAT-led HSIQF at the CNR managed 7,105 residents from 42 direct international flights, with 205 residents (2.9%) confirmed COVID-19 cases and a peak prevalence of 5.7% residents with confirmed COVID-19 in April due to the Delta variant.

In this report, we describe the outdoor quarantine model implemented by AUSMAT to ensure the safe passage of returned travellers to Australia. The report includes a background on the deployment request, mission objectives, design and setting of the facility, the key stakeholders involved and their role, and the operational policies and procedures implemented. The report provides an in-depth overview of the resident journey from pre-departure to quarantine clearance, health services provided, infection prevention and control activities and workforce management strategies whilst emphasising the iterative nature of the deployment, which was adapted according to changing recommendations and evidence for risk mitigation.

We include with a series of key observations, lessons learnt and recommendations from the deployment. We emphasise the success of the operation, with achievement of no leakage of COVID-19 from the facility to staff or the local community, and the subsequent commissioning of additional CNR quarantine facilities to be built across the country in 2021 based on the success of HSIQF. The success of the operation has had an enduring effect in Australia and internationally, with experiences of HSIQF at the CNR used to inform AUSMAT deployments across the Asia-Pacific, NCCTRC consultancies in Fiji, the Olympics and Paralympics, and the development of NCCTRC's Rapid Response Teams.

timeline of key events



28 December

AUSMAT utilised Manigurr-ma Village to quarantine 266 Australians evacuated from Wuhan, China.

April

HSIQF at the CNR experienced a peak in COVID-19 cases due to the Delta variant, with prevalence of COVID-19 in residents increasing from 0.9% in March to 5.7% in April.

27 April

The Australian Government implemented a temporary ban on flights from Delta endemic countries (India) following a surge in global COVID-19 cases with the Delta variant, including at HSIQF at the CNR. Pre-departure procedures were strengthened with an AUSMAT member deployed to India to review pre-departure flight procedures.

JANUARY 2021 | FEBRUARY | MARCH | APRIL | MAY | 2021

8 February

AUSMAT established an Operation Expansion Plan, with the NTG planned to succeed management following the initial 31 March 2021 operational conclusion date.

15 May

Flights from India resumed with enhance pre-departure procedures before arrival to HSIQF at the CNR.

23 February

HSIQF at the CNR staff commenced mandatory vaccination with Pfizer-BioNTech (Comirnaty).

23 May

AUSMAT commenced demobilisation and handover to NTG.

25 February

The first COVID-19 vaccine, Pfizer-BioNTech (Comirnaty), was made available in Australia.

25 May

AUSMAT conclude all operations at HSIQF at the CNR, following successful handover to the NTG.

Background

On 31 December 2019, the World Health Organisation (WHO) was informed of a cluster of cases of pneumonia of unknown cause detected in Wuhan City, Hubei Province of China. The cause of pneumonia was soon declared to be caused by a novel coronavirus, which are a large family of viruses that cause illness ranging from the common cold to more severe diseases. Globally, novel coronaviruses emerge periodically in different areas (i.e. severe acute respiratory syndrome in 2002 and middle east respiratory syndrome in 2012). Following the spread of the novel coronavirus, the WHO declared the outbreak a Public Health Emergency of International Concern on 30 January 2020 and pandemic on 11 March 2020 [7].

In Australia, the first confirmed case of COVID-19 was identified on 25 January 2020 [8]. In March 2020, the Australian government declared a human biosecurity emergency in response to the COVID-19 outbreak and shortly after Australian borders were closed to all non-residents on 20 March 2020. Returning residents were required to undergo two weeks in supervised quarantine hotels from 27 March 2020. Non-pharmaceutical interventions, including mandatory quarantine for returned travellers, initially contained the first COVID-19 outbreak in Australia, however a hotel quarantine breach led to a second wave of COVID-19 in Victoria throughout May and June 2020 [9].

In early 2020, AUSMAT deployed to manage a series of quarantine facilities, including: Christmas Island and Howard Springs for Australian citizens or permanent residents repatriated from Wuhan; passengers from the Diamond Princess cruise ship in Japan; and in Western Australia for passengers and crew on MS Artania. AUSMAT's quarantine management was a success with no leakage of COVID-19 to staff or the community across the deployment. Additionally, AUSMAT's use of outdoor quarantine facilities in some of these deployments highlighted the benefits of an outdoor model compared to use of urban hotels.

Restrictions to international travel, limited international flight across the globe, high travel costs and quotas for international flight arrivals into each state and territory meant that a dedicated national response was required to facilitate the return and quarantine of vulnerable Australian citizens and permanent residents who wished to return to Australia. In response to this need, and the previous quarantine management success, the Australian Government requested the NCCTRC to deploy AUSMAT to establish Australia's first national quarantine facility.

The facility was named the HSIQF at the CNR and was delivered in partnership with the Department of Foreign Affairs and Trade, Australian Defence Force, Australian Federal Police, Northern Territory Police Force, Northern Territory Government and local contractors for cleaning, catering, security and waste management. Concurrently, the NTG were responsible for a domestic quarantine facility separately operating in parallel at the Manigurr-ma Village site, which will not be addressed in this report. The Australian Government-funded AUSMAT led the operation for an initial commissioned period of 23 October 2020 until 31 March 2021.


TOYOTA
ZOLL

mission objectives

The Australian and NT Governments agreed that a CNR managed by AUSMAT would be used to quarantine vulnerable Australian repatriations. The key mission objectives were:

1. **Allow Australians to return home as soon as possible.**

2. **Rebuild our economy through increased economic opportunities; and**

3. **Continue to protect Australians from any transmission of COVID-19 from returning Australians.**

operational structure

The operation functioned under the following legislation: the Northern Territory CHO Directions, Northern Territory Public and Environmental Health Act 2011, NT Notifiable Diseases Act, Biosecurity Act 2015 (Commonwealth) and Emergency Management Act 2013. All components of the operation were performed in a chain of command structure in accordance with emergency management best practice. The command and control structure was led by the Mission Lead; who oversaw leadership of Clinical Leads (Nursing, Medical and Public Health), Operations Lead, Logistics Lead and Telehealth Lead. Daily reporting was required by all staff in supervisory roles to their line manager, and all reporting was sent upwards to the Mission Team Lead for consolidation in the daily situation report. Figure 1 presents the AUSMAT HSIQF at the CNR organisational chart.

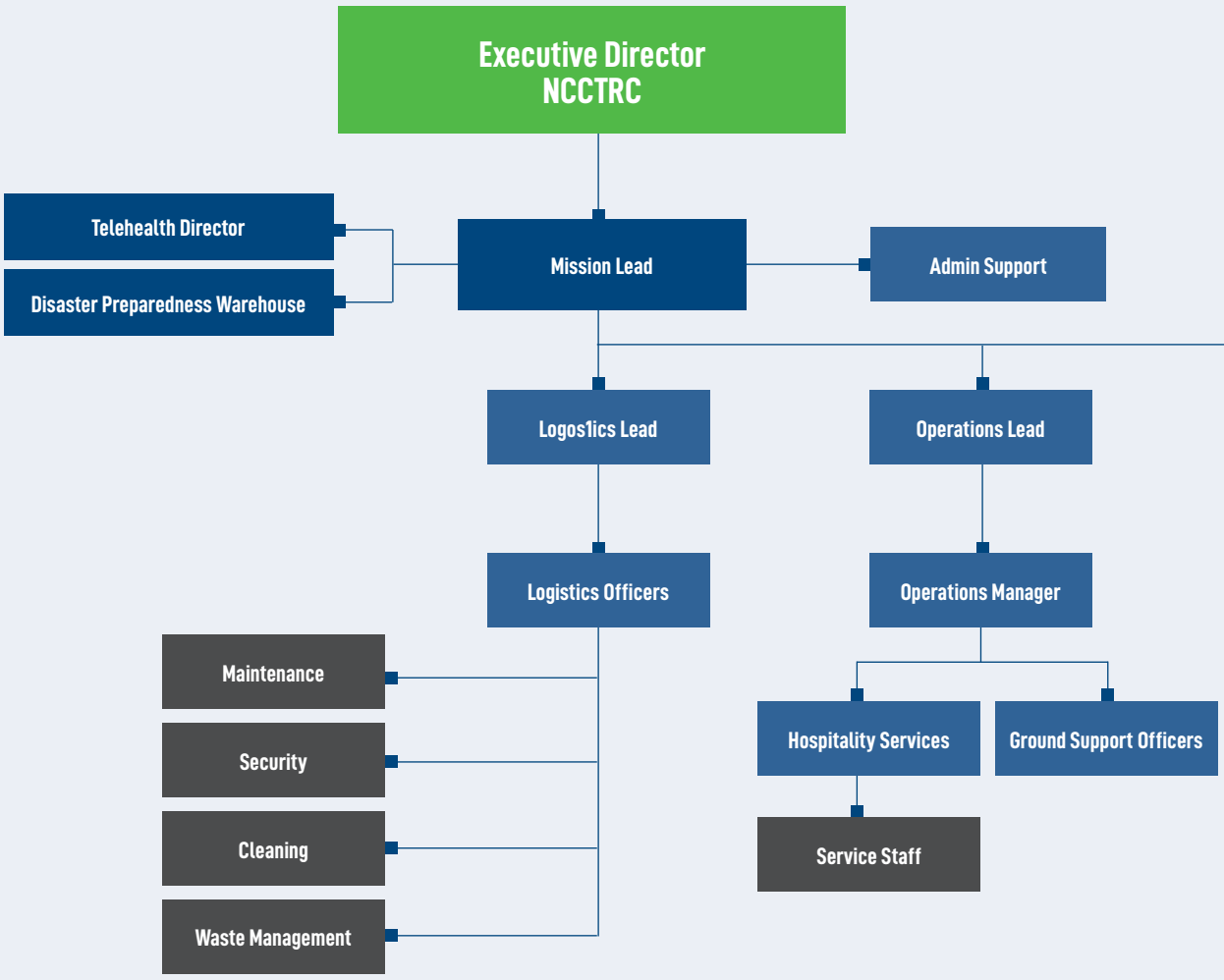
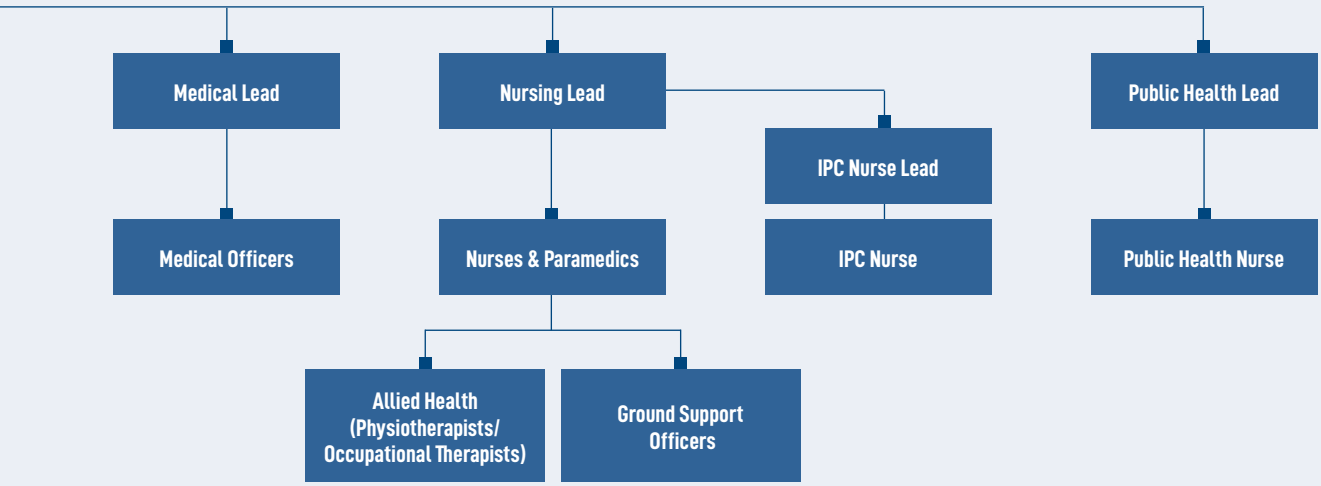


Figure 1. Organisational chart of the Australian Medical Assistance Team operation at Howard Springs International Quarantine Facility at the Centre for National Resilience.



key stakeholders

Below presents an outline of the key partners involved in the delivery of HSIQF at the CNR during AUSMAT management.

Organisation	Role
Australian Biosecurity	Biosecurity officers boarded planes of repatriated residents prior to disembarkation to identify priority unwell passengers, then facilitated passengers to be disembarked in seating cohorts, and performed routine biosecurity operations.
Australian Border Force (ABF)	Supported the coordination of flights, planning of proposed flights, and hosted the Whole of Government coordination meetings to prepare for arrivals returning from overseas. They provided direction on matters of border security and the management of arrivals into Australia. During arrival of repatriated residents, ABF official's completed passport control of passengers.
Australian Medical Assistance Team (AUSMAT)	Led the establishment and management of the facility, including development of Standard Operating Procedures (SOPs), employment of clinical and operational staff, procurement of equipment and local contractors to deliver the required services. The key teams within AUSMAT were clinical (nursing and medical, allied health), logistics (operational support and interpreters), laboratory scientists, pharmacists and teleservices.
Australian Defence Force (ADF)	Supported the arrival of return travellers at the RAAF Darwin air base (co-located at Darwin International Airport) and at HSIQF ,where they monitored the compliance of staff and residents with the NT Chief Health Officer (CHO) public health orders.
Australian Department of Health	Provided the direction and guidance on Australia's health protection, through the Australian Health Protection Principal Committee (AHPPC) and the National Health Emergency Management Standing (NHEMS) committee. The Australian Department of Health tasked AUSMAT and the NCCTRC to run HSIQF at the CNR, which was further formalised through a National Partnership Agreement with the Northern Territory Government.
Department of Foreign Affairs and Trade (DFAT)	Managed the process for identification and selection of vulnerable Australian citizens and permanent residents to return to Australia, including of flights, screening of return travellers for negative Polymerase Chain Reaction (PCR) COVID-19 test within 48 hours of flight departure, and provision of flight manifests to AUSMAT.
Australian Federal Police (AFP)	Maintained a 24/7 active presence at HSIQF at the CNR and at the RAAF Darwin air base during arrival procedures to monitor the compliance of staff and residents with the Northern Territory CHO public health orders.
NT Centre for Disease Control (CDC)	Provided a liaison registered nurse to discuss all new cases at HSIQF at the CNR and engaged in weekly meeting with AUSMAT regarding all existing cases. CDC also performed contact tracing as required.

Karen Sheldon Catering	Provided food and beverages for all onsite staff, contractors and residents. Food was prepared offsite, and limited catering team members could access a non-controlled zone to supply daily meal packages to AUSMAT for distribution. All food and beverages were supplied with single-use biodegradable utensils and dishes.
Northern Rise Village Services/ Delaware North	Contractors responsible for the following service delivery: fire evacuation wardens, Click and Collect service and delivery, general maintenance, television channel programming, Wi-Fi support, linen and laundry services, vending machine management (including cleaning), and room cleaning.
Northern Territory Police Force (NTP)	Maintained a 24/7 active presence at HSIQF at the CNR to monitor the compliance of staff and residents with the Northern Territory CHO public health orders. NTP also coordinated the overall arrival of travellers at the RAAF Darwin air base and their transfer to Howard Springs through the Emergency Operations Centre.
Northern Territory Police, Fire and Emergency Services	Junior Police Rangers prepared care packages for residents' rooms prior to their arrival.
Qantas	The carrier for all incoming repatriation flights. Their medical team ensured compliance of pre-departure swabs and provided a flight manifest to support preparation for arrival. Qantas ground crew ensured all bags were offloaded and supported the movement of mobility-impaired persons from the aircraft to the terminal.
Royal Darwin Hospital (RDH)	Engaged with AUSMAT for clinical consultation on patients, including COVID-19 cases and the general population in quarantine, and assisted with identification of transfers from HSIQF at the CNR for further medical needs, as required.
St John Ambulance	Provided emergency and non-emergency critical transfer of unwell residents to RDH for assessment
Transport operators	Taxi and bus transportation for residents from the airport to the hotel quarantine facility was arranged by the NT Emergency Operations Center. Transport operators were chosen subject to availabiity, with the larget cotnributors being Metro Coaches, Buslink, Darwin Radio Taxis and Blue Taxi company.
Trepang Services Pty Ltd	Contractors led onsite waste management and removal, supervised by the AUSMAT logistics team.
Wilson Security	Limited site access to only authorised workers who passed temperature screening, provided 24/7- foot patrol and closed-circuit television monitoring around the facilities perimeter and maintained security logs of all entries and exits into controlled zones onsite.

setting and facility layout

Howard Springs International Quarantine Facility at the CNR was established at the former INPEX natural gas project workers camp called Manigurr-ma Village, in Howard Springs approximately 40 kilometres from Darwin. The local climate is tropical savannah (Köppen Climate Classification subtype 'Aw') with average daily temperatures 23°C-32.1°C, and 09:00 humidity of 71% (10). The high temperature and humidity made heat management a priority consideration for all operations. The climate was also optimal to reduce the risk of COVID-19 transmission, as there is evidence that the virus survives poorly in high temperature and high humidity environments [11-13].

Manigurr-ma Village is approximately 148 acres, and the HSIQF at the CNR area was divided into blocks to cohort residents and staff. Figure 2 presents a sitemap overview of the HSIQF at the CNR. Areas with residents and resident-facing staff were considered 'controlled' (Block A-F) and a 'non-controlled' (kitchen and operations) area were for staff with no direct access to residents, or staff working in the controlled area. There were four areas with separated donning and doffing stations. Three were for entry/exit to the controlled areas, one of which was dedicated to cleaning and waste management contractors. The other was for entry/exit to the non-controlled area. There was further separation of confirmed or suspected cases and close contacts (Block D). The remainder of the facility was used for a separate domestic quarantine operation led by NTG. There were no shared facilities, resources, or mixing of staff or guests between the operations and the NT operation is not included in this report.

Demountable cabins or 'dongas' were used across the facility and contained four single rooms each with an adjoining ensuite and a separated balcony. Dongas were separated by 10-metres when front facing, and 5-metres side-by-side, were cohorted in blocks, and blocks were enclosed with 2.5-metre wire fence for security. All rooms were self-contained with single king bed, desk, reverse cycle air-conditioner, ensuite bathroom, kettle, bar fridge, TV and DVD player and covered veranda area which could be used whilst maintaining appropriate physical distancing to neighbours. All rooms had hard surfaces, which were considered easy to clean. A resident laundry area was in each block, housed with limited vending machines, and available for use alongside an escort based on a scheduled roster, with frequent cleaning performed.

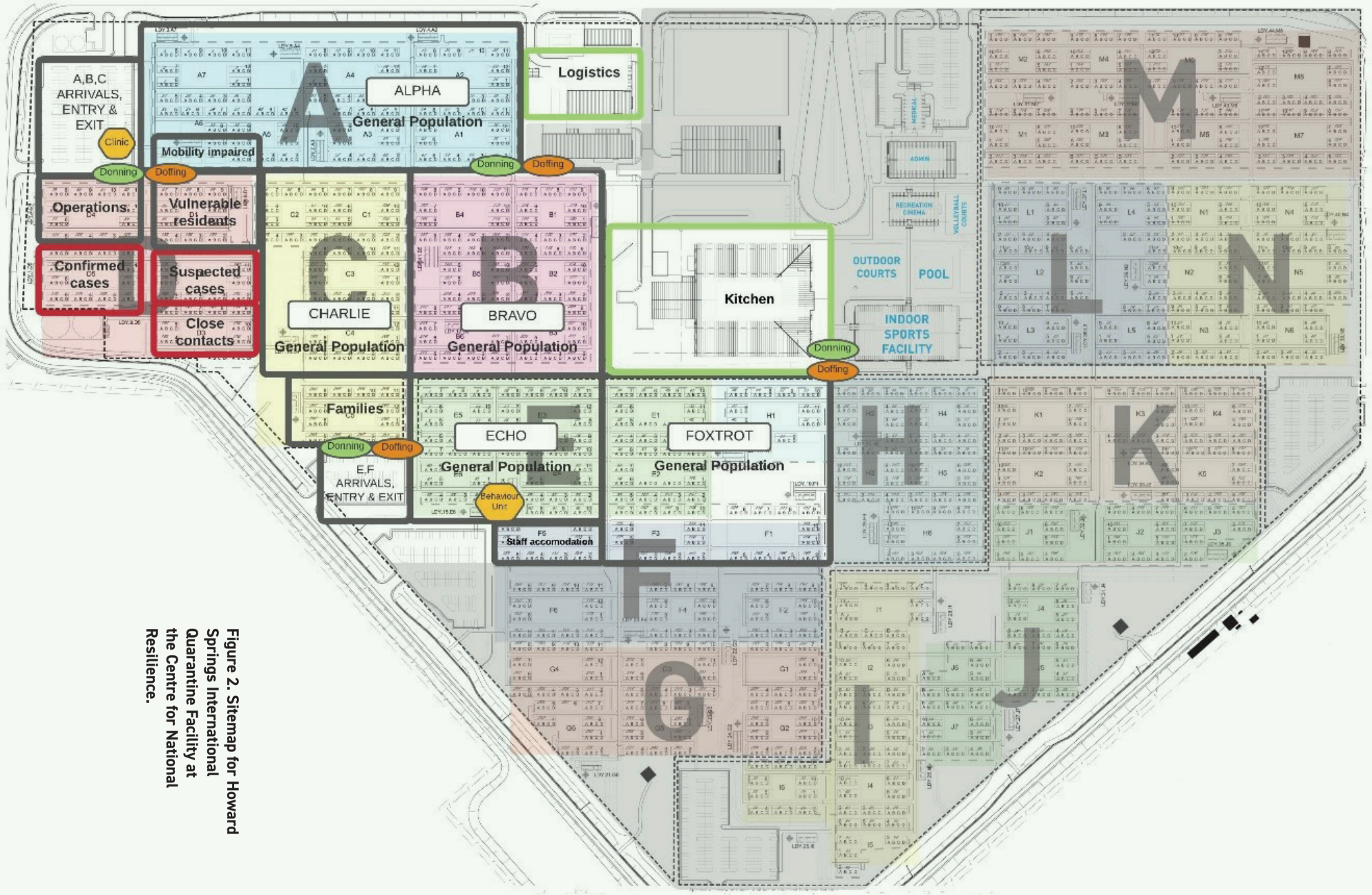


Figure 2. Sitemap for Howard Springs International Quarantine Facility at the Centre for National Resilience.

flight and resident overview

From 23 October 2020 to 21 May 2021, HSIQF at the CNR received 7,105 passengers (residents) from 41 direct international flights under the the National Partnership Agreement, an additional flight from Timor-Leste with seasonal workers and repatriated Australians and additional support to quarnantine ADF and Marine personel as required. Sixteen flights arrived from the United Kingdom (31%), 15 from India (29%), six from Germany (11%), and one from each Canada, Timor-Leste, France, South Africa and the United States (2%). Table 1 provides an overview of all flights and residents. In addition to these flights, small groups of COVID-19 close contacts and confirmed cases from the ADF and United States of America Marines quarantined onsite between March to May 2021. A total 205 residents (2.9%) were confirmed COVID-19 case, with a peak prevalence in April of 5.7% due to the Delta variant.

Table 1. Flight origin, arrival date and repatriated residents at Howard Springs International Quarantine Facility at the Centre of National Resilience from 23 October 2020 to 12 May 2021.

FLIGHT NUMBER	FLIGHT ORIGIN	ARRIVAL DATE	TOTAL RESIDENTS
1	LONDON, UNITED KINGDOM	23 OCTOBER 2020	161
2	NEW DELHI, INDIA	26 OCTOBER 2020	185
3	LONDON, UNITED KINGDOM	8 NOVEMBER 2020	171
4	NEW DELHI, INDIA	11 NOVEMBER 2020	153
5	LONDON, UNITED KINGDOM	12 NOVEMBER 2020	167
6	NEW DELHI, INDIA	24 NOVEMBER 2020	173
7	NEW DELHI, INDIA	28 NOVEMBER 2020	151
8	LONDON, UNITED KINGDOM	30 NOVEMBER 2020	165
9	FRANKFURT, GERMANY	13 DECEMBER 2020	177
10	CHENNAI, INDIA	15 DECEMBER 2020	174
11	PARIS, FRANCE	17 DECEMBER 2020	149
12	LONDON, UNITED KINGDOM	30 DECEMBER 2020	187
13	CHENNAI, INDIA	1 JANUARY 2021	177
14	FRANKFURT, GERMANY	3 JANUARY 2021	192
15	NEW DELHI, INDIA	8 JANUARY 2021	113
16	LONDON, UNITED KINGDOM	16 JANUARY 2021	199
17	CHENNAI, INDIA	19 JANUARY 2021	159
18	CHENNAI, INDIA	20 JANUARY 2021	195

FLIGHT NUMBER	FLIGHT ORIGIN	ARRIVAL DATE	TOTAL RESIDENTS
19	LONDON, UNITED KINGDOM	31 JANUARY 2021	144
20	LONDON, UNITED KINGDOM	2 FEBRUARY 2021	200
21	NEW DELHI, INDIA	4 FEBRUARY 2021	196
22	CHENNAI, INDIA	6 FEBRUARY 2021	193
23	LONDON, UNITED KINGDOM	17 FEBRUARY 2021	193
24	LONDON, UNITED KINGDOM	19 FEBRUARY 2021	200
25	FRANKFURT, GERMANY	21 FEBRUARY 2021	199
26	LONDON, UNITED KINGDOM	23 FEBRUARY 2021	200
-	DILI, TIMOR-LESTE*	24 FEBRUARY 2021	32
27	LONDON, UNITED KINGDOM	8 MARCH 2021	193
28	LONDON, UNITED KINGDOM	3 MARCH 2021	198
29	FRANKFURT, GERMANY	12 MARCH 2021	195
30	NEW DELHI, INDIA	14 MARCH 2021	197
31	NEW DELHI, INDIA	25 MARCH 2021	194
32	VANCOUVER, CANADA	27 MARCH 2021	137
33	LOS ANGELES, UNITED STATES OF AMERICA	29 MARCH 2021	96
34	FRANKFURT, GERMANY	31 MARCH 2021	171
35	JOHANNESBURG, SOUTH AFRICA	11 APRIL 2021	186
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**THIS FLIGHT INCLUDED 19 TIMOR-LESTE SEASONAL WORKERS AND 13 REPATRIATED AUSTRALIANS*


AUSMAT
LOGISTICS
Kathmandu

resident journey

Pre-departure

Australian citizens and permanent residents seeking to return to Australia registered through an online DFAT portal for one-way direct flights with Qantas Airways to Darwin. Passengers required proof of a negative COVID-19 PCR test in the 48 hours prior to departure. For risk profiling and to ensure residents were correctly supported from the outset, passengers also completed a voluntary AUSMAT pre-arrival questionnaire to self-identify medical, mobility, social and dietary needs, including the use of nebulisers or other respiratory devices. Residents were also provided an electronic pre-arrival pack, so they were aware of what to expect during their stay at HSIQF at the CNR.

Flight arrival

Arrivals were processed through the Royal Australian Air Force (RAAF) Base Darwin terminal located in Winnellie, adjacent to the Darwin International Airport to prevent any cross-contamination of returned international travellers entering quarantine with domestic flights. Biosecurity officers boarded planes prior to disembarkation to identify and immediately offboard unwell passengers. Those remaining, disembarked in seating cohorts of 30, were guided through immigration processing control by Australian Border Force officers and customs with the support of ADF, then attended COVID-19 screening (temperature scan and health screen) and quarantine administrative processing led by AUSMAT clinicians. Unwell and symptomatic passengers were escorted to sperate room in the airport for AUSMAT clinical review. All passengers completed arrival (day zero) nasopharyngeal PCR swabs at the airport, including children where possible. Following airport processing, passengers boarded separate buses in the flight seating cohorts for a 30-minute transit to HSIQF at the CNR. Symptomatic travellers were transported in a separate vehicle with a medical escort to HSIQF at the CNR, or by St Johns Ambulance to RDH if acutely unwell.

HSIQF Onsite arrival

AUSMAT deployed a temporary shelter in the onsite carpark for the reception of arriving passengers as quarantine residents. Residents were briefed by AUSMAT on-board the bus, disembarked and collected their luggage in the shelter , and were escorted to their relevant block. QR codes or the Track-Mi Application were used to track residents during this process for future contact tracing, if required. Resident rooms contained a welcome briefing pack including all policies and procedures and available support systems and services, and a care package with snacks, tea, coffee items.

Quarantine requirements

All international travellers returning to Australia were required to adhere to the current Northern Territory CHO directions. During the operation, these requirements were to quarantine for a minimum of 14 days to cover the incubation period for COVID-19.

Resident cohorting

Residents were cohorted from flight arrival to quarantine clearance. Cohorting was informed by risk profiling and protection principles, including aircraft seating, social and medical vulnerability, mobility needs and individuals travelling together, with passengers from different flights remaining separate. Risk profiling was ongoing, and residents were moved between blocks as indicated, e.g. confirmed cases or close contacts were moved into further isolation in the controlled zone. Medically vulnerable residents, including psychiatric, disability and elderly, were allocated to dedicated areas with the easiest staff access, and ramp access if required. Single males were housed separate to single females and families, couples were housed next door to each other, families were housed separate from couples, and those with relevant forensic histories were further separated. Accommodation was adapted to be family and child-focused to support families, including the provision of cots, baths and child-friendly spaces.

Resident resources

Residents received a daily evening hot meal delivery with cold meals packed for breakfast and lunch the following day, according to their dietary requirements (e.g., vegetarian, vegan, Halal). Room supplies, such as tea, coffee, milk, and toilet paper, were provided in bulk at the beginning for the quarantine period. Residents received a range of equipment to maintain appropriate IPC, such as cleaning supplies, masks and hand sanitisers. An iPad and voluntary biomonitoring arm band for adults for telehealth services, thermometers and pulse oximeter monitors for COVID-19 screening, surgical masks and a lanyard with a pocket for room swipe access card to reduce room lockouts. Residents received sim cards to minimise the sharing of items and had a click and collect service available from Coles, local IGA, Kmart and Big W to access additional supplies. Residents were also provided information for financial assistance (i.e. Centrelink). Age-appropriate education packs were provided for children and special celebration packs were provided for resident's birthdays, public holidays and other special occasions. Active engagement, encouragement, and public health messaging were delivered via SMS, email, television, paper drops, compliance notices, face-to-face messages, phone calls and video calls. Residents were also able to access a shared Facebook social media page to encourage a sense of community. Language interpreters were embedded within AUSMAT for the deployment to assist residents and staff. Resident health services are outlined in the 'Heath services' section of this report.

Teleservices for residents

Residents were provided access to a dedicated Telehealth service established for the quarantine program. Daily contact was made with each resident to monitor general well-being, COVID-19 symptoms and vital signs. Personalised care was delivered through use of an iPad. Where concerns were identified, the telehealth operator made referrals to onsite staff or external services as required. Further detail of the telehealth service are provided in 'Heath services'.

Resident testing

Residents were tested by PCR for COVID-19 on days 0, 7 and 12 at a minimum. Day 7 testing was introduced 6 December 2020 for early identification of incubating infections missed on arrival. Residents were swabbed on their veranda by AUSMAT clinical staff in full personal protective equipment (PPE). Samples were sent to RDH for analysis seven days a week, between 06.00 and 22:00, or outside of hours if urgent. Results were expected to be returned on the same day for samples delivered before 10:00 or next day for samples delivered after 10:00. Confirmation testing for COVID-19 positive results were sent to the Victorian Infectious Diseases Reference Laboratory in Melbourne at the beginning of the operation and continued throughout the operation for requested genomic sequencing.

Clearance from quarantine

All residents were required to receive quarantine clearance by a medical doctor in writing prior to departure. The earliest departure time for quarantine was at 12:00 unless the resident had an exemption e.g. for ongoing flight departures to their home jurisdiction. The AUSMAT medical and telehealth teams liaised to coordinate buses and taxis for departure.

Resident complaints process

Telehealth Customer Service Officers were available for escalation of resident complaints. Residents were asked to provide a written complaint to the Telehealth Customer Service Officer which was then passed to Telehealth Director or Manager for review and follow up action. After reviewing the complaint the Telehealth Director or Manager would forward to the relevant team. For example if the resident was complaining about possible allergens in the food, the complaint would be escalated and forwarded to the manager of the catering company. If a resident raised concerns about their neighbour acting in a unsafe way, this would be immediately escalated to the Mission Team Lead. Where possible, practical and safe to do so. residents would be visited by the applicable onsite team manager(s) to discuss and resolve the complaint. Where a face to face visit was not possible or practical, the Mission Team Lead followed up with an official response letter to the resident.Complaints, resolutions and follow up actions were discussed at daily management meetings.

health services

Resident clinical care

All residents were required to self-administer daily symptom and temperature check. Close contacts and confirmed cases had face-to-face clinical review with a medical officer on day 1 and subsequent daily face-to-face clinical review with a registered nurse or paramedic. All other residents had face-to-face clinical review for COVID-19 symptoms with clinicians on day of arrival and days 3, 7 and 9. Residents that failed or did not complete the daily symptom and temperature check or residents with ongoing medical issues were put on a clinical watch list to receive an additional telehealth consult, general practitioner referral or face-to-face consultant if necessary. The clinical watch list was updated daily according to residents need for ongoing treatment or re-review. There was an emphasis on virtual health and support services to reduce the risk of COVID-19 transmission while maintaining quality patient care.

Telehealth services

The AUSMAT clinical care model prioritised telehealth services to reduce staff exposure to potential infection through face-to-face contact with residents and to minimise time spent in PPE in the challenging ambient environment. The Telehealth Call Centre consisted of non-clinical phone operators, non-clinical Team Leads, a Registered Nurse Team Lead, Shift Supervisor, General Manager and Director (Nurse Practitioner). All operators completed compressive training, including two-days of classroom theory, a two-day Mental Health First Aid accredited course and three-days of buddy shifts.

The call centre operated seven days a week between the hours of 08:00 to 18:21 weekdays and 08:00 to 17:21 weekends with an average 20 phone operators per day. After hours, residents were able to contact the quarantine centre reception for queries, an on-call clinician or local emergency services for medical care. Onsite support included psychiatrists, medical officer, nurses, paramedics and others services who also made referrals as required. Communication with residents was guided using phone scripts, and all interactions (successful and unsuccessful) between the resident and the telehealth and/or onsite teams were recorded in a central database.

Telehealth operators were divided into teams and allocated to a cohort of residents according to their flight and/or physical location at the quarantine facility, where possible. The primary responsibility of telehealth operators was to maintain daily contact with residents in their cohort to monitor general well-being, COVID-19 symptoms and vital signs. Vital signs were monitored for adult residents that voluntarily wore a biomonitoring armband. The telehealth team delivered personalised care packages for all children in quarantine, and for all residents on special occasions including birthdays, mother's day, father's day, Diwali and other holidays and events of cultural significance.

An additional core responsibility was to complete weekly psychological screening of each resident using a script developed by Psychiatrists and the Kessler Psychological Distress Scale to identify general mental health problems and assess the areas of coping, worry and depression. Telehealth escalation linked residents to further telemedicine and other essential services, such as general practitioner referral, pharmacy orders and psychological services. Telehealth vs face-to-face consultations were provided at a 2:1 ratio for Medical Officers, and 1:9 for nurses/paramedics. Table 2 presents health services provided during the initial commissioned from 23 October 2020 until the 31 March 2021.

Table 2. Health services provided at Howard Springs International Quarantine Facility at the Centre of National Resilience from 23 October 2020 to 31 March 2021

Type of service	Total services provided
Telehealth outbound calls	42,519
Telehealth inbound calls	8,604
Telehealth outbound text messages	36,848
Telehealth outbound emails	5,975
Telehealth inbound emails	3,158
Medical Officer face-to-face consultations	541
Medical Officer telehealth consultations	1,287
Nurse/paramedic face-to-face consultations	14,770
Nurse/paramedic telehealth consultations	1,573
Overnight face-to-face clinical call outs	92
Transfers to Royal Darwin Hospital	60
Remote general practitioner consultations	66
Telehealth counselling consultations	339
Medical psychiatric telehealth consultation	218
Nursing psychiatric telehealth consultation	37
Other mental health requests	63
Residents requiring Alcohol and Other Drugs support	89
Residents with a carer	125
Residents requiring special support	43
Residents with mobility assistance rooms	11
Occupational therapy consultations	23
Midwifery/Antenatal consultations	18
Pharmacy orders complete	315

Psychological services

The mental health of residents was a priority, acknowledging that quarantine can be extremely difficult. Early intervention and health promotion occurred by providing residents with wellbeing information and resources on their iPad and TV. All residents received a general mental health history screen from the telehealth operators within two days of arrival, and the mental health team were alerted of relevant past or current issues. A repeat mental health screen was performed on day seven to ensure early intervention in mental ill-health. Residents were able to access a telephone counselling and welfare service between the hours of 08:00 and 22:00 via a contracted service services TeamHEALTH, or emergency psychological support through EASA (Counselling, Training, Mediation, Consulting) Darwin outside of these hours. In addition to providing residents with access to counsellors and mental health recovery professionals, TeamHEALTH also provided assistance with welfare services such as Medicare and Centrlink. A Psychiatrist was available onsite for consults (Telemedicine prioritised over face-to-face) and additional psychologist or psychiatrist services were available via a general practitioner referral. The on-call psychiatrist at RDH was available to discuss if escalation to acute-clinical services was required.

Allied health services

Occupational Therapists or a Physiotherapist were available for the management of issues relating to access, mobility and safe completion of personal care tasks (showering and toileting). Assistance was primarily achieved through the provision of assistive devices such as mobility aids (wheelchairs, walking frames, walking sticks) and over toilet frames and shower chairs, with on-site services only permitted following discussion with the medical officer and senior nursing staff. Allied health services also supported passengers who arrived to HSIQF at the CNR with pre-existing conditions.

Pharmacy

The pharmacy team were integral to pre-arrival and arrival day preparation They led the compilation of flight maifest information provided by DFAT and the voluntary AUSMAT pre-arrival questionnaire for passangers to create risk profiles for each resident and provide timely assistance for pre-existing medical conditions. From this process, the pharmacy team allocated resident rooms appropriately. In addition, pharmacy prepared envelopes for each residents arrival at the airport, which included labelled swab packs, rooms keys and relevant information about their stay.

The pharmacy team established protocols for nurse/paramedic Initiated Medicine Protocols (for these staff to supply medicines to clients without a Doctors Order) and got these approved for use at HSQIF. They further managed a small imprest of medicines and a safe onsite.

Residents were able to contact their existing General Practitioner for a telehealth consultation or were linked with a remote General Practitioner via the telehealth team to arrange pharmacy orders. The AUSMAT pharmacy team connected with local pharmacies to arrange delivery of pharmacy orders via a courier to HSIQF at the CNR, where an AUSMAT team member would collect the order and deliver it to the requesting resident.

Clinical management of COVID-19 cases

A new diagnosis of suspected or confirmed COVID-19 resulted in immediate transfer to the appropriate isolation block. In addition to the care described in 'resident clinical care', online case conferences were held with Infectious Diseases and Public Health physicians from RDH to identify appropriate management plans and streamline admissions, if required. Escalation transfer pathways were activated when medical assessment identified significant comorbidities enhancing the likelihood of hospital admission and deterioration with COVID-19 or if clinical deterioration was determined by the onsite treating clinical team. Through collaborative specialist support, all attempts were made to manage residents onsite to minimize the burden on local health services. There was a formal agreement with other jurisdictions for medical retrieval from HSIQF at the CNR to home states if medically required. Non-urgent interstate transfers required agreement from relevant the jurisdictions CHO, discussion with Mission Team Lead, appropriate paperwork and identification of a retrieval services. Urgent interstate transfers occurred via TEHS usual protocols.

Onsite resuscitation

Onsite medical facilities included the installation of the AUSMAT EMT field hospital resuscitation shelter with appropriate equipment for acute management of deteriorating persons until ambulance transfer to RDH was available. This facility included two beds, full resuscitation capability (adults and paediatrics), trauma management and emergency equipment, including obstetric capacity. AUSMAT are a WHO globally veritified Level 2 EMT that are internationally renowned for their EMT response capacity, including the ability to rapidly establish field hospitals of various sizes and capacities.


bollé

quarantine policies and procedures

Overview

All IPC policies and procedures adhered to best practice of national and international guidelines and recommendations and were implemented according to the Northern Territory Pandemic Plan, NCCTRC Operations Manual, HSIQF at the CNR SOPs, compliance tools and working templates. In addition, AUSMAT utilised innovative protocols in staff training, audit and testing to maximise safety of staff and residents.

Physical distancing

Residents and staff were required to maintain >1.5 metres from others and there was a limit of one person per four square metres for indoor spaces unless residents were travelling together in an approved 'travel bubble'. For example, families with young children or couples were placed in adjacent rooms and permitted to share their rooms and balcony. Residents could access personal balconies with masks but were not permitted to leave their balconies unless scheduled to visit the blocks laundry building or rubbish bins. Staff were not permitted to enter the resident's balcony or room unless there was a medical emergency. Resident COVID-19 testing and symptom screening was performed in full PPE on the resident's veranda. Staff training and huddles occurred outdoors and there were no common indoor staff areas.

Hand and respiratory hygiene

There was mandatory use of consistent hand and respiratory hygiene reinforced to staff through daily training and procedural posters at donning and doffing stations, and to residents through daily text messages and the onsite television channel translated into multiple languages.

Contact tracing

To support contact tracing on site, a QR system was initially allocated to each door of each administrative room and staff were required to scan upon entry to a room to track movements interactions and identify close contacts by AUSMAT. Aircraft wastewater surveillance for COVID-19 fragments was performed by Qantas Airways post flight and data were immediately provided to AUSMAT to triangulate with results of passenger arrival testing [14]. Line lists of COVID-19 close contacts from flights and onsite (for families) were provided to the CDC to perform contact tracing. Close contacts were defined according to the current Australian Government Series of National Guidelines for COVID-19.

Personal Protective Equipment

PPE protocols were simplified and consistent across the workforce to ensure uniformity and enhance adherence. Low risk activities without face-to-face resident contact required gloves, surgical masks and eyewear. High-risk activities required full PPE, including P2 or N95 mask, eyewear, face-shields, two pairs of gloves and gown with taping on the back and cuffs. Taping was used to optimise fit and to prevent PPE compromises during intensive physical activities. Double gloving was necessary due to excess sweat soilage in the climate and an inability to reapply gloves due to hands denaturing after removal of the primary pair. PPE was air-condition stored in an onsite facility and offsite NCCTRC warehouse, and there were no PPE shortages or stockouts during the operation.

Donning and doffing compliance

A single procedure of donning and doffing was reinforced and practiced in daily training. A 'buddy' system was mandated to spot donning and doffing techniques and identify potential breaches. Donning required a photograph to be taken and submitted to the wider team via WhatsApp that was monitored to promote real-time auditing, feedback and adherence. PPE breach reporting was mandatory by all staff and contractors and reporting of near misses and potential compliance issues experienced or witnessed was promoted as part of safety culture. Regular and unscheduled daily audits of PPE compliance occurred. During the operation, there were no PPE breaches requiring staff to be furloughed for 14 days.

Doffing video surveillance

In mid-January 2021 as the operation increased capacity for residents, motion activated video cameras were installed at five doffing stations, with an additional two video cameras installed in March 2021. Video footage of personnel was reviewed by a trained security personnel through use of the PPE doffing compliance checklist. When a personnel's doffing did not meet all checklist criteria, if the procedure was not done in correct order, or if personnel were wearing jewellery, the video and failed checklist were reported daily as a potential compliance issue to AUSMAT leadership who immediately confirmed the relevance of the compliance issues, provided a risk grading and initiated a practical response.

Cleaning

Equipment and facilities were cleaned with disinfectants approved by the Australian Therapeutic Goods Administration for use against COVID-19. Chlorine-free product was used to disinfect equipment, alcohol-based product for hand sanitising, and portable sinks with soap and water were located at each block entrance for handwashing. After disinfecting and if no longer in use, equipment was left in direct sunlight for two hours as an extra precaution. Stringent cleaning protocols were established, with random auditing of protocol adherence conducted by AUSMAT senior logisticians. At the end of a shift, staff who return to homes in Darwin were required to shower onsite, change into clean clothes, uniforms were laundered onsite, and shoes were disinfected.

Resident room cleaning

Residents placed linen in plastic bags on their veranda at the end of their quarantine period, which was removed by AUSMAT logisticians in full PPE and sent off-site for commercial cleaning. All grossly contaminated items were destroyed. To reduce potential fomite transmission, rooms were furloughed for 48-hours and deep cleaned prior to a new resident checking-in to the room.

Waste management

Waste in controlled areas were removed by AUSMAT logisticians in full PPE, double bagged, sprayed with disinfectant and handed to waste personnel from a licenced contractor for removal. General waste was removed by licenced contractors for removal which required a surgical mask, eye protection and nitrile gloves under riggers gloves. Disinfectant was used between riggers glove use, and to regularly spray bins.

Independent operational reviews

Ongoing audits were performed by the Australian Government. Separate audits were also performed by the Australian Government Chief Nurse, the NT Chief Nurse and an external IPC review was performed by the New South Wales Clinical Excellence Commission.

workforce management

Workforce model

To meet the operations demands, AUSMAT employed a hybrid model combining existing highly skilled and trained AUSMAT experts from across all Australian jurisdictions, with new surge staff who were not required to complete the rigorous selection process of existing team members. The existing AUSMAT members were experienced senior practitioners and many had recent experience managing COVID-19 outbreaks, quarantine facilities and COVID-19 testing facilities. Surge staff were prioritised according to experience and ability to work in austere and difficult environments, such as remote Australia employment or those with direct COVID-19 management experience. Contractors and AUSMAT staff worked together closely during the operation and agencies provided additional clinical staff during peak periods. Some staff resided onsite as required, in a dedicated staff block with individual dongas, separated from residents. All operations were performed under the supervision of AUSMAT personnel, and AUSMAT functioned in command-and-control structure.

Limitations on outside work and study

Onsite access was restricted only to those necessary to perform their duties. Onsite staff were not permitted to work in any other job and were employed on a full-time basis by AUSMAT to prevent this from occurring and to meet the needs of the operation. Staff were promoted to complete their required studies online; however, those with-face-to-face requirements were not permitted in controlled areas.

Staff induction and pre-commencement training

All staff were required to undertake comprehensive induction training prior to and upon arrival. This included online and in-person simulation training for all operations and individual PPE training audited for competence. Simulation trainings encompassed all potential workplace encounters, from airport arrival procedures to management of an acutely disturbed resident and management of medical emergencies. Non-AUSMAT surge staff were required to complete a two-day mental health first aid training.

Daily onsite staff training

The AUSMAT training model sought to embed IPC practices as 'muscle memory' through repeat practical training, to compensate for cognitive offloading during periods of fatigue and to account for many personnel who were novice to IPC/PPE. Therefore, at the commencement of shift, daily supervised group hand hygiene and PPE training occurred for all staff, irrespective of their assigned activities, to foster camaraderie, promote a safe and collaborative workforce and ensure all understood IPC principles and safe execution. The training was interactive, requiring donning and doffing of full PPE and application of hand sanitiser. In March 2021, a collaboration with Northern Rise Village Services/ Delaware North was established to involve all high-cleaners and terminal cleaners in AUSMAT-led training.

Airport training

For all flight arrivals, AUSMAT conducted PPE training and operational briefings to ABF, AFP, NTP, Qantas ground crew and transport operators.

Workforce cohorting

Staff were allocated into one of five teams each specific to a cohorted flight block with the staff-to-resident ratio varying depending on caseload, staff availability and well-being. On average per day, each block had a dedicated six nurses/paramedics and one general service operator, the facility had 25 general service operators, there were a minimum two doctor's onsite, one doctor on call overnight, and one additional telehealth doctor. Staff were restricted to working in their allocated block for the entirety of the cohort's quarantine to minimise potential contamination and mass furloughing. Non-resident-facing staff remained separate from resident-facing staff always.

Food was prepared in a controlled area only accessible by catering contractors. Non-contact meal drops to staff and resident balconies occurred daily under AUSMAT supervision and by AUSMAT for confirmed or suspected cases and close contacts. Terminal Cleaners were not permitted to mix with standard cleaners and were cohorted to their own rooms between cleans. Contractors were not permitted to enter the controlled zone without the permission of the Mission Lead and informing the Logistics Lead of their purpose and location. All staff operated in a buddy system to promote compliance and support heat management.

Onsite movement tracking

Onsite movement tracking was implemented to support contact tracing. Initially, QR check-ins were used per room, and by March 2021 a Track-Mi was available to report on proximity and contact with other users of the application. With permission, the application could also track staff off-site. The application automatically integrated with the custom- built secure central database, Covid in Communities (CIC) (further details below) and could be used to check-in for activities such as daily training. In addition, all staff and contractors were required to sign paper security logs for each entrance to the resident zone as an extra layer of security and to facilitate contact-tracing efforts.

Daily health screening

Staff completed daily self-administered health screens, capturing temperature, symptoms and heat management. Results were monitored and electronic records maintained and audited daily for compliance. Failed screens were responded to by an established medical team protocol. Symptomatic staff remained in isolation (either at HSIQF at the CNR or home) and until a negative PCR result was obtained, they were asymptomatic, and a medical officer provided clearance. If a PCR was positive for Influenza or respiratory syncytial virus, the staff member remained off work until asymptomatic for three consecutive days.

Staff testing

Enhanced surveillance for early detection of potential infection was iteratively adapted in accordance with national recommendations and international scientific evidence. The staff testing was facilitated by the onsite pharmacy team, including laboratory scentists. Initially, staff submitted weekly nasopharyngeal PCR, which progressed to become twice weekly. This was modified to daily RDT-Ag with weekly nasopharyngeal PCR from 28 December 2020. From 18 February 2021, daily saliva PCR was added to this regime. A positive RDT-Ag initiated a protocol involving the supervising clinician to immediately inform the medical team lead. Two staff members donned full PPE, escorted the positive staff member to a designated isolation room and be given an urgent PCR sent to RDH with a written request and a telephone call to the laboratory staff to inform them of the situation. Cleaning of the area and equipment occurred using cleaning and disinfection protocols. Compliance with daily testing was actively audited in conjunction with the NT CDC. PCR testing was also required before staff arrived from interstate, final site departure (cessation of work) and for those planning more than two consecutive days of leave. Contractors not operating in controlled areas were required to complete weekly nasopharyngeal PCR but could also participate in daily RDT-Ag and saliva PCR. No positive PCR results were recorded in staff during the operation.

Vaccination

Staff vaccination with Pfizer-BioNTech (Comirnaty) COVID-19 vaccine commenced 25 February 2021, two days after the vaccine was made available in Australia. HSIQF at the CNR immediately obtained approval to be a service provider for the administration of COVID-19 vaccines, including set up of cold chain management and record keeping for the Australian Immunisation Register. Vaccination was mandated for all staff entering controlled areas. Multiple vaccination clinics were run to ensure that all staff working at CNR were up-to-date with their required COVID-19 vaccinations.

Heat management

Heat management strategies were central to workplace safety given the climate. staff were asked to prepare and increase their heat tolerance prior to deployment Daily staff and resident wellness screening monitored heat management, and an onsite wet-bulb thermometer was monitored continuously. Given the risk of dehydration and heat exhaustion whilst wearing full PPE, only emergency procedures were carried out from 12:00 to 15:00. Resident consultations were undertaken during relatively cooler periods outside these hours. Cold bottled water, air-conditioned workspaces and a slushed ice machine were available to reduce core body temperature, aid recovery from heat exposure and to sustain performance. There was a one-hour limit working in full PPE before a rest break was required in an airconditioned room. A staff clinic was available to manage heat related emergencies and other basic first aid requirements. A confidential medical screen was conducted pre-employment (originally within a few days of deployment) to screen for significant heat management medical issues and risk factors.


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GORILLA CARTS

additional information

Information Technology

A custom-built secure central client information database, Covid in Communities (CIC), was developed collaboratively by NCCTRC and a private contractor - EMT Solutions to coordinate resident care and monitor resident and staff symptom screening and testing. The permission-based system limited access of sensitive information to the relevant clinical team and was iteratively adapted to operational needs. CIC was used for staff and residents and integrated track location, personal details, requests, daily checks, clinical parameters, vaccination, medication, test results, communications and decision making. A custom-built location tracking application, Track-Mi, was also developed to support the rapid identification of individuals for incident control points, such as close contact to a confirmed COVID-19 case or for evacuation procedures.

Operations and equipment

The operations team led the procurement and ongoing stocktake of all relevant equipment including those for rooms (e.g. cots, highchairs, mattresses), IPC (e.g., Clinell wipes, hand sanitizer, soap), transport (e.g. trollies, bikes and golf buggies), hazard management (e.g. stretchers for cyclone preparedness), clinical and testing activities. PPE stock was maintained in onsite containers and were sourced from the large NCCTRC warehouse.

Security and safety

All staff were required to show proof of employment and check-in using the Territory Check In application upon entry and exit of the facility. Security personnel were located at each quarantine entry point, and recorded staff names, time of entry and purpose of entry and confirmed PPE compliance. Entry to the quarantine and isolation area was guarded by security to monitor movements and record entry/exit.

Risk management and quality assurance

Risk escalation occurred through the chain of command structure, and staff were actively engaged to identify any perceived or actual risk during daily meetings and forward planning activities. The supervisor ensured that the risk was documented and escalated to the appropriate command chain, i.e., logistics, nursing, medical or mission lead where immediate risk mitigation is not possible. Risk was evaluated for each task on site and staff rehearsed activities prior to commencing the activity in a high-risk environment. Additional controls were implemented to ensure staff maintain vigilance and continue compliance with IPC practices. This included random audits, planned audits, photographic evidence of compliance, and debriefs after activities conclude to ensure an active risk management process was in place.

Research

A Commonwealth Scientific and Industrial Research Organisation (CSIRO) research team were based at HSIQF at the CNR with a focus on investigating sewage testing as an early warning system for detecting COVID-19. CSIRO partnered with Qantas to perform wastewater testing of flights to provide an extra layer of screening incoming passengers for COVID-19, to account for a possible lag in viral detection in deep nasal and throat samples and if passengers were yet to show symptoms. In addition, the NT CDC performed a series of research for safety and quality improvement, including findings of nil cross contamination between residents outside family units. A range of NCCTRC-led operational research has continued to document the operations success, with the current peer-review publications published or in press:

- Curtis SJ, Trewin A, McDermott K, Were K, Walczynski T, Notaras L, Walsh N. An outdoor hotel quarantine facility model in Australia: best practice with optimal outcomes. Australian and New Zealand Journal of Public Health. 2022
- Trewin A, Curtis SJ, McDermott K, Were K, Walsh N. Avoiding Catastrophe in a High-Risk Environment: AUSMAT at Howard Springs. Global Biosecurity. 2022.
- Curtis SJ, Trewin A, McCormack LM, Were K, McDermott K, Walsh N. Building a safety culture for infection prevention and control adherence at Howard Springs: a workplace survey. Infection, Disease & Health. 2022
- Curtis SJ, Trewin A, McDermott K, Were K, Clezy K, Dempsey K, Walsh N. Electronic monitoring of doffing using video surveillance to minimise error rate and increase safety at Howard Springs International Quarantine Facility. 2022 (under review).

Staff welfare

Staff welfare was a priority of the operation to manage the risk of COVID-19 transmission and heat management. Daily welfare activities were outlined in the 'workforce management' section of this report and IPC activities were performed in the interest of staff welfare. In addition to these activities, staff were able to access a 24/7 psychological response services and onsite clinical services.

Media

HSIQF at the CNR attracted a range of media interest, with the Australian Broadcasting Corporation the lead non-government media agency used for public communication. In addition, the NCCTRC social media platforms, Facebook, Instagram, Twitter and YouTube were used to promote activities.

Official Visits

A range of high-level officials visited HSIQF at the CNR, including the Australian Prime Minister Scott Morrison and Northern Territory Chief Minister Michael Gunner on 27 April 2021. Ongoing auditing was performed by the Australian Government and site visits occurred by interstate governments, including the Victorian government to observe and gather lessons learnt from the success of the operation.

Demobilisation

Following AUSMAT's completion of their initial mandate from 23 October 2020 to 31 March 2021, the operations extension and handover of management to the NTG were announced. The operations handover was gradual to allow for appropriate recruitment and upscaling by the NTG, with official handover commencing on 3 May 2021, and the final AUSMAT members were demobilised on 25 May 2021.

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