

Review Article

Updated COVID-19 Condition in Australia

Ke-Yan Loo¹, Vengadesh Letchumanan¹, Loh Teng-Hern Tan², Jodi Woan-Fei Law^{1*}

Article History

Received: 28 November 2021;

Received in Revised Form:
12 December 2021;

Accepted: 15 December 2021;

Available Online: 16 December 2021

¹Novel Bacteria and Drug Discovery Research Group (NBDD), Microbiome and Bioresource Research Strength (MBRS), Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Subang Jaya 47500, Malaysia; ke.loo@monash.edu (K-YL); vengadesh.letchumanan1@monash.edu (VL)

²Clinical School Johor Bahru, Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Johor Bahru 80100, Malaysia; loh.teng.hern@monash.edu (LT-HT)

*Corresponding author: Jodi Woan-Fei Law; ¹Novel Bacteria and Drug Discovery Research Group (NBDD), Microbiome and Bioresource Research Strength (MBRS), Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Subang Jaya 47500, Malaysia; jodi.law1@monash.edu (JW-FL)

Abstract: The COVID-19 pandemic has had detrimental effects on the lives of citizens worldwide in the past two years. The highly infectious respiratory disease discovered in late 2019 was a public health emergency that prompted the rapid development of vaccines to prevent the further spread of the virus. In late 2020, vaccines were finally ready to be distributed globally to reduce the severity of the disease and fatalities. The early stages of the pandemic were crucial as detecting the virus earlier on was a critical step in protecting the community from the coronavirus. In Australia, the local government quickly closed national borders, implemented lockdowns and restrictions, increased testing within the community, established mask mandates and developed vaccination programs. The strategies used by the Australian government have proven to be effective and efficient in managing outbreaks amidst the pandemic. The authorities were able to control the virus spread and maintained a low fatality rate within the country.

Keywords: COVID-19; coronavirus; Australia; endemic; vaccines

1. Introduction

Since the discovery of the novel coronavirus, SARS-CoV-2, the virus has spread worldwide as the coronavirus plummeted the world into a COVID-19 pandemic for nearly two years^[1]. Those infected with this airborne respiratory disease would often present symptoms of fever, cough, shortness of breath, muscle aches, fatigue and loss of taste or smell^[2]. During the late stages of the infection, patients may require intensive care such as supplemental oxygen via tracheal intubation^[3]. In addition, COVID-19 patients with other underlying medical conditions or are immunocompromised, the prognosis for the disease is generally poor^[4]. Even when COVID-19 patients recover from the illness, they may still encounter post-COVID conditions which can affect their daily lives. These conditions include multiorgan system effects involving the immune, hematological, pulmonary,

cardiovascular, gastrointestinal, hepatic and renal systems^[5]. Other reported symptoms which may persist after recovery from COVID-19 include fatigue, cognitive impairment, myalgia, fever, impaired daily function and mobility and poor endurance^[6].

Throughout the pandemic, this public health emergency took millions of lives and jeopardised the livelihoods of many as COVID-19 also plunged the world economy into a recession^[7-9]. During the initial stages of the pandemic, leaders of countries were quick to act by closing national borders, enforcing mask mandates, restricting travels within local communities in hopes of breaking the chain of disease spread^[10, 11]. The government implemented travel restrictions in Australia as national borders were closed to all non-residents. Moreover, individuals returning to Australia from a higher-risk country were not allowed to attend public gatherings for 14 days. Those undergoing testing for COVID-19 were also prohibited from attending public gatherings^[12]. The local government also implemented lockdown restrictions progressively to restrict citizens' movement and reduce gatherings. Australia prioritises testing on active cases and close contacts to prevent the disease spread, and close contacts of COVID-19 patients would also be required to undergo quarantine^[12]. Nevertheless, the virus is highly transmissible through air, and once it infiltrated communities or spaces with high occupancy, outbreaks were frequently reported^[13-16]. Nevertheless, since the discovery of COVID-19 vaccines and their rapid distribution worldwide^[17], things started to look up, and life was expected to be back to normal as the daily total of confirmed cases was better stabilised.

2. COVID-19 Cases in Australia

The first case of COVID-19 in Australia was isolated from a 58-year-old Chinese national who arrived in Melbourne on 19 January 2020. He was admitted to the Monash Medical Centre in Melbourne on 24 January 2020 with fever, cough and progressive dyspnea^[18]. In the following week, 11 more cases were confirmed whereby all were acquired in China, similarly to the aforementioned first case. The first local case was subsequently reported when the patient contacted a Chinese tourist in the first week of February^[19]. The disease spread quickly, and by the end of March 2020, the total number of confirmed cases in Australia had skyrocketed to over 4000 cases, with 19 deaths peaking at 458 cases a day on 28 March 2020^[20]. At this point, 2129 cases were hospitalised, with 176 cases in intensive care units (ICU). Among the cases in ICU, five required ventilator intubations. When April 2020 came along, the rate of increase in cases reduced steadily, possibly due to the closure of national borders, lockdown implementations and social distancing measures introduced by the government^[21]. In late April 2020, a contact tracing app called COVIDSafe was developed based on the Singaporean version to quickly and effectively trace any close contacts of COVID-19 patients^[22]. This app will notify individuals of their status, and if there are any close contacts, they can self-isolate and undergo COVID-19 tests for further confirmation. Following its release, the app has been downloaded by 6.3 million Australian adults with smartphones as of 16 June 2020^[19].

However, there was a spike in confirmed cases in July 2020, which could be attributed to outbreaks across multiple settings and locations in Victoria. More than half of the infections

were locally acquired from known clusters. At the same time, the overseas-acquired cases were related to cruise-ship travel or travel originating from Europe or the Americas^[23]. The sudden increase in cases led to another lockdown in Victoria, metropolitan Melbourne and Mitchell Shire. Residents were only allowed to leave their homes to shop for food and essentials, provide care or seek medical treatment, exercise, study, and work if working from home was not possible. Non-essential services and businesses such as physical recreation facilities and entertainment facilities were also required to close during this time. The local authorities rapidly conducted covid tests nationally to detect the disease in the early stages, and overall positivity rates in the country was found to be less than 0.5%. On the other hand, in Victoria, where the most significant number of cases were reported, the positivity rate was 0.84. Of all the cases in Australia at this time, most of the individuals presented with mild symptoms, with only 12% of the cases requiring hospitalisation^[23].

In August 2020, daily reported cases of COVID-19 were still increasing despite the mitigation measures enforced by the Australian government. Thus, a nightly curfew was imposed along with mandatory face coverings in public, and schools and businesses were required to close. Outbreaks were determined to be from aged care facilities where the residents were at higher risk of COVID-19 infection due to communal living. They were also at risk of severe complications if they contracted the disease. On 2 August 2020, 1436 cases were associated with 148 residential aged care facilities, with 800 cases involving the residents, while the remaining cases occurred in the facilities' staff members^[24]. The restrictions implemented by the Australian government proved to be effective as the daily confirmed cases and deaths began to decrease throughout the country. In October 2020, the restrictions were eased as case numbers continued to dwindle. Finally, it was announced on 26 October that the 112-day lockdown in Victoria would end, and various sectors were allowed to reopen on 28 October. Shortly after, on 1 November 2020, Australia recorded zero locally acquired COVID cases for the first time since 9 June 2020^[25]. On 19 November 2020, a short lockdown was reimplemented for four days in response to a cluster of cases in South Australia, and restrictions were eased once the outbreak was speedily controlled^[26]. Towards the end of 2020, Australia continues to report low numbers of confirmed COVID-19 cases, and restrictions were further eased across the different jurisdictions in the country, except for New South Wales. Border restrictions were implemented in New South Wales from 17 December 2020 due to outbreaks, and heightened restrictions such as gatherings limits, travel and stay at home requirements were also imposed. Border restrictions were also implemented between New South Wales and other jurisdictions such as Tasmania and the Northern Territory to prevent disease spread^[27]. As of 31 December 2020, Australia recorded 28,408 COVID-19 cases with 909 deaths (Figure 1).

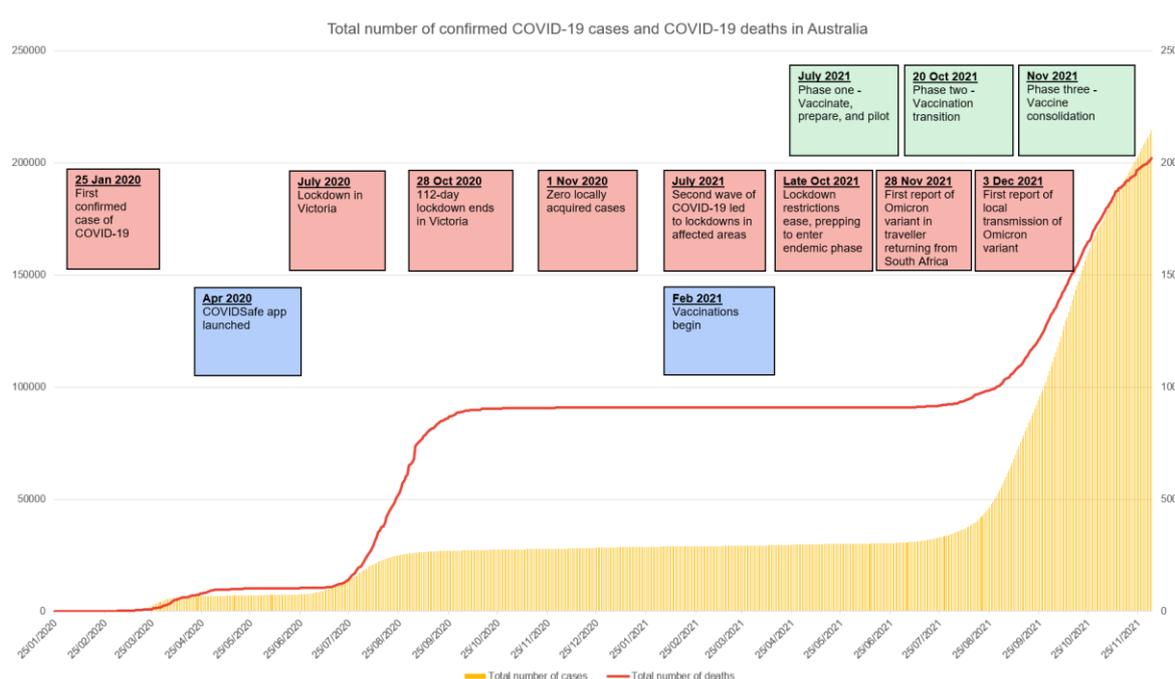


Figure 1. Total number of confirmed COVID-19 cases and COVID-19 deaths in Australia.

Australia's decreasing trend of confirmed COVID-19 cases continued into 2021, with most cases being from overseas-acquired cases, and most of them did not require hospitalisation. Although multiple variants of the coronavirus that were highly infectious^[28] had been detected in Australia, the number of confirmed cases remained low with low fatality rates^[29, 30]. Vaccinations finally began in late February 2021, and the first people to receive the vaccines were quarantine and border workers, frontline healthcare workers, aged and disability care residents, and staff at a significantly higher risk of COVID-19^[31]. The vaccine would later be distributed to the mass public as more vaccines arrived and were made available in Australia. The three vaccines approved for use in Australia are Comirnaty (Pfizer), SpikeVax (Moderna) and Vaxzevria (AstraZeneca)^[32]. Comirnaty and SpikeVax are mRNA vaccines that deliver mRNA encoding for the spike protein of SARS-CoV-2 to the host. Upon vaccination, the host cells would produce the viral spike proteins, and the immune system will be triggered to produce antibodies to neutralise the virus. As for Vaxzevria, the vaccine utilises non-replicating chimpanzee viral vectors to deliver genetic information of the coronavirus to the host cells to produce viral spike proteins that will trigger an immune response to produce antibodies^[16, 17]. Studies have shown that these vaccines are also effective towards variants of the novel coronavirus such as the B.1.1.7 (Alpha), B.1.351 (Beta) and B.1.617.2 (Delta) variants^[33, 34]. Although an individual is fully vaccinated, they may still get infected by the virus as the vaccines are not 100% effective. Despite that, these vaccines will help prevent severe symptoms and illness in individuals with COVID-19 vaccine breakthrough cases^[35]. The vaccines were quickly distributed to the public, and by June 2021, over 6.5 million doses of COVID-19 vaccines were administered nationwide. Furthermore, reported cases of COVID-19 and related deaths remained low, and fatality rates were stable at around 3% in Australia throughout the first half of 2021. Whenever outbreaks occurred, the local government would

quickly impose restrictions or lockdown measures in the areas involved to prevent the disease from spreading like wildfire within the community^[36, 37].

In spite of the continuous efforts by the Australian government and the cooperation of the public, COVID-19 cases began to rise again in July 2021. The upwards trend was attributed to an ongoing outbreak in the Bondi area of Sydney, where the Delta variant of the coronavirus was detected in a driver transporting international flight crew. Meanwhile, in Queensland, locally-acquired cases were linked to a hotel quarantine transmission event where an international aircrew contracted the Alpha variant of the virus^[38]. On 1 July 2020, Australia moved into phase one of the national plan to transition Australia's COVID-19 response, known as "Vaccinate, prepare and pilot". In phase one, the aim was to vaccinate as many individuals as possible and impose early, stringent and short lockdowns where outbreaks occurred. The cap for international travellers entering the country was also halved^[39]. As cases continue to increase despite the high vaccination rates, strict lockdown measures were imposed on areas with high positivity rates, such as Sydney and Melbourne^[40, 41]. The daily toll of confirmed COVID-19 cases peaked in October 2021 when cases reached over 2000 cases per day^[42]. On 20 October 2021, phase two, the vaccination transition phase had occurred where lockdowns were less likely, and a target of 70% vaccination rates was in place. Moreover, travel bans were lifted for vaccinated residents, and quarantine was imposed for international arrivals^[39, 43]. Although the positivity rates were high, the government remains optimistic as their vaccination rates were high, with 73.4% of people aged 16 and over were fully vaccinated as of 24 October 2021. Cities like Melbourne and Sydney that were under lockdown were prepared to ease restrictions to begin living life with the coronavirus. The main focus of the Australian government was to keep up with the vaccination rates, as restrictions would be progressively lifted once the target for vaccination rates is met^[44].

At the time of writing, Australia has amassed 214,708 confirmed COVID-19 cases, with 2,020 deaths in the country. They have also achieved the target (80%) of fully vaccinated individuals as 87.9% of the population was fully vaccinated on 3 December 2021^[32]. This target was set as part of phase three, the vaccine consolidation phase in the national plan to transition Australia's COVID-19 response. During this phase, vaccinated residents were exempt from domestic restrictions, and restrictions in travelling outbound for these individuals were lifted. Lockdowns would also be infrequent and, if implemented, would be highly targeted to specific areas of outbreaks only^[43]. Like the Singapore society, the Australians were prepping to move into an endemic phase with COVID-19. However, a new variant (B.1.1.529) of the coronavirus known as the Omicron variant was detected in South Africa on 24 November 2021^[45]. An update given by the local government on 30 November 2021 notified the public that six cases of the Omicron strain had been reported in Australia, with all six cases in quarantine and the individuals had mild to no symptoms. The Australian government continues to reassure the people that they are well prepared to manage the new variant as they begin to implement travel restrictions, revised quarantine and home isolation requirements. For instance, non-citizens traveling from South Africa will be temporarily denied entry into Australia, while Australians from South Africa must undertake a 14-day quarantine under state and territory public health requirements. Moreover, the government noted that they are utilising a suppression approach

in handling the Omicron variant to limit the rate of incursions into Australia. It was also noted that there is a sufficient supply of booster doses of the COVID-19 vaccines for Australians^[46]. The country is still looking forward to moving into phase four, the post-vaccination phase of the national plan, but plans are placed on hold due to the emergence of the Omicron variant in Australia. With phase four, individuals who are 18 and older will be able to receive a booster dose of vaccine if they have received the second dose of their COVID-19 vaccination at least six months ago. The booster dose will help increase protection against severe disease due to COVID-19, and currently only Comirnaty is approved and preferred as a COVID-19 booster dose in Australia^[47]. In addition, phase four is when the community will live with COVID-19, international borders will be opened, and both vaccinated and non-vaccinated will be allowed entry into the country following specific guidelines^[39, 43].

3. Conclusion

As of 3 December 2021, the daily total for COVID-19 cases in Australia has been decreasing since the peak in October 2021, and vaccination rates have achieved 87.9%, with over 17 million residents fully vaccinated. Australia is rapidly moving into an endemic phase with COVID-19, hoping that life will return to normal soon. The Australian government has successfully controlled the pandemic despite the outbreaks as they could maintain a low fatality rate. Early actions by the government, such as the closure of national borders, increasing community-wide testing, establishing lockdowns for areas with high positivity rates, and mask mandates indoors, have effectively controlled the spread of the virus^[19]. The government also released an app to identify COVID-19 positive individuals and their close contacts effectively and efficiently. These individuals could be easily traced and put into isolation and treatment. Moving into 2021, the Australian government focused on distributing the COVID-19 vaccines as soon as possible to reduce the spread of the virus and prevent severe illnesses within those tested positive. In addition, the authorities were not lax with restrictions even when vaccination rates were high, as lockdowns were still being enforced when outbreaks occurred. In short, the strategies used in Australia to handle the pandemic can be modeled by other countries that wish to move into an endemic phase with COVID-19.

Author Contributions: K-YL performed the literature search, critical data analysis, and manuscript writing. LT-HT performed proofreading and editing. VL and JW-FL performed proofreading and conceptualised this review writing project.

Funding: No external funding was provided for this research.

Acknowledgements: The authors would like to acknowledge Professor Shajahan Yasin, Head of School, Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Letchumanan V, Ab Mutalib N-S, Goh B-H, *et al.* Novel coronavirus 2019-nCoV: Could this virus become a possible global pandemic. *Prog Microbes Mol Biol* 2020; 3(1).

2. Centers for Disease Control and Prevention (CDC). Symptoms. 2021 [Accessed 2021 Nov 5]; Available from: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>.
3. COVID-19 Treatment Guidelines Panel. Coronavirus disease 2019 (COVID-19) treatment guidelines. 2021 [Accessed 2021 Nov 5]; Available from: <https://www.covid19treatmentguidelines.nih.gov/>.
4. Zhang J, Yu M, Tong S, *et al.* Predictive factors for disease progression in hospitalised patients with coronavirus disease 2019 in Wuhan, China. *J Clin Virol* 2020; 127: 104392.
5. Silva Andrade B, Siqueira S, de Assis Soares WR, *et al.* Long-COVID and post-COVID health complications: an up-to-date review on clinical conditions and their possible molecular mechanisms. *Viruses* 2021; 13(4): 700.
6. Centers for Disease Control and Prevention (CDC). Post-COVID conditions: overview. 2021 [Accessed 2021 Nov 5]; Available from: <https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-care/post-covid-conditions.html>.
7. Ser H-L, Letchumanan V, Law JW-F, *et al.* PMMB COVID-19 Bulletin: Spain (18th April 2020). *Prog Microbes Mol Bio* 2020; 3(1).
8. Tan LT-H, Letchumanan V, Ser H-L, *et al.* PMMB COVID-19 Bulletin: United Kingdom (22nd April 2020). *Prog Microbes Mol Bio* 2020; 3(1).
9. Ser H-L, Tan LT-H, Law JW-F, *et al.* Genomic analysis of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) strains isolated in Malaysia. *Prog Microbes Mol Bio* 2020; 3(1).
10. Bremmer I. The best global responses to the COVID-19 pandemic, 1 year later. 2021 [Accessed 2021 Nov 5]; Available from: <https://time.com/5851633/best-global-responses-covid-19/>.
11. Johnson D, Ren SEC, Johnson HD, *et al.* COVID-19: Are Malaysians embracing or suffering the new normality? *Prog Microbes Mol Biol* 2020; 3(1).
12. COVID-19, Australia: Epidemiology Report 7 (Reporting week ending 19:00 AEDT 14 March 2020). *Commun Dis Intell (2018)* 2020; 44.
13. Wee LE, Ko KKK, Ho WQ, *et al.* Community-acquired viral respiratory infections amongst hospitalised inpatients during a COVID-19 outbreak in Singapore: co-infection and clinical outcomes. *J Clin Virol* 2020; 128: 104436.
14. Mahale P, Rothfuss C, Bly S, *et al.* Multiple COVID-19 outbreaks linked to a wedding reception in rural Maine—August 7–September 14, 2020. *Morbidity and Mortality Weekly Report* 2020; 69(45): 1686.
15. Hashim JH, Adman MA, Hashim Z, *et al.* COVID-19 epidemic in Malaysia: epidemic Progression, challenges, and response. *Public Health Front* 2021; 9.
16. Loo K-Y, Letchumanan V, Ser H-L, *et al.* COVID-19: Insights into potential vaccines. *Microorganisms* 2021; 9(3): 605.
17. Francis AI, Ghany S, Gilkes T, *et al.* Review of COVID-19 vaccine subtypes, efficacy and geographical distributions. *Postgrad Med J* 2021.
18. Caly L, Druce J, Roberts J, *et al.* Isolation and rapid sharing of the 2019 novel coronavirus (SARS-CoV-2) from the first patient diagnosed with COVID-19 in Australia. *Med J Aust* 2020; 212(10): 459–462.
19. Fitzgerald DA and Wong GW COVID-19: A tale of two pandemics across the Asia Pacific region. *Paediatr Respir Rev* 2020; 35: 75–80.

20. World Health Organisation (WHO). COVID-19: Australia. 2021 [Accessed 2021 Nov 24]; Available from: <https://covid19.who.int/region/wpro/country/au>.
21. COVID-19, Australia: Epidemiology Report 9 (Reporting week to 23:59 AEDT 29 March 2020). *Commun Dis Intell* (2018) 2020; 44.
22. COVIDSafe: new app to slow the spread of the coronavirus. 2020, Australian Department of Health.
23. COVID-19, Australia: Epidemiology Report 21 (Fortnightly reporting period ending 19 July 2020). *Commun Dis Intell* (2018) 2020; 44.
24. COVID-19, Australia: Epidemiology Report 22 (Fortnightly reporting period ending 2 August 2020). *Commun Dis Intell* (2018) 2020; 44.
25. COVID-19 Australia: Epidemiology Report 29: Fortnightly reporting period ending 8 November 2020. *Commun Dis Intell* (2018) 2020; 44.
26. COVID-19 Australia: Epidemiology Report 30: Fortnightly reporting period ending 22 November 2020. *Commun Dis Intell* (2018) 2020; 44.
27. COVID-19 Australia: Epidemiology Report 32: Four-week reporting period ending 3 January 2021. *Commun Dis Intell* (2018) 2021; 45.
28. Thye AY-K, Law JW-F, Pusparajah P, *et al.* Emerging SARS-CoV-2 Variants of Concern (VOCs): An Impending Global Crisis. *Biomed* 2021; 9(10): 1303.
29. COVID-19 Australia: Epidemiology Report 36 Reporting period ending 28 February 2021. *Commun Dis Intell* (2018) 2021; 45.
30. COVID-19 Australia: Epidemiology Report 33 Fortnightly reporting period ending 17 January 2021. *Commun Dis Intell* (2018) 2021; 45.
31. Australian Government Department of Health. First COVID-19 vaccinations in Australia. 2021 [Accessed 2021 Nov 5]; Available from: <https://www.health.gov.au/news/first-covid-19-vaccinations-in-australia>.
32. Australian Government Department of Health. Vaccination numbers and statistics. 2021 [Accessed 2021 Nov 25]; Available from: <https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/numbers-statistics>.
33. Lopez Bernal J, Andrews N, Gower C, *et al.* Effectiveness of Covid-19 vaccines against the B.1.617.2 (Delta) variant. *New Engl J Med* 2021; 385(7): 585–594.
34. Chemaitelly H, Yassine HM, Benslimane FM, *et al.* mRNA-1273 COVID-19 vaccine effectiveness against the B.1.1.7 and B.1.351 variants and severe COVID-19 disease in Qatar. *Nat Med* 2021; 27(9): 1614–1621.
35. Centers for Disease Control and Prevention (CDC). Vaccines work. 2021 [Accessed 2021 Nov 15]; Available from: <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/effectiveness/work.html>.
36. COVID-19 Australia: Epidemiology Report 40: Reporting period ending 25 April 2021. *Commun Dis Intell* (2018) 2021; 45.
37. COVID-19 Australia: Epidemiology Report 34: Reporting period ending 31 January 2021. *Commun Dis Intell* (2018) 2021; 45.
38. COVID-19 Australia: Epidemiology Report 45 Reporting period ending 4 July 2021. *Commun Dis Intell* (2018) 2021; 45.
39. Prime Minister of Australia, National Cabinet Statement (National plan to transition Australia's National COVID-19 response). 2021.

40. COVID-19 Australia: Epidemiology Report 52 Reporting period ending 10 October 2021. *Commun Dis Intell* (2018) 2021; 45.
41. COVID-19 Australia: Epidemiology Report 50: Reporting period ending 12 September 2021. *Commun Dis Intell* (2018) 2021; 45.
42. COVID-19 Australia: Epidemiology Report 53 Reporting period ending 24 October 2021. *Commun Dis Intell* (2018) 2021; 45.
43. National plan to transition Australia's national COVID-19 response. [Accessed 2021 Nov 5]; Available from: <https://www.australia.gov.au/national-plan>.
44. Australia's Melbourne set for Covid-19 lockdown exit despite record cases as vaccinations spike, in *The Straits Times*. 2021.
45. Australian Government Department of Health. Omicron variant. 2021 [Accessed 2021 Dec 2]; Available from: <https://www.health.gov.au/news/health-alerts/novel-coronavirus-2019-ncov-health-alert/omicron-variant>.
46. Prime Minister of Australia, National Cabinet Statement 58. 2021.
47. Australian Government Department of Health. COVID-19 booster vaccine advice. 2021 [Accessed 2021 Nov 10]; Available from: <https://www.health.gov.au/initiatives-and-programs/covid-19-vaccines/getting-your-vaccination/booster-doses>.



Author(s) shall retain the copyright of their work and grant the Journal/Publisher right for the first publication with the work simultaneously licensed under:

Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0). This license allows for the copying, distribution and transmission of the work, provided the correct attribution of the original creator is stated. Adaptation and remixing are also permitted.