



## **Supporting Information**

### **Supplementary results**

**This appendix was part of the submitted manuscript and has been peer reviewed.  
It is posted as supplied by the authors.**

Appendix to: Grout L, Katar A, Ait Ouakrim D, et al. Failures of quarantine systems for preventing COVID-19 outbreaks in Australia and New Zealand. *Med J Aust* 2021; doi: 10.5694/mja2.51240.

**List of COVID-19 border control failures associated with quarantine systems in Australia and New Zealand, to 15 June 2021**

<b>Event</b>	<b>Extent of known spread</b>	<b>Details</b>
<b>Australia</b>		
Rydges Hotel – Victoria "second wave" outbreak (late May to late October 2020)	Over 19,800 cases, <sup>1,2</sup> and over 800 deaths <sup>3</sup>	Genomic testing indicated that 99% of Victoria's second wave of community COVID-19 cases were linked to transmission events related to returned travellers infecting workers at the Rydges Hotel in Carlton and the Stamford Plaza Hotel (see row below) in Melbourne central business district, which were used as facilities for quarantine. <sup>4</sup> Specifically, around 90% of cases can be traced back to a single family of four that returned to Australia in mid-May and were quarantined at the Rydges Hotel. <sup>5</sup> The virus then spread from the infected workers to the community, with high rates of local transmission. <sup>4</sup> The outbreak led to a stringent lockdown for 112 days in the state, with particularly strict measures in the major city of Melbourne. <sup>6</sup> At least nine people employed in the Melbourne hotel quarantine program tested positive between late July and early October 2020, although the cases may have been a reflection of substantial community transmission in Melbourne at the time rather than additional hotel quarantine failures. <sup>7</sup> Two of those cases worked while infectious. <sup>7</sup>
Stamford Plaza Hotel – Victoria "second wave" outbreak (late May to late October 2020)	See row above	Almost 10% of cases in Victoria's "second wave" outbreak were attributable to an outbreak at the Stamford Hotel in mid-June. <sup>4</sup> The outbreak was traced back to international travellers who returned to Australia in early June, <sup>4</sup> and then was spread by security guards who worked at the facility. <sup>8</sup>
Marriot Hotel at Circular Quay in Sydney, NSW (August 2020)	2 security guards	A security guard at the Marriot Hotel at Circular Quay in Sydney tested positive for SARS-CoV-2 on 15 August. <sup>9</sup> Genomic sequencing linked the infection to a returned overseas traveller at the facility. <sup>9</sup> A second security guard subsequently tested positive. <sup>10</sup>
Parafield outbreak in South Australia (December 2020)	33 cases <sup>3</sup>	Genomic testing indicated that Adelaide's Parafield cluster was linked to transmission events related to a returned traveller in a quarantine hotel infecting workers in the facility, possibly due to poor ventilation at the facility. <sup>4</sup> The virus spread from the workers to the community, resulting in a strict lockdown. <sup>4</sup>
Quarantine hotel facility cleaner infected in Sydney, NSW (December 2020)	A single worker	A quarantine hotel worker (a cleaner) who completed shifts at two quarantine hotels, the Ibis Hotel and the Novotel in Darling Harbour in Sydney, tested positive for SARS-CoV-2 in early December. <sup>11</sup> There was also spread in a facility with 5 returned travellers being infected.
Airport Bus Driver NSW (December 2020)	A single worker	A Sydney van driver who drives international flight crew to and from Sydney Airport, tested positive for SARS-CoV-2 on 17 December 2021. <sup>12</sup> Although he was symptomatic and worked for 3 days before being tested, this did not cause an outbreak and it was contained to one case. <sup>12</sup>

Event	Extent of known spread	Details
Avalon outbreak in NSW (January 2021)	151 cases (as of 11 January 2021) <sup>13</sup>	It has been reported that genomic sequencing suggests that the strain is of US origin and entered Australia via an infectious returned traveller who entered hotel quarantine upon arrival. <sup>11</sup> It was unknown how the virus spread to the community (as per the time of writing in January 2021). Case numbers include those from the linked Croydon and Wollongong clusters, but not the linked Black Rock cluster in Victoria (27 cases as of 5 January 2021) due to separate reporting by states.
Berala outbreak in NSW (January 2021)	26 cases (as of 11 January 2021) <sup>13</sup>	It has been reported that genomic sequencing linked the outbreak back to infectious international travellers. <sup>14</sup> A patient transport worker transferred infectious travellers from Sydney Airport to a hospital. <sup>13, 14</sup> Another patient transport worker who was a close contact of the first then also tested positive. <sup>13, 14</sup> The virus then spread from the second infected worker into the community, seeding the Berala outbreak. <sup>14</sup>
Hotel Grand Chancellor outbreak in Brisbane, Queensland (January 2021)	6 cases (as of 13 January 2021) <sup>15</sup>	A hotel quarantine worker in Brisbane tested positive in early January 2021 for the Alpha variant of SARS-CoV-2. <sup>16</sup> This case led to a three-day lockdown in the greater Brisbane area, while contact tracers worked to ensure there was no community transmission of the strain. <sup>17</sup> It was later revealed that there were six genomically linked cases within the quarantine facility, including the hotel quarantine worker and five returned travellers. <sup>15</sup>
Four Points by Sheraton hotel, Western Australia (January 2021)	A single worker	A Perth quarantine hotel security guard, who worked a second job as a ride share driver, tested positive to the Alpha strain of SARS-CoV-2, sparking a five-day lockdown for 80 per cent of the state's population, in an attempt to stop any further transmission. <sup>18</sup> It's believed he was exposed to the virus on the 26 January when he worked at Four Points by Sheraton, on the same floor where a quarantined returned traveller with a confirmed case of infection with the Alpha variant, was staying. After feeling sick on 28 January, the case visited a GP, and tested positive on 30 January. The exact cause is unknown, but it's believed poor ventilation could be a factor. <sup>19</sup> This comes a week after Western Australia committed to daily testing of the hotel quarantine staff, instead of weekly. <sup>20</sup> Quarantine hotel staff, including cleaners, security guards and catering staff, are no longer allowed to have second jobs but will receive a pay increase of about 40 per cent as compensation. <sup>18</sup> It has been announced an inquiry will be held. <sup>19</sup>
Grand Hyatt Hotel, Victoria (February 2021)	A single worker	One 26-year-old staff member at the Grand Hyatt Hotel (an isolation facility that was used for players and support staff for the Australian Open) tested positive for a highly transmissible variant of SARS-CoV-2 (ie, the B.1.1.7 or Alpha variant) in February 2021, leading to heightened restrictions. <sup>21</sup> The close contacts of the case all tested negative, and the outbreak did not spread into the wider community. <sup>21</sup>

Event	Extent of known spread	Details
Holiday Inn Hotel Cluster, Victoria (February 2021)	22 cases	Twenty-two cases have been linked to the Holiday Inn cluster in Melbourne, where an infected returned traveller used a nebuliser, causing an outbreak and a 5-day lockdown. <sup>22</sup> There were no further cases detected in the community during the lockdown as all confirmed cases had already been informed of their status as close contacts and were in isolation for the duration of their infectious period. Cases included returned travellers, hotel quarantine staff and their families, as well as a Melbourne Airport worker. <sup>22</sup>
Princess Alexandra Hospital Doctor outbreak, Brisbane, Queensland (March 2021)	6 cases <sup>23</sup>	A doctor and a nurse (see row below) who worked at the Princess Alexandra Hospital while unvaccinated were linked to two separate COVID-19 outbreaks. <sup>23</sup> While both outbreaks were the highly transmissible Alpha variant of the disease and originated at the same hospital, they were from two different sources. <sup>23</sup> The doctor tested positive on 12 March 2021, with subsequent infections in five other persons. <sup>23</sup> These outbreaks resulted in a three-day lockdown just before the Easter holiday. <sup>23</sup>
Princess Alexandra Hospital Nurse outbreak, Brisbane, Queensland (March 2021)	13 cases <sup>24</sup>	A nurse (see row above) who worked on a COVID-19 ward at the Princess Alexandra Hospital while unvaccinated tested positive in late March. <sup>23</sup> Genome sequencing links the case to an overseas traveller from India who was being cared for at the hospital. <sup>25</sup> The nurse's sister, a number of attendees at a "hen's party", and several other contacts were subsequently infected. <sup>23</sup>
Sofitel Wentworth in Sydney, NSW (March 2021)	A single security guard	A security guard at the Sofitel Wentworth in Sydney tested positive for SARS-CoV-2 on 13 March through routine surveillance testing. <sup>26</sup> Genomic sequencing linked the case to a returned traveller and subsequent testing revealed that another returned traveller was also infected within the facility. <sup>26</sup>
Mercure Hotel Cluster in Perth, Western Australia (April 2021)	3 cases	A mother and her four-year-old daughter who had returned from the UK, and a traveller who had returned from China contracted the virus while in hotel quarantine. <sup>27</sup> The mother and child's infections were detected on 16 April and genomically linked to a couple who had returned from India on 10 April and subsequently tested positive for the Alpha variant. <sup>27</sup> All of the travellers were staying in adjacent rooms on the same hotel floor. <sup>27</sup> The returned traveller from China tested negative on release from hotel quarantine in Perth on 17 April, but later tested positive for SARS-CoV-2 in Melbourne. <sup>28</sup> The case then spent up to five days in the community in Perth while infectious, and two linked community cases were identified. <sup>29</sup> The outbreak led to a three-day lockdown in Perth and the neighbouring Peel region, <sup>28</sup> and a brief suspension in quarantine-free travel between Western Australia and NZ. <sup>29</sup> The ventilation at the Mercure Hotel had previously been identified as the riskiest among Western Australia's 10 quarantine hotels, with an engineer finding that the corridors had no independent airflow with oxygen supply leaking from the adjoining rooms. <sup>27</sup> Chief Health Officer Andy Robertson had

Event	Extent of known spread	Details
		recommended that the Mercure Hotel no longer operate as a quarantine facility on 14 April. <sup>27</sup>
Community cases in NSW (May 2021)	2 known cases (possibly more)	On 5 May 2021, a man in his 50s from Sydney was diagnosed with COVID-19. <sup>30</sup> His wife subsequently tested positive. <sup>30</sup> The cases were genomically linked to a traveller who returned from the US and was moved to a quarantine facility on 28 April. <sup>31</sup> However, an epidemiological link between the traveller and the cases was not established, <sup>30</sup> (at least at the time of writing), suggesting that there may have been additional cases in the community. Additionally, fragments of coronavirus were detected in wastewater samples in Sydney. <sup>31</sup> The cases did not result in a lockdown in NSW, but additional restrictions, including compulsory masking and limits on indoor gatherings were put in place. <sup>30</sup> Additionally, the situation led the NZ Government to temporarily pause their quarantine-free travel arrangement with NSW for 48 hours, and a close contact of one of the cases was placed in a MIQ facility in Christchurch after travelling to NZ. <sup>30</sup>
Pan Pacific Hotel in Perth, Western Australia (May 2021)	3 cases	A security guard at the Pan Pacific Hotel in Perth tested positive to SARS-CoV-2 on 1 May. <sup>32</sup> He worked on the same floor as two infected travellers (one from the US and one from Indonesia). <sup>32</sup> He had had the first dose of the Pfizer vaccine, but not the second. <sup>32</sup> Two of the seven people that he lived with subsequently tested positive. <sup>32</sup> This was an event for which Western Australia was still subject to restrictions from a previous outbreak. <sup>32</sup>
Whittlesea Community Outbreak in Victoria, stemming from the Playford Hotel in South Australia (May 2021)	At least 63 cases (outbreak was still active as of 23 June 2021)	A traveller who returned from India via the Maldives and Singapore completed the required stay in quarantine in South Australia. <sup>33</sup> After leaving quarantine on 4 May, he then travelled directly to his home in Victoria. He subsequently developed symptoms and tested positive to SARS-CoV-2. <sup>33</sup> It is thought that the traveller likely contracted the virus while in quarantine in South Australia; it has been reported that the traveller stayed next door to another person who tested positive for the virus. <sup>33</sup> This later caused a widespread outbreak, spreading into an aged care facility, and resulted in a 14-day lockdown followed by tight restrictions. <sup>34</sup>
West Melbourne Delta Variant Cluster, Victoria (May 2021)	15 known cases (possibly more)	This outbreak has been genomically linked to a hotel quarantine case that arrived in Victoria from Sri Lanka on 8 May 2021 and tested positive on the same day. <sup>35</sup> The case was subsequently moved from the Novotel Ibis quarantine hotel in Melbourne's CBD to the Holiday Inn on 9 May, and then was released from quarantine on 23 May 2021. <sup>35</sup> The Delta variant was then detected in members of a family in Victoria that were known to have travelled to parts of NSW, and had the same genomic sequence as the hotel quarantine case. <sup>35</sup> However, there is still uncertainty about the link between these cases, as no formal epidemiological link was established, suggesting that there may have been additional cases in the community. <sup>35</sup>

Event	Extent of known spread	Details
Airport Limo Driver in NSW (June 2021)	1 case (outbreak was still active as of 23 June 2021)	A 60-year-old airport limo driver, who was involved in transporting international flight crew to and from Sydney Airport, tested positive for SARS-CoV-2 on 15 June. <sup>36</sup> It's believed he transported a crew of three from a FedEx freight plane before he became infectious, on 11 June. <sup>36</sup> At the time of writing this case was still being investigated, as authorities believed this man breached NSW quarantine and testing protocols. <sup>36</sup>
<b><i>New Zealand</i></b>		
Auckland outbreak (August 2020)	A total of 179 cases, with 3 deaths <sup>37</sup>	The cause of this outbreak remains unknown, but genomic work probably provides the best evidence to this being a border facility (isolation or quarantine facility) failure: "There are a large number of similar genomes which are from the United Kingdom (UK), which would seem to suggest the UK is the most likely source of any unknown importation". <sup>38</sup> This was at a time when 40% of cases in NZ quarantine/isolation facilities did not have genomic work on the virus infecting them (ie, there was not enough complete virus in the samples). It was also estimated <sup>38</sup> that there was only a very tiny risk of this outbreak being a continuation of the March/April spread of the pandemic in NZ: "Our Bayesian phylogenetic analysis ... estimates that there is a 0.4% probability that case 20VR2563 is in the "sister clade" of the Auckland cluster." Finally, the chance of the outbreak being from contaminated imported food was also considered very unlikely: "Our Bayesian phylogenetic analysis ... shows that the estimated mutation rate on the branch leading to the cluster is not a lot smaller than elsewhere in the tree, lending little weight to the possibility that the virus lay dormant on packing material for a long period of time."
Border facility maintenance worker infected (August 2020)	A single worker	A shared lift environment in a quarantine hotel (the Rydges Hotel in Central Auckland) was the source suspected by officials, <sup>39</sup> with the sharing being only minutes apart. <sup>38</sup> The genomic sequencing indicated the same virus infecting the worker as per a recent traveller in the same facility. <sup>38</sup>
Border facility health worker infected (September 2020)	A single worker	This was a work-related infection associated with a hotel facility used for isolating infected cases (the Jet Park Hotel, Auckland), given that the case was linked via genomic sequencing to three cases within the facility. <sup>40</sup> Some details of the full investigation report were provided to the media and these suggested that while the nurse wore protective personal equipment (PPE), there was a period where the associated patient did not have a mask on during treatment. <sup>41</sup> This situation could have contributed to a failure of the PPE worn by the nurse.
Traveller-related outbreak / Crowne Plaza, Christchurch border facility (September 2020)	The 2 returnees and 4 others	Three returnees (Cases A, B, and C) tested positive for SARS-CoV-2 while in an MIQ facility (ie, these cases were caught at the border). <sup>42</sup> Evidence suggests that two returnees (Cases D and E) were then infected through suspended aerosol particles while in the same hotel quarantine facility (Cases D and E were staying in

Event	Extent of known spread	Details
		the room next to Case C), before then moving into the community. <sup>42,43</sup> These infected returnees appear to have then infected another person (Case G), potentially on a charter flight after leaving the facility. <sup>42,43</sup> A household contact of Cases D and E was also infected (Case F). <sup>42,44</sup> Two household contacts of Case G were also infected. <sup>42</sup>
Border facility health worker (Case A) in Christchurch (November 2020)	A single worker	This was a work-related infection associated with a hotel facility used for isolating infected cases. Both this case (and “Case B” below) had the virus genome sequencing linked to infection in a group of international mariners in the same facility but with different virus subtypes in each case. <sup>39</sup> “The finding supports the current theory that there were two separate events infecting both workers at the facility.” These cases of infected health workers appear to have contributed to border control nurses threatening strike action if they were not supplied with improved PPE. One estimate was that 12 of the mariners were infected on arrival in NZ, but with subsequent spread within the facility a total of 31 mariners were ultimately infected. <sup>45</sup>
Another border facility health worker (Case B) (see above)	A single worker	This was a separate work-related infection associated with a border control facility – see in the row above.
Defence Force worker outbreak (November 2020)	The worker, a co-worker and 4 others (total of 6 cases)	This was a work-related infection in a Defence Force worker associated with a hotel border facility in Auckland (used for isolating known infected cases). “The genome sequencing we have conducted on Case A’s test result shows a direct link to two travellers who are part of a family group in the quarantine facility”. <sup>46</sup> The route of transmission to one of the community cases remains a mystery (albeit they worked in the same locality within Auckland City). Associated with these cases, the Prime Minister made statements around the need for further risk reduction. <sup>47</sup>
Traveller infectious after leaving a quarantine facility (January 2021)	1 traveller	A traveller was identified as being infectious in the community after leaving a quarantine facility (Pullman, Auckland). The traveller reportedly had the Beta variant (lineage B.1.351) of the pandemic virus. <sup>48</sup> Genome sequencing has linked this case to another traveller who was in the same facility. <sup>49</sup> The transmission mechanism has not been precisely identified with investigations still proceeding as of mid-February 2021. However, officials consider it likely to have been a separate transmission event to the one in the following row.
Travellers infectious after leaving a quarantine facility (January 2021)	2 travellers and a contact	Two travellers (a parent and child) were identified as infectious in the community after being infected with the Beta variant of the pandemic virus, with a link to a quarantine facility (Pullman, Auckland). <sup>50</sup> A close contact (the mother of the child) also became infected. <sup>51</sup> The transmission mechanism has not been

Event	Extent of known spread	Details
		precisely identified with investigations still proceeding as of mid-February 2021.
Managed isolation and quarantine workers (March 2021)	3 workers	A cleaner at the Grand Millennium Hotel managed isolation and quarantine (MIQ) facility in Auckland (Case A) tested positive during routine surveillance testing on 22 March 2021. <sup>52</sup> While a household contact returned a weak positive the next day, <sup>53</sup> subsequent tests were negative. <sup>54</sup> The MIQ worker had recently been vaccinated (with the Pfizer/BioNTech vaccine) on 23 February, with a second dose on 16 March, <sup>53</sup> although they tested positive before full protection from the vaccine could be expected. Their family had not yet been vaccinated. <sup>53</sup> Genome sequencing revealed that Case A was infected with a highly transmissible variant (Alpha) and was linked to a traveller in the facility who had arrived on 13 March. <sup>55</sup> In early April, two unvaccinated security guards at the same facility tested positive (Cases B and C) and genome sequencing linked the two cases to Case A. <sup>56,57</sup>

COVID-19 = coronavirus disease 2019; SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.



## References

1. Zhang L, Tao Y, Zhuang G, et al. Characteristics analysis and implications on the COVID-19 reopening of Victoria, Australia. *Innovation (N Y)* 2020; 1: 100049.
2. Department of Health and Human Services, State Government of Victoria. Tracking coronavirus in Victoria, 2020. <https://www.dhhs.vic.gov.au/tracking-coronavirus-victoria> (accessed Apr 2021).
3. Tsirtsakis, A; "Ending the second wave: How did Victoria get to zero active cases?" newsGP 24 Nov 2020 <https://www1.racgp.org.au/newsgp/clinical/ending-the-second-wave-how-did-victoria-get-to-zero>
4. Board of Inquiry into the COVID-19 Hotel Quarantine Program. COVID-19 hotel quarantine inquiry final report and recommendations, Volume 1. Victorian Government Printer, 2020.
5. Taylor J. Hotel quarantine linked to 99% of Victoria's covid cases, inquiry told. *The Guardian* (Victoria) 2020; 18 Aug. <https://www.theguardian.com/australia-news/2020/aug/18/hotel-quarantine-linked-to-99-of-victorias-covid-cases-inquiry-told> (accessed Apr 2021).
6. Mercer P. Covid: Melbourne's hard-won success after a marathon lockdown. *BBC News* (Australia) 2020; 26 Oct. [www.bbc.com/news/world-australia-54654646](http://www.bbc.com/news/world-australia-54654646) (accessed Apr 2021).
7. Covid-19 coronavirus: Officials still searching for the source of Sydney outbreak. *NZ Herald* (World) 2020; 20 Dec. <https://www.nzherald.co.nz/world/covid-19-coronavirus-officials-still-searching-for-source-of-sydney-outbreak/UCDN5SOFNOKFM232YTXG4AWDK4/> (accessed Apr 2021).
8. Lucas C. Stamford hotel blames government and guards for outbreak. *The Age* (Politics/Victoria/Coronavirus pandemic) 2020; 2 Jul. <https://www.theage.com.au/politics/victoria/stamford-hotel-blames-government-and-guards-for-outbreak-20200702-p558e6.html> (accessed Apr 2021).
9. NSW coronavirus investigation after Sydney hotel quarantine security guard tests positive. *ABC News* 2020; 18 Aug. <https://www.abc.net.au/news/2020-08-18/nsw-coronavirus-hotel-quarantine-security-guard-investigated/12570336> (accessed Apr 2021).
10. Aubusson K, Chung L. Australian health authorities racing to contain cluster as NSW records 14 new covid-19 cases. *Stuff* 2020; 29 Aug. <https://www.stuff.co.nz/world/australia/300094865/australian-health-authorities-racing-to-contain-cluster-as-nsw-records-14-new-covid-19-cases> (accessed Apr 2021).
11. Tsirtsakis A. Is it time for a national approach to hotel quarantine? *newsGP* (Clinical) 2020; 4 Dec. <https://www1.racgp.org.au/newsgp/clinical/is-it-time-for-a-national-approach-to-hotel-quaran> (accessed Apr 2021).
12. Nguyen K. NSW coronavirus warning as Sydney airport driver tests positive for COVID-19. *ABC News* 2020; 16 Dec. <https://www.abc.net.au/news/2020-12-16/nsw-confirms-new-locally-acquired-coronavirus-case/12988866> (accessed Jun 2021).
13. NSW Health. Covid-19 weekly surveillance in NSW: Epidemiological week 52, ending 26 December 2020. NSW Government; 2021. <https://www.health.nsw.gov.au/Infectious/covid-19/Documents/covid-19-surveillance-report-20201226.pdf> (accessed Apr 2021).
14. Lathouris O. Berala cluster: Syney COVID outbreak linked to BWS where two infected staff worked throughout Christmas. *Nine News* (National) 2021; 4 Jan. <https://www.9news.com.au/national/coronavirus-nsw-update-berala-bws-cluster-not-linked-to-avalon-sydney-northern-beaches-covid19-strain-genomic-testing-finds/26e4bfd0-df34-42d6-852c-5ac774bc8a11> (accessed Apr 2021).
15. Incident response set up following confirmation of Brisbane hotel cluster [press release]. Queensland Government, 2021; 13 Jan. <https://www.health.qld.gov.au/news-events/doh-media-releases/releases/incident-response-set-up-following-confirmation-of-brisbane-hotel-cluster> (accessed Apr 2021).
16. Gramenz E. Quarantine hotel worker tests positive to coronavirus in Brisbane, Queensland records two new cases. *ABC News* 2021; 7 Jan. <https://www.abc.net.au/news/2021-01-07/coronavirus-queensland-quarantine-hotel-worker-tests-positive/13034046> (accessed Apr 2021).
17. Queensland Government. Greater Brisbane 3-day lockdown 2021 <https://www.qld.gov.au/health/conditions/health-alerts/coronavirus-covid-19/current-status/greater-brisbane-lockdown> (accessed Apr 2021).
18. Manfield E. WA coronavirus hotel quarantine security companies agree to ban on second jobs. *ABC News* 2021; 10 Feb. <https://www.abc.net.au/news/2021-02-10/wa-hotel-quarantine-security-guards-to-end-second-jobs-next-week/13139172> (accessed Apr 2021).
19. Hendrie D. Latest hotel quarantine leak proves 'we're not learning'. *newsGP*. 2021; 1 Feb. <https://www1.racgp.org.au/newsgp/clinical/latest-hotel-quarantine-leak-proves-we-re-not-lear> (accessed Apr 2021).
20. Woodley M. National Cabinet strengthens Australia's border controls. *newsGP* 2021; 8 Jan. <https://www1.racgp.org.au/newsgp/clinical/national-cabinet-strengthens-australia-s-border-co> (accessed Apr 2021).
21. No new local cases in Victoria, amid hotel quarantine leak. *The New Daily* 2021; 5 Feb. <https://thenewdaily.com.au/news/coronavirus/2021/02/05/hotel-quarantine-victoria-zero/> (accessed Apr 2021).
22. Estcourt D, Sakkal P. One in intensive care as Holiday Inn COVID-19 cluster grows to 22. *The Age* (Victoria/Coronavirus pandemic) 2021; 19 Feb. Available from: <https://www.theage.com.au/national/victoria/three-new-covid-19-cases-linked-to-holiday-inn-cluster-emerge-20210219-p573wq.html> (accessed Apr 2021).
23. Motherwell S. How two clusters from one hospital triggered the Brisbane lockdown. *ABC News* 2021; 30 Mar. <https://www.abc.net.au/news/2021-03-30/brisbane-lockdown-clusters-coronavirus-explained-pa-hospital/100037608> (accessed Apr 2021).
24. Historic case linked to Brisbane COVID-19 cluster [press release]. Queensland Health, 2021; 11 Apr. <https://www.health.qld.gov.au/news-events/doh-media-releases/releases/historic-case-linked-to-brisbane-covid-19-cluster> (accessed Apr 2021).
25. Brisbane COVID-19 clusters explained [press release]. Queensland Health, 2021; 30 Mar. <https://www.health.qld.gov.au/news-events/doh-media-releases/releases/brisbane-covid-19-clusters-explained> (accessed Apr 2021).
26. Kontominas B. NSW quarantine hotel worker tests positive to coronavirus. *ABC News* 2021; 14 Mar. <https://www.abc.net.au/news/2021-03-14/nsw-records-one-new-covid-19-case-in-hotel-quarantine-worker/13246856> (accessed Apr 2021).
27. McNeill H, de Kruijff P. Perth plunged into three-day lockdown over Mercure Hotel cluster. *WA Today* (Coronavirus pandemic) 2021; 23 Apr. <https://www.watoday.com.au/national/western-australia/perth-plunged-into-lockdown-over-mercure-hotel-cluster-20210423-p571wb.html> (accessed Apr 2021).
28. Perth lockdown: WA premier wants designated quarantine facilities. *Radio New Zealand* (World/COVID-19) 2021; 24 Apr. <https://www.rnz.co.nz/news/world/441176/perth-lockdown-wa-premier-wants-designated-quarantine-facilities> (accessed Apr 2021).
29. Covid-19: 'Low' risk to NZ from Perth case - Health Ministry. *Radio New Zealand* (New Zealand/COVID-19) 2021; 24 April. <https://www.rnz.co.nz/news/national/441154/covid-19-low-risk-to-nz-from-perth-case-health-ministry> (accessed Apr 2021).
30. NSW records no new COVID-19 cases in community, ahead of NZ travel bubble decision. *1 News* 2021; 8 May. <https://www.tvnz.co.nz/one-news/world/nsw-records-no-new-covid-19-cases-in-community-ahead-nz-travel-bubble-decision> (accessed Jun 2021).
31. Cheng D. Covid 19 coronavirus: Thousands of travellers' plans disrupted as flights from NSW paused for 48 hours. *NZ Herald* (Politics) 2021; 7 May. <https://www.nzherald.co.nz/nz/covid-19-coronavirus-thousands-of-travellers-plans-disrupted-as-flights-from-nsw-paused-for-48-hours/VHG4T2FY5IUZVPND7GYZJMALVE/> (accessed Jun 2021).
32. De Poloni G. Perth hotel quarantine guard tests positive for COVID-19, along with two others. *ABC News* 2021; 1 May. <https://www.abc.net.au/news/2021-05-01/perth-hotel-quarantine-guard-tests-positive-for-covid-19/100109788> (accessed Jun 2021).
33. Victoria records COVID-19 case at Wollert, north of Melbourne, after man leaves SA hotel quarantine. *ABC News* 2021; 11 May. <https://www.abc.net.au/news/2021-05-11/victoria-covid-19-case-man-north-of-melbourne/100131038> (accessed Jun 2021).

34. Lockdown restrictions in regional Victoria to ease as Melbourne COVID outbreak grows to 63. *ABC News* 2021; 3 Jun. <https://www.abc.net.au/news/2021-06-03/new-covid-cases-detected-in-victoria-as-lockdown-continues/100186750> (accessed Jun 2021).
35. Dunstan J. How the Delta COVID variant likely jumped Victorian hotel quarantine and started Melbourne outbreak. *ABC News* 2021; 8 Jun. <https://www.abc.net.au/news/2021-06-08/melbourne-covid-outbreak-delta-strain-link-hotel-quarantine/100183468> (accessed Jun 2021).
36. Malone U. How the potentially 'inexcusable' actions fo a limo driver put Sydney on COVID-19 alert. *ABC News* 2021; 18 Jun. <https://www.abc.net.au/news/2021-06-17/nsw-quarantine-worker-may-have-breached-health-order/100223120> (accessed Jun 2021).
37. Ministry of Health. COVID-19: Source of cases 2021 [updated 23 Jun 2021]. <https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-data-and-statistics/covid-19-source-cases> (accessed Jun 2021).
38. Hadfield J, Douglas J, Geoghegan J, et al. Re-emergence of community transmission in Aotearoa New Zealand - Genomic overview of the Auckland Outbreak. Institute of Environmental Science and Research (ESR) 2021. <https://nextstrain.org/community/narratives/ESR-NZ/GenomicsNarrativeSARSCoV2/2020-10-01?n=5> (accessed Oct 2020).
39. 1 case of COVID-19 in quarantine worker [press release]. New Zealand Ministry of Health, 2020; 7 Nov. <https://www.health.govt.nz/news-media/media-releases/1-case-covid-19-quarantine-worker> (accessed Apr 2021).
40. 1 new case of COVID-19 [press release]. New Zealand Ministry of Health, 2020; 14 Sep. <https://www.health.govt.nz/news-media/media-releases/1-new-case-covid-19-18> (accessed Apr 2021).
41. Quinn R. Covid-infected nurse 'did everything right', report finds. *Radio New Zealand* 2020; 6 Nov. <https://www.rnz.co.nz/news/national/429973/covid-infected-nurse-did-everything-right-report-finds> (accessed Apr 2021).
42. Eichler N, Thornley C, Swadi T, et al. Transmission of Severe Acute Respiratory Syndrome Coronavirus 2 during border quarantine and air travel, New Zealand (Aotearoa). *Emerg Infect Dis* 2021; 27: 1274-1278.
43. No new cases of COVID-19 [press release]. New Zealand Ministry of Health, 2020; 2 Oct. <https://www.health.govt.nz/news-media/media-releases/no-new-cases-covid-19-50> (accessed Apr 2021).
44. 2 new cases of COVID-19 [press release]. New Zealand Ministry of Health, 2020; 27 Sep. <https://www.health.govt.nz/news-media/media-releases/2-new-cases-covid-19-21> (accessed Apr 2021).
45. Canterbury District Health Board. International mariners quarantine: Summary of official information request 2021 (updated 22 Jan 2021). <https://www.cdhb.health.nz/about-us/document-library/international-mariners-quarantine/> (accessed Apr 2021).
46. 4 new cases of COVID-19 in managed isolation [press release]. New Zealand Ministry of Health, 2020; 9 Nov. <https://www.health.govt.nz/news-media/media-releases/4-new-cases-covid-19-managed-isolation> (accessed Apr 2021).
47. Cheng D. Covid 19 coronavirus: Jacinda Ardern's immediate moves to minimise risk for MIQ workers. *New Zealand Herald* (Politics) 2020; 9 Nov. <https://www.nzherald.co.nz/nz/politics/covid-19-coronavirus-jacinda-arderns-immediate-moves-to-minimise-risk-for-miq-workers/ZGJEQB77N6Z3JIFUY3KMJJSETU/> (accessed Apr 2021).
48. 2 cases of COVID-19 in managed isolation; update on Northland case [press release]. New Zealand Ministry of Health, 2020; 26 Jan. <https://www.health.govt.nz/news-media/media-releases/2-cases-covid-19-managed-isolation-update-northland-case> (accessed Apr 2021).
49. Update on Northland case, and 6 cases of COVID-19 in managed isolation [press release]. New Zealand Ministry of Health, 2021; 25 Jan. <https://www.health.govt.nz/news-media/media-releases/update-northland-case-and-6-cases-covid-19-managed-isolation> (accessed Apr 2021).
50. 3 new cases of COVID-19 at the border and an update on border-related cases in Auckland [press release]. New Zealand Ministry of Health, 2021; 28 Jan. <https://www.health.govt.nz/news-media/media-releases/3-new-cases-covid-19-border-and-update-border-related-cases-auckland> (accessed Apr 2021).
51. 7 new cases of COVID-19 [press release]. New Zealand Ministry of Health, 2021; 4 Feb. <https://www.health.govt.nz/news-media/media-releases/7-cases-covid-19> (accessed Apr 2021).
52. Ministry reporting positive COVID-19 case at the border [press release]. New Zealand Ministry of Health, 2021; 22 Mar. <https://www.health.govt.nz/news-media/media-releases/ministry-reporting-positive-covid-19-case-border> (accessed Apr 2021).
53. Covid-19: MIQ worker's family returns three negative, one weak positive result - Hipkins. *Radio New Zealand* (COVID-19) 2021; 23 Mar. <https://www.rnz.co.nz/news/covid-19/438962/covid-19-miq-worker-s-family-returns-three-negative-one-weak-positive-result-hipkins> (accessed Apr 2021).
54. No new community cases; 3 cases of COVID-19 in managed isolation [press release]. New Zealand Ministry of Health, 2021; 26 Mar. <https://www.health.govt.nz/news-media/media-releases/no-new-community-cases-3-cases-covid-19-managed-isolation-0> (accessed Apr 2021).
55. One new border-related case; 19 cases of COVID-19 in managed isolation; 4 historical cases [press release]. New Zealand Ministry of Health, 2021; 8 Apr. <https://www.health.govt.nz/news-media/media-releases/one-new-border-related-case-19-cases-covid-19-managed-isolation-4-historical-cases> (accessed Apr 2021).
56. No new community cases; 7 cases of COVID-19 in managed isolation; 1 historical case [press release]. New Zealand Ministry of Health, 2021, 12 Apr. <https://www.health.govt.nz/news-media/media-releases/no-new-community-cases-7-cases-covid-19-managed-isolation-1-historical-case> (accessed Apr 2021).
57. New border-related positive COVID-19 case [press release]. New Zealand Ministry of Health, 2021; 11 Apr. <https://www.health.govt.nz/news-media/media-releases/new-border-related-positive-covid-19-case> (accessed Apr 2021).