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31 March 2023



Ref: H2023022384

Tēnā koe Ai

### **Response to your request for official information**

Thank you for your request under the Official Information Act 1982 (the Act), which was transferred from the Department of the Prime Minister and Cabinet (DPMC) to Manatū Hauora (the Ministry of Health) on 23 March 2023. You requested:

*“This document...Review of the public health value of mask mandates - was refused to be released on the grounds it will soon be publicly available...could you provide a timeframe or day when it will be released and I can check back for it?”*

The document you requested, titled *“Briefing – Review of the public health value of mask mandates”* is attached to this letter. Please note that a small amount of information has been withheld under the following sections of the Act:

- Section 9(2)(a), to protect the privacy of natural persons, and
- Section 9(2)(h), to maintain legal professional privilege.

Where information is withheld under section 9 of the Act, I have considered the countervailing public interest in release in making this decision and consider that it does not outweigh the need to withhold at this time.

I trust this information fulfils your request. Under section 28(3) of the Act, you have the right to ask the Ombudsman to review any decisions made under this request. The Ombudsman may be contacted by email at: [info@ombudsman.parliament.nz](mailto:info@ombudsman.parliament.nz) or by calling 0800 802 602.

Please note that this response, with your personal details removed, may be published on the Manatū Hauora website at: [www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests](http://www.health.govt.nz/about-ministry/information-releases/responses-official-information-act-requests).

Nāku noa, nā

A handwritten signature in black ink, appearing to be 'A. Old', written in a cursive style.

Dr Andrew Old  
**Deputy Director-General**  
**Public Health Agency | Te Pou Hauora Tūmatanui**

# Briefing

## Review of the public health value of mask mandates

**Date due to MO:** 11 August 2022      **Action required by:** N/A

**Security level:** IN CONFIDENCE      **Health Report number:** 20221311

**To:** Hon Dr Ayesha Verrall, Minister for COVID-19 Response

### Contact for telephone discussion

Name	Position	Telephone
Dr Andrew Old	Deputy Director-General, Public Health Agency	S9(2)(a)
Dr Harriette Carr	Acting Director of Public Health, Public Health Agency	

### Minister's office to complete:

- Approved       Decline       Noted
- Needs change       Seen       Overtaken by events
- See Minister's Notes       Withdrawn

Comment:

# Review of the public health value of mask mandates

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**Security level:** IN CONFIDENCE      **Date:** 11 August 2022

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**To:** Hon Dr Ayesha Verrall, Minister for COVID-19 Response

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## Purpose of report

1. You have requested a briefing on the value of ongoing mask mandates, and the potential public health risk of removing them. You have requested:
  - a. benefits of both mandating the use and strongly recommending use; and
  - b. inclusions of any data that may be available to support either view.
2. This report discloses all relevant information.

## Summary

3. The evidence that mask wearing decreases the rate of transmission of COVID-19 (and other airborne respiratory viruses) is substantial.
4. The effectiveness of mask mandates as a public health intervention will depend on a number of factors – including the level of community transmission at the point in time; the nature of the settings in which masking is required; cultural and geographical norms around masking; correct mask use; and the extent to which improvements to ventilation/filtration have been enacted as systemic primary prevention.

## Benefits of mask mandates

5. The key difference between having a mask mandate and strongly recommending mask use is that evidence suggests adherence is higher when there is a mandate. For example, one US study found that having a local policy that required masking increased the odds of wearing a mask by nearly 3-fold (OR = 2.99, P = .0003) compared to no requirement to wear a mask and by 2-fold compared to a recommendation only<sup>1</sup>.
6. At the same time, there is evidence that the effectiveness of mask mandates, as with any repetitive health messaging, wanes over time. Although there are no systematic studies on mask wearing behaviour in New Zealand, in July 2022 15% fewer people believe others used a mask as required 'always or most of the time' compared May 2022 with a further 11% reduction between May and March 2022. In addition, although they should be treated with caution regarding their generalisation to New Zealand, studies from the

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<sup>1</sup> Puttock EJ, Marquez J, Young DR, et al. Association of masking policies with mask adherence and distancing during the SARS-COV-2 pandemic [published online ahead of print, 2022 May 8]. *Am J Infect Control*. 2022;S0196-6553(22)00402-3. doi:10.1016/j.ajic.2022.04.010 <https://www.sciencedirect.com/science/article/pii/S0196655322004023>

US have found links between COVID-19 health message fatigue and adherence to preventative behaviour such as masking.

7. From a public health perspective, mask mandates compared to recommendations may have relatively greater ongoing value in reducing transmission which would in turn mean a greater impact in:
  - a. limiting the likelihood of transmission to those most vulnerable; and
  - b. limiting the population risk of long COVID, and other post-acute sequelae; and
  - c. these effects would still be beneficial and improve equity at low levels of community infection.
8. There are three key public health risks if mask mandates were to be removed:
  - a. risk of reduced adherence leading to increased transmission;
  - b. risk that the outcomes would become more inequitable, as transmission to those most vulnerable could increase; and
  - c. risk that members of the public may misinterpret the change as being a sign that 'the danger has passed'.

**Benefits of strongly recommending mask use**

9. From a public health perspective, strongly recommending (rather than requiring) masks would have value in:
  - a. supporting a stronger focus on ensuring that the interventions to encourage and support mask use were in place;
  - b. less stigmatising for those with disabilities that are unable to wear a mask; and
  - c. responding to mask fatigue.

10. While reported case numbers are decreasing and hospitalisations have stabilised and starting to decrease, current levels of new infection as indicated by wastewater levels to week ending 31 July, still indicate a high risk of community transmission, as levels are similar to the March peak. Work is underway to provide thresholds in order to indicate levels of community infections that may help guide the level at which mask mandates could be replaced by guidance.

## Recommendations

We recommend you:

- a) **Note** the contents of this briefing
- b) **Advise** if you require any further information

**Noted**  
**Yes/No**



Dr Harriette Carr  
Acting Director of Public Health  
**Public Health Agency**  
Date: 11 August 2022



Hon Dr Ayesha Verrall  
**Minister for COVID-19 Response**  
Date: 14/8/22

RELEASED UNDER THE OFFICIAL INFORMATION ACT 1982


# Review of the public health value of mask mandates

## Background

### Legal context

11. The COVID-19 Public Health Response (Protection Framework) Order 2021 (the Order) sets out a list of settings where masks are required to be used at Red and Orange on the COVID-19 Protection Framework (CPF). At Orange, this includes public transport, essential services, and most indoor public spaces. At Red, these requirements are expanded to also include educational settings (schools U4 and above, and universities), and also customers at close-contact services.
12. The Order exempts people from face mask requirements if they have a physical or mental illness or condition or disability that makes wearing a face mask unsuitable.
13. A new process for providing evidence of a person's exempt status was launched on 31 May 2022. The process involves the person making a declaration that they meet one or more of the criteria for exemption. People can apply for passes online via MyCovidRecord, or via one of several assisted channels. To date, more than 37,000 people have been issued with exemption passes, approximately 70 percent of whom were fully vaccinated or boosted.

14. S9(2)(h)



### Recent developments and current context in relation to mask mandates

15. The most recent significant change to mask requirements was the move from the red setting to orange which included removal of mask mandates in a number of settings including educational settings (Y4 and above) in April 2022. In July 2022, the Ministries of Health and Education strongly recommended that schools review and reinstate mask policies in all indoor settings for the first four weeks of Term 3<sup>1</sup>.
16. The June 2022 behavioural insights survey commissioned by Manatū Hauora (Ministry of Health) found the following:<sup>3</sup>
  - a. Most participants would be likely to wear a mask while at the hospital or medical practice (86%) on public transport (85%), grocery shopping (84%), in a taxi service (83%), in a retail store (82%).

<sup>2</sup> The Ministry of Education does not have data on the number of schools currently requiring masks in all indoor settings.

<sup>3</sup> Attitudes and behaviours to COVID-19 protection measures in the post-Omicron peak, prewinter context, June 2022 Report



- b. Situations where participants were less likely to wear a mask were at a bar (61%), walking in the city (53%), at a large outdoor event (53%) and in your home if you are self-isolating (29%).
  - c. Participants aged 25-34 and 55-64 were more resistant to wearing a mask in any listed situation (particularly to large outdoor events such as rugby games or walking in the city) than other age groups. These participants were more likely to be of European ethnicity and more likely to have tested positive for COVID-19.
17. The July 2022 behavioural insights survey conducted by DPMC<sup>4</sup> indicates a decline in people reporting that they have think other New Zealanders “always or most of the time use a mask as required including on public transport and in shops” over the past month, (from 67 percent to 52 percent).
18. The requirement to wear a mask will have some impacts on individuals and businesses. For example, those with conditions which cause difficulties in wearing a mask may attempt to comply and not be aware of their right to apply for an exemption; or staff at affected businesses such as supermarkets may suffer abuse from customers when seeking to ensure compliance. However, these impacts have not been examined within a New Zealand setting beyond anecdotal reports.

### **Under what conditions are mask mandates most useful?**

19. The value of mask mandates compared to strongly recommending mask use will depend on a number of factors:
- a. the level of community transmission at the point in time – when community transmission is high there is relatively greater benefit; when community transmission is low there is relatively less benefit;
  - b. the nature of the settings – there are some settings where masking is the only practical mitigation possible (at least in the short-term – for example, on public transport), as some settings are more likely to have high-risk people present (e.g. hospitals), and some settings will be higher risk due to the 3Cs (closed spaces with poor ventilation, crowded places with many people nearby, and close-contact settings, especially where close range conversations are necessary without being able to physically distance);
  - c. cultural and geographical norms around masking – if there are strong norms that mask use is socially accepted and desirable, then the relative gain of requiring masking is less than if this is not a strong norm; mandates will have benefits for those who are relatively ambivalent about a particular action, but will comply if they must. It will be ineffective for those who strongly object to a measure. Therefore, the value of a mandate will be highly dependent on the pre-existing level of support for an action based on the current messaging and encouragement.
  - d. the extent to which improvements to ventilation/filtration have been enacted as systemic primary prevention – for example, other countries have established ventilation standards and/or requirements for CO<sub>2</sub> monitoring in many or all of the place where mandates typically apply (and in some cases beyond) – this means that

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<sup>4</sup> TRA July 2022 Behaviour & Sentiment Topline Report.



the baseline risk in those indoor settings will be lower in those countries, somewhat reducing the relative value of a mask mandate.<sup>5</sup>

- e. the extent to which people comply with other public health measures also in force, for example staying home if sick, testing if symptomatic, and isolating if COVID-19 case is confirmed.
20. Given the above, at the current point in time in New Zealand, on balance, the relative benefits of mask mandates outweigh strong guidance as:
- a. the level of community transmission (based on wastewater detection) remains relatively high in relation to the March 2022 peak, noting though that reported cases and hospitalisations are declining;
  - b. there are variable social norms around masking; and
  - c. there has been very little systemic improvement to ventilation/filtration in these settings – a recent report of CO<sub>2</sub> levels in different indoor settings in New Zealand identified public transport as a location with markedly elevated CO<sub>2</sub> levels<sup>6</sup>. A more detailed analysis would provide further evidence to identify areas of highest transmission.

## What is the ongoing relative value of mask mandates in New Zealand compared to public health recommendations to wear masks?

21. From a public health perspective, mask mandates compared to recommendations would have relatively greater ongoing value in reducing transmission when community transmission rates are high, which would in turn mean a greater impact in:
- a. limiting the likelihood of transmission to those most vulnerable; and
  - b. limiting the population risk of long COVID, and other post-acute sequelae.
22. This section will explain and outline evidence for each of the above factors in turn.

### Value in reducing transmission

23. The evidence that **mask wearing decreases the rate of transmission** of SARS-CoV-2 (and other airborne respiratory viruses) is substantial<sup>7</sup>.
- a. Masks (when worn correctly) are effective at preventing transmission of SARS-CoV-2 to a contact (protection) or preventing transmission of SARS-CoV-2 from a case (source control). However, not all masks have the same efficacy for protection and/or source control. Mask wearing becomes more efficacious when combined with other public health measures that reduce the risk of transmission. See appendix 1 for more detailed information.

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<sup>5</sup> Manatū Hauora has signalled the importance of ventilation in the built environment for more than a year and has published information regarding ventilation at <https://www.health.govt.nz/covid-19-novel-coronavirus/covid-19-health-advice-public/covid-19-ventilation>, which includes links to the MBIE Healthy Homes Standards. However, the current advice does not address key practical issues such as: acceptable levels of ventilation in a range of built environments; measuring the level of ventilation and recommended interventions to improve ventilation. As a result, New Zealand's level of guidance lags behind jurisdictions such as that of the Victorian Government in Australia (see <https://www.coronavirus.vic.gov.au/ventilation>).

<sup>6</sup> Whose breath are you breathing. <https://www.rnz.co.nz/news/in-depth/470690/whose-breath-are-you-breathing>

<sup>7</sup> [The Efficacy of Facemasks in the Prevention of COVID-19: A Systematic Review | medRxiv](#)

24. **Mask mandates are typically associated with an increased adherence** (likelihood that someone will wear a mask). Optional mask use will reduce compliance and population effectiveness of the intervention if the aim is to reduce transmission. Mandates provide clear rules for mask use and will enable better compliance than voluntary guidance, at least in the short term.

- a. A study published in May 2022 analysing observed mask wearing was undertaken in 126 cities in the United States<sup>8</sup>. The overall adherence to correct mask use was 48% (52,740/109,999), with a rate of 66.5% (38089/57311) in cities with mask mandates, 31% (11383/36756) in cities where masks were recommended but not mandated and 20.5% in cities where mask wearing was not required (3268/15932). Therefore, having a local policy that required masking increased the odds of wearing a mask by nearly 3-fold (OR = 2.99, P = .0003) compared to no requirement to wear a mask and by 2-fold compared to a recommendation only.

25. **Mask mandates are typically associated with reduced transmission.**

- a. A study undertaken in the USA<sup>9</sup> in 2020 analysed the difference in community transmission rates before and after the introduction of a mask mandates in 15 states for all individuals and reported that a mandate decreased the daily COVID-19 growth rate by between 1 and 2 percent<sup>10</sup>.
- b. Mask mandates have been consistently associated with a decrease in the prevalence of COVID-19 in the community, but unless masks are worn during all interactions, it can be difficult to identify if transmission occurred in a setting with or without a mandate in place. A study undertaken in a large US university with a mask mandate used genomic sequencing and contact tracing to identify transmission events on the university campus<sup>11</sup>. There were over 850 cases of SARS-CoV-2 infection identified through weekly surveillance testing of all students and faculty on campus during the Autumn 2021 semester. There were nine instances of potential in-class transmission, defined as SARS-CoV-2 positive individuals whose only known contact was within the classroom and none of these instances were confirmed to be in-class transmission based on genome sequencing.
- c. Following the removal of mask mandates in New Zealand schools at the start of Term 2 this year, there was a clear increase in case rates in school aged children in May<sup>12</sup>. Case rates in both pre-school children and adults did not increase during this period. However, this change coincided with a move to Orange traffic light levels which also brought about a range of other changes such as removal of gathering limits, return of school assemblies and other fixtures and events so we are not able

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<sup>8</sup> Puttock EJ, Marquez J, Young DR, et al. Association of masking policies with mask adherence and distancing during the SARS-COV-2 pandemic [published online ahead of print, 2022 May 8]. *Am J Infect Control*. 2022;S0196-6553(22)00402-3. doi:10.1016/j.ajic.2022.04.010 <https://www.sciencedirect.com/science/article/pii/S0196655322004023>

<sup>9</sup> Note that the reasons for mask-wearing may in US may vary in some cases compared to New Zealand and it is unclear whether the study design has controlled for these effects in this case. Caution should therefore be used when generalising these results to a New Zealand context.

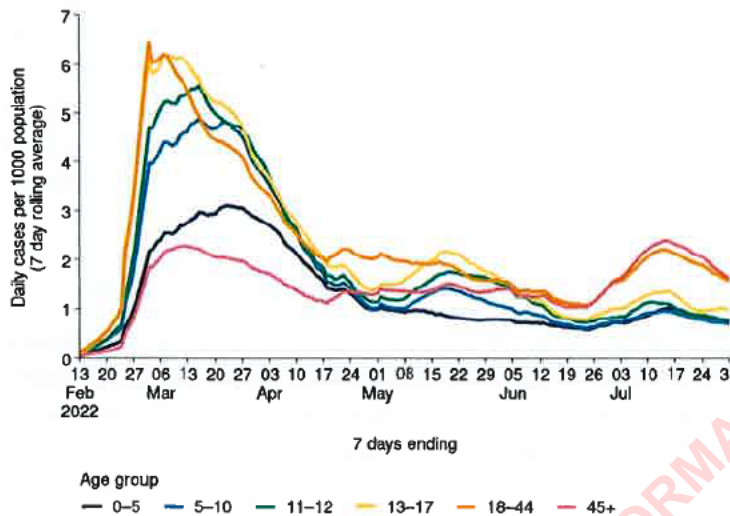
<sup>10</sup> Lyu W, Wehby G. Community Use Of Face Masks And COVID-19: Evidence from A Natural Experiment Of State Mandates In The US. *Health Affairs*. 2020;39(8):1419-25.

<sup>11</sup> Kuhfeldt K, Turcinovic J, Sullivan M, Landaverde L, Doucette-Stamm L, Hamer DH, et al. Examination of SARS-CoV-2 In-Class Transmission at a Large Urban University with Public Health Mandates Using Epidemiological and Genomic Methodology. *JAMA Network Open*. 2022;5(8):e2225430-e.

<sup>12</sup> Case rates for children remained relatively low relative to adults in early July despite masks not being mandated in schools however this may be due to the impact of immunity from previous infections on recent COVID-19 vaccination.

to say that the increase is due to removal of mask mandates, especially as some schools continued to require masks to be worn. See Figure 1 below and Appendix 2 for further information.

Figure 1: Daily case rates per 1000 population (7 day rolling average) in New Zealand - by age group, February - July 2022



26. While the message to 'stay home if you are sick' has been strengthened over winter, a key reason why mask mandates are associated with reduced risk of transmission is that they **reduce the risk that someone who is asymptomatic or pre-symptomatic will inadvertently infect another person.**
- Data from the United Kingdom (UK) COVID-19 Infection Survey which reported on what can be considered the beginning of the 'Omicron period' (20 December 2021 - 23 January 2022) indicates that approximately 54% of participants did not report any symptoms (within 35 days after first observed positive test), considered asymptomatic.<sup>13</sup>
  - The risk of transmission from asymptomatic and pre-symptomatic cases has been established epidemiologically<sup>14</sup>. However, there is conflicting evidence for the relative risk of transmission from these individuals compared to cases who are symptomatic. Overall, any decrease in the infectiousness of individuals before they develop symptoms, or in those who never develop symptoms, is likely to be offset by the lack of isolation or other precautions that these individuals will take as they are unaware that they are infectious.
27. However the **effectiveness of mask mandates may wane over time** - as with any repetitive health messaging<sup>15</sup>.

<sup>13</sup> UK Office for National Statistics. Coronavirus (COVID-19) Infection Survey, characteristics of people testing positive for COVID-19, UK: 02 February 2022. 02 February 2022. Available from:

<https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/datasets/coronaviruscovid19infectionsinthecommunityinengland>.

<sup>14</sup> Gao W, Lv J, Pang Y, Li L-M. Role of asymptomatic and pre-symptomatic infections in covid-19 pandemic. BMJ. 2021;375:n2342.

<sup>15</sup> A 2018 US experimental study (N = 312), for example, found that its subjects suffered from both reactance and disengagement in response to repeated anti-obesity messages. This 'message fatigue' in turn led to a reduced behavioural intention to adopt four



- a. Although there is no systematic study in New Zealand on mask-wearing behaviour, 15% fewer respondents to a July 2022 study thought people use a mask as required, including on public transport or the shops, 'always or most of the time' compared to May 2022. There was a further 11% reduction between May and March 2022<sup>16</sup>.
- b. US studies should be treated with caution regarding their generalisability to New Zealand, given the potential for greater politicisation of mask mandates. Nevertheless a 2021 study (N=268) found that a greater perceived freedom threat was linked to greater reactance, which in turn was associated with lower levels of adherence to hygiene- and social-related COVID-19 preventive behaviour (e.g. mask-wearing and social distancing).<sup>17</sup> Similarly a 2022 study found a relationship between message fatigue and a person's future anxiety and willingness to remain vigilant for those with low autonomy satisfaction<sup>18</sup>.

### Value in limiting the likelihood of transmission to those most vulnerable

28. **Mask wearing, enhanced by mandates, makes it possible for someone who is at higher risk of poor outcomes to go about their daily life as safely as possible.** This has two benefits: it means that this group is (a) less likely to actually be infected, and (b) that they will be more likely to feel able to continue to safely participate in basic activities of daily life.
29. A conservative estimate is that one in every six New Zealanders is at high risk of poor outcomes. The Ministry of Health does not have precise figures for the number of New Zealanders who meet the definition of being at higher risk, however in April 2022, the number of 'clinically vulnerable' people (which is defined more narrowly than 'high risk') was estimated at 800,000<sup>19</sup>. Increased access to anti-viral treatment coupled with booster vaccinations help to mitigate the risk of severe illness in this group.
30. As BA.5 is more transmissible than previous COVID-19 variants and subvariants, it is reasonable that rates of household transmission will be higher than the BA.2 Omicron wave. In this context, the risk of infection for someone who is at higher risk does not relate simply to their own activities and actions, but rather that of the person with the greatest risk exposure in the household.
31. Therefore, there is a reasonable argument that it is not possible to put in place an equitable response for this group without ensuring that all reasonably practicable mitigations that can be put in place, are in place. The concept of 'reasonably practicable' is drawn from the Health and Safety at Work Act 2015, and simply requires consideration

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recommended weight management behaviours (Kim, S. and J. So (2018). "How Message Fatigue toward Health Messages Leads to Ineffective Persuasive Outcomes: Examining the Mediating Roles of Reactance and Inattention." J Health Commun 23(1): 109-116 DOI: 10.1080/10810730.2017.1414900).

<sup>16</sup> See TRA 'July 2022 Behaviour and Sentiment Topline', p.10. The sample for this research is derived from the DPMC Behaviour and Sentiment monitor which runs once every 8 weeks. Only 52% of respondents in July 2022 considered other New Zealanders use a mask as required, including on public transport and in shops, always or most of the time. In May 2022, 67% answered this question positively and in March 2022, 78%.

<sup>17</sup> Ball, H. and T. R. Wozniak (2021). "Why Do Some Americans Resist COVID-19 Prevention Behavior? An Analysis of Issue Importance, Message Fatigue, and Reactance Regarding COVID-19 Messaging." Health Communication: 1-8 DOI: 10.1080/10410236.2021.1920717.

<sup>18</sup> Lee-Won, R. J., et al. (2022). "The Relationship between Future Anxiety Due to COVID-19 and Vigilance: The Role of Message Fatigue and Autonomy Satisfaction." International Journal of Environmental Research and Public Health 19(3): 1062 DOI: 10.3390/ijerph19031062.

<sup>19</sup> 'Options for improving respiratory protection against aerosolised viral particles for vulnerable and priority populations' (HR20220682), 29 April 2022. The definition of individuals 'at higher risk' is slightly wider than the 'clinically vulnerable' definition used in April. That said, many individuals are likely to fall into more than one group on the list. Using the figure of 800,000 as a conservative estimate of the number of people at higher risk; this equates to approximately one person in every six.

of the nature of the risk, the severity of harm that might result, and the existence and availability of control measures. This would ensure that people who are at high risk are not placed at *avoidable* increased personal health risk and are more equitably able to continue with basic daily activities.

32. While it is true that vulnerable people could continue to choose to mask, there is evidence that **source control (2-way masking) is more effective than personal protection (1-way masking)**:
- a. The benefits masking for the case, the contact or both has been studied in the laboratory using particle analysis<sup>20</sup>. Placing a cloth mask on the source resulted in an 80% reduction in the aerosol concentration ( $p < 0.0001$ ). Placing a mask on the recipient reduced the concentration by 41% at a 0.9 m separation ( $p = 0.0001$ ), and masks on both source and recipient reduced the concentration by 92% ( $p < 0.0001$ ). Surgical or N95 mask would be expected to provide a greater degree of protection.
  - b. Mask use decreases transmission due to preventing a case from exhaling virus into the air (source control) and by protecting the individual from inhaling virus in the air (personal protection). Source control has been estimated to be more effective than personal protection. Therefore, although a vulnerable person may be able to decrease the risk of infection, they are still reliant on others wearing masks to obtain the maximum protection.
33. It is clear that **Māori, Pasifika, people with disabilities, and people living in areas of high deprivation are likely to be disproportionately affected**<sup>21</sup> if mask mandates were removed and replaced with strong recommendations, as these groups are:
- a. more likely to not be able to work from home
  - b. more likely to live in crowded households
  - c. more likely to live in multi-generational households
  - d. more likely to rely on public transport
  - e. more likely to have underlying health conditions that put them at higher risk of poor outcomes
  - f. less likely to access health services, or to have high level of health literacy.
34. The above factors mean that these groups will often have both greater exposure to risk and a higher likelihood of poor outcomes if they are infected. Mask mandates act as a counterbalance towards the acknowledged differential exposure to risk.
35. Without specific modelling, it is difficult to assess the scale of the impact dropping mask mandates would have on these groups. It would also depend on the prevalence at the time of the change – the impact would be greater if mandates are dropped while there are still relatively high rates of community transmission. It would also depend on the nature of other mitigations in place at time.

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<sup>20</sup> Lindsley WG, Beezhold DH, Coyle J, Derk RC, Blachere FM, Boots T, et al. Efficacy of universal masking for source control and personal protection from simulated cough and exhaled aerosols in a room. *J Occup Environ Hyg.* 2021;18(8):409-22.

<sup>21</sup> Although this depends on how much transmission would occur in mask mandate settings if the mandates were dropped in favour of strong recommendations.

36. Similar to the argument in relation to people at high risk of poor outcomes, there is a strong argument to be made that it is not possible to put in place an equitable response for these population groups without ensuring that all reasonably practicable mitigations that can be put in place, are in place.
37. **Mask mandates also reflect the principle of active protection in Te Tiriti.** Specifically, in the context of BA.5, this requires a recognition that households that include Māori are more likely to be crowded, multi-generational, and have members who are at higher risk. This highlights the need to ensure, that when transmission rates are high, all mitigations that are reasonably practicable that can be made to essential services, work, school, and public places, are made.

#### **Value in limiting the population risk of long COVID, and other post-acute sequelae**

38. There are now several effective tools to reduce the likelihood of poor outcomes in relation to the acute stage of infection: vaccination, antivirals, and effective care pathways from the community through to primary, secondary, and tertiary care as appropriate all act as strong mitigations against poor outcomes.
39. While it may not be possible to get  $R_e$  to below 1 with highly infectious variants/sub-variants, there is still significant value in trying to prevent infections where possible, as each new infection (or reinfection) effectively 'rolls the dice' for one or more post-acute sequelae that are known to occur such as Long COVID and increased risk of long term (up to 1 year) cardiovascular complications compared to individuals without COVID-19.<sup>22</sup>
40. Long COVID and other post-acute sequelae have personal costs, but also broader impacts on society, in terms of outcomes such as increased disability, increased welfare and health costs, and reduced workforce participation.<sup>23</sup>

#### **What are the potential public health risks of removing mask mandates?**

41. There are three key public health risks if mask mandates were to be removed and replaced with strong recommendations while transmission is high:
- risk of reduced adherence, leading to increased transmission;
  - risk that the outcomes would become more inequitable, as transmission to those most vulnerable could increase; and
  - risk that members of the public may misinterpret the change as being a sign that 'the danger has passed'.
42. This section will outline each of the above risks in turn.

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<sup>22</sup> See Ballering AV, van Zon SKR, olde Hartman TC, Rosmalen JGM. 'Persistence of somatic symptoms after COVID-19 in the Netherlands: an observational cohort study'. *The Lancet*. 2022;400(10350):452-61; and Xie Y, Xu E, Bowe B, Al-Aly Z. Long-term cardiovascular outcomes of COVID-19. *Nature Medicine*. 2022;28(3):583-90.

<sup>23</sup> For example an August 2022 report from the Office for National Statistics in the UK estimated that 1.8 million people living in private households were experiencing self-reported long COVID (symptoms continuing for more than four weeks after the first suspected COVID-19 infection that were not explained by something else) see <https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/bulletins/prevalenceofongoingsymptomsfollowingcoronaviruscovid19infectionintheuk/4august2022>.

### *Risks in reduced adherence and increased transmission*

43. The main risk is that replacing mandates with strong recommendations will lead to the opposite of the above stated benefits:
- reduced adherence – while it may be true that compliance is not high in some settings, evidence both from overseas<sup>24</sup> and the recent experience of dropping legal mask mandates in schools strongly indicates that mask adherence would be even lower in these settings if mandates did not exist.
  - increased transmission – although case rates are currently declining nationally, if mask mandates were removed, case rates could potentially increase – as they did when mask mandates were removed from schools; it is difficult to estimate the likely impact without modelling;
  - reduced equity – as it is likely that the impact would fall disproportionately on those most vulnerable; and
  - increased population rates of long COVID and other post-acute sequelae – as a result of transmission occurring that would have been avoidable had mask mandates been in place.

### *Risks in accurately communicating risk to the public*

44. There is also a risk that members of the public may misinterpret a shift from mandating masks to strongly recommending masks as a sign that 'the danger has passed'. There are already anecdotal reports that some people believe they are immune because they 'have had COVID', or that 'it's just like a cold'.
45. While there is relatively high public awareness of the range of outcomes from the acute stage of a COVID-19 infection, there is significantly less awareness of post-acute sequelae. If masking is left to a personal decision in relation to risk, there may need to be increased public information on these risks, so that people could make that decision from an informed perspective.

### *Risks in our ability to manage future waves*

46. The COVID-19 pandemic has progressed in waves, which have been due to a combination of new variants and waning immunity. It is likely that this pattern will continue. It is not necessary for new variants to be more severe than previous variants for a rapid increase in hospitalisations which may cause significant pressure on the health system and further stress the health workforce.
47. Therefore, decisions regarding the use of a mask mandate would ideally be made in the knowledge that future waves of infection similar to the BA.2 and BA.5 waves will occur in the medium term and before the pandemic can be considered 'over'.

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<sup>24</sup> See for example T. Mitze, R. Kosfeld, J. Rode and K. Wälde, 'Face masks considerably reduce COVID-19 cases in Germany' Proceedings of the National Academy of Sciences of the United States of America (PNAS), 3 December 2020, <https://doi.org/10.1073/pnas.2015954117>. 20 d after becoming mandatory face masks have reduced the number of new infections by around 45% Germany: <https://www.pnas.org/doi/10.1073/pnas.2015954117>  
Alberta: schools with mandates 3 times more likely to have outbreaks <https://www.cbc.ca/news/canada/calgary/alberta-government-mask-mandates-1.6477208>



48. There continue to be developments in the management and understanding of COVID-19. The delay achieved from the elimination strategy enabled substantial benefits from vaccination which were substantial and long lasting. Strong baseline measures to prevent transmission of infectious disease are likely to be useful to flatten the curve and enable more effective implementation of interventions (such as new therapeutics) and new knowledge which becomes available over time.
49. In contrast, the removal and then re-instatement of mandates will take time. Considering the highly infectious nature of future variants, there is likely to be widespread community transmission very soon after a new variant is identified. From a public health perspective, it would be preferable that mask use became a default behaviour, especially in essential services, where other public health measures, such as physical distancing and ventilation are currently not available. The repeated removal and reinstatement of public health measures is unlikely to result in widespread behavioural change.

### **What is the public health value of strongly recommending, rather than requiring mask use?**

50. From a public health perspective, the benefits of strongly recommending (rather than requiring) mask use are as follows:
- a. Now that we have high vaccination rates, a large proportion of the population have also had COVID-19 (and hence, relatively high level of immunity in the community) and we have improved access to antiviral therapies for those that will benefit from them, there is no longer as strong an argument to maintain mask mandates at least in most settings where it currently applies.
  - b. It would support a stronger focus on ensuring that the interventions to encourage and support mask use were in place:
    - To achieve a higher adherence to these measures, public health messaging plays a key role, especially if the messages are delivered by trusting figures, and is part of a suite of interventions (behavioural, environmental, legislative, etc).
    - The measures that need to be in place to achieve an improvement in public health behaviour, such as educational programmes, behaviour modelling, targeted public health advice, data collection and distribution and the provision of resources (such as masks) can be implemented without the addition of a legal mandate.
  - c. It would respond to mask fatigue – possible explanations of the decline in observed mask wearing behaviour include messaging fatigue, perceived decline in risks/threats (vaccination), social/peer pressure (when among people who are less inclined to mask wearing). Such factors can lead to people taking active or passive actions to restore their freedoms (eg attending large gatherings or not wear masks);
  - d. Prolonged mandates past a certain point may alienate the public – and reduce compliance behaviour; at the beginning of the pandemic people were more willing to accept reduced freedom for the greater good.

## When do public health interventions typically involve legislative or regulatory requirements?

51. Public health interventions involving legislative or regulatory requirements are typically put in place where:
  - a. EITHER: the actions or inactions of one person have the potential to significantly impact on the health and/or safety of other people – for example, legislative or regulatory requirements apply to drink driving, to following road rules, and to food hygiene;
  - b. OR: risk relates to the person themselves, but the potential impact is catastrophic, and/or where there a need to protect workers – for example, legislative or regulatory requirements relate to handling certain chemicals, removing asbestos, and children purchasing tobacco.
52. By contrast, there are no legislative or regulatory requirements in relation to putting on sunscreen, eating healthily, or getting physical exercise. For these types of interventions, guidance or advice is sufficient.
53. In situations where one person's actions have the potential to significantly harm another person, mandates are typically used – as opposed to a variable requirement to act at certain times and not at others. For example, smoking is not permitted in indoor public settings at all times, despite the risk of exposure (in the absence of the mandate) clearly varying by day and time. Similarly drink driving is not permitted at all times, regardless of the number of cars on the road.

### Equity

54. This briefing on the public health value of mask mandates has considered relative impact that (a) mask mandates and (b) strong recommendations for masking might have on equity. Please refer to paragraphs 28 - 37 for full analysis.

### Next steps

55. Please advise if you would like any further information on any element of this briefing.

ENDS.

## Appendix 1: Detailed evidence of masking efficacy at reducing transmission of SARS-CoV-2

56. There is a considerable amount of data on the efficacy of masks in preventing transmission of SARS-CoV-2<sup>25</sup>. A summary of the information is provided in multiple sources including on the Ministry of Health Website.
57. Generally, studies point in the same direction and estimates find that student masking and teacher masking reduce transmission by 85% and 80% respectively. Although much of this data is observational and therefore subject to confounding, taken together, the evidence regarding the efficacy of masks is robust.
58. A large, representative study, with robust methodology, analysing the benefit of masks and ventilation in schools was undertaken in the Autumn of 2020 in Georgia, United States<sup>26</sup>. Mask requirements for teachers and staff decreased the rate of infection in schools.
59. A study on the use of masks in 5- to 10-year-olds found that masking alone did not significantly decrease their risk of infection. Improved ventilation did result in a ~40% decrease in the rate of infection which was similar to the improvement seen with mask wearing in teachers. Notably, the use of dilution only, which involved opening doors and windows, was effective, whereas using air-purifiers only did not significantly decrease the rate of infection. However, this study was not adequately powered to be generalisable to all school aged children and settings.
60. Masking is not the only public health measure which can influence the rate of COVID-19 infection. The relative contribution of various public health measures in schools to prevent COVID-19 was published in 2021<sup>27</sup>. This study analysed data collected from 2,142,887 total respondents across 50 states in the United States of America including Washington DC.
61. The study identified that increasing the number of interventions decreased the risk of transmission. Teacher masking and daily symptom screening appeared to be most effective at preventing infection in schools, with benefit also observed from student masking, cohorting and restriction of extracurricular activities [refer to **Figure 2**].
62. Reduced class sizes had less of an effect, and desk shields appeared to increase the risk of infection (potentially restricting air flow), which re-enforces the importance of airborne transmission and ventilation in managing COVID-19.

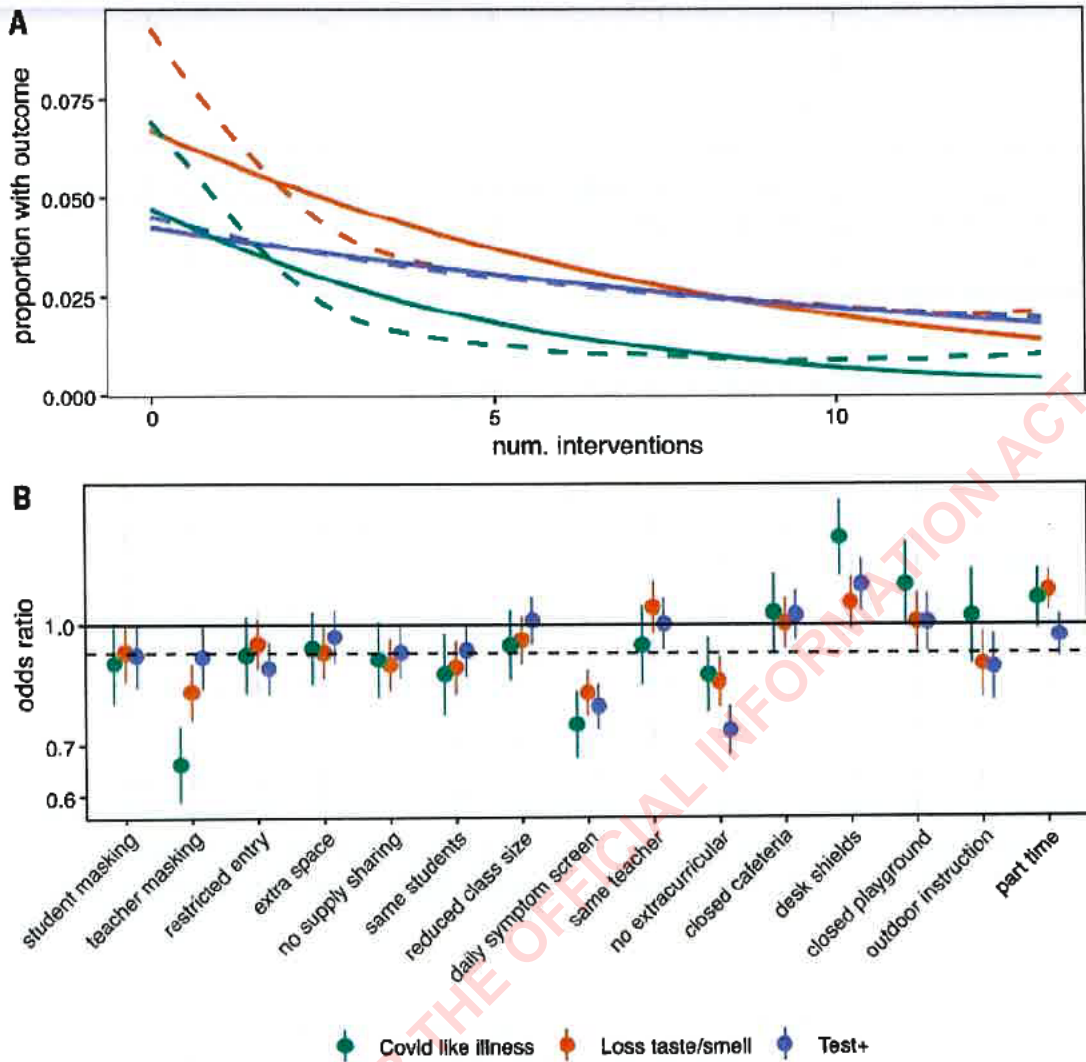
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25 Talic S, Shah S, Wild H, Gasevic D, Maharaj A, Ademi Z, et al. Effectiveness of public health measures in reducing the incidence of covid-19, SARS-CoV-2 transmission, and covid-19 mortality: systematic review and meta-analysis. *BMJ*. 2021;375:e068302.

26 Mask Use and Ventilation Improvements to Reduce COVID-19 Incidence in Elementary Schools — Georgia, November 16–December 11, 2020

27 Lessler J et al. Household COVID-19 risk and in-person schooling. *Science*. 2021.

**Figure 2 Impact of individual mitigation measures**



**(A)** Relationship between number of mitigation measures and percent reporting COVID-19-related outcomes using a log-linear (solid lines) and spline (dashed lines) model. **(B)** Odds ratio of COVID-19-related outcomes by mitigation measure in multivariable model including all measures versus the reduction resulting from a generic mitigation measure (dashed line). Student masking and teacher masking was found to reduce proven COVID-19 transmission in full-time educational settings by 85% and 80% respectively.

63. With regards to the use of mandates, there is limited advice regarding the success of this in decreasing the risk of transmission of SARS-CoV-2 in schools. There are multiple reasons why there may or may not be a change in the rate of infections with the imposition or removal of mandates. Such reasons include that:
- a. Mandates are often included as part of a raft of policy changes and do not necessarily reflect the changes due to alterations in mask behaviour,
  - b. The type of mask used may vary widely, and
  - c. Compliance with the mask mandate is not assessed.



64. Internationally, mask mandates have been controversial. Adherence to mask wearing requirements in the United States during the periods these studies were performed was required by federal law. This mask mandate was politically contentious and was overturned in mid-April 2022.
65. A study was published in May 2022 assessing the relationship between local mask wearing policies and the adherence to mask wearing in 126 cities in the United States.<sup>28</sup> **Having a local mask mandate increased the odds of wearing a mask 3-fold (OR = 2.99, P = .0003) compared to no recommendation.** People observed in rural areas were least likely to wear masks. Correct mask use was greatest in December 2020 and remained high until June 2021 (P < .0001).

## Factors that improve or reduce mask efficacy

### Types of masks

66. N95 masks are very effective at preventing infection when used optimally are more effective than surgical masks. This is the underlying rationale for the use of these masks in high-risk healthcare settings.
67. However, the process for obtaining maximum benefit is part of the rigorous infection control procedures which are mandatory in a healthcare setting. Outside of these settings the marginal benefit of N95 masks vs surgical masks will be substantially decreased, even assuming full compliance.
68. Factoring in a lack of compliance and other behaviours which further decrease the efficacy of masks, there is probably benefit derived from a policy of recommending N95 masks for those at increased risk of infection, or severe outcomes, but the benefit derived from a policy of recommending N95 masks for the entire population is likely to be minimal

### Fit testing and fit checking

69. For masks to provide maximal efficiency, all inhaled or exhaled air should be filtered through the mask. Consequently, even a highly efficient mask will not provide benefit unless there is a good seal to the skin. As individuals have different shaped faces, fit testing, which assesses the best type of mask for an individual, is recommended for the use of N95 masks when used in a healthcare setting. The process is time consuming and was not achieved for many border workers or others within various sectors who were required to wear masks.
70. It is highly unlikely that fit testing would be possible for the general public. Fit checking, which is analogous to testing swimming goggles for an airtight fit is recommended and outside of a high-risk healthcare environment, it is likely to be sufficient to provide significantly improved protection from N95 masks.
- d. Ideally, N95 masks or similar should be fit tested. However, even in the absence of fit testing N95 masks provide substantially increased protection compared to cloth masks and some medical masks.**

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<sup>28</sup> Eric J. Puttock, et al Association of masking policies with mask adherence and distancing during the SARS-COV-2 pandemic, American Journal of Infection Control, 2022.

Duration (% of time worn)

71. The greater the time worn, the better the efficacy, but even wearing a mask some of the time is better than not wearing it at all.<sup>29</sup>
- e. **While continuous mask use provides the best protection from infection, intermittent mask use is also beneficial.**

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29 Andrejko et al. Effectiveness of Face Mask or Respirator Use in Indoor Public Settings for Prevention of SARS-CoV-2 Infection — California, February–December 2021, MMWR CDC. 2022

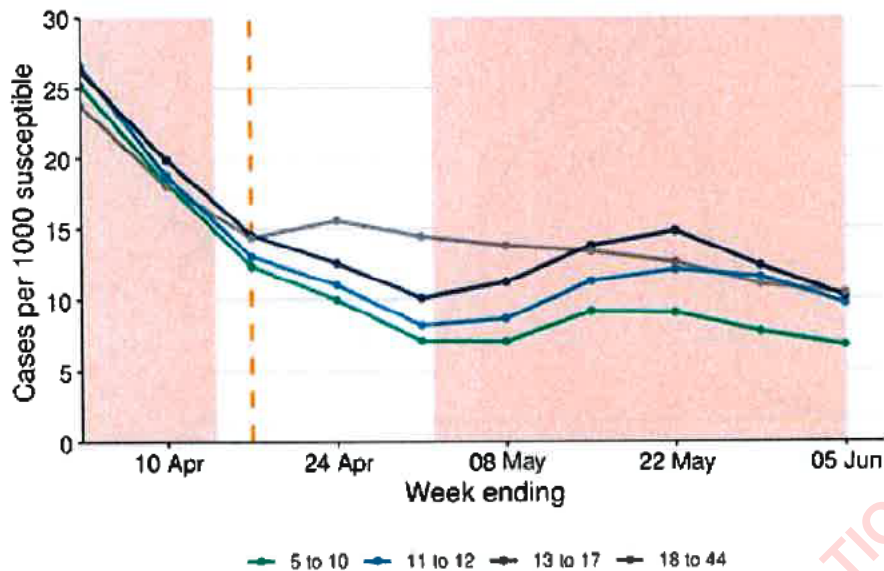
## Appendix 2: Case study – removal of mask mandates in New Zealand schools in May 2022

### Case trends in school aged children

72. It is difficult to determine from the available data if the removal of mask mandates from schools after the move from CPF (COVID-19 Protection Framework) Red level to Orange impacted on the rate of transmission within schools for several reasons. Most importantly, the removal of mask mandates was associated with changes to other measures such as capacity limits used to control the transmission of COVID-19 infection.
73. However, some indirect evidence regarding any varying risk of infection within schools may be obtained by a comparing the rate of infection in school age children and in teachers over time and with similar cohorts. This could indicate that schools are a potential “engine” of transmission of COVID-19 within the community.
74. Therefore, we have provided an analysis of case rates in school aged children comparing with adults over the period 03 April to 05 June, which encompasses school term break and changes to the mandates. The weekly incidence rate among susceptible populations (defined as those who haven’t had a previous infection, vaccination status was not considered) are shown in **Figure 4**. Age breakdowns within children are chosen to match different school settings; primary, intermediate, and high school. The beige block represents school terms; Term 1 finished 14 April and Term 2 began 2 May. The dashed orange line marks the change to CPF from Red to Orange.
75. Initially there was a steady decline in rates among susceptible school aged children and adults during school term 1; in the two weeks to 17 April (the first Sunday of school holidays), there was a 50% decrease in the rate in all school aged children (5-17 years) and a 40% decrease among adults. The decline in cases among school aged children continued during school term break as well (a 39% decrease to Sunday 1 May), after which there were sudden substantial increases in rates after their return to school (an increase of 35% in the first 2 weeks, which continued in the following week as well). However, for adults during school holidays, overall, the rate changed little, and then continued to decrease after school holidays (however at a slower rate, with ~10% decrease from 1 to 15 June).
76. In general, prevalence drives incidence given adult rates were falling, this would not appear to be the explanation for school aged children having increased rates in mid-May. Furthermore, rates were declining before school holidays, when there was school-based transmission risk for children; with the return of children to school the trend reversed albeit only for the first few weeks of term.
77. These trends could suggest that removing the mask mandate may have increased the risk of acquiring COVID-19 in school settings for a short period at the start of term 2.



Figure 3: COVID-19 case rates in school aged children and adults aged 18-44

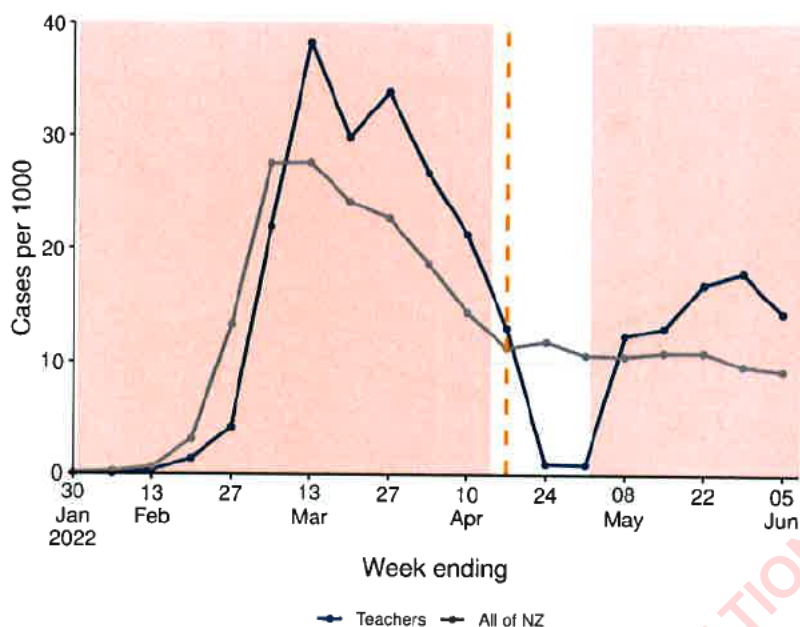


School terms are indicated in beige shading, school holidays in white shading. Rates in children declined before and during the holidays but increased when school resumed. Rates in adults (grey) were not impacted as markedly during and after the school holidays.

#### Teacher absences due to COVID-19

78. The Ministry of Education collects information on teacher absences due to COVID-19, as special arrangements for sick leave are provided for teachers due to COVID-19 infection.
79. A comparison between the case rate in teachers and the total population would indicate their rate of infection is higher than that of the general population [refer to **Figure 5**]; however, it is also possible that their case ascertainment is higher than the general population, although teachers are not required to undertake regular asymptomatic screening.
80. The evidence suggests an increase in transmission in the school environment in Term 2 as:
  - a. there was a similar pattern of decreasing rates at the end of Term 1 and increasing at the start of Term 2 as seen in school-aged children, and
  - b. trends in the total population were of continued decreasing rates, unlike the increase seen in teachers.

Figure 4 The rate of infection in teachers compared to all of NZ. cases per 100 per day, week.



## Behavioural Insights

### Achieving behavioural change in the short and long term

81. Key behavioural considerations for mask wearing in schools include:
  - a. Effective behaviour change in the short term can be achieved with a 'stick' approach – making mask wearing a requirement – for a short time (eg weeks, months), especially when the threat is seen and felt by parents and children to be real and immediate.
  - b. In many situations this is a very useful approach to signal potential danger as well as enhance protection of the population quickly.
  - c. In school settings, individual student behaviour (eg mask wearing) is strongly influenced by the behaviour and expectations of their peers.<sup>30</sup>
  - d. Additional cost (eg time or financial resources) will influence the ability of individuals to adhere to a mandate.
  - e. Providing high-quality masks to schools wishing to implement a masking policy, especially schools in lower socio-economic areas, should increase the uptake.

**Mandates are effective when used alongside other tools available for encouraging adherence to public health measures.**

82. The use of additional measures, such as improved ventilation and vaccination uptake, will influence the potential benefits from a mandate.
83. Ventilation in schools can usually be achieved through natural ventilation, CO<sub>2</sub> monitoring, and alignment of the use of the space to the ventilation possible in that space.

<sup>30</sup> Veenstra R et al. Peer network studies and interventions in adolescence. *Current Opinion in Psychology*. 2022.

84. Management of additional respiratory pathogens, such as influenza and RSV, which impact on a child's education. For example, the provision of free influenza vaccination for all children and staff. From this perspective, consideration could be undertaken regarding providing a free vaccine for extended whanau and/or the national population.
85. The effective use of COVID-19 vaccination, including boosters in the eligible population, is another tool that can influence the benefits of a mask mandates.
86. The use of a robust strategy of early detection, using rapid antigen testing (RATs), to identify individuals with COVID-19 early and minimise the risk of transmission within schools with a decrease in the requirement for closure of whole schools or classrooms.

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### Appendix 3: Research on behavioural science of mask mandates

87. Several papers and systematic reviews have concluded that mask mandates improve the level of adherence to varying degrees. There is some evidence that long-term mask mandates could improve adherence to mask wearing when combined with additional interventions<sup>31</sup>.
88. Some research found that a voluntary policy was perceived to be less fair and could intensify stigmatisation of those who wore masks. This is because mask wearing is a social contract wherein compliant people perceive each other more positively, and noncompliance is socially punished<sup>32</sup>. Some research pointed out that mask mandates contradict the understanding of a social encounter, and should be enforced only if there is a clear public health need<sup>33</sup>.
  - a. Use respected individuals as role models at the national and local levels to demonstrate adherence to recommendations and establish social norm
  - b. Ensure a unified and clear message with local jurisdictions and healthcare organisations for showing support and providing region specific information.
89. When making changes (especially, reversing) to a health recommendation, it is important to gain support and feedback from local health providers, communities, NGOs, and other stakeholders prior to the change, and be clear and transparent with the public on the reason for the changes.
90. When considering between mandating and recommendation, there is an inherent assumption that the public will understand and appreciate the difference. However, studies on non-mandate scenario have found that the burden on the individual to determine the pros and cons of mask wearing and when to wear a mask can lead to lower adherence to mask wearing. From a public health standpoint, the goal is to achieve a high enough level of adherence. The problem is there is often insufficient local data to provide evidence that a strong recommendation is sufficient to achieve this objective. Furthermore, this still shifts the burden of discerning the appropriate action onto individuals.
91. From a social psychological perspective, there are several reasons for low adherence to public health measures, such as confusing messaging, low perceived risk, lack of observable and consistent norms<sup>34</sup>.
92. To achieve the public health goal there are other tools that can be used. The advantage of these techniques is that they have the potential to leverage psychological tendencies

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<sup>31</sup> Ontario Agency for Health Protection and Promotion (Public Health Ontario). Association between mask mandates and population-level COVID-19 outcomes –What We Know So Far. Toronto, ON: Queen's Printer for Ontario; 2022.

<sup>32</sup> Betsch, C., et al. (2020). "Social and behavioral consequences of mask policies during the COVID-19 pandemic." *Proceedings of the National Academy of Sciences* 117(36): 21851-21853 DOI: doi:10.1073/pnas.2011674117

<sup>33</sup> Zimmermann, B. M., et al. (2021). "Face mask uptake in the absence of mandates during the COVID-19 pandemic: a qualitative interview study with Swiss residents." *BMC Public Health* 21(1): 2171 DOI: 10.1186/s12889-021-12215-4 **2021/11/26**.

<sup>34</sup> Young, S. D. and N. J. Goldstein (2021). "Applying social norms interventions to increase adherence to COVID-19 prevention and control guidelines." *Preventive Medicine* 145: 106424 DOI: <https://doi.org/10.1016/j.ypmed.2021.106424> **2021/04/01/**.

and biases while preserving individuals' sense of freedom. Some options for consideration are already in use in New Zealand but can be enhanced<sup>35</sup>.

93. Please note that each study referred to above is independent of each other and follows different methodology. Therefore, conclusions from them are not accumulative, nor are they applicable in different contexts

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<sup>35</sup> Young, S. D. and N. J. Goldstein (2021). "Applying social norms interventions to increase adherence to COVID-19 prevention and control guidelines." *Preventive Medicine* 145: 106424 DOI: <https://doi.org/10.1016/j.ypmed.2021.106424> 2021/04/01/.

## #11 – Mask use in children - Studies of children wearing masks in the 8-12 year old category

### Disclaimer

There is no universally accepted cut-off for mask use and evidence supporting the choice of age cut-off is limited. This rapid review does not include a comprehensive systematic literature search hence it is acknowledged that relevant studies may have been overlooked.

Evidence on the benefits and harms of children (particularly in the 8- to 12-year-old category) wearing masks to mitigate transmission of COVID-19 and other coronaviruses is limited. However, some studies have evaluated the effectiveness of mask use in children for influenza and other respiratory viruses. [1-4] A study of mask wearing during seasonal influenza outbreaks in Japan noted that the use of masks was more effective in higher school grades (children aged 9-12 years) than lower grades (children aged 6-9 years). [5] One study, conducted under laboratory conditions and using non-beta coronaviruses, suggested that children between five and 11 years old were significantly less protected by mask wearing compared with adults, possibly related to the inferior fit of the mask. [6] Other studies found evidence of some protective effect for influenza for both source control [2] and protection in children, [5] although overall compliance with consistent mask wearing, especially among children under the age of 15, was poor. Some studies, including studies conducted in the context of influenza and air pollution, found the use and acceptability of mask wearing to be highly variable among children, initially ranging from very low to acceptable levels and decreasing over time. [1-3, 7-9] One study was carried out among primary school children during COVID-19 and reported 51.6% compliance [3].

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