



# Wearing one for the team: views and attitudes to face covering in New Zealand/Aotearoa during COVID-19 Alert Level 4 lockdown

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## ABSTRACT

**INTRODUCTION:** Mass masking is emerging as a key non-pharmaceutical intervention for reducing community spread of COVID-19. However, although hand washing, social distancing and bubble living have been widely adopted by the 'team of 5 million', mass masking has not been socialised to the general population.

**AIM:** To identify factors associated with face masking in New Zealand during COVID-19 Alert Level 4 lockdown to inform strategies to socialise and support mass masking.

**METHODS:** A quantitative online survey conducted in New Zealand during April 2020 invited residents aged  $\geq 18$  years to complete a questionnaire. Questions about face masking were included in the survey. The sample was drawn from a commissioned research panel survey, with boosted sampling for Māori and Pacific participants. Responses were weighted to reflect the New Zealand population for all analyses.

**RESULTS:** A total of 1015 individuals participated. Self-reported beliefs were strongly related to behaviours, with respondents viewing face masking measures as 'somewhat' or 'very' effective in preventing them from contracting COVID-19 more likely to report having worn a face mask than respondents who viewed them as 'not at all' effective. The strongest barriers to face mask use included beliefs that there was a mask shortage and that the needs of others were greater than their own.

**DISCUSSION:** Highlighting the efficacy of and dispelling myths about the relative efficacy of mask types and socialising people to the purpose of mass masking will contribute to community protective actions of mask wearing in the New Zealand response to COVID-19.

**KEYWORDS:** Infectious diseases; population health; risk management; self-care

## Introduction

A coronavirus outbreak in Wuhan, China, during December 2019, later named COVID-19 and caused by a new pathogen, the SARS-CoV-2 virus has become the largest global pandemic in living

memory. Although there is still much to learn about COVID-19, the disease is most commonly spread via droplets and aerosols from the mouth or nose,<sup>1</sup> and public health authorities around the world have recommended a range of non-pharmaceutical

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## WHAT GAP THIS FILLS

**What is already known:** Mass masking is emerging as a key non-pharmaceutical intervention for reducing the spread of a pandemic. Recent policy shifts from the World Health Organization, the United States Centers for Disease Control and Prevention, and the New Zealand Ministry of Health reflect growing evidence for the effectiveness of this intervention when combined with other non-pharmaceutical interventions such as social distancing and mass contact tracing.

**What this study adds:** The use of face masks or coverings in New Zealand during COVID-19 Alert Level 4 lockdown was strongly related to beliefs about the efficacy of face masking. Barriers to mask wearing were less about cost and embarrassment, and more about comfort, a perceived shortage of masks and a belief that others needed them more.

interventions to reduce pandemic spread.<sup>2</sup> Universally agreed-upon sanitary and physical distancing measures include coughing and sneezing etiquette, regular and thorough hand hygiene and maintaining safe distances from others.<sup>3</sup>

As COVID-19 is spread through close contact with an infectious person and with their droplets,<sup>1</sup> masks can effectively reduce the spread of pathogens by suppressing the dispersion of droplets to others.<sup>3</sup> However, there has been considerable debate and confusion about the use of face masks for healthy individuals in the community (mass masking) as a way of limiting the spread of COVID-19.<sup>4</sup> The most recent advice on mask use from the World Health Organization<sup>5</sup> (WHO) and the United States Centers for Disease Control and Prevention<sup>6</sup> (CDC) reflects a major policy shift<sup>7</sup> and provides much called for clarification.<sup>8</sup> Official recommendations about mass masking and actual public practice varies widely within and between countries and is changing rapidly.<sup>3,9</sup>

To prevent community transmission of COVID-19, the WHO now advises governments to 'encourage the general public to wear masks in specific situations and settings as part of a comprehensive approach to suppress SARS-CoV-2 transmission' (p. 6).<sup>5</sup> The Ministry of Health recently provided advice on mass masking<sup>10</sup> based on growing evidence for the effectiveness of this intervention in conjunction with

other non-pharmaceutical interventions, such as social distancing and mass contact tracing.<sup>2,11</sup>

Observed differences in face mask wearing rates between countries are not explained solely by differences in policy and are more likely due to cultural factors.<sup>12</sup> Resistance to mass masking in some countries (such as Austria, the United Kingdom, Australia and the United States), has been driven by conflicting interpretation of evidence for effectiveness; potential non-compliance, anxiety and stigmatisation concerns; confusion about different forms of masking (eg for use in general public settings and for use in medical settings); and supply issues, including concern that mass masking will limit the supply of masks for essential workers and vulnerable individuals.<sup>7,13</sup>

The public adoption of non-medical masks may be an essential intervention to prevent lockdown given the recurrence of COVID-19 outbreaks in New Zealand.<sup>7</sup> Attempts to introduce mass masking in New Zealand may be hampered by a lack of established social expectations around mask wearing, as well as previous negative and confusing public messaging and conflation of masks and personal protective equipment.<sup>7</sup>

To better understand population views and actions relating to face masking, this study aims to identify factors associated with face masking in New Zealand and during COVID-19 Alert Level 4 lockdown (see <https://covid19.govt.nz/covid-19/restrictions/alert-system-overview/>) to inform strategies to socialise and support mass masking in this country.

## Methods

A quantitative online questionnaire was designed to identify factors associated with non-pharmaceutical interventions to reduce risk of transmission of COVID-19. Fieldwork for the survey was conducted by Ipsos (a global market and social research company) through their Wellington office for the University of Otago, Wellington. The first module was completed in April 2020 (during Alert Level 4 lockdown). A target of 1000 participants was sought from an Ipsos commissioned research panel, including a boosted sample for Māori ( $n = 300$  target) and Pacific Peoples ( $n = 200$ ) aged  $\geq 18$  years. Participants (panel members) are residents and

citizens of New Zealand who had previously agreed to consider participating in online surveys for various topics. All panellists receive a small incentive from Ipsos for their participation. By using different incentives, Ipsos minimize the possibility of incentives biasing responsiveness or the creation of satisfying behaviour.

The questions were devised by Ipsos, the research team, and agreed with the Ministry of Health and questionnaire design experts at the University of Otago, ensuring questions complemented existing surveys in the field at the time. The planning process between the study team and the Ministry of Health included questions prepared by Ipsos already included in their International surveys to allow for country-to-country comparison. Other new questions were designed to seek rapid answers to emerging New Zealand-specific discussions such as the utility of masking and contact tracing apps or cards. A further section of questions was included to inform modelling being conducted by a separate study team. Question domains included attitudes and behaviours relating to physical distancing; adherence to requirements of the alert level (including contacts with other people); and barriers, enablers and beliefs about non-pharmaceutical-related behaviours (including face mask use and hand washing).

The analysis presented is largely descriptive estimates of beliefs about face mask use reported as percentages (with 95% confidence intervals (CI)). Survey responses were weighted to the New Zealand adult population, using post-stratification weights calculated to match the population in the 2018 census based on age group, prioritised ethnicity, and sex (the 2018 New Zealand Census asked respondents about sex; the current survey asked about gender). This weighting accounted for boosted sampling of certain priority populations in the panel (Māori and Pacific respondents) when reporting national-level estimates. Analysis was conducted using SAS 9.4 (SAS Institute, Cary, NC, USA) using the PROC SURVEYFREQ and PROC SURVEYLOGISTIC procedures to account for weighting. Post-stratification weights were calculated using R software package version 4.0 (R Foundation, Vienna, Austria).

Research consultation with Māori was undertaken with the Ngāi Tahu Research Consultation

Committee (ref: 5745\_21723). Ethical approval for this study was obtained from the University of Otago Ethics Committee (ref: D20 107).

## Results

Data reported in this paper were collected between 25 and 29 April 2020. A total of 1015 people responded, with 940 (93%) completing the survey before the change to Level 3 at midnight on 27 April. The remainder of respondents ( $n = 75$ , 7%) who completed the survey before 0200 h on the first day of Alert Level 3 lockdown were included, as questions asked about activity in the preceding 7 days (covering Level 4 lockdown).

Table 1 profiles the survey respondents; the unweighted percentage column gives the profile of the sample (eg 23.3% of respondents were aged 25–34 years), whereas the weighted percentage column gives the profile when weighted to the New Zealand adult population (eg 18.4% of the adult population was aged 25–34 years). All subsequent percentages in the text are weighted percentages.

Approximately one-third of respondents ( $n = 362$ , 33.1% [29.6–36.7%]) said they had worn a face mask in the last 7 days, with very few reporting wearing a mask every day ( $n = 56$ , 12.1% [8.3–16.0%]). Of respondents who had worn a mask in the last 7 days, most reported wearing a mask on only 1 day ( $n = 140$ , 43.4% [36.8–50.6%]) or 2 days ( $n = 70$ , 19.7% [13.7–26.0%]). Excluding the use of personal protective equipment by health-care workers, the most common type of masks worn were surgical or paper masks ( $n = 222$ , 64.8% [58.5–71.1%]), followed by cloth or home-made face masks or coverings ( $n = 72$ , 18.2% [13.2–23.2%]), and respirator (N95) face masks ( $n = 42$ , 11.0% [7.1–14.9%]).

The most common place that face masks had been worn were in public ‘enclosed’ places such as supermarkets ( $n = 173$ , 64.7% [56.4–73.0%]) of respondents who wore a mask in the last 7 days, followed by health-care settings ( $n = 71$ , 26.9% [20.7–33.2%]) and in public ‘open’ places such as on a walk ( $n = 59$ , 20.1% [15.3–24.7%]).

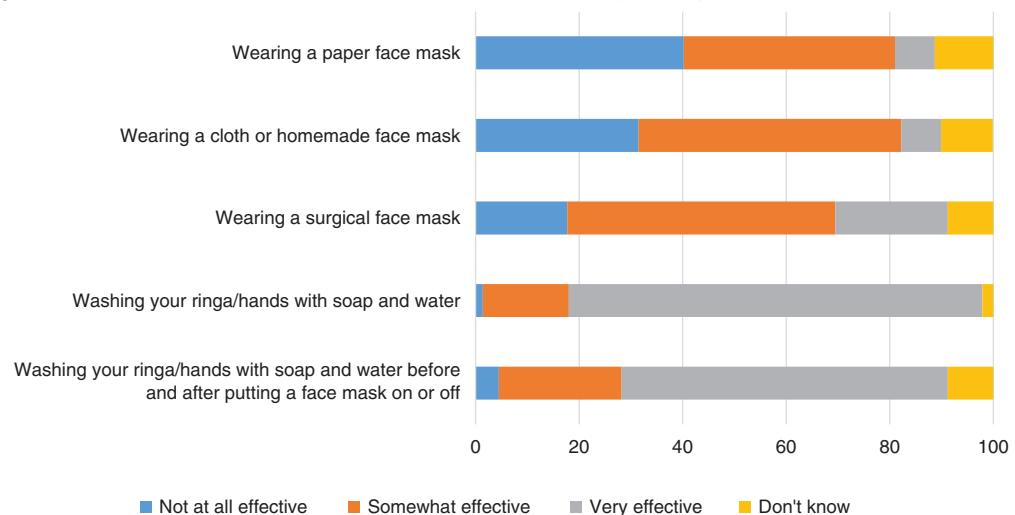
All participants were asked about their views of the effectiveness of several non-pharmaceutical

Table 1. Respondent demographics with unweighted and weighted percentages

Characteristic	Number of respondents	Unweighted percent	Weighted percent
Age group (years)			
18–24	135	13.3	14.0
25–34	236	23.3	18.4
35–44	202	19.9	16.3
45–54	169	16.7	17.4
55–64	162	16.0	14.9
65+	111	10.9	18.9
Sex and gender			
Male	416	41.0	47.1
Female	592	58.3	52.4
Gender diverse	7	0.7	0.6
Total ethnicity*			
Māori	306	30.1	15.0
Pacific	207	20.4	9.7
Asian	103	10.1	14.3
Other	447	44.0	63.4
Total	1015	100	100.0

\*Some respondents identified with multiple ethnicities, total >1015.

Figure 1. Views of effectiveness of mask-related measures (N = 1015) – all respondents.



interventions for preventing them from personally acquiring COVID-19. Most respondents thought washing your hands with soap and water generally ( $n = 977$ , 96.5% [95.2–97.8%]) or before and after

putting a face mask on or off ( $n = 884$ , 86.7% [84.2–89.2%]) were effective (somewhat or very). Wearing a paper facemask was seen as the least effective of the measures (Figure 1).

Table 2. Mask wearing behaviours according to beliefs about efficacy of mask type

Belief about effectiveness of:	Total number	Wore any mask in last 7 days			
		<i>n</i>	Weighted % (95% CI)	OR* (95% CI)	<i>P</i> -value
Wearing surgical face masks					
Not at all effective	166	26	14.4 (8.2–20.6)	1.00 (Reference)	<0.001
Somewhat effective	529	178	31.7 (26.8–36.6)	2.75 (1.58–4.78)	
Very effective	235	139	57.3 (49.1–65.5)	7.97 (4.35–14.59)	
Don't know	85	19	22.2 (10.1–34.2)		
Wearing cloth or home-made face masks					
Not at all effective	306	67	20.5 (15.2–25.8)	1.00 (Reference)	<0.001
Somewhat effective	503	194	37.6 (32.3–43.0)	2.34 (1.55–3.53)	
Very effective	99	65	60.0 (45.4–74.6)	5.82 (3.00–11.28)	
Don't know	107	36	31.4 (20.0–42.7)		
Wearing paper face masks					
Not at all effective	396	78	18.2 (13.9–22.6)	1.00 (Reference)	<0.001
Somewhat effective	411	190	45.9 (39.8–51.9)	3.80 (2.60–5.55)	
Very effective	92	64	62.9 (48.3–77.4)	7.59 (3.80–15.16)	
Don't know	116	30	21.5 (12.4–30.7)		

\*Unadjusted odds ratio (OR) for wearing a mask in the last 7 days in each belief group relative to the 'not at all effective' group.  
CI (confidence interval).

These self-reported beliefs were strongly related to behaviours. Respondents who viewed these measures as effective (somewhat or very) in preventing them from contracting COVID-19 were substantially more likely to report having worn a face mask than respondents who viewed them as 'not at all' effective. Table 2 shows the proportion of respondents reporting having worn a mask in the previous 7 days according to beliefs about efficacy of two non-pharmaceutical interventions (masks and washing hands). Mask wearing in the last 7 days was ~60% of all individuals who rated a particular mask type as 'very effective', and considerably less common in those who viewed masks as not at all effective (14.4–20.5%).

Participants were also asked to indicate their level of agreement with several statements about face mask use (Figure 2). The strongest barriers to face mask use included beliefs that there was a mask shortage ( $n = 483$ , 48.0% [44.3–51.8%]), and other people might need masks more than the respondent did ( $n = 412$ , 39.3% [35.6–43.0%]). Comfort also factors in people's views on face mask use, with over 40% agreeing or strongly agreeing that they found them

uncomfortable to wear ( $n = 427$ , 40.7% [37.0–44.5%]). The least often reported barriers were cost and embarrassment that others would think they looked silly if they wore one ( $n = 118$ , 12.4% [9.7–15.0%]).

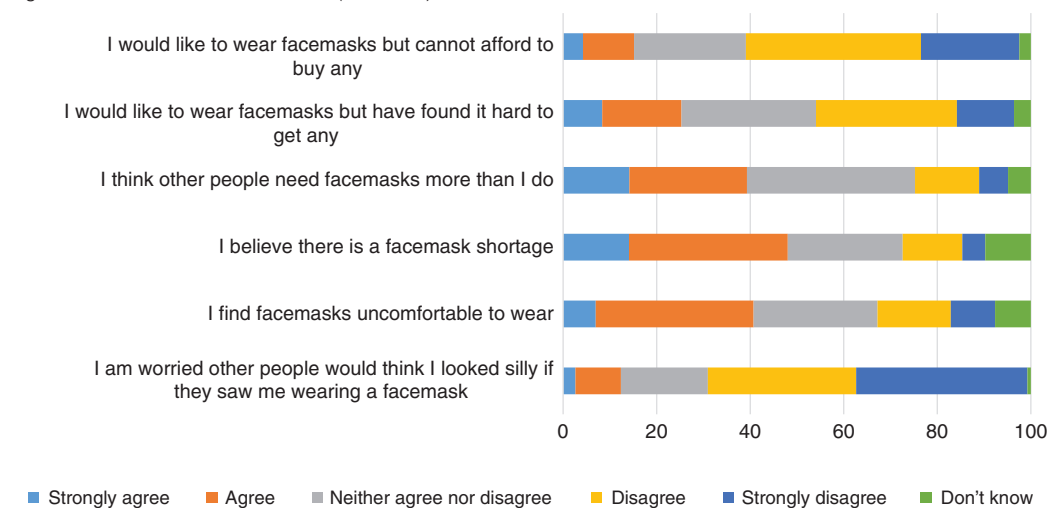
## Discussion

The fact that face mask use was not common in this study is perhaps unsurprising because mask wearing was not promoted by the New Zealand Ministry of Health during the period of the survey. The most common places face masks had been worn were in supermarkets, followed by health-care settings, possibly reflecting the need for people to visit these locations during the Level 4 lockdown.

Cost of masks and embarrassment about what others would think when wearing a mask were least likely to be reported as barriers, and as the pandemic progresses in New Zealand, there is likely to be a growth in the social norms of wearing masks.<sup>14</sup>

Concern about shortage of masks and the need to reserve medical masks for health-care workers was a

Figure 2. Views on face mask use (N = 1015).



regular feature of national news and daily government briefings.<sup>15,16</sup> This finding is reflected in the concerns of respondents about a perceived shortage of masks and a need to reserve these for others perceived to have higher need.

Cloth or home-made masks were not widely worn by respondents, but this situation is likely to change in response to the recent call from the Ministry of Health in August 2020 for all households to have a supply of non-medical grade face masks (single use or reusable fabric and washable).<sup>7,10,17</sup> There is increasing evidence that fabric masks, easily manufactured or made at home and reused after washing, are effective at reducing transmission, especially where there are high levels of population compliance.<sup>4,7,8,18</sup> This option is likely to appeal to people concerned about the possible environmental impact of disposable masks that often contain layers of plastics<sup>17</sup> and which are designed to be treated as medical waste.

Our finding that belief about efficacy is strongly related to adherence to given behaviours is similar to findings reported elsewhere.<sup>19</sup> As beliefs about the efficacy of non-pharmaceutical interventions may be influenced by available information, more promotion of the efficacy of recommended behaviours may help to maximise adherence.<sup>19,20</sup>

Clear and practical guidelines can encourage adherence,<sup>11</sup> but we also need to understand what drives people to follow advice for mask wearing. Efforts to socialise the ideas around preparedness, personal ownership and masking in preparation for possible resurgence of COVID-19 need to focus on explaining how masks work to reduce droplet and aerosol spread and why this is important for increased community protection.<sup>4,13</sup>

Mass masking as a response to possible asymptomatic transmissions of COVID-19 shifts the motivation from self-protection to a community-focused altruism.<sup>4,6</sup> As Dr Anthony Fauci, a lead member of the White House Coronavirus Task Force, recently told PBS NewsHour 'Putting a mask on yourself is more to prevent you from infecting someone else'.<sup>21</sup> We also know from general hazards and pandemic research that a sense of responsibility for others, including feeling a responsibility for vulnerable populations, can be a key driver in people undertaking protective action.<sup>22</sup>

This research highlights key factors associated with mask use during Alert Level 4 (lockdown). Another cohort is being followed from April to August 2020 to explore how views and attitudes towards masking change across alert levels and in response to changes in guidance and COVID-19 status.



## Strengths and limitations

While the data in this paper were collected in April 2020 and there have been major shifts in scientific thinking, mask use and beliefs relating to COVID-19 remain novel for New Zealand. This is believed to be the first analysis of quantitative survey data relating to beliefs, attitudes and reported behaviours concerning face masking and face covering during a pandemic in New Zealand. Beliefs and attitudes will likely change over time in response to evolving events. A related study will map beliefs, attitudes and behaviours over time (Alert Levels 4 to 1, April–August 2020).

As a survey drawn from an internet panel, there will be some selection bias as to who participated (ie respondents differ from non-respondents on key dimensions). Weighting of responses in analysis can account for differences between our sample and the target population of adult New Zealanders based on key demographics (age, gender, and ethnicity), but the results may still be effected by residual differences from the broader population. This partly relates to the composition of the panel (ie who tends to be on a panel survey) and also to the opt-in nature of the survey (true of any voluntary survey). If this meant respondents tended to be people concerned about the pandemic, then self-reports of mask-wearing behaviours and beliefs might be over-estimates of the truth for the New Zealand adult population.

Data were collected as part of a broader survey and drawn from a limited set of questions on face mask use. As a result, this study does not explore the full range of challenges people may experience with mask use. For example, mass masking is especially difficult for people with hearing loss as it prevents lip-reading and hinders the use of facial cues in communication.<sup>23</sup>

Finally, as all measures were self-reported, there may be some effect of social desirability bias on responses (particularly for behaviours, where individuals may have over-reported behaviours that they believed to be healthier).

## Conclusion

There is growing evidence for the effectiveness of mass masking when implemented in conjunction with other non-pharmaceutical measures and border

control strategies. However, in countries without established expectations of mask wearing, confusion and mixed messaging about mask wearing continues.

This study highlights the importance of understanding and targeting beliefs about mass masking if this is to be successfully implemented as part of a multi-barrier approach in this country. At the time of writing, mandatory mask wearing on public transport at Alert Level 2 and above has been announced, coming into force from 31 August 2020 in New Zealand. The experiences and communication needs of people with hearing impairment needs urgent investigation given the rapid uptake of mask use in New Zealand.

General practitioners (GPs) are well placed to support their patients and local communities to understand the difference between mass masking and personal protective equipment for health-care workers and whether a patient's health conditions warrant the use of surgical masks, paper or fabric. GPs also have a role in supporting patients to socialise understanding of the value of mass masking during outbreaks to reduce risk of transmission to others and to understand that masks stop droplets and aerosols carrying this virus from spreading it to others.

## Authors' contributions

LG, MB, AK, JS led the formation of this study. LG is the lead investigator. LG, MB, AK, JS, SW, NTM and VP designed the New Zealand-specific questions. LG and CM contributed significantly to the initial manuscript preparation. JZ and JS provided data analysis input. All authors contributed to all phases of the study design and manuscript preparation. NTM and VP provided Māori and Pacific oversight and advice for this study. LG, CM, JS and AK contributed significantly to the revised manuscript preparation. All authors read and approved the initial and final manuscript.

## Competing Interests

The authors declare no competing interests.

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