MINISTRY OF HEALTH
MANATŪ HAUORA

9 September 2020

133 Molesworth Street
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Wellington 6140
New Zealand
T+64 4 496 2000

[redacted]

Dear [redacted]

Response to your request for official information

Thank you for your request under the Official Information Act 1982 (the Act) on 13 July 2020 for:

> *"I'm interested to learn what discussion were had had by the Government and officials about whether to adopt/enforce the use of masks on public transport/flights etc because of Covid-19. Please provide under the Official Information Act in a fully searchable format: All correspondence regarding discussion and decisions about whether to adopt/enforce the use of masks on public transport/flights etc because of Covid-19 to include but not limited to memos, reports, texts, and emails. Any and all legal advice pertaining to the above. This to apply to the timeframe of the start of the pandemic outbreak until now."*

On 15 July 2020, you refined your request to:

> *"can I refine this OIA request to just include official advice such as reports, memos, briefings and legal advice."*

On 13 August 2020, the due date for responding to the request was extended under section 15A of the Act, as further consultation was required.

Eleven documents have been identified within scope of your request. These documents are outlined in Appendix One with copies enclosed. The table in Appendix One also lists the specific grounds under which information has been withheld.

Please note, the information for release predates the latest Ministry of Health (the Ministry) advice on the use of mark or face coverings on buses, trains, ferries and on all flights at Alert Level 2 and above. Updates on the Ministry's advice about the use of masks by the public as part of New Zealand's ongoing response to COVID-19 will depend on the alert level in the community. Further information on this topic (including relevant advice about face masks and coverings in the context of COVID-19 from the World Health Organization) can be found at the following address: https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-health-advice-public/covid-19-use-masks-and-face-coverings-community.

Please note the document in scope of your request *'Guidance on the provision of face masks on inbound international flights'* is refused under section 18(d) of the Act, as this document is

publicly available at: https://www.health.govt.nz/system/files/documents/pages/face-masks-on-planes-25june2020.pdf.

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.

Please note that this response, with your personal details removed, may be published on the Ministry website.

Yours sincerely

Jane Kelley
Acting Group Manager
Office of the Deputy Chief Executive
COVID-19 Health System Response

Appendix One: List of documents for release

#	Date	Title	Decision on release
1	15 May 2020	Memorandum- The supply chain impacts of recommending or requiring routine use of masks on public transport	Released, with some information withheld under the following grounds of the Act: • Section 9(2)(a), to protect the privacy of natural persons; • Section 9(2)(b)(ii), to protect information where the making available of that information would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information; • Section 9(2)(f)(iv), to maintain the constitutional conventions for the time being which protect the confidentiality of advice tendered by Ministers of the Crown and officials; and • Section 9(2)(g)(i), to maintain the effective conduct of public affairs through the free and frank expression of opinions by or between or two Ministers of the Crown or members of an organisation in the course of their duty
2	15 May 2020	Masks supply and demand A3	Released, with some information withheld under section 9(2)(b)(ii) of the Act, to protect information where the making available of that information would be likely unreasonably to prejudice the commercial position of the person who supplied or who is the subject of the information
3	N/A	Rapid literature review- transmission of SARS-CoV-2 through air travel	Released in full
4	N/A	Inflight transmission of respiratory illness- Rapid Review	Withheld in full under section 6(b)(i) of the Act, to protect information where the making available of that information would be likely to prejudice the entrusting of information to the Government of New Zealand on a basis of confidence by the Government of any other country or any agency of such a Government
5	N/A	Request for rapid review on air travel passengers	Released in full

		use of face masks on planes	
6	26 May 2020	ELT Memorandum: Updated Ministry website content on community use of face masks for COVID-19	Released in full
7	29 May 2020	Draft: Rapid review on air travel passengers' use of face masks on planes	Released in full
8	5 June 2020	Ministry of Health COVID-19 response- Science and Technical Advisory Request for independent advice and response	Released in full
9	19 June 2020	BARNZ- Facemasks for passengers on international flights	Released in full
10	19 June 2020	Memorandum- Face masks use by air travel passengers	Released in full
11	N/A	Guidance on the provision of face masks on inbound international flights	Refused under section 18(d) of the Act, as the information is publicly available

Memorandum

The supply chain impacts of recommending or requiring routine use of masks on public transport

Date due to MO:	15 May 2020	**Action required by:**	18 May 2020
Security level:	IN CONFIDENCE	**Health Report number:**	20200763
To:	Minister of Health		

Contact for telephone discussion

Name	Position	Telephone
Dr Ashley Bloomfield	Director-General of Health	s 9(2)(a)
Kelvin Watson	COVID 19 Supply Chain Workstream Lead	s 9(2)(a)

Action for Private Secretaries

N/A

Date dispatched to MO:
14 May 2020

Masks on public transport

Purpose of report

1. This memo provides information for an oral update to Cabinet on Monday 18 May in response to the Social Wellbeing Committee (SWC) request for information on what the impact on demand, supply and distribution would be if people were recommended or required to wear masks on public transport. Talking points for Cabinet are attached at Appendix 1.

2. You have also asked for information on the role of the Ministry of Health and other parts of Government in relation to New Zealand's supply chain for Personal Protective Equipment (PPE).

3. An A3 outlining the projected impact on supply chains if masks were required on public transport is attached at Appendix 2. The outline of New Zealand's supply chain for PPE is outlined at Appendix 3.

Context

4. The use of masks on public transport was discussed at SWC on 13 May 2020. It was noted that physical distancing requirements would have a substantial impact on the capacity of public transport (including trains, buses, taxis, ferries and planes). Requiring masks to be worn by those using public transport was suggested as a way to mitigate risk, potentially allowing physical distancing measures to be relaxed.

5. SWC requested further information on the impacts on the demand, supply, and distribution of masks if a decision is made in future to recommend or require people to wear them on public transport. The request includes consideration of all types of masks i.e. surgical/medical and non-medical (cloth) masks.

Government supply chain management of PPE

6. The Ministry of Health manages the supply chain of PPE for essential services in the healthcare sector in New Zealand. This includes procurement and distribution to DHBs, Public Health Units, and other healthcare providers. An overview of New Zealand's supply chain for PPE is attached at Appendix 3. Other parts of Government, like the Police and NZDF, have their own supply chains for PPE.

7. Supplies from the private sector to Government entities follows the Ministry of Health/WHO guidelines and only secures supply for essential workforces, prioritising the health workforce. The supply for Government has been predicated on a forecast demand for masks of 1 million per day for the essential workforce. If there was a decision to recommend or require the general population to wear masks, the collective demand (for surgical type masks) could be in excess of 5 to 6 million per day.

8. The supply chain management is outlined in Appendix 3, showing which parts of the supply chain are currently managed by the Ministry of Health and what parts by the All of Government (AoG) team. Note that from Monday 18 May the AoG supply chain for PPE will be merged with the Ministry of Health's one. This means the supply chain

currently run from AoG will be managed by the Ministry of Health, along with that for the wider health sector.

Government stocks of PPE

9. As at 13 May 2020, the New Zealand health supply chain has 17.8 million masks in stock on hand. This will continually be added to through local production and importing:

   - Local production: s 9(2)(b)(ii) [redacted]
   - Importing of masks in addition to the local supply has been forecast until 22 July 2020. The offshore manufacturing capacity is significantly greater than local capacity and is reflected in the quantities arriving in New Zealand (58.8m by 22 July 2020). Local supply will not be able to meet the commensurate demand during a COVID scenario, therefore complementary offshore supplies are necessary.

10. If masks are recommended or required on public transport, this will increase demand for use on public transport and it is expected there will be an immediate cascade effect on wider public, essential services and health workforce demand for masks that will be difficult for supply to meet, as the market would not have positioned itself to meet an unanticipated change in policy and corresponding large uptick in demand in the immediate future

11. Three demand scenarios have been drawn up that contrast the increasing demand for masks by Transport users. DHBs, essential services, and NGOs is outlined in Appendix 2.

12. The A3 does not include data on education-provided transport to schools, however the Ministry of Education advises approximately 100,000 children use education-provided transport.

Partners in the retail sector can enable supply to the public

13. During Alert Level 4 and Alert Level 3, supply feedback showed that retail supply was stable and able to support wider public demand and the market is generally comfortable meeting those demand levels.

14. While the private sector has approximately 17 million masks in stock, a move to recommending or requiring use of masks on public transport would have a similar wider impact that that outlined above. This is outlined in a table in the A3 attached at Appendix 2.

15. s 9(2)(g)(i) [redacted]

16. It is expected that over the longer term the private sector would respond to increased demand for masks and increase supply to meet it, however there would be a lead in time to replenish stocks of approximately 30 days. Once stocks are replenished by the private sector, there may be residual challenges with distribution and equitable access to the new supply.

17. s 9(2)(f)(iv) [redacted]

If masks are recommended or required on public transport, at least some physical distancing will still be required

18. As the effectiveness of home-made face coverings or non-medical masks is not as good as a (properly used) disposable surgical mask, and we cannot guarantee they will be safely used, a decision to recommend or require the use of face masks on all public transport would not replace the need for other control measures to be maintained. This includes the need to maintain appropriate physical distancing and other basic hygiene measures, including frequent hand washing.

19. On public transport, regular cleaning of surfaces and ensuring passengers and public transport workers adhere to physical distancing and the basic hygiene principles is the most important ways to stop the spread of infections, including COVID-19.

Effectiveness of home-made face coverings and non-medical masks

20. Home-made face coverings or non-medical masks are not required to meet a required quality standard for filter efficiency or fit and are therefore not used in the health care setting. They vary greatly in design and types of materials used.

21. Their widespread use in the community setting has also not been well evaluated, so their effectiveness is unclear. If worn properly (covering the mouth and nose, with correct fit and appropriate materials), they may provide a level of 'source control' in reducing the spread of someone's own infectious droplets to another person.

22. Further to the lack of clarity on effectiveness, there are potential risks associated with use of home-made face coverings or non-medical masks (many of which also apply to disposable surgical masks), including:

- providing a false sense of security leading to less adherence to essential hygiene and physical distancing measures
- exposure to infections through self-contamination from incorrect use, incorrect fit, unsafe cleaning or unsafe disposal
- breathing difficulties, with specific safety risks for some population groups (children and those with chronic respiratory conditions)
- inequitable access

- stigmatisation
- and impact on supply of masks for other critical areas notably medical/surgical face masks for health and disability care workers.

23. In the current New Zealand COVID-19 context, the risk of exposure to COVID-19 for most people is now considered low. Medical/surgical mask use is recommended for those groups at highest risk of exposure (health care and border management) and for those who could potentially be infectious to others who need to leave their residence for urgent care (unwell with symptoms consistent with COVID-19 or recent exposure to a COVID-19 case). The latter group are also advised to not use public transport.

Average cost of different types of masks

24. Different types of masks have different costs attached. At the most affordable end, home-made masks can be made from cotton fabric relatively easily. Reusable and washable store-bought masks can cost between s 9(2)(b)(ii) [redacted]

25. Surgical masks are grouped into levels. Level 2 masks are considered a moderate barrier and are suitable for procedures with light or moderate amount of blood, fluid, aerosols or spray are produced and are latex or fiberglass free. Level 3 masks are considered a high barrier, and used for procedures with a moderate or high amount of fluid, blood, aerosols or spray exposure.

26. Level 2 masks cost on average s 9(2)(b)(ii) [redacted] with Level 3 masks costing s 9(2)(b)(ii) [redacted] These masks are single use only and larger quantities would need to be purchased if used by a member of the general public.

International examples of mask requirements for the general public

27. There is significant variability in recommendations on community use of face masks from country to country. The difference in the level of COVID-19 in each country will influence their recommendations. Australia, which has low levels of COVID-19, currently advises that people only need to wear a mask if they are sick with COVID-19 symptoms or are looking after someone who may have COVID-19.

28. There are few measures internationally that are specific to the wearing of masks on public transport. Where countries or territories have enacted measures requiring masking in public, these have been general requirements covering shops/businesses, public gatherings, and public transport.

29. Masks are mandatory in public in India, China, parts of France, certain US states, Singapore, Portugal, Germany, Austria, Slovakia, Bulgaria, Czech Republic, Turkey, Jordan, Chile, Jamaica, the Philippines, Venezuela, Cuba, Timor Leste, Israel, UAE, Ethiopia, Qatar, and Nigeria.

30. UK commuters are encouraged to wear a face covering on public transport, though this is not mandatory. Cloth coverings are recommended and the guidance stresses that surgical masks or respirators used by healthcare and other workers should not be worn by the general public, to conserve supplies for those who need it.

31. In Australia, states and territories have the authority to determine how to enforce a range of stated public health measures relating to Covid-19, including social distancing,

limits on gatherings, and opening restrictions on schools, businesses and other facilities. Compulsory masking in public is not included in these measures and no states or territories appear to have mandated this separately although we understand that, as in New Zealand, discussions on mask use are ongoing in Australia.

Next steps

32. You have been asked to provide and update on the SWC request for information on masks on public transport at Cabinet on 18 May 2020 through oral update.

Dr Ashley Bloomfield

Director-General of Health

Talking points

- At the Social Wellbeing Committee meeting on 13 May, further information was requested what the impact on demand, supply and distribution would be if it was required for all to wear masks on public transport.
- If masks are required to be worn on public transport, it is assumed that this will increase demand for use on public transport as well as general use by the public, essential services and the health workforce.
- This will have immediate cascading effects on wider public demand of masks that will be difficult for supply to meet, as the market would not have positioned itself to meet an unanticipated change in policy and corresponding large uptick in demand in the immediate future.
- It is expected that over the longer term that the private sector would respond to increased demand, but there will be a lead in time to increase supply to meet demand.
- The private sector currently has approximately 17 million masks in stock. If demand for masks increases, this stock will meet approximately two weeks' demand.
- There is a lead in time to replenish stocks of approximately 30 days, so there is a potential gap in supply of two weeks, if the private sector orders more supply at the beginning of the period where higher demand is expected.
- If demand cannot be met by the private sector, rationing and prioritisation of masks may be required.
- s 9(2)(f)(iv) [redacted]
- s 9(2)(f)(iv) [redacted]

Effectiveness of cloth masks

- The effectiveness of home-made face coverings or non-medical masks is not clear and there is no guarantee that they would be safely used.
- Face masks also do not protect people from potential exposure to COVID-19 or other infections through their eyes, which is important as exposure does not only occur through the mouth or nose.
- If the use of face masks is required on public transport, this would not replace the need for all other control measures to be maintained, i.e. the need to maintain appropriate physical distancing and other basic hygiene measures, including frequent hand washing.

Other countries tend to either have no masks required in public, or masks required in all public settings

- There are few examples internationally which are specific to the wearing masks on public transport. Where countries or territories have enacted measures requiring masking in public, these have been general requirements covering shops/businesses, public gatherings, and public transport.
- Australia currently has no requirement for public masking, but conversations on this topic is ongoing.

Impacts on supply A3

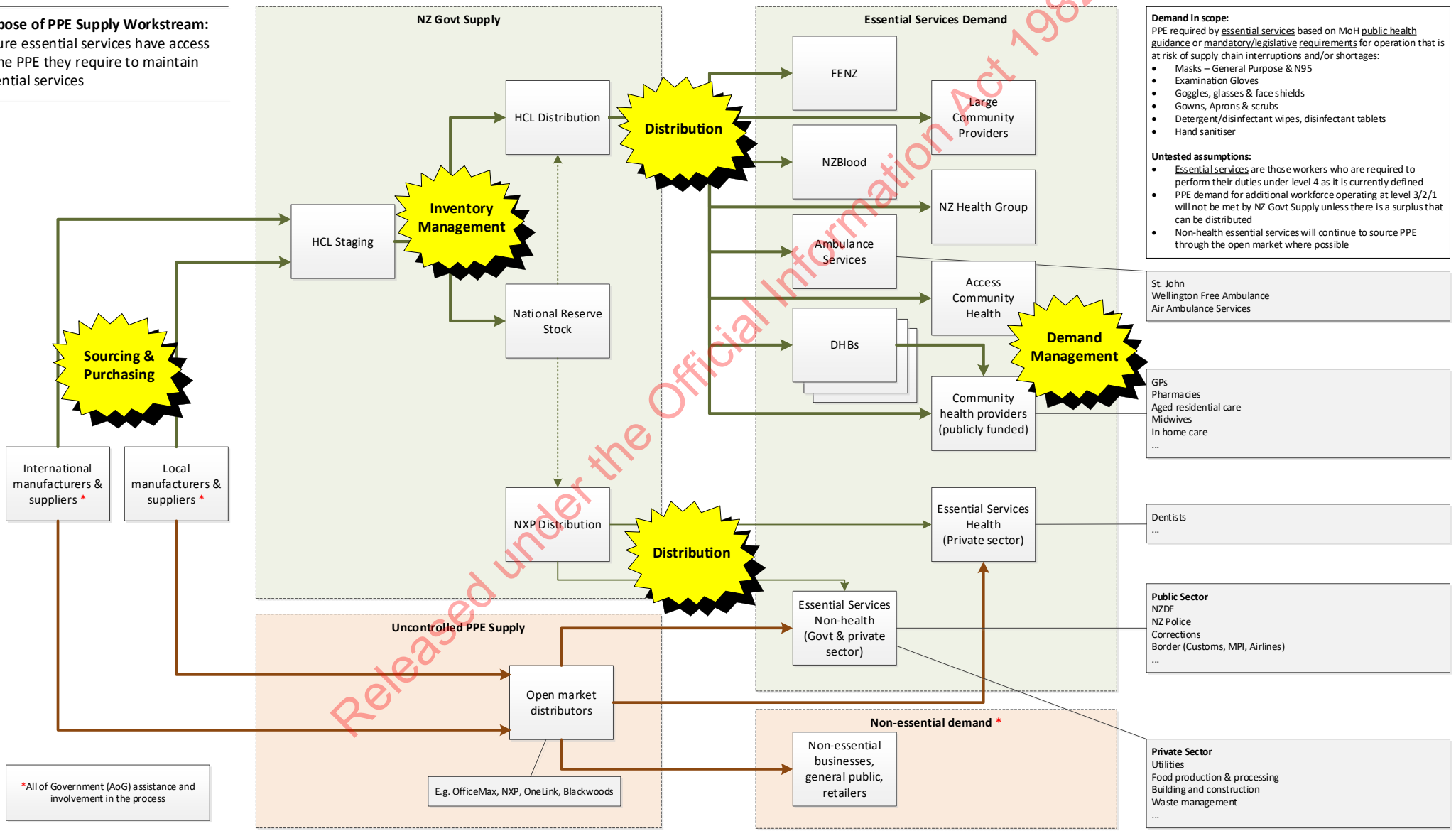
Document 1

Appendix 3

National PPE supply chain model

Green Cross
Pharmacies

Purpose of PPE Supply Workstream:
Ensure essential services have access to the PPE they require to maintain essential services



Impacts on disposable mask supply and demand if recommended or required on public transport

IN-CONFIDENCE
Document 2

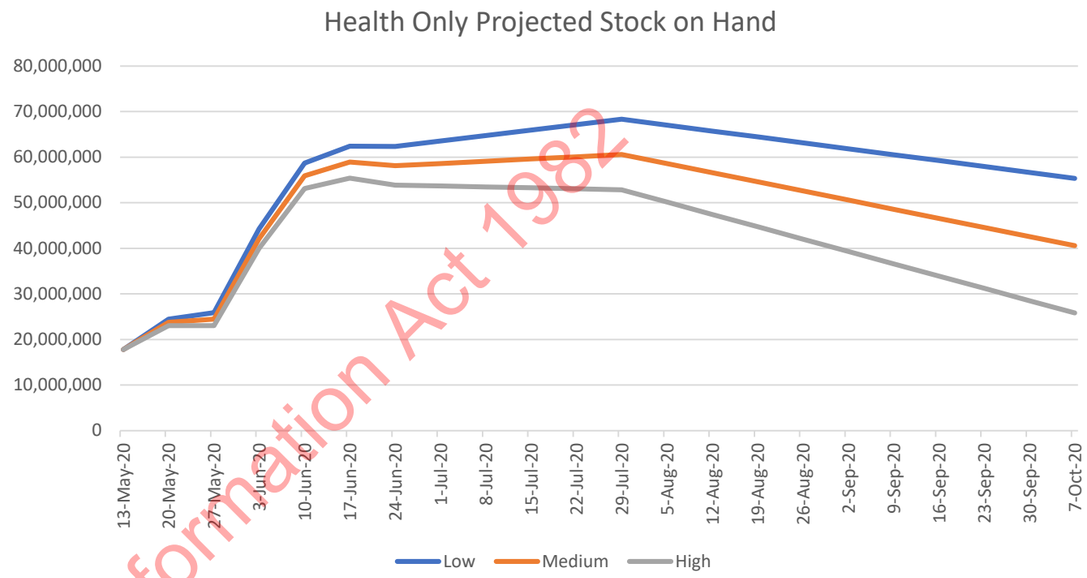
Scenarios outlining increased demand for masks on government reserve stock if people are required to wear masks on public transport

Projected weekly demand (qty)			
Scenario	Low	Medium	High
User Group			
Transport users	1,106,557	1,468,249	1,798,994
DHBs	1,500,000	2,203,500	2,907,000
Essential services	2,992,105	4,488,557	5,984,209
NGOs	0	1,000,000	2,000,000
Total	5,598,662	9,159,905	12,690,203
Date projected to exhaust stock	02 September 2020	15 July 2020	24 June 2020

Assumptions
-One mask per public transport trip
-Public transport masking will drive additional demand in other groups
-DHBs demand will come from health sector supply
-Public transport, essential workforce and NGOs demand will come from the private sector supply
-Public transport excludes education sector e.g. use of school buses

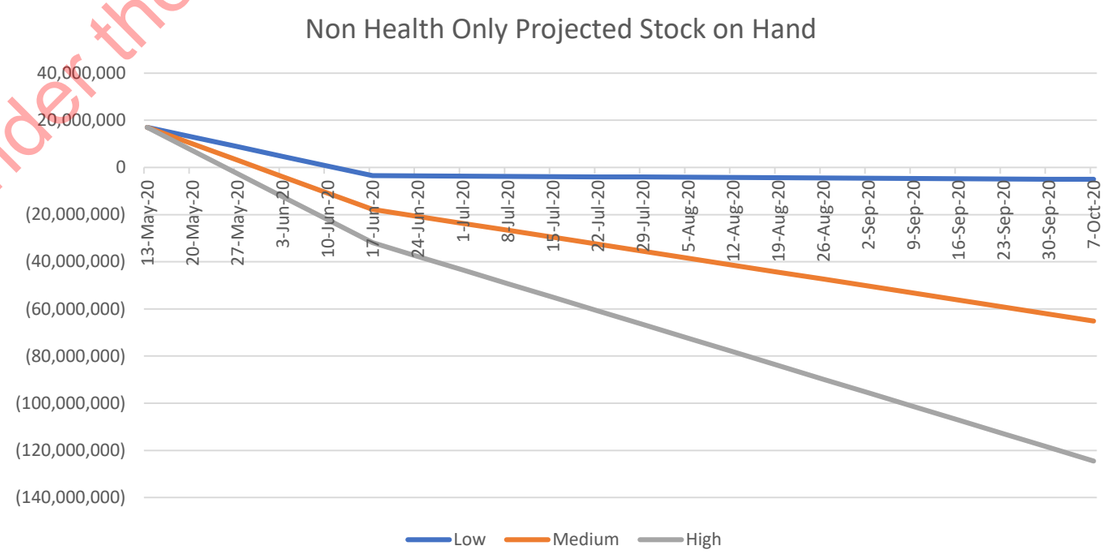
s 9(2)(b)(ii)

Impacts on health supply chain of increased demand on mask supplies



Assumptions
This graph shows the increased pressure on the health supply chain as a consequential impact of increased demand for mask. We are assuming the public will be supplied by the private sector, not the healthcare sector.

Projected demand and supply available for masks in the private sector



At Medium and High demand, stocks of masks in the private sector will fall below the demand for masks within a short time frame. There is an estimated 30 day lead in time for replenishing stocks of masks in the private sector. There are currently an estimated 17 million masks in stock in the private sector. These stocks will run out in approximately two weeks at medium/high demand. There would therefore be a two week lag period where it is projected there would be no supply of masks in the private sector as stocks are replenished.

Assumptions for all tables
Public transport low, medium and high figures are based on scenarios as per Ministry of Transport. For other groups:
Low – Demand is trending as it currently is
Medium –Demand is trending moderately upward as expectation for masks increases as a result of the public transport decision
High – Demand is trending steeply upward as expectation for masks increases as a result of the public transport decision

Rapid literature review – transmission of SARS-CoV-2 through air travel

The following search strategy was undertaken to identify articles on the possible in-flight transmission of SARS-CoV-2. The following search strategy was used:

Database: Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Daily and Versions(R) <1946 to May 19, 2020>, adapted for Scopus, Embase, Scholar, MEDRXIV Preprint Server

Search Strategy:

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1 (2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019 or ((novel or new or nouveau) adj2 (CoV or nCoV or covid or coronavirus* or corona virus or Pandemi*2)) or ((covid or covid19 or covid-19) and pandemic*2) or (coronavirus* and pneumonia)).mp.

2 limit 1 to (english language and yr="2020 -Current")

3 'aero transport'.ab,ti OR aircraft*.ab,ti OR aeroplane*.ab,ti OR airline*.ab,ti OR airplane*.ab,ti OR flight*.ab,ti OR aircrew.ab,ti OR airflight*.ab,ti OR aviation.ab,ti OR airport*.ti,ab OR aeroport*.ti,ab OR 'air port'.ti,ab OR steward.ti,ab OR stewardess.ti,ab OR inflight.ti,ab OR 'in-flight'.ti,ab OR 'cabin crew'.ti,ab

4 2 and 3

Overall, there is a lack of quality evidence around the transmission of SARS-CoV-2 through air travel and no systematic literature reviews have been done. Although it looks as if it can occur, it doesn't seem sitting near someone who is infected with SARS-CoV-2 on a plane is a risk factor for being infected.

Of note, there have been instances of in-flight transmission of influenza and SARS.

Next steps:

Undertake more in-depth literature review, including accessing grey literature and case studies.

Undertake analysis on of cases who were symptomatic during flights and identify whether close contacts on those flights developed COVID-19.

Summary of articles on SARS-CoV-2 transmission:

1. Guo-Qing Qian, Nai-Bin Yang, Feng Ding, Ada Hoi Yan Ma, Zong-Yi Wang, Yue-Fei Shen, Chun-Wei Shi, Xiang Lian, Jin-Guo Chu, Lei Chen, Zhi-Yu Wang, Da-Wei Ren, Guo-Xiang Li, Xue-Qin Chen, Hua-Jiang Shen, Xiao-Min Chen, Epidemiologic and Clinical Characteristics of 91 Hospitalized Patients with COVID-19 in Zhejiang, China: A retrospective, multi-centre case

series, *QJM: An International Journal of Medicine*, , hcaa089, https://doi.org/10.1093/qjmed/hcaa089

This study was a retrospective case series. Looked at eighty-eight cases of laboratory-confirmed and three cases of clinically confirmed COVID-19 were admitted to five hospitals in Zhejiang province, China. Data were collected from 20 January 2020 to 11 February 2020.

There were 11 patients who took the same flight and we believe they were infected while flying together, but no person that could be singled out as the index patient within this group. It is difficult to identify when they were infected.

2. Probable aircraft transmission of Covid-19 in-flight from the Central African Republic to France. Carole Eldin, Jean-Christophe Lagier, Morgane Mailhe, Philippe Gautret. Travel Medicine and Infectious Disease. Available online 1 April 2020, 101643

Discusses a case where the potential source of transmission was during a flight. However, no further information was given around whether those suspected of transmitting the virus were seated close to him or not. Of note, the case reported that his partner (in her fifties) who works for company X and undertook the same business travel, had cough and fever from February 25th to February 29th that resolved thereafter. She had a negative SARS-Cov-2 RT-PCR on a nasopharyngeal sample obtained on March 3rd. *There was no discussion that the potential source of infection could have been the partner.*

3. Lack of COVID-19 transmission on an international flight. CMAJ 2020 April 14;192: E410.

Described transmission of an index patient who was symptomatic with dry cough during the flight and wife who became symptomatic the day after. Both had sets of throat and nasopharyngeal swabs collected were positive for COVID-19.

Close contacts included 25 individuals sitting within 2 m of the index case during the flight, flight crew members, and

1 close contact on arrival in Toronto. On Jan. 29, (7 days after flight) 1 close contact developed symptoms of cough; however, nasopharyngeal and throat swabs were negative for COVID-19. The authors do not state if this close contact was on the plane with the index case. 5 non-close-contact passengers became symptomatic, were tested and found by nasopharyngeal and throat swabs to be negative for COVID-19.

4. Zhang, X.-A., et al. (2020). "Importing coronavirus disease 2019 (COVID-19) into China after international air travel." Travel medicine and infectious disease: 101620 DOI: https://dx.doi.org/10.1016/j.tmaid.2020.101620

Article described a cluster of COVID-19 in a 110-person international tour group with destination to Singapore and Malaysia. The tour group flew from Wuhan to Singapore on Jan 20, 2020, with flight time of 10 hours. However, it is hard to make an accurate estimation on the incubation period,

because the cases originated from areas with active COVID-19 transmission, so they could have gotten SARS-CoV-2 infection in Wuhan/Hubei before travel, or from each other during their 5-day tour in Singapore/Malaysia, or during the 5-h flight since transmission could have occurred anywhere in those periods of close contact.

Articles on influenza transmission

1. Review Article: Influenza Transmission on Aircraft: A Systematic Literature Review. Katrin Leitmeyer , Cornelia Adlhoch. https://pubmed.ncbi.nlm.nih.gov/24373291/

Identified 14 peer-reviewed publications describing contact tracing of passengers after possible exposure to influenza virus aboard an aircraft. Contact tracing during the initial phase of the influenza A(H1N1)pdm09 pandemic was described in 11 publications. The studies describe the follow-up of 2,165 (51%) of 4,252 traceable passengers. Altogether, 163 secondary cases were identified resulting in an overall secondary attack rate among traced passengers of 7.5%. Of these secondary cases, 68 (42%) were seated within two rows of the index case.

2. Transmission of Pandemic A/H1N1 2009 Influenza on Passenger Aircraft: Retrospective Cohort Study. Michael G Baker 1 , Craig N Thornley, Clair Mills, Sally Roberts, Shanika Perera, Julia Peters, Anne Kelso, Ian Barr, Nick Wilson. BMJ Actions. 2010 May 21;340:c2424. doi: 10.1136/bmj.c2424. https://pubmed.ncbi.nlm.nih.gov/20495017/

Results: Nine members of the school group were laboratory confirmed cases of pandemic A/H1N1 infection and had symptoms during the flight. Two other passengers developed confirmed pandemic A/H1N1 infection, 12 and 48 hours after the flight. They reported no other potential sources of infection. Their seating was within two rows of infected passengers, implying a risk of infection of about 3.5% for the 57 passengers in those rows. All but one of the confirmed pandemic A/H1N1 infected travellers reported cough, but more complex definitions of influenza cases had relatively low sensitivity. Rigorous follow-up by public health workers located 93% of passengers, but only 52% were contacted within 72 hours of arrival.

Conclusions: A low but measurable risk of transmission of pandemic A/H1N1 exists during modern commercial air travel. This risk is concentrated close to infected passengers with symptoms. Follow-up and screening of exposed passengers is slow and difficult once they have left the airport.

SARS transmission

Transmission of the Severe Acute Respiratory Syndrome on Aircraft

Sonja J Olsen 1 , Hsiao-Ling Chang, Terence Yung-Yan Cheung, Antony Fai-Yu Tang, Tamara L Fisk, Steven Peng-Lim Ooi, Hung-Wei Kuo, Donald Dah-Shyong Jiang, Kow-Tong Chen, Jim Lando, Kwo-Hsiung Hsu, Tzay-Jinn Chen, Scott F Dowell

DOI: 10.1056/NEJMoa031349

Abstract

Background: The severe acute respiratory syndrome (SARS) spread rapidly around the world, largely because persons infected with the SARS-associated coronavirus (SARS-CoV) traveled on aircraft to distant cities. Although many infected persons traveled on commercial aircraft, the risk, if any, of in-flight transmission is unknown.

Methods: We attempted to interview passengers and crew members at least 10 days after they had taken one of three flights that transported a patient or patients with SARS. All index patients met the criteria of the World Health Organization for a probable case of SARS, and index or secondary cases were confirmed to be positive for SARS-CoV on reverse-transcriptase polymerase chain reaction or serologic testing.

Results: After one flight carrying a symptomatic person and 119 other persons, laboratory-confirmed SARS developed in 16 persons, 2 others were given diagnoses of probable SARS, and 4 were reported to have SARS but could not be interviewed. Among the 22 persons with illness, the mean time from the flight to the onset of symptoms was four days (range, two to eight), and there were no recognized exposures to patients with SARS before or after the flight. Illness in passengers was related to the physical proximity to the index patient, with illness reported in 8 of the 23 persons who were seated in the three rows in front of the index patient, as compared with 10 of the 88 persons who were seated elsewhere (relative risk, 3.1; 95 percent confidence interval, 1.4 to 6.9). In contrast, another flight carrying four symptomatic persons resulted in transmission to at most one other person, and no illness was documented in passengers on the flight that carried a person who had presymptomatic SARS.

Conclusions: Transmission of SARS may occur on an aircraft when infected persons fly during the symptomatic phase of illness. Measures to reduce the risk of transmission are warranted.

The observation that the passengers who became infected were clustered in the few rows directly in front of or behind the ill passenger, rather than being randomly distributed throughout the aircraft, is consistent with the pattern described in other cases in which a respiratory pathogen was transmitted on board an aircraft13 and lends further plausibility to the theory that transmission occurred during the flight. The risk to passengers was greatest if they were seated in the same row as the index patient or within three rows in front of him. The greater concentration of persons who became infected in front of the index patient than behind him may point to the role of coughing in transmission, causing a combination of aerosol and small-droplet spread.

Request for rapid review on air travel passengers use of face masks on planes

Context:

Advice on IPC guidance for air travel passengers is increasingly sought after and required, especially in reference to increased movement across the trans-Tasman bubble. The Minister of Health has requested advice on guidance for air travel passengers specifically regarding the use of face masks on planes. This recommendation will be used to inform the Ministry's advice to the Director General (and the Minister) and then ultimately shared with the transport sector and the public. The Minister of Health will receive a memo with this guidance from the Ministry of Health on Friday 5 June, which this advice will help to inform, alongside input from ODPH, quarantine, and border operations teams.

The IPC Subgroup is receiving a Request for Advice on whether they recommend passengers wear masks (medical or cloth) on aircraft to reduce the risk of the transmission of COVID-19. They will be asked to provide a recommendation for both domestic and international air travel, noting note that it may not always be possible to maintain physical distancing on aircraft.

Rapid review

A rapid review on this topic is requested to help inform the IPC Subgroup's consideration of this issue, and is requested to be provided on **Friday 29 May** by 1pm.

It should address the question:

What is the evidence base for passengers wearing face masks on planes in reducing the risk of transmission of COVID-19, acknowledging that physical distancing may not always be possible?

This rapid review should include a quick scan of the academic literature, plus reviewing the policy positions of other countries/ airlines, as well as grey literature and possibly social commentary.

The following link may be a good starting point: https://www.easa.europa.eu/document-library/general-publications/covid-19-aviation-health-safety-protocol

MINISTRY OF HEALTH
MANATŪ HAUORA

ELT Memorandum

Updated Ministry website content on community use of face masks for COVID-19

To:	Ashley Bloomfield, Director-General of Health
From:	Margareth Broodkoorn, Chief Nursing Officer Ian Town, Chief Science Advisor Caroline McElnay, Director of Public Health
Date:	26 May 2020
For your:	Decision

Purpose of report

1. This memo seeks your decision on publishing updated Ministry website content on the use of face masks in the community for COVID-19 at Alert Levels 1 & 2.

Context

2. There has been substantial interest around the community use of face masks in New Zealand. Updated content for the Ministry of Health website has been drafted to provide clarity on the Ministry's advice on this issue, as well as the rationale for this advice and what would prompt reconsideration (as per appendix 1).

3. Evidence to recommend the use of face masks for healthy people in the community to prevent the spread of COVID-19 is inconclusive. There are potential benefits and potential risks with such use. Countries are taking different approaches based on their current COVID-19 context.

4. We currently advise that healthy people in the community are not required to wear a face mask for protection from COVID-19 in New Zealand. In our current environment, where there is no or low risk of community transmission, the potential benefits of requiring face masks to be worn by all healthy people in the community do not outweigh the potential risks.

5. If a healthy member of the public chooses to purchase and wear a face mask, or make their own, we advise that they need to ensure they use it safely, as there are risks associated with incorrect use of all types of face masks. Advice on how to use a face mask safely has been included in the draft website content.

6. There are a few specific contexts where medical face masks are recommended which are also highlighted in the draft website content.

Recommendations

We recommend that you:

a) **Approve** for publication the draft Ministry website content on 'Use of face masks in the community for COVID-19 in Alert Levels 1 & 2' as per appendix 1. **Yes/No**

Signature _____ Date:

Dr Ashley Bloomfield

Director-General of Health

Appendix 1: Draft Ministry of Health website update on use of face masks in the community for COVID-19 in Alert Levels 1 & 2

Use of face masks in the community for COVID-19 in Alert Levels 1 & 2

Information on the use of face masks in the community

COVID-19, the disease caused by SARS-CoV-2, is spread by droplets. When an infected person coughs or sneezes without covering their mouth and nose, droplets containing the virus spread a short distance and can settle on surrounding surfaces.

COVID-19 is mostly spread following close contact with people who have the virus and have symptoms. You may also get infected if you touch surfaces or objects contaminated with droplets and then touch your mouth, nose or eyes.

Staying home if you're unwell, maintaining physical distancing and basic hygiene measures remain the most important way to stop the spread of infections, including COVID-19.

Basic hygiene measures include:

- **Hand hygiene –** frequently wash your hands for a minimum of 20 seconds, then dry them thoroughly. If you are unable to access soap and water, use an alcohol-based hand sanitiser containing at least 60% alcohol. If using sanitiser, ensure that you use enough to cover your hands and rub hands together until dry.
- **Cough and sneeze etiquette –** sneezing or coughing into the crook of your elbow or covering coughs and sneezes with a tissue, then putting the tissue in a bin and cleaning your hands (as above).
- **Avoiding touching your face –** hard surfaces can be contaminated with infectious droplets. Hands can be contaminated after contact with these surfaces. If you need to touch your face, clean your hands first.
- **Cleaning surfaces and frequently touched items –** clean high-touch surfaces and items (for example door handles and phones) frequently with an appropriate cleaning solution to reduce transmission of germs in general.

General information on face masks and COVID-19

Face masks are one part of Infection Prevention and Control (IPC) measures used in health care settings. They are a type of personal protective equipment (PPE) used to help prevent the spread of infectious diseases. They must meet appropriate standards for use in health care, be worn correctly and in the appropriate context.

Non-medical face masks, including home-made facial coverings or cloth masks, vary greatly in composition and design. They are not required to meet the same safety standards that are used in health care to prevent the spread of diseases.

There is no convincing evidence one way or other to require the use of non-medical face masks for healthy people in the community to protect from COVID-19. There are potential benefits and

potential risks with such use. Countries are taking different approaches based on their current COVID-19 context.

Non-medical masks could provide an additional element of protection in preventing someone who is infectious with COVID-19 spreading this infection to others. This is through potentially 'catching' large infectious respiratory droplets produced by the wearer, so they do not spread further. This is called 'source control'.

Non-medical masks are not proven to effectively protect the person wearing them from becoming infected by others. They are therefore not a substitute for physical distancing and basic hygiene measures. Some of the reasons for this include the types of materials used for the masks and how they are worn.

The COVID-19 context in New Zealand at Alert Levels 1 and 2

- The risk of exposure to COVID-19 for most people is now considered low and manageable by sticking to the core public health actions: staying home if unwell, maintaining physical distancing and basic hygiene measures, including frequent hand washing.
- Our small number of active COVID-19 cases are restricted to individual households or known clusters and are well controlled; those that are still potentially infectious to others must follow strict isolation requirements until they no longer present a risk.
- People who have been in close contact with COVID-19 cases are at risk of developing COVID-19. If they do develop COVID-19, they present a small risk of potential transmission to others before they develop any symptoms, as well as if they develop obvious symptoms. To manage this risk, we have strict isolation requirements for those who have been identified as close contacts of COVID-19 cases and may have been exposed to the virus.
- The highest risk of exposure to COVID-19 outside of health care settings is for those involved in border management of people coming into New Zealand from overseas (including our quarantine and self-isolation facilities). Medical face masks are recommended for use in these situations to help prevent workers from being infected with COVID-19 if they come into contact with someone who is infectious.

Advice on community use of face masks in New Zealand's current COVID-19 context

Based on the New Zealand context of COVID-19 and the range of control measures we have in place (including staying home if unwell, maintaining physical distancing and basic hygiene), current advice on the use of face masks in the wider community is as follows:

- **Healthy people in the community are not currently required to wear a face mask for protection from COVID-19 in New Zealand.** In our current environment, the potential benefits of requiring masks to be worn by all healthy people in the community are not felt to outweigh the potential risks. This may change if we see increasing community transmission in the future.

- **Healthy members of the public may choose to purchase and wear a face mask, or make their own. If you would like to wear one for your own comfort, please ensure you use it safely, as there are risks associated with incorrect use of all types of face masks.** See advice below around how to use a face mask safely (hyperlink).

- **If you are unwell with new or worsening symptoms of an acute respiratory infection** (cough, sore throat, shortness of breath, runny nose or temporary loss of smell, with or without fever), **you should stay home and call Healthline on 0800 358 5453 or your health care provider.** If you have symptoms consistent with COVID-19 and are advised that you need to be assessed in person, you will be asked by a health care worker to put on a medical face mask to reduce the risk of spreading any infection. They will supply you with one and tell you how to use it correctly.

- **If you have COVID-19 or are a close contact of a COVID-19 case,** you will be isolating in your home or another location until you no longer present a risk of potentially spreading COVID-19 to others. You will be provided advice and support on how to safely access urgent care (in the rare circumstance it is needed) to prevent potential spread of infection to others. This may include the use of a medical face mask in certain circumstances.

  Note: for close contacts of COVID-19 cases, this advice includes additional precautions to account for the small risk that they may have developed COVID-19 and are able to pass it on to others while they have few or no symptoms.

This advice on use of face masks in the community will be updated if new evidence or guidance from the World Health Organization emerges, or we see a change in COVID-19 disease patterns in New Zealand (for example, increasing community transmission).

How to use a face mask safely

If you choose to wear a face mask – one you purchase or make yourself – you need to know how to use it safely. This includes how you put it on, what to do while wearing it, how to take it off and how to handle it safely after use to avoid the risk of infection.

Some key points:

- Never share face masks with other people.
- Face masks should not be worn by young children or anyone unable to remove them without assistance.
- Face masks should not be worn by people who have trouble breathing.

How to safely put on a face mask:

1. Ensure your face mask is clean and dry and is not damaged.
2. Before putting on your face mask, clean your hands with soap and water or use hand sanitiser (containing at least 60 percent alcohol). Ensure your hands are dry.
3. Place the face mask over your nose and mouth and secure with ties or loops. Make sure the mask fits snugly, moulded to your face and around your nose. Make sure the mask fully covers your nose, mouth and chin. Your mask should be comfortable, with no gaps around the mask and your face, and allow you to breathe easily.
4. Clean your hands again (as above).

While wearing a face mask:

- Do not touch the front of the face mask. If you do, clean your hands and dry thoroughly.

- Avoid touching your face, as infection can still be introduced by touching your eyes or if you are not wearing your face mask correctly.
- Face masks should not be moved during use. This includes being pulled up or pulled down below your chin. If you need to remove your mask (for example, to eat) - remove it safely, dispose of it appropriately (or wash if a home-made facial covering or cloth mask) and clean your hands.
- Replace the face mask if it becomes damp, damaged or soiled.

How to safely remove a face mask

1. Clean your hands with soap and water or use hand sanitiser (containing at least 60 percent alcohol). Ensure your hands are dry.
2. Remove the face mask from behind (do not touch the front of the mask) by untying ties or removing loops and pull it away from your face. Be careful not to touch your eyes, nose and mouth when removing your mask.
3. Clean or dispose of it appropriately (see below).
4. Clean your hands again (as above).

Safely disposing of single-use face masks

1. Dispose in a closed lidded bin or place into a bag and seal before putting into a rubbish bin or taking home.
2. Clean your hands after disposing of the face mask with soap and water or use hand sanitiser (containing at least 60 percent alcohol). Ensure your hands are dry.
3. Do not re-use or try to disinfect single-use disposable face masks.

Cleaning home-made facial coverings or cloth masks

1. Wash the mask in a washing machine with detergent at 60 degrees Celsius.
2. After putting the mask in the washing machine, clean your hands with soap and water or use hand sanitiser (containing at least 60 percent alcohol). Ensure your hands are dry.
3. Dry the mask completely before you use it again. Do not use a damp mask.

Further information and advice from the World Health Organization

For videos and further advice on how to put on and take off a face mask, and dispose of one safely, please see the World Health Organization (WHO) information available at:

https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/when-and-how-to-use-masks

Current WHO advice on community use of facemasks is also available here:

https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak

Read the review of science and policy around the use of face masks, commissioned by the New Zealand Ministry of Health's Chief Science Advisor

- Review of science and policy around face masks and COVID-19 (New version: 15 May 2020)

Rapid review on air travel passengers' use of face masks on planes

Draft 29th May 2020

Context

The Minister of Health has requested advice on guidance for air travel passengers specifically regarding the use of face masks on planes. The Infection Prevention and Control (IPC) Subgroup has been asked to provide a recommendation on whether they recommend passengers wear masks (medical or cloth) on domestic or international air travel to reduce COVID-19 transmission, noting that it may not always be possible to maintain physical distancing on aircraft. A rapid review on this topic was requested to help inform the IPC Subgroup's consideration of this issue.

Scope

This rapid review was undertaken to address the question:

- ***What is the evidence base for passengers wearing face masks on planes in reducing the risk of transmission of COVID-19, acknowledging that physical distancing may not always be possible?***

In seeking to answer this question, this review also examines following sub-questions:

- *Can SARS-CoV-2 be transmitted on planes, how, and does proximity of seating to the index case matter?*
- *Is there evidence that the routine use of masks in passengers will reduce SARS-CoV-2 transmission in planes? What about in airports?*
- *Is this a feasible and equitable policy option?*

Recommending face masks in COVID-19 control is complex, with unclear efficacy and potential advantages and disadvantages. This review notes the related evidence reviews already undertaken for the Ministry of Health on the role of community masking in COVID-19 control, and therefore focuses on evidence and policy specifically relating to the use of masks in air travel.

Policy context in New Zealand

Currently in New Zealand, the use of face masks in the wider community is not recommended for COVID-19 control[i]. In the current context of no/minimal community transmission, the potential benefits of requiring masks to be worn by healthy people in the community are not felt to outweigh the potential risks.

The question remains whether the balance of benefits and risks falls differently in specific settings where there may be a higher risk of transmission, through an inability to adopt physical distancing or other safety measures (eg on planes or other public transport), or where there is an increased likelihood of exposure to infected people (eg international airport arrivals).

[i] https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-health-advice-general-public/covid-19-use-face-masks-community

In the current context of no/low community transmission, New Zealand's primary source of new COVID-19 cases is from international arrivals. Therefore, the highest risk of exposure to COVID-19 outside of health care settings is for those involved in border management of people coming into New Zealand from overseas. Medical face masks are currently recommended for use in these situations to help prevent workers from being infected with COVID-19.

So far, this recommendation does not extend to passengers on international or domestic flights in New Zealand. In New Zealand's current context of low/no community transmission, these two settings have quite different risk profiles: domestic flights represent an indoor environment where physical distancing may not be possible, but there is also a very low chance of an individual within the New Zealand community having COVID-19. An international flight, especially in-bound, has the same difficulty with physical distancing, but a much higher chance of carrying an individual with COVID-19 if it is coming from regions with higher levels of community transmission than New Zealand, or with weaker border control measures.

Literature search strategy

The review included rapid scan of the academic literature, plus reviewing the policy positions of other jurisdictions, as well as relevant grey literature. The following databases were searched: PubMed, MEDRXIV (preprint server for health services) and Google Scholar, using combinations of the following search terms:

1. facemask$ or face-mask$ or mask$ or ((face$ or cloth$) and cover$))
2. 2019-ncov or ncov19 or ncov-19 or 2019-novel CoV or sars-cov2 or sars-cov-2 or sarscov2 or sarscov-2 or Sars-coronavirus2 or Sars-coronavirus-2 or SARS-like coronavirus* or coronavirus-19 or covid19 or covid-19 or covid 2019
3. transport$ or aircraft or air travel or aviation or flight or inflight or aircrew or steward$
4. respiratory vir$ or influenza or SARS or transmission

Additional internet searches were conducted to ascertain the policy approaches taken in other jurisdictions. This rapid review is not a formal systematic review of the evidence.

Summary of key findings

- Sharing indoor space is a major SARS-CoV-2 infection risk. Compared to other confined indoor settings, some factors about the inflight environment offer theoretical protection (eg HEPA filtration of cabin air) and some pose theoretical additional risk (eg low absolute humidity).
- There are case reports that SARS-CoV-2 can be transmitted between passengers on flights.
- Evidence from other respiratory viruses including influenza and SARS-CoV does not suggest that the risk of transmission is amplified aboard aircraft. While passengers sitting in close proximity have been found to be at higher risk in some studies, the majority of secondary cases occur in passengers not seated close to the index case.
- There is insufficient evidence to comment on the most significant modality of transmission (eg small particle, droplet, direct contact, fomites) for SARS-CoV-2 on aircraft. The use of face masks offers a theoretical potential benefit in reducing all of these modes of transmission.

- There is minimal research relating to the use of face masks on aircraft to prevent SARS-CoV-2 transmission. One case report suggests face mask wearing in flight attendants offered protection from exposure to SARS-CoV-2 infected passengers. Evidence regarding the use of passenger face masks in preventing the inflight transmission of other respiratory viruses suggests some protective effect. There is also some limited evidence that mask wearing may reduce SARS-CoV-2 transmission in other public transport settings, including one case report of mask wearing being effective source-control in reducing SARS-CoV-2 transmission from an infected individual during a bus journey, and evidence of low transmission in South Korean metro trains.
- There are other infection control measures recommended to reduce the risk of SARS-CoV-2 transmission inflight, including hand hygiene, respiratory etiquette, limiting contact with cabin surfaces, minimising on-board service, measures to avoid passengers queuing in the aisle or the galleys and reducing the use of individual air supply nozzles. It is not clear to what extent these measures reduce the risk of SARS-CoV-2 transmission, compared to the use of face masks.
- Noting the inconclusiveness of the evidence regarding the effectiveness of community face masks in the prevention of SARS-CoV-2 and related respiratory viruses, there are a number of factors about the inflight setting that make offer a stronger protective effect from masking. The short duration, limited mobility of individuals and heightened passenger awareness during the flight may contribute to increased compliance and adequacy of mask wearing in an aircraft, compared to the broader community.
- The evidence regarding mask wearing on aircraft does not extend to mask wearing in the airport setting. It is not clear whether there is any protective effect of mask wearing in the airport. Some authors believe that the risk of transmission at any of the points in the airport are extremely low. It is not known whether recommending extended mask wearing (eg from arrival at departure airport to exit from arrival airport) has any impact on the effectiveness and compliance with mask wearing, compared to guidance just to wear masks on board the aircraft.
- None of the studies found explicitly consider the potential equity impacts of a policy to require masking on flights. One New Zealand expert blog suggested that masking on public transport in general could ensure the affordability of mass transport, by avoiding the need for more costly "empty middle seat" options which could drive up ticket prices for individuals, and this view is supported by the airline industry body. The acceptability of a policy on masking for Māori and other population groups (including people with hearing impairments) in New Zealand is beyond the scope of this rapid review, and this information will be needed to understand and mitigate any potentially inequitable impacts of a masking policy.
- None of the studies reviewed investigate the costs, potential negative impacts or unintended consequences of recommending or requiring the use of face masks in airline passengers. None of the studies discuss the feasibility of implementing mask wearing policies on board aircraft, including the jurisdictional mandate over international flights. This issue needs to be investigated to clarify the scope of policy options available to the New Zealand government.

Results

The findings from the rapid review are presented below under the categories of research evidence, expert guidance/opinion and policy approaches.

1. Research evidence

Risk of inflight transmission of SARS-CoV-2

- It is plausible that SARS-CoV-2 can be transmitted on planes, and there is emerging evidence to support this. Analysis of 318 SARS-CoV-2 outbreaks in China found that most clusters occur indoors, especially on public transport (34%) and inside homes[1]. A retrospective case series of eighty-eight cases of laboratory-confirmed and three cases of clinically confirmed COVID-19 in China included 11 patients who took the same flight, and the authors believe they were infected while flying together, although no person could be singled out as the index patient within this group and it is difficult to identify when they were infected[2]. There are at least two case reports[3,4] of potential SARS-CoV-2 transmission during an international flight, although they are unable to confirm the source of transmission or exactly when transmission occurred.
- There are a number of potential modes for SARS-CoV-2 transmission on an aircraft including large droplets, direct contact, or indirect contact via contaminated surfaces and fomites. Some factors, such as the HEPA filtration of cabin air, removing particles larger than 0.3 µm by 1 µm, may be protective[5]. Other factors such as the low humidity, may make flights a higher transmission risk setting[6] than other indoor physical spaces where physical distancing is similarly difficult.
- In terms of inflight transmission of other respiratory viruses:
    - There is evidence of influenza transmission between passengers on flights. A systematic review of passenger contact tracing during the influenza A(H1N1)pdm09 pandemic (11 publications, 2165 passengers) found an overall secondary attack rate among traced passengers of 7.5%. Of these secondary cases most were seated more two rows of the index case[7]. A retrospective cohort study of 232 passengers estimated an overall attack rate (AR) of 4.3% for influenza A(H1N1)pdm09 on a nine-hour commercial flight with six potentially infectious passengers on board, and did not demonstrate an increased risk to those seated within two rows of an infectious case[8]. However, a New Zealand cohort study of influenza A(H1N1)pdm09 transmission on aircraft found that most secondary cases did occur amongst passengers seated closely to the index case[9].
    - A review of SARS-CoV transmission on an aircraft carrying 120 people and 1 infected case, found that of the 18 secondary cases, transmission was higher amongst passengers seated close to the index case (RR 3.1, 95% CI 1.4- 6.9), although most cases (n=10, 56%) occurred in passengers not seated close to the case[10].
    - Accurate data about the infectious risks of air travel are limited, but the available evidence does not suggest that aircraft are a particularly high-risk environment for transmission. For SARS-CoV, out of 35 flights under investigation because a patient with symptomatic SARS had been on board, only 4 of these flights were deemed to be associated with possible transmission[11]. Other cohort studies of both SARS-CoV and influenza exposure on flights suggest that the risk of transmission is not amplified aboard aircraft[5,9,12,13].
    - There is a lack of evidence regarding transmission in the airport setting, outside the confines of the aircraft. Given that the exposure at common points in the airport (e.g., at the check-in counter or security checkpoints) is brief, some authors conclude it is unlikely to lead to a high attack rate[14].

Impact of mask-wearing in reducing inflight SARS-CoV2 transmission

- There is scant evidence specifically relating to the use of face masks on aircraft to prevent SARS-CoV-2 transmission. A retrospective case series of 12 patients believed to have contracted COVID-19 during a flight found that 0/9 flight attendants who interacted with the unwell passengers during this flight became ill, perhaps because of their use of masks[15].
- A descriptive analysis [16] has been published of the procedures used to minimise risk of transmission during 39 flights, moving over 2,000 individuals, all of whom were either COVID-19 positive or persons under investigation (PUIs). These recommendations are specific to the context of known positive cases, so are not directly applicable to routine air travel. However, to minimise onboard transmission, all passengers were offered masks: known positive patients wore N95 masks and PUIs wore at least standard surgical masks. Staff in close proximity of patients (< 6 ft) wore extensive PPE with either a powered air-purifying respirator or an N95 mask with a face shield. Staff outside the 6-ft range (pilots and flight attendants) wore a fitted N95 mask and gloves at a minimum. The authors also note the importance of other interventions to reduce inflight transmission, including physical separation, use of plastic barriers, and ensuring good cabin ventilation at all times, including ground delays. In aircraft with poorly controlled interior airflow, such as rotor wing or other non-pressurized fixed wing aircraft, physical barriers are essential.
- There is some evidence regarding the use of passenger face masks in preventing the inflight transmission of other respiratory viruses. A small retrospective case-control study of passengers who became infected with influenza A(H1N1)pdm09 on a long haul international flight, found that mask wearing passengers were less likely to become infected[14]. No passengers who became infected were wearing a mask (0/9), compared to 47% (15/32) of control-passengers. The type of mask was not assessed. The authors suggest several possible reasons why masking in an aircraft appeared to offer greater protection against influenza than seen in community masking studies: exposure was for <24 hours, in a confined space with limited activity of exposed persons, and compliance with face mask use was probably greater among travellers who were concerned about unpredictable health effects of the new virus.
- There is some weak evidence that mask wearing may reduce SARS-CoV-2 transmission in other confined public transport settings. A COVID-19 case in China took two similar bus journeys on the same day, wearing a mask on one but not the other. He transmitted the virus to 5/39 passengers on the bus where he did not wear a face mask, and 0/14 passengers on the journey where he wore a face mask[17]. Analysis of a South Korean call centre cluster of SARS-CoV-2 found a surprisingly low attack rate in the densely packed metro trains used by infected employees (compared to a high attack rate in their office building), and the authors attribute this finding to the near universal use of face masks amongst metro passengers in South Korea[18].

2. Expert guidance

- COVID-19 operational guidelines[20] on the management of air passengers and aviation personnel, jointly issued by the European Union Aviation Safety Agency (EASA) and European Centre for Disease Prevention and Control (ECDC) released on 20th May 2020 recommend the wearing of medical (not cloth) masks for all passengers, aircrew, and airport staff with passenger contact, from the moment they enter the terminal until at the departure airport until they exit the

terminal building at the destination airport. Children under 6 years of age and persons with medical issues are exempted. Passengers should be reminded to change masks every 4 hours or when wet/soiled, and extra facilities must be provided in airports and aircraft to ensure safe disposal of used masks. Masks are in addition to, and not a replacement for, other safety measures such as physical distancing, respiratory etiquette, meticulous hand hygiene and avoiding touching the face. These guidelines also recommend a number of other measures to reduce the risk of SARS-CoV-2 transmission inflight, including hand hygiene, respiratory etiquette, limiting contact with cabin surfaces, minimised on-board service, measures to avoid passengers queuing in the aisle or the galleys and reducing the use of individual air supply nozzles[20].

- The World Health Organization do not recommend the use of masks for healthy people in community settings, including public transport, for the prevention of SARS-Cov2 transmission[21].
- The airline industry body, International Air Transport Association (IATA), considers that mask-wearing by passengers and crew will reduce the already low risk of COVID-19 transmission, while avoiding the dramatic cost increases to air travel that onboard social distancing measures would bring[22]. This recommendation is likely to affect policies on aircraft servicing New Zealand and ultimately on domestic flights that connect to them.
- While the USA CDC recommends the use of cloth face coverings for the general community, the joint CDC and the Federal Aviation Administration Updated Interim Occupational Health and Safety Guidance for Air Carriers and Crews issued on 11th May 2020 advises airlines to undertake a safety assessment on the use of face coverings in crew as they may affect the timely donning of oxygen masks. No comment is made regarding the use of inflight face coverings in passengers.
- Although not specific to air travel, Greenhalgh et al call for the precautionary principle to be applied to recommendations about masks. Given that "masks are simple, cheap, and potentially effective" they argue the lack of direct evidence on mask efficacy within the community context should not preclude the recommending of public health policies that may have a potentially beneficial effect[23].
- A group of New Zealand epidemiologists argue that even though community transmission in New Zealand is currently low, the public should be encouraged to wear masks in indoor situations which pose the highest risk of pre-symptomatic transmission (eg, public transport and border control)[24]. They claim this could make wider community mask uptake in the future easier and more efficient at mitigating any future outbreaks, and also suggest that masking on public transport could facilitate the return to safe, affordable, and efficient public transport.

3. Policy approaches

The following table summarises the policy approaches taken in other jurisdictions, in relation to mask wearing in air travel. Due to time constraints, many of these policies have been reported in mass media sources and have not all been verified using official government sources. Where public transport has been specifically mentioned, this is listed. Otherwise, policies referring to public spaces are assumed to apply to public transport (including air travel) although this is not specified.

Table 1 Policies on the wearing of face masks in other jurisdictions

Jurisdiction	Policy	Date of policy
Argentina	Face masks obligatory for everyone using public transport	14 April 2020
Australia	No recommendation for masks in public transport or air travel	26 May 2020
Austria	Wearing masks in public spaces mandatory	6 April 2020
Bahrain	Wearing masks in public mandatory	22 April 2020
Belgium	Face masks compulsory on public transport (stops and stations, as well as the vehicles themselves) and at airports.	18 May 2020
Bosnia and Herzegovina	Face mask or a cloth covering compulsory outside of home	29 March 2020
Cameroon	Face masks obligatory for people going outside their homes	9 April 2020
Canada	All air passengers must have a non-medical mask or face covering to cover their mouth and nose during air travel, including at airport screening.	20 April 2020
Chile	Face masks obligatory for everyone using public transport	8 April 2020
Colombia	Face masks compulsory on the public transport system and other public spaces	4 April 2020
Cuba	Wearing masks in public mandatory	6 April 2020
Czech Republic	Mandatory masks on public transport, supermarkets, and pharmacies.	18 March 2020
Ecuador	Wearing masks in public mandatory	7 April 2020
El Salvador	Wearing masks in public mandatory	8 April 2020
France	Use of face masks in public mandatory	10 May 2020
Germany	Wearing of face masks compulsory when on public transport and shopping	22 April 2020
Honduras	Face masks obligatory for people going outside their homes	3 May 2020
Israel	Wearing masks in public mandatory	12 April 2020
Jamaica	Wearing masks in public mandatory	21 April 2020
Luxembourg	Face masks mandatory in public places where it is not possible to keep enough distance between one person and the other, such as public transport	20 April 2020
Morocco	Wearing masks in public mandatory	7 April 2020
Norway	Masks not recommended outside of healthcare settings	27 May 2020
Poland	Covering the face with either a mask or homemade piece of fabric such as a scarf mandatory in public places.	16 April 2020
Qatar	Wearing masks in public mandatory	17 May 2020
Slovakia	Mandatory masks on public transport, supermarkets, and pharmacies.	25 March 2020
South Korea	Mandatory for people to wear masks when using public transportation and taxis nationwide.	26 May 2020
Spain	Compulsory on May 20 for everyone older than six to wear masks in indoor public spaces, and outdoor ones when it is impossible to keep more than two metres apart.	20 May 2020
Uganda	Every person who leaves their home must wear a cloth face mask	5 May 2020

UK	Face covering is optional on public transport and air travel. Medical masks reserved for health workers.	28 May 2020
United Arab Emirates	Wearing masks in public mandatory	4 April 2020
Venezuela	Wearing masks in public spaces mandatory	March 2020
Viet Nam	Compulsory mask in public places	16 March 2020

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Ministry of Health COVID-19 response - Science and Technical Advisory

Request for independent advice and response

Deliverable	Advice		
ID reference #	863	**Title**	Advice for air travel passengers regarding the use of face masks
Requestor	Minister of Health, via Niki Stefanogiannis	**Due date**	Friday 5 June 2020
Lead	IPC Subgroup	**Time allocated**	
Description	*Context:* Advice on IPC guidance for air travel passengers is increasingly sought after and required, especially in reference to the proposed increase in movement across the trans-Tasman bubble. The Minister of Health has requested advice on guidance for air travel passengers specifically regarding the use of face masks on planes. This recommendation will be used to inform the Ministry's advice to the Director General (and the Minister) and then ultimately shared with the transport sector and the public. The Minister of Health will receive a memo with guidance from the Ministry of Health on Friday 5 June, which this advice will help to inform, alongside input from ODPH, quarantine, and border operations teams. *Question:* Does the IPC Subgroup recommend passengers wear masks (medical or cloth) on aircraft to reduce the risk of the transmission of COVID-19? - Please provide a recommendation for both domestic and international air travel. - In considering the request, please note that it may not always be possible to maintain physical distancing on aircraft. *Additional information:* A rapid review of the academic and international policy literature regarding passenger facemask use on planes was provided on Friday 29 May to assist the IPC subgroup in their consideration of this issue. Other documents sent for consideration include: A rapid review of the academic and international policy literature on the risk of transmission of COVID-19 in flight, and a rapid review on in-flight transmission of respiratory illnesses.		

	Timeline: Initial discussion took place at the IPC Subgroup meeting on Friday 29 May, with a final discussion on Tuesday 2 June. The advice summary was collated by Sarah Mitchell for sending to Niki Stefanogiannis and Sally Giles on Tuesday 2 June. The formal RfA response will be provided by Sarah Mitchell by Friday 5 June.		
Endorsed by	Sally Roberts	**Date**	5/06/2020
Advice issued to:	Niki Stefanogiannis and Sally Giles (MOH)	**Date**	5/06/2020

Response to request for advice

Summary of Response

Key messages from the IPC group are:

- For domestic flights, given New Zealand's current context of little to zero COVID-19 community transmission and other public health measures in place, a requirement for passengers to wear face masks while on board does not appear necessary (assuming no onwards domestic travel from international arrivals). This is in line with the New Zealand advice that widespread masking for healthy people in the community is not currently required, as the potential benefits are not considered to outweigh the risks[1]. However, passengers may choose to wear masks if they prefer.

- For international flights (including to and from 'safe zones'), there may be benefit in offering masks to all passengers, for voluntary use as a precautionary measure while on board. These could be provided as part of a hygiene pack and come with instructions for proper use, alongside crew instructions in the safety briefing. The hygiene pack should also contain hand sanitiser, and ideally a small pack of surface disinfectant wipes. For safe use, enough masks would need to be available for changing as appropriate throughout the flight, and there would need to be facilities (and advice) for safe mask disposal. There are some passenger groups for whom wearing a mask may not be recommended, such as those whose breathing or comfort would be impacted, or young children.

- Note the above recommendations assume that other IPC precautions are being implemented, such as thorough regular cleaning of high-touch surfaces, minimising of passenger interactions, etc. Also, these recommendations only focus on the time passengers are on-board, rather than pre and post departure.

[1] https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-health-advice-general-public/covid-19-use-face-masks-community

Detailed response

Given New Zealand's present situation of little to zero COVID-19 transmission and other public health measures in place, the risk on internal flights is currently seen to be low. This is also consistent with current advice on community use of face masks[1]. Acknowledging the practicalities required for safe mask use, other measures for reducing spread of infection are likely to be more important. However, passengers may choose to wear a mask for their own peace of mind. It is important that any mask is used safely. This advice assumes there is no onward domestic air travel from international arrivals until their isolation period has ended.

The balance of risks and benefits is likely different on international flights, where passengers are in close proximity (especially if proper physical distancing cannot be observed) for a much longer period of time, and there may be a mix of passengers from countries where COVID-19 levels are higher than in New Zealand, or where border controls are less robust. Although HEPA filters and other systems in place on planes that fly internationally make any transmission risk very low, in this context it may be beneficial to offer face masks to all passengers for the duration of the flight, for their voluntary use. The evidence does not appear strong enough to make mask use mandatory, but it may be a helpful added precaution. Masks may also help provide peace of mind to passengers and crew.

It would be beneficial to have masks provided as part of a hygiene pack and with instructions for proper use, alongside crew instructions in the safety briefing. The hygiene pack should also contain hand sanitiser, and ideally a small pack of surface disinfectant wipes. Enough masks will need to be available for changing as appropriate throughout the flight (i.e. long-haul flights, if mask becomes damp), and there would need to be facilities (and advice) for safe mask disposal.

There are some passenger groups for whom wearing a mask is not recommended, such as those whose breathing or comfort would be impacted, or children under the age of six. This advice regarding younger children is for safety/ tolerability reasons, and the European Union Aviation Safety Agency (EASA) and European Centre for Disease Prevention and Control (ECDC) do not recommend mask use for children under the age of six.

Mask use is not a substitute for other basic hygiene precautions, but as a precautionary approach, it could potentially provide an added layer of protection if used safely in international air travel. It also doesn't diminish any need for airlines to maintain other measures such as contact lists of passengers if contact tracing needs to take place..

The IPC Subgroup acknowledges the general paucity of evidence on transmission of COVID-19 in flight and on the specific issue of wearing face masks on planes, as well as the varied recommendations by different jurisdictions/ authorities. This is an area for ongoing review of the evidence and advice may change for domestic and international flights accordingly.

In the development of this advice, the following parties have been consulted with:	The IPC subgroup have discussed this RFA at their weekly meeting, including with Ministry IPC specialists and Margareth Broodkoorn (Ministry ex officio contact on the IPC subgroup). Niki Stefanogiannis and Sally Giles (MOH) also attended this meeting to help clarify any questions arising during discussion.

What are the implications and considerations of this advice on Te Tiriti o Waitangi and equity?	A policy of offering rather than requiring mask wearing allows passengers autonomy in this decision. If a masking policy were to be implemented at any stage, information on the acceptability of masking for Māori and other population groups (including people with hearing impairments) would be needed to help understand and mitigate any potentially inequitable impacts. As noted in the rapid review of face masks on planes, some experts as well as the airline industry body note that masking on public transport may help ensure affordability of mass transport. As noted in the same review, there would need to be consideration of costs, potential negative impacts or unintended consequences of recommending or requiring the use of face masks in airline passengers. If a policy of recommending masks on planes is pursued, provision of high-quality masks to passengers and providing instructions for safe use may help reduce inequities in access (as opposed to asking passengers to bring their own). Any masking policy would need to consider equity implications in terms of access to masks as well as ensure that masks are not being directed away from people who would be considered high risk (e.g. healthcare workers and border control staff).
Supporting evidence and/or research	In forming their recommendations, in addition to their own knowledge in the area, the IPC subgroup considered the following rapid reviews: • A rapid review of the academic and international policy literature regarding passenger facemask use on planes • A rapid review of the academic and international policy literature on the risk of transmission of COVID-19 in flight • A rapid review on in-flight transmission of respiratory illnesses from Australia.
Next steps	Once finalised with the IPC subgroup (including ex officio Ministry contact), this document is to be sent back to Niki Stefanogiannis and Sally Giles to inform the memo to the Minister of Health on Friday 5 June.

MINISTRY OF HEALTH
MANATŪ HAUORA

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19 June 2020

Justin Tighe-Umbers
Executive Director
BARNZ
justin@barnz.org.nz

Dear Justin Tighe-Umbers

Face masks for passengers on international flights

New Zealand has had great success in the past few months in reducing the prevalence of COVID-19 in our country and progressing towards elimination of this disease. Our border remains our most critical line of defence in maintaining the gains we have made to date.

I would like to start by thanking you for your support to date in keeping our borders safe. I particularly would like to acknowledge the support you and your staff have shown in implementing the measures we have requested to mitigate the risk of crew exposure to COVID-19, particularly during international layovers.

In order to further strengthen the line of defence at the border, I request that medical / surgical masks are offered to passengers on inbound international flights, including Trans-Tasman flights, and passengers should be strongly encouraged to use these masks as a precautionary measure while on board.

Masks should be provided as part of a set of packaged items that could contain hand sanitiser, and ideally a small pack of surface disinfectant wipes. Masks should come with written instructions for proper use, alongside crew instructions/ demonstration in the safety briefing.

It is important that other infection prevention and control precautions continue to be rigorously implemented, such as thorough regular cleaning of high-touch surfaces and minimising of passenger interactions - including pre-departure, on-board, and on arrival to the destination.

Ministry of Health will provide further information to implement this policy directly to your staff.

I acknowledge that it will take time to procure and distribute packs. While this procurement is taking place, I request that you increase the mask supplies on board the plane, let passengers know they are available and strongly encourage they are used. Please also ensure that hand sanitiser is widely available on board. Further recommendations on how these interim measures may be implemented is also provided in the attached document.

Please note that at this stage we are only requesting that masks are provided on inbound international flights. However, going forward, particularly if there is an increase in COVID-19 in New Zealand, there may be a further request to provide masks (and packs) on domestic flights.

I acknowledge that airlines are not legally required to provide masks and hand sanitiser to passenger, however, your compliance with this request would be much appreciated.

Yours sincerely

Dr Ashley Bloomfield
Director-General of Health

cc: Peter Mersi, Chief Executive, Ministry of Transport
Cath O'Brien, Air New Zealand

Document 10

Memo

Date:	19 June 2020
To:	Dr Caroline McElnay, Director of Public Health Dr Ian Town, Chief Science Advisor
Copy to:	Margareth Broodkoorn, Chief Nursing Officer Sally Giles, Principal Advisor, Environmental and Border Health
From:	Dr Niki Stefanogiannis
Subject:	Face masks use by air travel passengers
For your:	Information

Background

The Infection Prevention and Control technical advisory sub-group (IPC subgroup) were asked to provide advice on whether air travel passengers should wear masks on aircraft to reduce the risk of transmission of COVID-19. The IPC subgroup were asked for this advice in response to queries from the Minister of Health.

The IPC subgroup provided their advice and recommendations on 5 June 2020.

Summary

Key messages from the IPC group are:

- For domestic flights, given New Zealand's current context of little to zero COVID-19 community transmission and other public health measures in place, a requirement for passengers to wear face masks while on board does not appear necessary (assuming no onwards domestic travel from international arrivals). This is in line with the New Zealand advice that widespread masking for healthy people in the community is not currently required, as the potential benefits are not considered to outweigh the risks[1]. However, passengers may choose to wear masks if they prefer.

- For international flights (including to and from 'safe zones'), there may be benefit in offering masks to all passengers, for voluntary use as a precautionary measure while on board. These could be provided as part of a hygiene pack and come with instructions for proper use, alongside crew instructions in the safety briefing. The hygiene pack should also contain hand sanitiser, and ideally a small pack of surface disinfectant wipes. For safe use, enough masks would need to be available for changing as appropriate throughout the flight, and there would need to be facilities (and advice) for safe mask disposal. There are some passenger groups for whom wearing a mask may not be recommended, such as those whose breathing or comfort would be impacted, or young children.

- Note the above recommendations assume that other IPC precautions are being implemented, such as thorough regular cleaning of high-touch surfaces, minimising of passenger

[1] https://www.health.govt.nz/our-work/diseases-and-conditions/covid-19-novel-coronavirus/covid-19-health-advice-general-public/covid-19-use-face-masks-community

interactions, etc. Also, these recommendations only focus on the time passengers are on-board, rather than pre and post departure.

The IPC sub group also noted that:

- A policy of offering rather than requiring mask wearing allows passengers autonomy in this decision.
- If a masking policy were to be implemented at any stage, information on the acceptability of masking for Māori and other population groups (including people with hearing impairments) would be needed to help understand and mitigate any potentially inequitable impacts.
- As noted in the same review, there would need to be consideration of costs, potential negative impacts or unintended consequences of recommending or requiring the use of face masks in airline passengers.
- If a policy of recommending masks on planes is pursued, provision of high-quality masks to passengers and providing instructions for safe use may help reduce inequities in access (as opposed to asking passengers to bring their own).
- Any masking policy would need to consider equity implications in terms of access to masks as well as ensure that masks are not being directed away from people who would be considered high risk (e.g. healthcare workers and border control staff).

This advice was communicated to the airline sector on 17 June 2020. A formal letter from the Director-General will be sent on 19 June 2020 requesting that masks are offered to passengers on inbound international flights (including trans-Tasman flights).

Action

I advise that the IPC subgroup's advice and recommendations are accepted and communications made to the airline sector requesting the provision of masks to their passengers on international flights – these communications are underway.

The communications will also acknowledge that if the COVID-19 incidence in New Zealand increases again, then there might be a request for the provision of masks on domestic flights.

Recommendations

It is recommended that you:

1.	agree	To accept the IPC sub-group's advice and recommendations	Yes/No
4.	note	The Ministry will work closely with the airline sector to implement these recommendations	Yes/No

Signature CAMcElnay Date: 23/6/20
Dr Caroline McElnay
Director of Public Health

Signature _____ Date:
Name
Title