

ACADEMIC

Lessons from the COVID-19 pandemic: the ethics of coercive vaccination policies – where should we draw the line?

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Abstract

The ongoing COVID-19 pandemic has created unprecedented social, financial, and moral disruptions across the globe despite global efforts to reduce the transmission of the novel coronavirus. Currently, vaccinating populations against COVID-19 has emerged as the most sustainable strategy to help countries recover from the socioeconomic effects of COVID-19 while protecting public health. To meet vaccination targets, some countries have adopted policies that rely on varying levels of coercion. This paper analyses the ethical implications of coercive vaccination policies implemented in Singapore and Italy, which impose barriers to accessing healthcare on the unvaccinated. These two cases are compared to the vaccine mandate in New Zealand, which did not restrict access to healthcare for the unvaccinated. This analysis draws on key considerations from Kass' ethical framework for assessing public health intervention. This analysis is relevant to countries considering similar policies to increase vaccination uptake for infectious diseases. Since healthcare is a fundamental good, a critical question is whether imposing barriers to accessing healthcare services is an ethically justifiable consequence of the choice to remain unvaccinated.

Introduction

The coronavirus disease 2019 (COVID-19) pandemic was first declared as a public health emergency by the World Health Organization (WHO) on 11 March 2020.² This pandemic has overwhelmed healthcare systems internationally and demanded multi-pronged control strategies, including travel restrictions, mandatory isolation and quarantine for travellers, nationwide lockdowns, and strict COVID-19 vaccination policies.³⁻⁵

At the time of writing, it has been approximately two years since the COVID-19 pandemic was declared. This pandemic has affected 186 countries, with more than 434 million total cases and 5.95 million deaths.⁶ The New Zealand government adopted a COVID-19 elimination strategy and implemented a strict countrywide lockdown on 26 March 2022. In conjunction with border controls, this strategy proved effective and ended the initial wave of identified community transmission.⁷

However, COVID-19 disease will likely persist for years to come due to the relentless emergence of new viral strains. Full or partial lockdown enforcement will not be a sustainable strategy to control the disease long-term.⁸⁻¹¹ Hence, governments face pressure to ease many COVID-19 control measures in the interests of restoring economic, educational and social activity. Strict vaccination policies are possibly the only strategy to put an end to this pandemic while minimising the population burden of COVID-19.¹⁰

Previous studies have analysed the ethics of incentivisation and mandates for seasonal influenza and childhood vaccinations.^{12,13} In the context of a pandemic, however, the urgency of achieving high vaccination levels to control infection rates warrants reconsideration of ethical justifications for mandatory vaccination policies.

Vaccine hesitancy and coercive vaccination strategies

COVID-19 vaccines are safe and protect against serious or fatal illnesses. Some evidence shows that being vaccinated will reduce the likelihood of COVID-19 transmission.¹⁴ This means that vaccination may protect others and the vaccinated individual.^{4,5} Adverse effects of the vaccine are extremely rare and clinical trial data has shown that the benefits of vaccination outweigh the potential harms.^{16,17}

The challenge for governments is to help as many individuals as possible to get vaccinated. Compared to more established vaccines, the development of COVID-19 vaccines was accelerated in light of the pandemic.^{18,19} These vaccine characteristics, along with other factors like anti-vaccination sentiments on social media, have exacerbated vaccine hesitancy,^{20,21} which was identified by WHO as one of the top threats to public health even before COVID-19 emerged.²²

Some governments have therefore turned to the use of incentives to encourage COVID-19 vaccination uptake in populations and motivate people to do what is good for themselves and others.²³ Others have chosen to enforce coercive vaccination policies, some of which make essential goods like access to healthcare contingent on getting vaccinated.²⁴ This includes vaccine mandates whereby one's choice to refuse vaccination is made highly unfavourable due to the enforcement of penalties for non-compliance. Although the goal of coercive policies is to protect individuals and the wider community, they have been challenged on legal and ethical grounds.¹⁰

The Nuffield Council on Bioethics has argued that coercion itself is a burden that may not be justified as a strategy for reducing COVID-19 infections.²⁵ On this argument, coercive public health interventions, like vaccine mandates, are justified only if less intrusive alternatives to individual freedom have been demonstrated to be inadequate.²⁵ Increasing vaccination-specific health literacy to empower individuals to get vaccinations would be a less restrictive alternative. However, vaccination education campaigns are time-consuming and are less effective in reducing COVID-19 infection rates when used alone.¹⁰

Coercive policies which restrict healthcare access

Coercive policies and mandates can take many forms and typically include occupational, social or travel restrictions.^{26,27} In September 2021, for example, Singapore introduced Vaccinated Travel Lanes with

Germany and Brunei. This allowed only fully vaccinated passengers to travel to Singapore from Brunei to Germany without quarantine,²⁶ thus restricting the international mobility of unvaccinated individuals. In New Zealand, healthcare workers needed to be fully vaccinated to continue working.²⁸

Less common are policies that restrict access to healthcare services for the unvaccinated. This is likely because, unlike other services such as restaurants, public pools or libraries, access to healthcare is an essential good and access to it is a fundamental right. A high degree of justification is required to withhold this good from individuals.

As part of New Zealand's vaccination mandate, the Ministry of Health (MOH) confirmed in a position statement that unvaccinated individuals would be able to access healthcare services without pre-consultation COVID-19 testing.²⁹ The MOH also argued that given risk mitigation strategies already in place in healthcare facilities, including mandatory vaccination for healthcare workers, there is insufficient evidence for refusing access to services based on vaccination status.²⁹

As noted above, New Zealand introduced vaccine-differentiated policies in social settings to protect public health interests. At the time of writing, unvaccinated individuals are unable to access many public facilities, such as libraries, gyms or pools.³⁰ However, from MOH's statement, it is clear that New Zealand has drawn a distinct line between access to these goods and the more essential good of access to health care services.

The section below examines two policies from other countries that have chosen not to exclude access to healthcare services from the range of penalties imposed on the unvaccinated.

SINGAPORE: ENDING FREE COVID-19 TREATMENT FOR INDIVIDUALS UNVACCINATED BY CHOICE

In October 2021, Singapore decided to abandon its initial "zero COVID" approach in favour of learning to coexist with the virus. This change was made in response due to the emergence of new variants which resulted in a surge of community cases. With a population of approximately 5.45 million,³¹ Singapore has achieved some of the highest national vaccination coverage in the world. As of 25 January 2022, 91% of its eligible population and 88% of its total population has completed the full vaccination regimen, which is currently 2 doses of COVID-19 vaccines. 56% of the total population has received booster shots.³²

The change of strategy included the announcement that from 8 December 2021 onwards, individuals who chose to remain unvaccinated but who required medical attention due to COVID-19 would have to pay their medical bills.³³ Personal insurance or saving schemes could still be used for their medical bills, where applicable. The median bill size for those who require acute COVID-19 treatment and intensive care was reported as 25,000 SGD (28,024.53 NZD).³⁴ This policy was introduced by the Ministry of Health to encourage further vaccine uptake as unvaccinated individuals constituted a disproportionate strain on intensive care facilities.³⁵

Before this new policy, only those who tested positive or developed COVID-19 symptoms within 14 days of arrival from overseas travel were responsible for paying their treatment costs. The government had borne the COVID-19 medical expenses of all Singaporeans, permanent residents, and long-term pass holders.³³

Entirely government-funded treatment is exceptional compared to the typical health coverage offered in Singapore. Described as a mixed financing system, health coverage fundamentally involves a public statutory insurance system that covers large hospital bills and certain treatments. Premiums, deductibles, coinsurance and any costs above the claim limit are contributed by the patient.³⁶ Hence, the withdrawal of fully funded COVID-19 treatment from willingly unvaccinated individuals is a striking approach to encourage vaccination uptake.

Similar policies to protect public health are not new to Singapore, where childhood vaccinations against diphtheria and measles are compulsory by law.³⁷ This is salient in a country as densely populated as Singapore.

ITALY: UNVACCINATED WORKERS TO PAY FOR COVID-19 SWAB TESTING

Italy enacted a law which requires all private and public workers to show proof of vaccination via a "Green Pass", a negative test result or recent recovery from COVID-19 infection.

From 15 October 2021, workers were considered unjustifiably absent and had to take unpaid leave if they did not procure a valid Green Pass. Unvaccinated workers were required to pay for the cost of testing, approximately 18 Euros (29.60 NZD) per swab test. A test result was valid for 48 hours. For non-compliance, workers risked fines of up to 1500 Euros (2470 NZD).^{38,39} The goal of this law was to incentivize unvaccinated individuals, estimated to be 3.5 million in November 2021, to get vaccinated to achieve Italy's target vaccination coverage.⁴⁰

This requirement was in addition to Italy's prior measures which mandated that all healthcare professionals were to be vaccinated from April 2021 and that Green Passes were needed to access public and private locations from August 2021.³⁹

Ethical analysis

The slow return to pre-pandemic life relies on vaccine-induced population immunity to mitigate transmission or reduce morbidity. As mentioned above, vaccine hesitancy is a significant barrier to achieving optimal vaccine coverage rates.^{41,42} Earning the public's trust that policies are enacted for public benefit is the most important asset that public health systems can lean into to reduce vaccine hesitancy. This can be achieved through a thorough analysis of the potential strategies and their implications before deploying them.

Public health strategies should confer benefits to the population as a whole, be minimally burdensome, distribute the benefits and burdens equitably, and be proportionate to the magnitude of the public health threat. The extent to which proposed interventions are in tension with the rights of individuals should also be considered. Nancy Kass proposed a 6-step framework to help policymakers consider the ethical implications of public health policies.¹ This analysis uses the questions in this framework to draw out the ethical complexities of the COVID-19 policies introduced in Singapore and Italy.

1. WHAT ARE THE PUBLIC HEALTH GOALS OF THE STRATEGY?

Coercive COVID-19 vaccination policies have the fundamental goal of reducing COVID-19 morbidity and mortality by increasing the rate of vaccination uptake in the community. By increasing what is at stake in the penalty to include access to essential goods such as healthcare, the policies in Singapore and Italy aim to further accelerate vaccination uptake. This benefits both individuals and the wider community by optimising vaccination coverage quickly in response to an urgent public health threat.

2. HOW EFFECTIVE IS THE PROGRAM IN ACHIEVING ITS STATED GOALS?

Mandatory vaccination policies have been successful in other contexts, such as seasonal influenza and childhood vaccinations.^{12,13} This suggests that in general, coercive vaccination policies can be effective.

However, there are scant existing studies regarding the effects of mandates on increasing COVID-19 vaccination uptake. Although peaks in COVID-19 vaccination uptake rates following the announcement of coercive policies have been observed, these loose associations can be confounded by multiple factors acting in synergy.²⁷ Such factors include increased trust in vaccines due to effective vaccination information dissemination or positive political affiliations.⁴³ Furthermore, policies with penalties which specifically result in restricted access to healthcare are rare. This makes the search for data to support this specific subset of policies challenging.

As the degree of socio-economic sacrifice required by the policy increases, stronger evidence supporting the efficacy of the proposed programs is required.¹ Access to healthcare is crucial for wellbeing. More evidence of the likelihood of success would therefore be re-

quired to ethically justify vaccination policies, such as those adopted in Singapore and Italy, where access to healthcare is at stake.

Ideally, more data is needed to confirm the efficacy of coercive COVID-19 vaccination policies which use restrictions to accessing healthcare services to improve overall public health. However, COVID-19 continues to claim thousands of lives each day.⁶ In the urgency of a pandemic, having time to compare coercive vaccination policies which restrict access to healthcare with less restrictive alternatives thoroughly is a luxury that most countries do not have.

3. WHAT ARE THE KNOWN OR POTENTIAL BURDENS OF THE PROGRAM?

Policymakers should anticipate both avoidable and unavoidable harms of proposed measures, including socio-economic or educational disruptions.¹ The case studies present three main categories of harm. These are the harms to health, harms inherent to restrictions of liberty, and risks to justice.

Harms to the health of individuals penalised, and to others in the community, may result from the implementation of policies that involve restrictions on access to healthcare. Financial penalties that create barriers to healthcare access may reinforce an unvaccinated person's reluctance to seek medical attention even if severe COVID-19 symptoms develop. Additionally, they may also deplete funds typically used for other healthcare necessities, create delays in diagnosis or treatment and cause significant psychological distress.

Under Singapore's policy, unvaccinated individuals may decide not to seek the necessary treatment to avoid hefty treatment costs. This may risk their health or life. Italy's decision to impose a cost on COVID-19 testing may also be considered a barrier to accessing healthcare. As a COVID-19 result is only valid for 48 hours, unvaccinated individuals would be required to pay for approximately three tests each week. The accumulated costs of these tests would be a significant disincentive to getting tested for COVID-19. If individuals are unaware of positive COVID-19 status, they may unknowingly transmit the virus to many others in the community. This is not congruent with public health goals.

Another significant burden of coercive policies is that they undermine ethical principles of individual liberty and self-determination by forcing individuals to decide how much they value their expression of liberty relative to other goods. Competent adults have the right to bodily integrity and to make voluntary healthcare decisions for themselves but when considering the ethics of public health interventions, individual liberty is not the sole concern.

The burdens of coercive vaccine policies on individual choice are potentially offset by an alternative notion of liberty; the freedom to live safely in the community without significant risk of exposure to hazards.⁴⁴ This includes the harm of a potentially fatal infectious disease. By further incentivising individuals to be vaccinated, policies adopted in Singapore and Italy are congruent with this notion of liberty. Being vaccinated would reduce avoidable risks to others and improve population health.

However, evidence that vaccines stop COVID-19 transmission is currently limited.¹⁴ This weakens the argument that unvaccinated individuals pose harm to others that are significant enough to warrant restrictions to access to healthcare. Therefore, while the urgency of reducing infection rates is an important justification for coercive vaccination policies in general, it does not necessarily justify the healthcare-related penalties imposed by Singapore and Italy.

Lastly, the policies in Singapore and Italy may be particularly burdensome for socioeconomically disadvantaged individuals. This undermines the principle of justice and will be discussed under Question Five.

4. CAN BURDENS BE MINIMISED? ARE THERE ALTERNATIVE APPROACHES?

When known or anticipated burdens of a policy are identified, policymakers are ethically obligated to minimise the burdens as much as possible while maintaining the policy's efficacy. In both countries,

modifications could be considered for reducing the burden of the policy on the unvaccinated. Means testing could alleviate the financial barrier to accessing COVID-19 treatment for the unvaccinated. In Italy, redeploying unvaccinated employees to remote working options could help to reduce the need for expensive and frequent testing.

5. IS THE PROGRAM IMPLEMENTED FAIRLY?

At a minimum, public health interventions should not exacerbate social and health inequities.

The policies described in Singapore and Italy, where financial barriers to accessing healthcare were placed in the name of public benefit, may result in health-wealth trade-offs that are difficult to justify ethically. Risks to justice may arise as socio-economically disadvantaged individuals are likely to be disproportionately affected by financial barriers.

6. HOW CAN THE BENEFITS AND BURDENS OF A PROGRAM BE FAIRLY BALANCED?

The balance between the benefit to public health and the burdens imposed on individuals needs to be considered. This includes infringements of individual liberty and in the two cases described above, creating barriers to accessing healthcare services.

Based on the analysis above, the costs of using coercion in public health may be considered to outweigh the potential benefits. While less coercive measures than a vaccine mandate are more likely to be ineffective in managing the persistent COVID-19 pandemic, penalties that do not impact access to essential basic goods like access to healthcare will be easier to justify ethically.

Conclusion

The policies in Singapore and Italy aim to optimise vaccine uptake in the community and strengthen population-level immunity to infectious diseases. However, the penalties are not only burdensome for the affected individuals, but to the extent that they are a barrier to people getting tested or seeking other interventions, they are likely to be burdensome for the whole population. Furthermore, these policies also add disproportionate burdens to already highly burdened populations.

Given that access to healthcare is a fundamental entitlement, the strategy adopted in New Zealand, which did not impose barriers to access is more justified from an ethical perspective compared to the policies highlighted in Singapore and Italy.

References

1. Kass NE. An Ethics Framework for Public Health. Vol. 91, American Journal of Public Health. 2001.
2. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020 [Internet]. [cited 2022 Feb 28]. Available from: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19--11-march-2020>
3. Hsiang S, Allen D, Annan-Phan S, Bell K, Bolliger I, Chong T, et al. The effect of large-scale anti-contagion policies on the COVID-19 pandemic. *Nature* 2020 584:7820 [Internet]. 2020 Jun 8 [cited 2022 Feb 28];584(7820):262–7. Available from: <https://www.nature.com/articles/s41586-020-2404-8>
4. Fraser C, Riley S, Anderson RM, Ferguson NM. Factors that make an infectious disease outbreak controllable. *Proceedings of the National Academy of Sciences* [Internet]. 2004 Apr 20 [cited 2022 Feb 28];101(16):6146–51. Available from: <https://www.pnas.org/content/101/16/6146>
5. Fong MW, Gao H, Wong JY, Xiao J, Shiu EYC, Ryu S, et al. Nonpharmaceutical Measures for Pandemic Influenza in Nonhealthcare Settings—Social Distancing Measures. *Emerg Infect Dis* [Internet]. 2020 May 1 [cited 2022 Feb 28];26(5):976. Available from: <https://pmc/articles/PMC7181908/>
6. John Hopkins University & Medicine. COVID-19 dashboard [Internet]. 2022 [cited 2022 Feb 28]. Available from: <https://coronavirus.jhu.edu/map.html>
7. Baker MG, Wilson N, Anglemeyer A. Successful elimination of Covid-19 transmission in New Zealand. *New England Journal of Medicine* [Internet]. 2020 Aug 20 [cited 2022 Sep 7];383(8):e56. Available from: <https://www.nejm.org/doi/10.1056/NEJMc2025203>
8. Nundy S, Ghosh A, Mesloub A, Albaqawy GA, Alnaim MM. Impact of COVID-19 pandemic on socio-economic, energy-environment and transport sector globally and sustainable development goal (SDG). *J Clean Prod*. 2021 Aug 20;312:127705.

9. Hamadani JD, Hasan MI, Baldi AJ, Hossain SJ, Shiraji S, Bhuiyan MSA, et al. Immediate impact of stay-at-home orders to control COVID-19 transmission on socioeconomic conditions, food insecurity, mental health, and intimate partner violence in Bangladeshi women and their families: an interrupted time series. *Lancet Glob Health*. 2020 Nov 1;8(11):e1380–9.

10. Xafis V, Schaefer GO, Labude MK, Zhu Y, Hsu LY. The Perfect moral storm: diverse ethical considerations in the COVID-19 Pandemic. *Asian Bioeth Rev*. 2020;

11. Nicola M, Alsaifi Z, Sohrabi C, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *Int J Surg [Internet]*. 2020 Jun 1 [cited 2022 Mar 2];78:185. Available from: [/pmc/articles/PMC7162753/](https://pubmed.ncbi.nlm.nih.gov/32232147/)

12. Rezza G. Mandatory vaccination for infants and children: the Italian experience. <https://doi.org/10.1080/2047772420191705021> [Internet]. 2019 Oct 3 [cited 2022 Feb 28];113(7):291–6. Available from: <https://www.tandfonline.com/doi/abs/10.1080/20477724.2019.1705021>

13. Yue M, Wang Y, Low CK, Yoong JS yin, Cook AR. Optimal design of population-level financial incentives of influenza vaccination for the elderly. *Value in Health*. 2020 Feb 1;23(2):200–8.

14. Eyre DW, Taylor D, Purver M, Chapman D, Fowler T, Pouwels KB, et al. Effect of Covid-19 vaccination on transmission of alpha and delta variants. *New England Journal of Medicine [Internet]*. 2022 Feb 24 [cited 2022 Sep 5];386(8):744–56. Available from: <https://www.nejm.org/doi/full/10.1056/nejmoa2116597>

15. Shrotri M, Krutikov M, Palmer T, Giddings R, Azmi B, Subbarao S, et al. Vaccine effectiveness of the first dose of ChAdOx1 nCoV-19 and BNT162b2 against SARS-CoV-2 infection in residents of long-term care facilities in England (VIVALDI): a prospective cohort study. *Lancet Infect Dis*. 2021 Nov 1;21(11):1529–38.

16. Hall VJ, Foulkes S, Saei A, Andrews N, Oguti B, Charlett A, et al. COVID-19 vaccine coverage in health-care workers in England and effectiveness of BNT162b2 mRNA vaccine against infection (SIREN): a prospective, multicentre, cohort study. *The Lancet*. 2021 May 8;397(10286):1725–35.

17. Lopez Bernal J, Andrews N, Gower C, Gallagher E, Simmons R, Thelwall S, et al. Effectiveness of Covid-19 Vaccines against the B.1.617.2 (Delta) Variant. *New England Journal of Medicine [Internet]*. 2021 Aug 12 [cited 2022 Feb 28];385(7):585–94. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMoa2108891>

18. Hanney SR, Wooding S, Sussex J, Grant J. From COVID-19 research to vaccine application: Why might it take 17 months not 17 years and what are the wider lessons? *Health Res Policy Syst [Internet]*. 2020 Jun 8 [cited 2022 Feb 28];18(1):1–10. Available from: <https://link.springer.com/articles/10.1186/s12961-020-00571-3>

19. Lurie N, Saville M, Hatchett R, Halton J. Developing Covid-19 vaccines at pandemic speed. *New England Journal of Medicine [Internet]*. 2020 May 21 [cited 2022 Mar 2];382(21):1969–73. Available from: <https://www.nejm.org/doi/full/10.1056/NEJMp2005630>

20. Evrony A, Caplan A. The overlooked dangers of anti-vaccination groups' social media presence. <https://doi.org/10.1080/2164551520171283467> [Internet]. 2017 Jun 3 [cited 2022 Sep 6];13(6):1475–6. Available from: <https://www.tandfonline.com/doi/abs/10.1080/21645515.2017.1283467>

21. Torrelee E. The rush to create a Covid-19 vaccine may do more harm than good. *BMJ [Internet]*. 2020 Aug 18 [cited 2022 Sep 5];370. Available from: <https://www.bmj.com/content/370/bmj.m3209>

22. Ten threats to global health in 2019 [Internet]. [cited 2022 Apr 11]. Available from: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

23. of Health D. COVID-19 vaccines information sheet-vaccination rewards Did you know that Australian organisations can offer rewards to fully vaccinated Australians? [Internet]. [cited 2022 Feb 23]. Available from: <https://www.health.gov.au/sites/default/files/documents/2021/07/covid-19-vaccination-business-kit-information-sheet-vaccination-rewards.pdf>

24. Giubilini A, Savulescu J. Vaccination, risks, and freedom: The seat belt analogy. *Public Health Ethics [Internet]*. 2019 Nov 1 [cited 2022 May 30];12(3):237–49. Available from: <https://academic.oup.com/phe/article/12/3/237/5602463>

25. Hamm D. A bioethics view on the latest covid vaccination policies: Press Release [Internet]. The Nuffield Council on Bioethics. 2021 [cited 2022 Feb 28]. Available from: <https://www.nuffieldbioethics.org/news/a-bioethics-view-on-the-latest-covid-vaccination-policies>

26. Ang HM. FAQ: What you need to know about the new vaccinated travel lanes for Germany and Brunei [Internet]. ChannelNewsAsia . 2020 [cited 2022 Feb 28]. Available from: <https://www.channelnewsasia.com/singapore/faq-germany-brunei-vaccinated-travel-lane-vtl-2123756>

27. Saban M, Myers V, ben Shetrit S, Wilf-Miron R. Issues surrounding incentives and penalties for COVID-19 vaccination: The Israeli experience. *Prev Med (Baltim) [Internet]*. 2021 Dec 1 [cited 2022 Sep 6];153:106763. Available from: [/pmc/articles/PMC8327565/](https://pubmed.ncbi.nlm.nih.gov/35211111/)

28. COVID-19: Mandatory vaccinations | Ministry of Health NZ [Internet]. [cited 2022 May 31]. Available from: <https://www.health.govt.nz/covid-19-novel-coronavirus/covid-19-response-planning/covid-19-mandatory-vaccinations>

29. Ministry of Health. Ministry of Health position statement on the management of unvaccinated individuals in healthcare settings [Internet]. 2021 Nov [cited 2022 Feb 28]. Available from: <https://www.nzccp.co.nz/assets/Untitled-attachment-01200.pdf>

30. My Vaccine Pass | Unite against COVID-19 [Internet]. [cited 2022 Feb 28]. Available from: <https://covid19.govt.nz/covid-19-vaccines/covid-19-vaccination-certificates/my-vaccine-pass/#when-you-need-a-my-vaccine-pass>

31. DOS | SingStat Website - Population and population structure - latest data [Internet]. [cited 2022 Feb 28]. Available from: <https://www.singstat.gov.sg/find-data/search-by-theme/population/population-and-population-structure/latest-data>

32. MOH | COVID-19 Vaccination [Internet]. [cited 2022 Feb 28]. Available from: <https://www.moh.gov.sg/covid-19/vaccination>

33. MOH | News Highlights [Internet]. [cited 2022 Feb 28]. Available from: https://www.moh.gov.sg/news-highlights/details/calibrated-adjustments-in-stabilisation-phase_8Nov2021

34. COVID-19 patients who are unvaccinated by choice could face S\$25,000 bill before subsidies, says MOH - CNA [Internet]. [cited 2022 Feb 28]. Available from: www.channelnewsasia.com/singapore/covid-19-unvaccinated-own-medical-bills-25000-moh-2309276

35. MOH | News Highlights [Internet]. [cited 2022 Sep 5]. Available from: https://www.moh.gov.sg/news-highlights/details/calibrated-adjustments-in-stabilisation-phase_8Nov2021

36. Singapore | Commonwealth Fund [Internet]. [cited 2022 Feb 28]. Available from: <https://www.commonwealthfund.org/international-health-policy-center/countries/singapore>

37. MOH | Nationally Recommended Vaccines [Internet]. [cited 2022 Feb 28]. Available from: <https://www.moh.gov.sg/resources-statistics/nationally-recommended-vaccines>

38. Fraser A. Italy imposes mandatory COVID health pass for work amid protests | Reuters [Internet]. [cited 2022 Feb 28]. Available from: <https://www.reuters.com/world/europe/italys-mandatory-covid-health-pass-work-sees-untroubled-launch-2021-10-15/>

39. Horowitz J. Italy's new law requires workers to get Covid vaccine or testing - The New York Times [Internet]. [cited 2022 Feb 28]. Available from: <https://www.nytimes.com/2021/10/15/world/europe/italy-vaccination-law-covid.html>

40. Horowitz J. Covid in Italy: Protests fizzle as government imposes vaccine mandate in workplaces - The New York Times [Internet]. [cited 2022 Mar 2]. Available from: <https://www.nytimes.com/live/2021/10/15/world/italy-covid-green-pass#workers-across-italy-face-a-new-reality-no-health-pass-no-paycheck>

41. Khubchandani J, Sharma S, Price JH, Wiblishauser MJ, Sharma M, Webb FJ. COVID-19 vaccination hesitancy in the United States: A Rapid National Assessment. *J Community Health [Internet]*. 2021 Apr 1 [cited 2022 Mar 2];46(2):270–7. Available from: <https://link.springer.com/article/10.1007/s10900-020-00958-x>

42. Ten threats to global health in 2019 [Internet]. [cited 2022 Mar 2]. Available from: <https://www.who.int/news-room/spotlight/ten-threats-to-global-health-in-2019>

43. Ben-David BM, Keisari S, Palgi Y. Vaccine and psychological booster: Factors associated with older adults' compliance to the booster COVID-19 vaccine in Israel. *Journal of Applied Gerontology [Internet]*. 2022 Jul 1 [cited 2022 Sep 6];41(7):1636–40. Available from: <https://journals.sagepub.com/doi/full/10.1177/07334648221081982>

44. Gostin LO. COVID-19 Vaccine mandates—a wider freedom. *JAMA Health Forum*. 2021 Oct 7;2(10):e213852.

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