
COVID-19 vaccine mandates and their relationship with vaccination intention, psychological reactance, and trust: a rapid behavioural evidence synthesis (March 2024 update)

27 March 2024

Research Question

What is the impact of implementing (or removing) COVID-19 vaccine mandates on *trust* in institutions and in science, on psychological *reactance*, and/or on *intention* to get future doses/vaccines?

Summary of Key Findings

- Vaccine mandates were used in Canada and internationally to promote vaccination during the COVID-19 pandemic. However, vaccine mandates may have a negative impact on intention to get vaccinated, psychological reactance, and trust.
- We conducted a rapid evidence synthesis to explore the relationship between vaccine mandates, intention to get vaccinated, psychological reactance, and trust in March 2022, and updated the review in February 2024 to include more recent research. This report focuses on studies conducted in Canada, the USA, the UK, Australia, and New Zealand [Five Eyes (FVEY) countries].
- Our February 2022 search identified 13 relevant studies related to vaccine mandates and intention (n = 6), reactance (n = 6), and trust (n = 1). The initial search only identified one study reporting data that included a Canadian sample (but did not report Canada-specific results). Our updated search in February 2024 identified 17 additional studies (3 in Canada) published since the last search (n=9 on mandates and intention to get vaccinated; n= 10 on mandates and reactance; and n=1 on mandates and trust); note some studies reported on more than one intersection).
- The synthesis of findings were grouped according to the outcomes of interest:
 - *Mandates and intention to get vaccinated*: The experimental literature is based only on hypothetical mandates and suggest that vaccine passports and employer mandates either have no effect on intention to get vaccinated, though one experiment suggested that vaccine passports for travel and sporting events may increase intention to get vaccinated. The survey literature for both hypothetical and experienced vaccine passports, there appears to be a positive association with intention to get vaccinated. The survey literature for employer mandates is less clear as hypothetical employer mandates in the general public suggest a

negative association to vaccination intention, whereas experienced employer mandates are based in studies with trainee health care workers and suggest a positive relationship. Taken together, there may be a neutral to modest positive association between mandates and vaccination intention but the literature remains sparse and weighted towards hypothetical mandates.

- *Mandates and psychological reactance*: Most identified studies suggested that vaccine mandates increase the likelihood of experiencing psychological reactance (i.e., anger and resistance in response to perceived threats to freedom) and that intention to vaccinate was likely to decrease. However, one study found that vaccine mandates increased intention to get vaccinated irrespective of personality trait reactance. Furthermore, two studies found evidence to suggest that explaining the benefits to high vaccination rates (e.g., economic and health benefits) and indicating when a majority of a community had been vaccinated attenuated experiencing reactance. Findings from qualitative research suggest that even when participants strongly disagree with mandates and express sentiments that align with psychological reactance, they may still opt to get vaccinated
 - *Mandates and trust*: Based on limited research, the relationship between trust and vaccine mandates appears to be bi-directional in that those who trust in governments are more likely to support vaccine mandates, however, mandates may harm trust between governments and the public when perceptions regarding the necessity of a mandate are not aligned.
- Overall, current evidence suggests that the potential gains in intention and uptake in vaccination by introducing mandates on the short term should be carefully considered against any potential effect on reactance and trust, especially among those who have not yet been vaccinated and/or have lower vaccine intention and vaccine confidence levels. Ways of presenting mandates and settings of implementing them, as well as tailoring co-interventions to different subgroups (especially those who have a history or current experience of harm and oppression brought on by governmental, health system or employer policies) are worth further study. Such future work should further examine the association between mandates, psychological reactance, trust, intention and vaccine uptake across and within subgroups in Canada and beyond.

Background

Vaccine mandates were implemented in several countries as part of public health responses to manage the COVID-19 pandemic, including Canada, the United States (US), the United Kingdom (UK), Australia, Denmark, France, Germany, Israel, Ireland, Italy, Switzerland, and Saudi Arabia^{1,2}. For this review, we define vaccine mandates as any requirement imposed by an external party (e.g., business, school, organisation, government) for an individual or group to receive a particular vaccination to access, attend, contribute to or remain in a given setting (e.g., work, business, school, travel). Mandates, in this case, may include 'vaccine passports' where access to specific settings is restricted to those who can demonstrate having a defined vaccination to encourage uptake and provide a guarantee to others in that given setting.

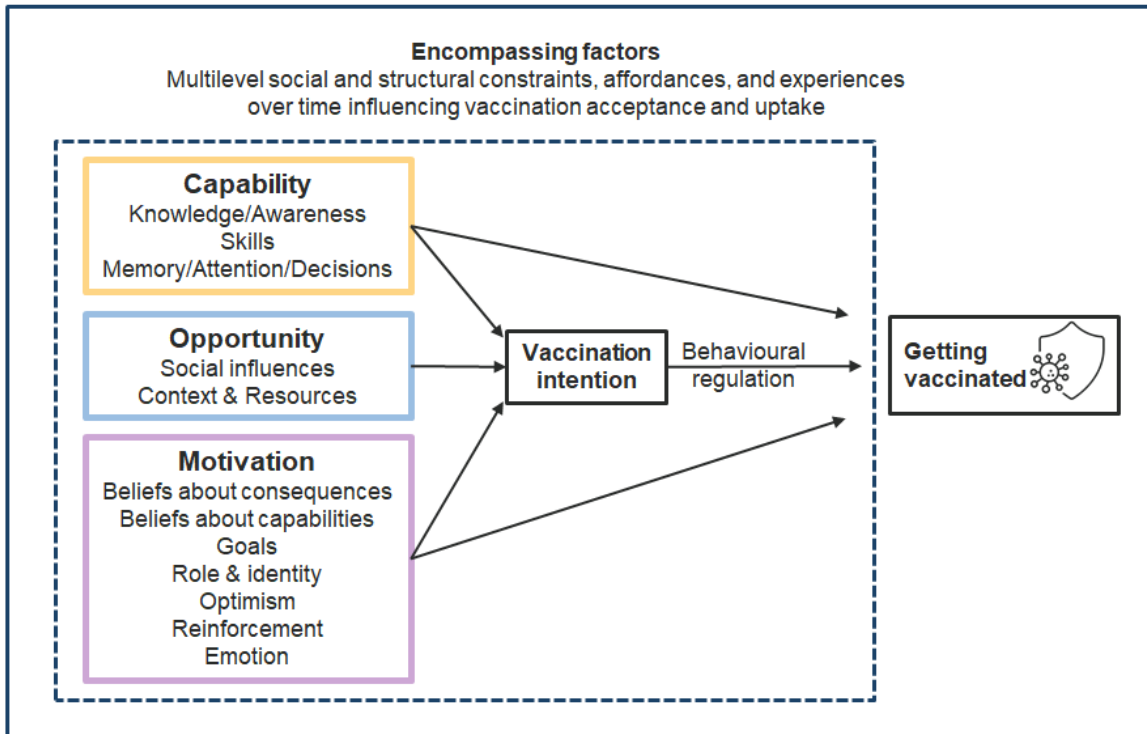
Vaccine mandates are a policy-level strategy that may be effective in increasing vaccination itself and may also have downstream consequences that are worth considering when weighing whether to deploy such approaches relative to others. Getting vaccinated – the decision and enacted behaviour – is based on multiple considerations, and these are not all shared across everyone in a given population. As a result, the ability for wide-reaching strategies to support vaccine uptake depends in part on the strategy addressing the various capabilities, opportunities, and motivations of those to whom the strategy is directed³. When there is a match between the strategy addressing the barriers and enablers, the likelihood of supported decisions and actions occurring increases; when there is a mismatch, there is a risk that the strategy may not work as effectively for some people as others. Even if the strategy such as vaccine mandates is effective at a given point in time, there may be downstream consequences on future action that increase or decrease the likelihood of future action.

A behavioural science approach can be helpful for characterising which barriers/enablers to vaccination may exist and linking these to individual and policy-level strategies that maximise the likelihood that a given strategy addresses barriers and meets the specific needs of those it is designed to support³⁻⁵. For instance, the Behaviour Change Wheel³ is an especially useful tool for understanding the linkages between specific Capability, Opportunity, and Motivation barriers/enablers, strategies best suited to address specific barriers/enablers, and policies that best enable those strategies to be enacted. Within the Behaviour Change Wheel, vaccine mandates are policy interventions designed to promote greater uptake of COVID-19 vaccines, often as means to achieve population-level immunity and correspond with the *regulation* and *legislation* policy functions. Such policy levers enable the use of vaccine mandates as a direct intervention to address barriers to vaccination. Within the Behaviour Change Wheel, vaccine mandates could correspond with three specific types of interventions depending on how they are deployed and received: *coercive* (e.g., where remuneration might be withheld), *restriction* (e.g., where access to settings might be prevented) and *incentivisation* (e.g., where access is provided to settings and opportunities that would otherwise have limited been limited) interventions which are best suited to addressing barriers related to intention, goals (e.g. priority), reinforcement, environmental context and resources, and social influences (see Figure 1).

We know from our living behavioural syntheses of 175 studies on factors affecting COVID-19 vaccination acceptance and uptake that intention to get vaccinated is influenced by a variety of other factors beyond those likely to be targeted by vaccine mandates, including concerns over vaccine safety (beliefs about consequences), a desire to know more about COVID-19 vaccines and the expedited development process (knowledge), and the role of fear and emotion in promoting vaccine acceptance (emotion)⁶. In fact, Crawshaw et al. found that beliefs about consequences were the most frequently identified barriers (e.g., concerns about vaccine safety, efficacy, side effects) and enablers (concerns about being infected, believing vaccines protect others) to COVID-19 vaccination intention⁶. Furthermore, the role of trust (and distrust) in institutions was consistently and frequently identified as contributing to vaccine hesitancy, including by (but not limited to) equity-deserving groups⁷⁻⁹. Given this existing backdrop of existing barriers/enablers to COVID-19 vaccination, and the potential sufficiency or lack thereof of mandates for addressing them, it is

worth investigating what downstream effects might be expected when vaccine mandates are put in place. With this rapid review, we were especially interested in synthesising what is known about three potential consequences of vaccine mandates; their impact on psychological reactance, on trust, and on intention to get a future vaccination.

Figure 1. Potential drivers of vaccination acceptance and uptake based on the COM-B model and Theoretical Domains Framework^{4,5}



Psychological reactance

Beliefs about consequences (i.e. what people think will happen to themselves or others if they do or do not take a given action, e.g. safety and side effects) are among the most widely identified barriers to vaccine uptake. Vaccine mandates are not especially well-positioned to address these common types of barriers and may instead in some instance risk exacerbating problematic outcomes related to restrictive public health measures. For example, a study on masking adherence and attitudes in Canada and the US found that those who wore facemasks did so because of personal concerns over COVID-19 while those who did not wear masks did not believe masks were effective at preventing COVID-19; both positions reflect beliefs about consequences. Those who did not wear masks were also more likely to express discontent at being forced to wear a mask¹⁰. In fact, a network analysis of negative masking attitudes showed that psychological reactance was the centrally important factor to masking¹⁰.

Psychological reactance is the observed phenomenon that when freedom of behaviour is perceived to be threatened (e.g., by rules, regulations, attempts at persuasion), some people will be motivated to restore that freedom by rejecting the means of control^{10,11}. When applied to public health, psychological reactance theory suggests that when people receive messaging in a way (e.g. controlling language) that communicates a perceived threat to their freedom, they are more likely to experience anger, greater negative attitudes toward the message, and become less inclined to behave according to that message¹². People can experience reactance directly to themselves, as well as indirectly when observing others with whom they identify having a removal of choice and freedom. When experiencing psychological reactance, some people act in different ways: direct restoration or indirect restoration, aggression (verbal or physical

demonstration of anger), demean source (infringe on legitimacy of the source of the perceived threat to a freedom), or change the appeal of the action for which a freedom has been removed¹³. This suggests that enforcing public health measures in the absence of public support, or when beliefs about consequences run counter to the rationale for that measure, those restrictions may incite backlash and resistance to the public health measures that are being enforced. However, it is also possible to communicate in ways that reduce the potential for psychological reactance such as emphasizing choice or using reactance to emphasize a message (e.g., “You have a right to wear a mask”)^{10,14}.

Trust

Trust may have the opposite effect as reactance. Trust in government and healthcare institutions has been identified as an important factor in promoting vaccination¹⁵ given that trust in government, authorities, and scientists has been associated with a greater likelihood of vaccine acceptance^{16–18}. Interpersonal trust is also important given that it is a key predictor of prosocial behaviour and collective action and is associated with greater support for government responses to COVID-19¹⁹.

Intention

While intention and hesitancy to get vaccinated against COVID-19 has been widely studied and is associated with several key determinants of behaviour^{6–9}, less is known about how intention to get vaccinated might change when vaccines are mandated rather than voluntary. A fundamental motivational consideration in the use of vaccine mandates is the potential impact on whether people feel they *have* to and/or whether they *want* to. This distinction has been well studied in other health settings, where the former reflects controlled motivation (i.e. feeling external pressure to do something) and the latter, more autonomous motivation (i.e. feeling that they ultimately have a choice and are doing something based on their own volition)²⁰. Importantly, people can be autonomously motivated even in situations where restrictions and mandates are in place (such as during the COVID-19 pandemic) if the external source of the restrictions and mandates are trusted and the rationale transparently described and agreed upon^{21–23}. Across a range of other settings, it has been shown that the more autonomously motivated people are, the more they sustain a given behaviour^{24–27}. Indeed, earlier in the pandemic, three studies in Belgium showed that greater autonomous motivation was associated with greater consistency in engaging in other COVID-19 protective behaviours over time²⁸. Thus, it is perhaps not only whether or not vaccine mandates impact on intention or not that is important, but also whether the mandates are communicated and deployed in a manner that fosters autonomous motivation.

It is, therefore, useful to consider the implications that vaccine mandates have on intention, reactance, and trust. For this synthesis we focus our attention on the possible impact of vaccine mandates on intention to get vaccinated, psychological reactance, and trust, and aim to explore the relationship between psychological reactance and trust and how they may or may not impact intent to vaccinate in the future. Specifically, we aimed to identify research literature that address the following research questions:

- 1- What is the impact of implementing (or removing) COVID-19 vaccine mandates or other vaccine mandates on trust (in government, healthcare, public health, science), on psychological reactance, and/or on intention to get future doses/vaccines, in general, and across the following sub-groups?
 - a. Studies conducted in Canada, the USA, the UK, Australia, and New Zealand [Five Eyes (FVEY) countries].
 - b. Provinces/territories (to explore differences in outcomes due to provincial differences in mandatory vaccine policies)
 - c. Work sectors (healthcare, education, transportation, public service)
 - d. Equity-deserving groups
- 2- What factors might explain any observed association between vaccine mandates, trust, psychological reactance or intention to get future vaccines?
- 3- Which co-interventions alongside vaccine mandates have been delivered specifically to increase trust or reduce psychological reactance?

Methods

Data sources

We conducted a rapid evidence synthesis of the relevant literature. We searched five databases (MEDLINE, Embase, Cochrane Central Register of Controlled Trials, PsycINFO, CINHALL) in March 2022 with no date restrictions and used a combination of key word and subject term searches to identify literature related to vaccine mandates, intent to vaccinate, reactance, and trust. We also sought to identify preprints by searching PsyArXiv and MedRxiv. We updated the search on February 9th, 2024. Search terms and strategy are provided in Appendix A.

For the first iteration of the review, two reviewers conducted a pilot round of level one (title and abstract) screening of 150 abstracts from published sources, discussed discrepancies, and resolved these by consensus. Level one and two (full-text) screening of published sources and preprints was completed by a single reviewer. Systematic reviews that were identified from the search results were hand searched for additional relevant studies.

Inclusion criteria

- *Population*: adults 18+ (general public and workers) in Canada, the USA, the UK, Australia, and New Zealand [Five Eyes (FVEY) countries; note: the previous version of this rapid evidence synthesis also includes the broader international literature)
 - Subgroups of interest: healthcare workers, education workers, transportation workers, public servants, equity-deserving groups
- *Intervention*: Introduction and/or removal of COVID-19 vaccine mandates and other vaccine mandates
- *Outcomes*: factors or co-interventions alongside vaccine mandates associated with
 - Intention to get future doses of COVID-19 vaccine or intention to get other vaccines
 - Psychological reactance
 - Trust (e.g., in government, healthcare, public health, science)
- *Design*:
 - Survey (studies using self-reported surveys to assess vaccination intention, trust or psychological reactance)
 - Qualitative (themes of factors in interviews and focus groups, content analyses of social media)
 - Experimental (trials, quasi-experiments, interrupted time series analyses of mandate introduction or removal and of co-interventions alongside mandates)

Exclusion criteria

- *Outcome*: Studies on trust in vaccines per se (confounded with large vaccine confidence/hesitancy literature)

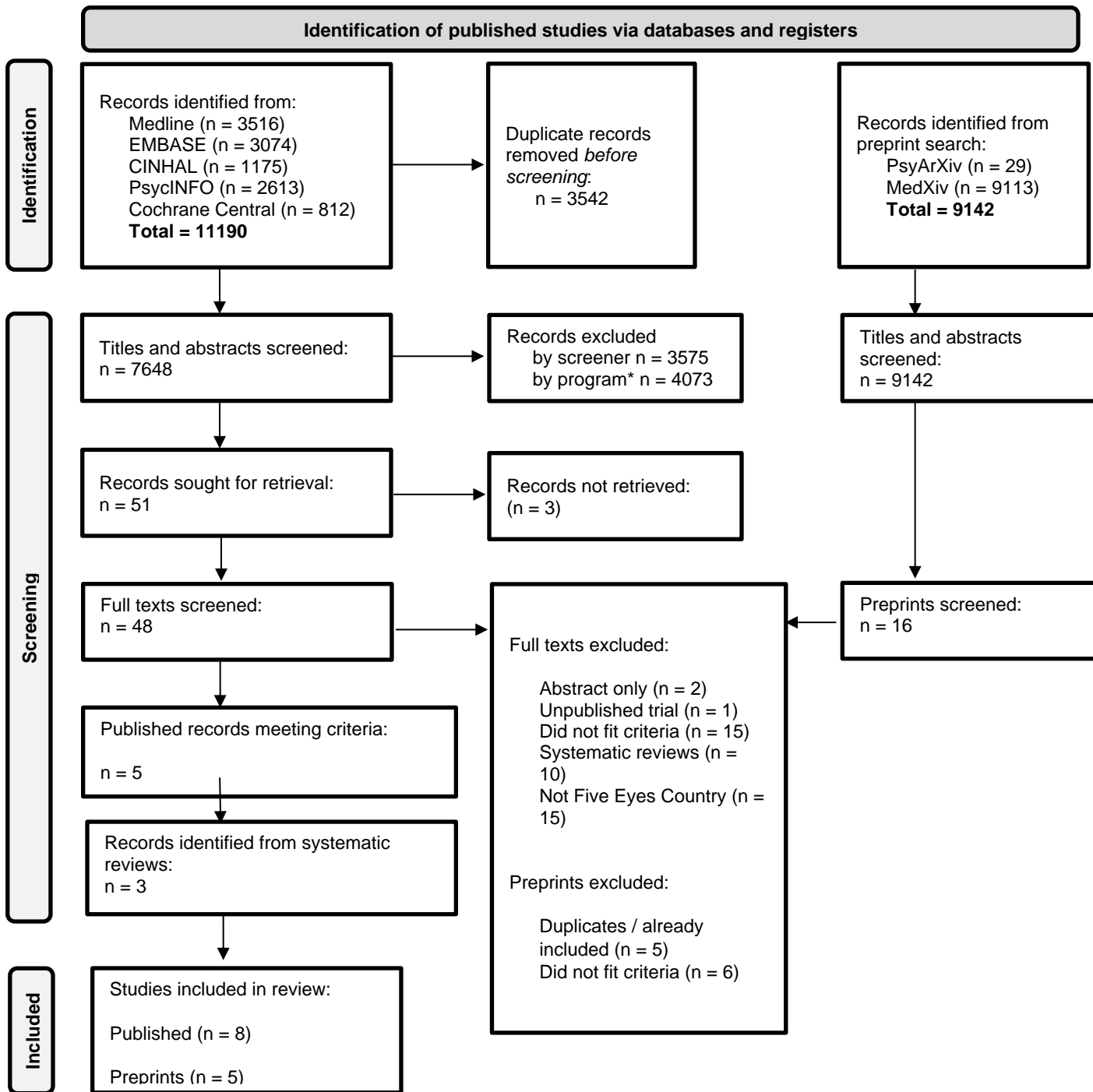
Data extraction

We used a standardised extraction form (Appendix B) to extract relevant data related to study characteristics, the characteristics of vaccine mandates, and the main findings related to the outcomes of interest (i.e., intention, reactance, trust).

Synthesis

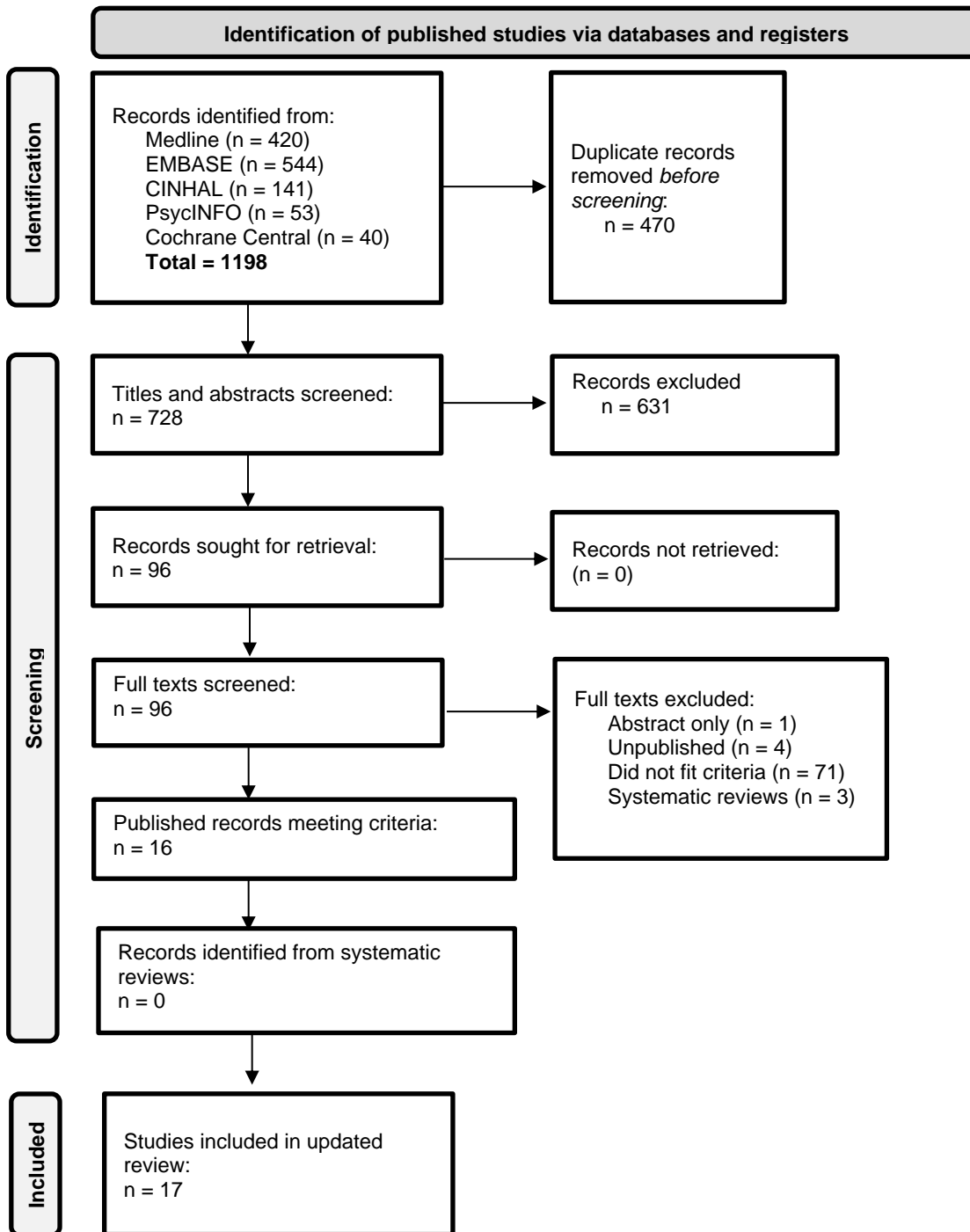
We conducted a narrative synthesis of the reviewed literature, including identified preprints. Findings are organized according to the outcomes of interest (intention, reactance, trust) and the types of study designs (experimental, survey, qualitative). Sub-group analyses (by jurisdiction, work sector, and equity-deserving group) are presented where possible.

Figure 2. PRISMA diagram – Original search up to Feb 2022



* n = 4073 records were not screened based on predictions provided by Abstrackr that suggested most relevant sources had been identified.

Figure 3. PRISMA diagram (updated search Feb 2022 to Feb 2024)



Results

Search results

In our original search, we identified 7648 unique published records and 9142 preprints based on our search strategy, identifying 13 studies conducted in FVEY countries (n = 0 Canada; n = 9 US; n = 4 UK; n = 0 Australia; 0 = New Zealand) relevant to vaccine mandates and intention (n = 6)²⁹⁻³⁴, reactance (n = 6)³⁵⁻⁴⁰, and trust (n = 1)⁴¹ up to February 2022. In our updated search in February 2024, we identified an additional 728 unique studies and following screening against our eligibility criteria, we now add 17 studies (n=3 Canada; n=8 US; n=3 UK; n=3 Australia; n=0 New Zealand) published since the last search: n=9 on mandates and intention to get vaccinated⁴²⁻⁵⁰; n=10 on mandates and reactance^{45,49,51-58}; and n=1 on mandates and trust⁵⁰. All except 1 study focused on COVID-19.

Details of the identification and screening process are presented in the PRISMA diagram in Figure 2 (original search) and Figure 3 (updated search and study details are provided in Table 1.

Overview: Vaccine mandates and intention, reactance, and trust

We provide a narrative synthesis of the literature discussing vaccine mandates, intention to get vaccinated, reactance, and trust and how these concepts are related. We begin by addressing what impact, if any, vaccine mandates have on intention, reactance, and trust. We then examine what other factors have been identified that may explain the relationship between vaccine mandates, trust, reactance, and intent to get future vaccines. Finally, we describe research that suggests possible interventions to support the implementation of mandates. We present studies in order of relevance and robustness and note where sufficient literature is lacking.

Section 1: Impact of vaccine mandates on reactance, trust, and intent to get future vaccines

Vaccine mandates

Vaccine mandates were differentially described within the identified literature, with some focusing on specific types of mandates (e.g., COVID-19 vaccines required for international travel, employer or education mandated vaccines, vaccines to access public spaces). Some asked about multiple mandates at once (e.g., asking participants about “vaccines required for work, school, or travel” or compared participant responses to different types of mandates (e.g., COVID-19 vaccines required for international travel vs vaccines required to access public spaces vs vaccines required for employment vs vaccines generally required of all residents). Furthermore, some studies focused on hypothetical mandates whereas others focused on experienced mandates. These differences are worth noting as some studies found that respondents were more or less accepting of certain types of mandates, and therefore results are presented based setting of mandate (employment vs passport) and hypothetical vs experienced.

Vaccine mandates and impact on intention to get vaccinated

We originally identified 5 studies that explored intention to get COVID-19 vaccines and 1 study on intention to get a flu vaccine under hypothetical mandates. Data for COVID-19 studies were collected between November 2020 and September 2021, both before and after vaccines were approved and as vaccines were being mandated in certain regions. Of these studies, five sought to document views from the general public and none focused on health care workers. Additionally, we identified one study that explored the role of mandates on the likelihood of getting the influenza vaccine by students in healthcare professions. In our updated search, we identified 9 studies (n=2 in Canada) investigating the link between mandates and intention to get a dose of COVID-19 vaccine. Data mostly reflect data collected in 2021 or 2022. Of these, 8 studies sought views from the general public (n=2 Canada) and 1 additional study involved data from health care workers in Australia. Table 1 summarizes the main findings from these studies.

Experimental research – Hypothetical mandates

Four studies used experimental methods to assess the conditions in which a hypothetical vaccine mandates impacted intention to receive a COVID-19 vaccine; all were conducted with the general public.

An experimental study sought to test the impact of behavioural nudges on participant support for COVID-19 vaccine travel passports, if there are synergies between the effects of two nudges, and whether there may be any negative impacts or spillover effects on vaccine intention. Sotis et al.³¹ conducted a double-blind online experiment where American participants (N = 4000) were randomized into one of four conditions: 1) a control condition where participants received information about a COVID-19 vaccine travel passport, 2) a status quo nudge indicating that vaccine passports are not new, 3) a peer effect nudge suggesting that vaccine passports are well supported by others, and a fourth condition that combined both status quo and peer effect nudges. Though these nudges did not increase vaccine intention, they did improve support for vaccine passports. Specifically, participants in the combined nudge condition were more likely to agree with statements regarding the importance of vaccine passports and to disagree with statements suggesting vaccine passports were unfair. The authors conclude that behavioural nudges can be used to bolster support for COVID-19 travel passports without reducing intent to vaccinate if passports were implemented.

A UK-based online randomized controlled trial⁴⁷ involving n=2726 participants compared how different hypothetical COVID-19 three-dose certification (passport) policies affected subsequent behavioural expectations. Participants were shown a scenario within the context of rising COVID-19 infection rates and public health measures. They were randomized to see a description of one of four different protective measure policies (vaccine passport, vaccine passport plus free testing, vaccine passport plus testing that needs to be purchased, or no vaccine passport), and one of two settings (care homes and hospitals vs large indoor/outdoor settings). They then sought to investigate whether the type or setting of the vaccine passport affected participants reported expectation to get their next dose of COVID-19 vaccine. They also sought to investigate any differential effect based on degree of reported vaccine concerns and hesitancy. As secondary outcomes they also investigated expectations to get next flu vaccine. They did not observe any difference on expectations in either healthcare or recreational settings, nor any difference between types of passports or no passport at all. Degree of vaccine hesitancy did not alter these findings.

In a US study⁴⁸ collecting cross-sectional online survey data in July 2021 among 5,144 unvaccinated US adults randomized respondents to consider one of four settings (attending a concert, sports event, restaurant or a vacation) then randomised them to a scenario whereby COVID-19 vaccine was needed or not to participate. A significantly higher percentage of unvaccinated respondents randomized to a hypothetical vaccination requirement to attend a sporting event (27% vs 19%) and for travelling (32% vs 23%) intended to get vaccinated; no statistically significant difference was observed of such mandates for dining out or attending a concert.

Finally, an online nationally representative online US study of 1006 participants investigated the incentivising role of a range of measures including employer vaccine mandates⁴². Participants were presented with a series of hypothetical vaccination profiles and asked whether they would or would not take up the vaccination. They did not find any evidence that employer mandates increase intention to get vaccinated, and this was consistent across political affiliation.

Experimental research – Experienced mandates

We did not identify any studies to date using an experimental design to evaluate actual mandates' effect on intention to get vaccinated.

Survey research – Hypothetical mandates

In our original search, we identified two studies that sought to explore the relationship between hypothetical vaccine mandates (for travel) and vaccination intention using cross-sectional survey designs. A large cross-sectional survey (N = 17,611) conducted in April 2021 in the UK to assess participant views on the effects of a COVID-19 vaccine passport on their intent to get vaccinated²⁹. Participants were asked how inclined they would be to accept a COVID-19 vaccine if a domestic COVID-19 passport were introduced (i.e., where proof of vaccination or immunity would be required to attend social events) and how inclined they would be to accept a COVID-19 vaccine if a COVID-19 passport were introduced for international travel. Almost half of participants indicated their intention to get vaccinated would not change in response to either domestic (46.5%) or travel (42%) related vaccine passports while a comparable number would “definitely” accept a COVID-19 vaccine for domestic use (48.8%) and international travel (42.9%). The authors were also interested in exploring who was more likely to see a change in intention and found that COVID-19 vaccine mandates may have a polarizing impact whereby those who already intended to get vaccinated experience an increase in vaccine acceptance whereas those with a pre-existing lower intention to get vaccinated experience decreases in vaccine acceptance. de Figueiredo et al. also found that the impact of passports on COVID-19 vaccine acceptance differed across demographic variables. Specifically, men, participants identifying as Black or Black British, those who are unemployed, working part-time, or had another work status, those looking after the home, and those who spoke another language reported decreases in vaccine intentions if domestic mandates were introduced. Similar trends were reported for international travel mandates.

A US-based study³² of N=1478 survey respondents used the Health Belief Model as a foundation for understanding willingness (intention) to be vaccinated for COVID-19 before travelling, and showed a positive cross-sectional association between intention and support for a vaccine mandate. The observed association was strongest for respondents who travelled more frequently.

In our updated search in February 2024, we identified three additional studies presenting (cross-sectional) survey data, both focused on hypothetical employer vaccine mandates in the general public. In a US-based survey⁴⁹ conducted in Summer 2021 with 14,142 participants, in the n=2,135 employed respondents reporting being unvaccinated, when asked if they intended to get vaccinated if mandated by their employer, 32% intended, 26% were undecided and 42% did not intend. In another US survey with n=2546 respondents from the general public in August-September 2021, 86% of those who were unvaccinated reported that they would not get vaccinated if their employer mandated it. Taken together, these US-based surveys based on hypothetical employer mandates in the general public suggest that a substantial proportion would remain unwilling to get vaccinated.

A large demographically-matched online study of American adults⁴⁸ showed that 35% of n=5091 responding to an online survey in July 2021 and 32% of n=4373 responding in Oct 2021 of unvaccinated Americans who work outside the home would be motivated to get a COVID-19 vaccination if their employer required it; with this motivator being more pronounced among unvaccinated Latino and Latina respondents (46%). In another US study investigating the views of N=523 unvaccinated respondents 6% reported intending to get vaccinated in the future, 55% were uncertain and 40% reported being unlikely; when asked their intention if their employer mandated vaccination, population-weighted percentages indicated that 49% reported intended to get vaccinated, 16% were uncertain and 5% did not intend.

Survey research – Experienced mandates

We identified four survey-based studies investigating the link between intention to get vaccinated in the context of having experienced mandates. Two of these studies focused on the general public and vaccine passports. A study among n=8911 residents of Quebec⁴³ from March 2020-Sept 2021 investigated how introducing a vaccine passport was reported to affect their intention to get a COVID-19 vaccine. In those who reported not having yet been vaccinated, 39% reported that the vaccine passport positively influenced their intention to get vaccinated.

In a 2021 study⁴⁴ involving n=6010 respondents Canadians to understand intention to take a third or annual COVID-19 vaccination dose, respondents were classified as those who accepted (intenders), were undecided, or reported refusing (non-intenders) to get a third dose or annual dose. Seventy percent and 64% reported willing to accept a 3rd dose and an annual dose (respectively), while 15% (third dose) and 18% (annual dose) were undecided. In those intending to get a future dose, only 3% indicated vaccine mandates as the main motivation for getting previous doses (with protection of self and family and wanting to return to normal being greater motivators). Among the undecided, 18% indicated that mandates were a past motivator and similarly 20% of non-intenders indicated that mandates were a motivator for getting a previous dose. Findings suggest mandates have negligible influence on those who already want to get a future dose, and relatively limited impact on motivation in the undecided and unmotivated.

The two other identified studies focused on employer mandates. A study⁴⁶ among 556 Australian midwifery and nursing trainees in Jan-May 2022 where mandates were introduced for healthcare workers and trainees, 95% reported having had at least one dose; 82% indicated that the mandate was one of the reasons they were vaccinated, yet 67% also indicated they would have been vaccinated even without the mandate, 16% indicated they might have, and 17% indicated they would not have had there not been a mandate. Another study³³ surveyed American university students in health professions (n = 1249 of 3578 students sampled) and found that most students in health professions who had already gotten their influenza vaccine did so under an academic program mandate. Of the health profession students who had received an influenza vaccine, 77% indicated they would be willing to accept a future influenza vaccine even if it was voluntary.

Qualitative research

A qualitative survey study (N = 867) exploring motivations to receive vaccines among those who expressed some degree of hesitancy found that several respondents indicated they would get vaccinated if required by their employer, schools, or to volunteer³⁰. A UK-based study explored the views of 29 focus group participants regarding COVID-19 vaccines and found that many held negative views regarding vaccine passports. Many indicated they would get vaccinated if vaccine passports were implemented but would feel forced into getting vaccinated. Many saw mandates as an infringement on privacy and human rights³⁴.

A qualitative interview study with 36 Black people in Canada across six provinces⁵⁰ identified two themes centred on vaccine acceptance and vaccine resistance, where rather than being two binary categories, Black people in Canada reported having to nuance both views as they relate to mandates. The authors highlight limitations of equating vaccine uptake with vaccine acceptance and intention in a setting of vaccine mandates. They highlight that the mandates themselves may have served to exacerbate lower vaccine confidence and intentions amongst some Black people in Canada by echoing the coercion and lack of choice that characterised past harms on Black communities. They note this resistance is nuanced alongside the recognition by Black people of the important role of vaccination for individual and community protection. Given the socioeconomic factors that contribute to positioning more Black people in employment settings more likely to have introduced mandates, the authors underscore the importance of developing vaccination policies that account for the historical and social contexts to mitigate introducing policies that serve to be reminiscent of the removal of choice, coercion, and oppression that Black people have and continue to face in Canada.

Summary: a potential impact on intention to get vaccinated

The findings from the identified studies suggest there is a relationship between vaccine mandates and intention. Experimental studies that investigated the effect of mandates on intention to get vaccinated have only been based on hypothetical mandates in the general public. Two of three experimental studies focused on vaccine passports showed no effect of passports on vaccine intention, with the third suggesting a modest improvement in intention for passport-based mandates focused on travel or sporting events. The only hypothetical employer mandate experiment showed no effect on intention to get vaccinated. The quantitative survey research suggests there is an association between vaccine

mandates and intention and that some types of mandates may lead to greater intention to get vaccinated than others. Survey studies with the general public suggest that for hypothetical vaccine passports for travel, there appears to be a positive relationship between such mandates and intention to get vaccinated. Survey studies investigating how experienced passport mandates relate to intention to get vaccinated suggested a minority of respondents reporting that mandates were a motivator for intending to get vaccinated. For hypothetical employer mandates with the general public, the evidence is less clear, with some studies showing a substantial percentage of respondents reporting not intending to get vaccinated in the presence of an employer mandate while others suggesting a more positive relationship. For experienced employer mandates, both survey studies focused on healthcare professional trainees and suggested that mandates had a modest effect on their intention to get vaccinated. Taken together, the survey and qualitative literature as a whole supports the experimental literature in suggesting a neutral or modest positive association between both passport-based and employer mandates with vaccination intention, suggesting that such mandates may motivate a minority to get vaccinated.

Vaccine mandates and impact on psychological reactance

In our initial search, we identified six studies related to psychological reactance (anger and resistance that results from perceived threats to freedom) and vaccine mandates. All but one study (Porat et al. 2021) reported results based on hypothetical mandates. Studies reported on data collected during the pandemic were conducted between April 2020 – May 2021. All studies were conducted with samples from the general population. In our updated search in February 2024, we identified 9 additional studies (1 in Canada). Table 1 summarizes the main findings from these studies.

Experimental research – hypothetical mandates

Five studies used experimental and quasi-experimental methods to gather data on whether vaccine requirements incite reactance and in turn impact intention or willingness to be vaccinated. Four of these studies found evidence to suggest that compulsory vaccines incite reactance which in turn negatively impact vaccine acceptance. For example, one study assessed how pre-existing vaccine intentions influenced the association between vaccine mandate and reactance. Sprengholz et al. conducted an experiment with American (N = 1394) adults to assess the impact of vaccine mandates and vaccine scarcity on reactance³⁶. They found that those with pre-existing low intention to get vaccinated against COVID-19 expressed more reactance when they were in a vaccine mandate experimental condition as opposed to an unrestricted or scarce vaccine condition. They also found that those with higher levels of reactance who were in the vaccine mandate condition rated higher in measures of activism, intent to avoid COVID-19 vaccines, and lower in intentions to obtain other vaccinations (e.g., chicken pox) and engage in protective behaviours (e.g., getting tested for COVID-19).

Another study by Sprengholz et al.³⁵ sought to assess the impact of COVID-19 vaccine mandate attitudes on reactance and uptake of other vaccines. In an experiment with a representative American sample (N = 576) that excluded healthcare workers, they found that reactance under a mandatory vaccine condition was greater when the mandatory vaccine policy was self-relevant (i.e., applying to all citizens and therefore relevant to participants vs applying to healthcare workers only) than when it was not.

One study conducted prior to the pandemic also support the finding that reactance negatively impacts vaccine acceptance. Sprengholz and Betsch found that selective mandates (i.e., making some vaccines compulsory and others voluntary) increased anger and reactance, which in turn decreased intent to vaccinate. However, providing participants with an explanation of population-level immunity attenuated the impact of reactance on vaccination. These authors conducted a moderated mediation analysis and found that participants who experienced anger in response to a selective vaccine mandate and were *not* provided with a herd immunity explanation were less willing to accept a hypothetical vaccine for a fictitious disease.

One experimental study did not find support for the negative impact of psychological reactance on vaccine uptake. Albarracin et al. report three quasi-experiments and one experiment with American participants who were recruited from the Prolific, Mechanical Turk, and Qualtrics platforms (N = 299 – 606) and found that participants in a required vaccine condition (i.e., required for work, school, or travel) were more likely to accept a hypothetical vaccine than those in voluntary and control conditions³⁸. They also found that when they introduced a social norm condition suggesting that 70% of other employees were vaccinated, those in the required vaccine condition reported stronger intentions to get

vaccinated irrespective of personality trait reactance levels as measured by the short form of the Hong Psychological Reactance Scale.

In another experimental study⁵¹, 371 students from two US university campuses were randomised in Spring 2021 to see a message that their own university or the other university was considering introducing a COVID-19 vaccine mandate for students, and further randomized to see a message that there would or would not be sanctions (in this case, being dropped from all courses). These messages were designed to investigate whether a direct (vaccine mandate at own university) or indirect (mandate at another university) threat to freedom affected reactance, and whether the magnitude of the freedom threat (having a sanction or not to not following through with the mandate) affected reactance. Those exposed to direct or indirect threat to freedom did not show higher reactance scores than control. Those exposed to messages about sanctions had higher reactance than those without sanctions. They also showed an interaction: in particular, those exposed to an indirect freedom threat (mandate at another university) that had a sanction experienced the greatest impact on psychological reactance. This finding underscores the potential social impact of observing similar other people having a perceived freedom removed and a negative consequence of not adhering, which has potentially important implications mandate related policies and how they are communicated. This study featured a hypothetical rather than an actual mandate.

Experimental research – experienced mandates

We did not identify any experimental studies evaluating the effect of actual mandates on psychological reactance.

Survey research – hypothetical mandates

One study identified in our initial search used quantitative survey methods to assess the relationship between vaccine mandates and psychological reactance. Porat et al. conducted a cross-sectional survey with adults from the UK (N = 681) and drew from self-determination theory to explore how three motivational needs may be impacted by mandates and may affect intention to get vaccinated: the need for autonomy (a sense of meaning and choice over one's life), competence (feeling capable of achieving goals and overcoming challenges) and relatedness (feeling cared for by others, trusted, understood). They found that when participants' need for autonomy and need for relatedness was frustrated, they were less willingness to get vaccinated. Our updated search identified three additional survey studies focused on hypothetical mandates: two focused on employer mandates and one on vaccine passports. In a US study⁴⁵ asking about vaccination intentions among unvaccinated respondents if their employer mandated vaccination, among those who did not intend to get vaccination, 29% indicated that they would quit, 32% said they would protest, and 43% indicated they would consider legal action. Using similar anticipated reactance metrics, another US study⁴⁹ that included views from 901 unvaccinated respondents' vaccine intentions if there was an employer mandate showed that 30% would quit, 9% would protest, 43% would consider legal action and 18% said they would take an unspecified course of action. In a nationally representative longitudinal UK survey⁵² in April (n=349), May (n=328) and July (n=311) 2021 investigated perspectives on a hypothetical (at the time) domestic and international vaccine passport. For both types of vaccine passports, they showed that higher liberty values was associated with greater anger towards the potential implementation of vaccine passports, which in turn is associated with lower support for passports. In longitudinal analyses, they showed that

support for domestic vaccine passports increased over time and that anger reactions decreased between measurement points; no differences over time were observed for international vaccine passports.

Survey research – experienced mandates

We did not identify any survey studies evaluating the relationship between actual mandates and psychological reactance.

Qualitative research – hypothetical mandates

We identified three qualitative studies focused on hypothetical mandates and reactance. In one study participants⁴⁰ held mixed views regarding vaccine mandates and passports; those who intended to accept a vaccine suggested mandates may be acceptable in some contexts, whereas both intenders and hesitators viewed mandates as coercive and a threat to autonomy. Those who disagreed with mandates believed personal choice and informed consent were essential.

Another interview study⁵⁵ with 39 Western Australia healthcare workers (mostly pharmacists and nurses) in the first half of 2021 showed that most were supportive of employer mandates. However, all but two in the sample had been vaccinated at least once or intended to, which may have impacted on surfacing reactance views.

A third qualitative study⁵⁸ reported on care home workers' (N = 10) views of COVID-19 vaccine mandates. This study was conducted prior to an announcement that care home workers in the UK would be mandated to get a COVID-19 vaccine as a condition of employment and so captures participants anticipatory views. The authors found that care home workers opposed vaccine mandates, as they viewed compulsory vaccine policies as an infringement on their freedom. They expressed anger and a sense of betrayal about being forced to get vaccinated when many had refused to get vaccinated due to mistrust in authorities. While some participants indicated they would unwillingly accept a vaccine to remain employed, others would rather leave a job they enjoyed than abide by mandates.

Qualitative research – experienced mandates

We identified four qualitative studies based on reactance to experienced mandates. In the only Canadian study identified, 25 people with a South Asian background in Ontario and British Columbia were interviewed from July 2021 to January 2022 about perceptions of COVID-19 risk and vaccine confidence. Mandate reactance-related findings focused mostly on the desire to have choice and the frustration stemming from differences in mandates between workplaces.

A US-based interview study⁵³ in spring 2022 among unvaccinated people in the Bay area of California showed that among the most common reasons for not getting a COVID-19 vaccine was specifically because there was a vaccine mandate, with one participant indicating that they would have considered it more had there not been a mandate. In a study of 56 healthcare aides in New York City from June-Oct 2021⁵⁷, vaccine mandates were reported to be insulting to their duty of care. The authors noted that while the mandates may have achieved the short-term goal of expediting the decision to get vaccinated amongst healthcare aides, the mandate did not itself address reasons for uncertainty in getting vaccinated.

In another interview study in Western Australia⁵⁴ – this time amongst 14 adults with co-morbidities – also included mostly participants who had been vaccinated. In two participants who took the vaccine only because of an employment mandate, one expressed

considerable anger, resentment and negativity, describing themselves as involved in civil disobedience due to perceived authoritarianism.

Summary

Experimental research on reactance based on hypothetical mandates provides some evidence to suggest that vaccine mandates incite psychological reactance and, in turn, negatively impact intention to get vaccinated, though one study found evidence to the contrary. Importantly, views about vaccine mandates are associated with the experience of reactance, such that those with negative views toward vaccines and mandates are more likely to experience reactance and decreased vaccine acceptance. The survey research results that vaccine mandates to date is also based on hypothetical mandates but suggests a link to psychological reactance and suggest that this also negatively associated with vaccination intention. There is also some evidence to suggest that communicating the benefits of high rates of vaccination in a community may attenuate the negative impact of reactance on vaccine intention. Qualitative research provides the only window into experiences of psychological reactance to actual vaccine mandate experiences and findings largely underscore experiences of reactance in a subset of respondents. Taken together, vaccine mandates whether passports or employer mandates appear to be linked to psychological reactance in a subset of respondents though more research is needed to clarify how actual mandate experiences elicit reactance to the same degree and how that affects subsequent intention to get vaccinated.

Vaccine mandates and impact on trust

Two studies were relevant to understanding the relationship between vaccine mandates and trust. Table 1 summarizes the main findings from these studies.

Experimental studies

No experimental studies identified.

Survey research

No survey research identified.

Qualitative survey research

Woolf et al conducted a qualitative survey study where healthcare workers in the UK (N = 3235) responded to one open-ended question about employer COVID-19 vaccine mandates. They found that healthcare providers who trusted their organization to respond to a concern about unsafe clinical practices were less likely to support a vaccine mandate (OR 0.78; 95%CI 0.63 – 0.96)⁴¹. Giwa et al conducted a qualitative study with 36 Black people in Canada⁵⁰ highlight how COVID-19 vaccine mandates may have served to strengthen existing mistrust in government due to historical and current oppression.

Summary of research on effect of mandates on trust

We identified very little research from FVEY countries to date on the relationship between mandates and trust. From the available studies, there is some evidence to suggest that vaccine mandates may impact trust in government institutions and government communications regarding COVID-19, especially among subgroups who have a history of harm and oppression. Based on limited research, greater trust in governments may help

support vaccine mandates, however, vaccine mandates may also harm trust between governments and the public.

Section 2: Factors explaining observed associations between vaccine mandates, trust, reactance, and intention to get future vaccines

One study used theory to identify predictors of intention to receive COVID-19 vaccines prior to international travel. Suess et al. examined the utility of the Health Belief Model for explaining the intent to vaccinate before travel and support for travel mandates. They conducted a survey with American adults (N = 1478) and found that participants' trust in information provided by governments, scientists, and the media about the risk of COVID-19 was significantly associated with their perceived susceptibility to, and severity of, COVID-19 infection. Perceived risk was associated with perceived benefits of the vaccine for travel, which predicted willingness to vaccinate prior to travel as well as the belief that others should also vaccinate before travel. All together, these constructs predicted support for COVID-19 travel-related vaccine mandates. These effects were stronger for those who travelled frequently.

Section 3: Co-interventions delivered alongside vaccine mandates to increase trust or reduce psychological reactance

Two studies described evidence to suggest that presenting participants with explanations of the benefits of high rates of vaccination (e.g., economic benefits, population-level immunity) may help attenuate the impacts of reactance on subsequent vaccine intention^{36,88}. These two studies are described in section 1. We did not find any literature assessing interventions to increase trust when vaccines have been mandated.

General discussion

In our initial search in February 2022, we identified 13 studies from FVEY countries related to vaccine mandates and their potential impact on, intention, reactance, and/or trust; an updated search in February 2024 identified a further 17 studies.

Based on the included studies, the effect of vaccine mandates on intention to get vaccinated appears to be either positive or neutral in many studies, though the relationship between mandates and intention to get vaccinated may best for people with pre-existing positive views about vaccines but can risk undermining intention for those with less supportive pre-existing views toward vaccines.

Of the studies identified related to psychological reactance (i.e., anger and resistance in response to perceived threats to freedom), most suggested mandatory vaccines incite psychological reactance particularly among those who hold negative views toward vaccines and vaccine mandates. Findings from qualitative research suggest that even when participants strongly disagree with mandates and express sentiments that align with psychological reactance, they may still opt to get vaccinated. Two studies also provide

some evidence that communicating the public health and economic benefits of high rates of vaccination may help attenuate the negative impacts of psychological reactance on subsequent vaccine uptake. While this is in keeping with the need to address beliefs about consequences, more research is needed to better understand the relationship between vaccine mandates, reactance, and intention.

The relationship between trust and mandates remains under-studied. Existing studies suggest the relationship between trust and vaccine mandates may be bidirectional. Vaccine mandates may negatively impact trust between citizens and governments. However, when trust is already present, citizens may demonstrate greater support for vaccine mandates than when they do not trust their governments.

Overall, current evidence suggests that potential gains in intention and uptake in vaccination by introducing mandates on the short term should be carefully considered against any potential effect on reactance and trust, especially among those who have not yet been vaccinated and/or have lower vaccine intention and vaccine confidence levels. That said, the evidence remains relatively meager, and often relying on hypothetical settings. Ways of presenting mandates and settings of implementing them, as well as tailoring co-interventions to different subgroups (especially those who have a history or current experience of harm and oppression brought on by governmental, health system or employer policies) are worth further rigorous study. Such future work should further examine the association between mandates, psychological reactance, trust, intention, and vaccine uptake across and within subgroups in Canada and beyond.

Table 1. Summary of findings from published studies included in this report

Mandates and intention to get vaccinated								
Authors	Year	Country	Design	Sample	Demographic details	Data collection period	Type of mandate and co-interventions	Main findings
Sotis et al ³¹	2021	US	Experiment	General population N = 4000	Age: NR Gender: 58%	May 15 th 2021	COVID-19 travel mandate	Status quo and peer-effect combined nudges improved support for travel mandates Nudges did not negatively impact intent to vaccinate given travel mandate
Algara et al ⁴²	2023	US	Experiment	General Population N = 1,006	Age range: NR Female: NR Ethnicity: NR	January 28, 2021 - February 2, 2021	Employment mandates	No evidence that mandate incentives or accessibility incentives have a significant effect on vaccine choice. Results provide support for direct financial incentives, rather than other incentives [e.g. mandates], as being a valuable tool for policy makers tasked with alleviating vaccination resistance among a US mass public increasingly polarized along partisan lines.
Mills et al ⁴⁷	2023	UK	Experiment	General population N = 2726	Age range: 18-87 Female: 51.4% Ethnicity: 6.3% Asian, 2.9% Black, 1.7% Mixed, 87.1% White, 4.4% Other, 7.3	August 2022	Certification policy	No main effects of setting or type of certification on expectation to receive the next dose of the COVID-19 vaccine, to receive the seasonal influenza vaccine, or to adhere to other protective measures, when controlling for baseline expectations.

					Prefer not to say			
Dube et al ⁴³	2022	Canada	Cross-sectional survey	General population N = 8911	Age range: 18-35+ Female: ~50% Ethnicity: NR	March 2020 - Sept 2021	Vaccine lottery and passport	The vaccine lottery had a limited impact on willingness to receive COVID-19 vaccines among unvaccinated adults in Quebec, but the implementation of the vaccine passport appears more influential based on survey respondents' responses
Reifferscheid et al ⁴⁴	2022	Canada	Cross-sectional survey	General population N = 6010	Age range: 18-70+ Female: 57% Ethnicity: 67.7% White, 23.8% Visible minority, 8.5% Indigenous, 1.6% Prefer not to answer	October 14 2021 - November 12 2021	Vaccine mandate	Approximately 2.9% of vaccine acceptors identified vaccine mandates or restrictions as a main motivator. Protection of self and family were also the top two most commonly identified motivators for the undecided group (44.3% and 20.7%, respectively), with vaccine mandates or restrictions the third most commonly chosen reason (17.8%).
Dudley et al ⁴⁵	2022	US	Cross-sectional survey	General population N = 2546	Age range: 18->60 Female: 49.3% Ethnicity: 40.6% White, 11.9% Black, 31% Hispanic, 4.6% Other/Non-Hispanic	24 August - 8 September 2021	Employer mandate	Most (86%) of the unvaccinated reported they would not vaccinate if mandated by their employer.

Naeim et al ⁴⁸	2022	US	Cross-sectional surveys AND embedded trial	General population N = 108733	Age range: 18-65+ Female: 51.4% 63.3% White, 11.3% Black, 6.2% AAPI, 2.9% Other, 16.3% Hispanic	October 2020 - October 2021	Employment vaccine mandate	Among unvaccinated individuals who were employed and worked outside of the home before COVID-19, an employer requirement for COVID-19 vaccination would motivate 35.4 % of these individuals to vaccinate in July 2021 with a similar proportion (32.4 %) in October 2021. Larger effects were noted among Hispanic individuals on average (45.5 %)
Sargent et al ⁴⁹	2022	US	Cross sectional survey	General population N = 14152	Age range: 18-85+ Female: 44.6% Ethnicity: 57.6% White, 11.7% Black, 10.4% Latinx, 5.6% Asian, 2.4% NA, 5% Other, 7.3% Multi-racial	June 30 – July 26, 2021	Employer mandate	Among working unvaccinated respondents (N = 2,135), 32.1% said that they would get vaccinated in response to a work requirement, 42.2% said they would not get vaccinated, and 25.7% reported that they were unsure if they would get vaccinated.
de Figueiredo et al. ²⁹	2021	UK	Cross-sectional survey	General population N = 17611, representative sample	NR	April 2021	COVID-19 vaccine passports for travel and access to public spaces	Almost half of respondents would be no more inclined to get vaccinated under domestic or travel mandates Almost half would be more likely to get vaccinated under domestic or travel mandates Black, unemployed, part-time employed, and participants who spoke a language other than English would be less likely to accept a vaccine despite mandates

Suess et al. ³²	2022	US	Cross-sectional survey	General population N = 1478	Age: 35.9% < 35 Gender: 48% F	November 2020	COVID-19 travel mandate	Health Belief Model predicted intention to get a COVID-19 vaccine prior to travel and support for vaccine travel mandates
Waghmare et al. ³³	2021	US	Cross-sectional survey	Students N = 3578 (In health professions n = 1249)	Age: 62.4% >20 Gender: 67.6% F	October 2017	School mandated influenza vaccine	77% of participants who were vaccinated (most due to mandate) indicated they would accept an influenza vaccine without a mandate (i.e., under voluntary conditions)
Ford et al. ⁴⁶	2023	Australia	Cross-sectional mixed methods	Health Care Workers N = 556	Age range: 18-64 Female: 94% Ethnicity: NR	January 2022 - May 2022	Mandate for continued studies	Mandates that required vaccination to attend clinical practice resulted in vaccination for 17.2% who would have otherwise not vaccinated
Giwa et al. ⁵⁰	2023	Canada	Interviews	General population N = 36	Age range: NR Female: 58% Ethnicity: 75% Black African, 3% Black American, 22% Black Caribbean	February - May 2022	Certificate for non-essential services	Two major themes arose: acceptance of the COVID-19 vaccine in the context of governmentality and resistance to vaccine mandates driven by oppression, mistrust, and religion
Moore et al. ³⁰	2021	US	Qualitative, open-ended question	General population N = 867 Vaccine hesitant sample	Age: M = 37 Gender: 60% F	April – July 2021	COVID-19 vaccine mandates (all types)	COVID-19 vaccine mandates of all types (e.g., employment or travel requirement) were cited as reasons to get vaccinated by vaccine hesitant participants
Williams & Dienes ³⁴ (preprint)	2021	UK	Qualitative focus groups	General population N = 29	Age: 90% <50 Gender: 38%	March 15-April 22 2021	COVID-19 vaccine passports	Many felt passports would force them to get a vaccine and held negative views toward mandates

						Vaccines rolled out to young adults		Vaccine refusers and delayers were more likely to mistrust science and government
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Mandates and reactance

Authors	Year	Country	Design	Sample	Demographic details	Data collection period	Type of mandate and co-interventions	Main findings
Sprengholz et al. ³⁶	2021a	US (study 2)	Experiment	General population N = 1394	Age: M 33-44 SD=10-15 Gender: 40-49%F	December 2020- January 2021	Mandatory COVID-19 vaccine with fine for noncompliance (vs unrestricted or scarcity condition)	Participants experienced higher reactance when they had low intention to get vaccinated and were in the mandatory vaccination condition Higher levels of reactance led to greater activism, vaccine avoidance, and lower intent to vaccinate in future
Sprengholz et al. ³⁷	2021b	US (study 3)	Experiment	General population N = 579		April – November 2020	Mandatory COVID-19 vaccinations for all vs for HCWs	Support for mandates decreased over time Confidence in vaccine safety was the strongest predictor of mandate support Mandating COVID-19 vaccines elicited more

								reactance in those with negative attitudes toward mandatory vaccines Explaining importance of vaccines for economic recovery and herd immunity attenuated impact of reactance on decreased intentions to vaccinate in the future
Sprengholz & Betsch ³⁵	2020	United States / Germany	Experiment	General population N = 576	Age: M=31.91, SD=5.96 Gender = 52.4%	July 2019	Mandatory vs voluntary vaccine for fictitious disease	Participants who experienced anger in response to selective mandates and were not given an explanation of herd immunity were less willing to get vaccinated
Kriss et al ⁵¹	2022	US	Experiment	General Population N = 371	Age: M=20.73 (18-46) Gender: 62.8% F 58.8% White; 18.6% Hispanic; 14% Asian American; 13.2% Black; 4.3% Latin American; 1.1% Native Hawaiian/Pacific Islander; 0.5% American Indian	Spring 2021	University vaccine mandate	Participants experienced significantly greater freedom threat perceptions when the mandate included sanctions compared to when it did not, but freedom threat perception did not differ when the mandate was on their own campus as to the other campus. An interaction effect was also observed in which perceived freedom threat and reactance was greatest among participants receiving an indirect (as opposed to direct) threat with sanctions.

Albarracin et al. ³⁸	2021	US	3 quasi-experiments + 1 experiment	General population N = 299-606	Age: M=32.66-50.63 (SD 10.93-19.23) Gender: 50-55% F	Jan-April 2021	Hypothetical mandate “required for work travel, or school” Study 3 specified tetanus, flu, COVID-19 vaccines	Respondents more likely to accept a vaccine when vaccines are required Required condition produced higher intentions regardless of reactance levels
Porat et al. ³⁹	2021	United Kingdom / Israel	Cross-sectional survey	General population N = 681 UK sample	Age: 50% 30-59 Gender: 51% F	May 2021	COVID-19 vaccine passports / mandates (to access public spaces)	Autonomy frustration predicted lower willingness to get vaccinated Autonomy frustration was higher in Israel where passports had been implemented
Sargent et al. ⁴⁹	2022	US	Cross sectional survey	General population N = 14,152	Age range: 18-85+ Female: 44.6% Ethnicity: 57.6% White, 11.7% Black, 10.4% Latinx, 5.6% Asian, 2.4% NA, 5% Other, 7.3% Multi-racial	June 30 – July 26, 2021	Employer mandate	Among those who reported that they would not get vaccinated despite a mandate (<i>n</i> = 901), 43.1% said that they would consider legal action, 30.1% would quit their jobs, 9.0% would protest, and 17.9% chose an unspecified course of action.
Harjani et al. ⁵²	2023	UK	Longitudinal surveys	General Population N = 349	Age range: 18-59+ Female: 51% Ethnicity: 10% Asian/Asian British, 5% Black/African/Caribbean/Black British, 4% Mixed or multiple ethnic groups, 2% other, 1% prefer not to say, 70% White	April, May, July, 2021	Vaccine passport	Individualising values are a positive predictor and liberty values a negative predictor of support for passports, suggesting adoption hinges on addressing liberty concerns. Longitudinal analysis

								examining the trajectory of change in support over time finds that individualising foundations positively predict changes in utilitarian and deontological reasoning over time. In contrast, a fall in anger over time predicts increased support towards vaccine passports
Brody et al ⁵³	2023	US	Interviews	General Population N = 32	Age range: NR Female: NR Ethnicity: NR	April - May 2022	Vaccine mandate	An overarching theme was that the vaccine rollout and messaging felt like an encroachment on personal choice and the feeling of being forced created more mistrust. Participants reported feeling like their decisions made them minorities among their colleagues, friends and family and that they were not persuaded by groupthink or by their relationships.
Roberts et al ⁵⁴	2023	Australia	Interviews	General Population N = 14	Age range: 21-60 Female: 64.3% Ethnicity: NR	January - April 2022	Employment mandates	Mandates operated as an external force on half of the vaccine hesitant participants and that these individuals chose to get vaccinated despite not altering their perceptions about COVID-19 or the vaccines. Mandates may pose costs later, generating psychological “reactance”

								and orienting people away from voluntary vaccination programs
Attwell et al ⁵⁵	2022	Australia	Interviews	Health Care Workers N = 39	Age range: NR Female: NR Ethnicity: NR	February-August 2021	Employment mandates	There was broad support for COVID-19 vaccine mandates for HCWs amongst our participants, but also different views about what such a mandate would mean (redeployment versus termination) and how it would impact the rest of the workforce. One vaccine hesitant participant said that mandates would be their prompt to get vaccinated.
Dennis et al ⁵⁸	2022	UK	Interviews	Health Care Workers N = 10	Age range: 25-61 Female: 70% Ethnicity: NR	April 2021	Employment mandates	Participants' views about mandatory vaccination could be grouped into two main subthemes: the importance of free choice and willingness to take a mandatory vaccination for work purposes. All participants felt that it was important to have the freedom to decide whether to have the vaccine or not.
Kandasamy et al ⁵⁶	2022	Canada	Interviews	General Population N = 25	Age range: 19-69 Female: NR Ethnicity: 100% South Asian	July 2021 - January 2022	Vaccine mandate	Participants also described how they perceived vaccine mandates and policies to be contradictory and unfair. Several believed people should be allowed a choice without 'carrots' being dangled in their view or

								'sticks' being used by workplaces. Though the vaccine mandates and policies were viewed as contradictory in some instances, the overall message was that they were effective in increasing vaccine uptake within the South Asian community.
Russell et al. ⁵⁷	2023	US	Interviews	Health Care Workers N = 56	Age range: 30-67 Female: 98.2% Ethnicity: 71.4% Black Non-Hispanic, 8.9% Hispanic, 3.6% White Non-Hispanic, 12.5% Mixed or Other Race/Ethnicity, 3.6% Not reported or unknown	June 15 - October 19 2021	Mandate for health workers	Vaccine mandates and financial incentives to become vaccinated were viewed with skepticism by aides, especially among aides who were unvaccinated. Aides viewed mandates and financial rewards as insulting or confusing, since they described being motivated to receive the vaccine based on their duty to provide care and set an example for their colleagues and clients.
Stead et al. ⁴⁰ (preprint)	2022	UK	Interviews	Vaccine hesitant general population N = 50	Age: 72% between 30-69 Gender: 56%F	February – May 2021	COVID-19 passports and mandatory vaccination	Some believed mandates were acceptable in some contexts Those who did not intend to get vaccinated viewed mandates as threat to autonomy and coercive

Mandates and Trust

Authors	Year	Country	Design	Sample	Demographic details	Data collection period	Type of mandate and co-interventions	Main findings
Woolf et al. ⁴¹ (preprint)	2022	UK	Mixed methods (open-ended responses coded and quantified)	Health care workers N = 3235 codable responses	Age: median = 46, IQR35-55 Gender: 74%F	Spring 2021	Employer mandate	HCWs who were vaccine hesitant, who were in an allied health profession, or who trusted their organization to act regarding unsafe clinical practices were less likely to support mandatory vaccines
Giwa et al. ⁵⁰	2023	Canada	Interviews	General population N = 36	Age range: NR Female: 58% Ethnicity: 75% Black African, 3% Black American, 22% Black Caribbean	February - May 2022	Certificate for non-essential services	Two major themes arose: acceptance of the COVID-19 vaccine in the context of governmentality and resistance to vaccine mandates driven by oppression, mistrust, and religion

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Appendix A

Search terms		
Database	Key word terms	Subject terms/MeSH terms
MEDLINE Embase CINHALL PsycINFO Cochrane Central Register of Controlled Trials	COVID-19 vaccine/vaccines/vaccination/immunization mandates/compulsory/mandatory/passport/passports Psychological reactance/psychological reactance theory/reactance Trust COVID-19 vaccine intention/uptake vaccine/vaccines/vaccination/immunization mandates/mandatory/compulsory/passport/passports	COVID-19 COVID-19 vaccine SARS-CoV-2 vaccine SARS-CoV-2 Coronavirus Mandatory programs Immunization programs Immunization Vaccination Vaccines Public health Prevention Policy making Trust Trust (social behaviour) Psychological theory Psychological reactance Freedom Intention Intent Behavioural intention Behaviour
PsyArXiv	(vaccin* OR immuni*) AND (manda* OR requir* OR pass*)	with subject: Life Sciences; Psychiatry; Social and Behavioral Sciences.
MedXiv	(vaccin* OR immuni*) AND (manda* OR requir* OR pass*)	

Search Strategy (Ovid MEDLINE)

1 exp COVID-19 Vaccines/ or exp Vaccination/ 126987
 2 ((covid* or sars cov 2 or sars cov2) adj4 (vaccin* or immuni?ation*)).tw,kf. 41425
 3 vaccination*.ti. 77754
 4 1 or 2 or 3 169306
 5 Mandatory Programs/ 2909
 6 (mandat* or compulsor* or passport* or requir* or certificat*).tw,kf. 2589894
 7 Mandatory Vaccination/ 6
 8 5 or 6 or 7 2591181
 9 4 and 8 15078
 10 (vaccin* adj2 (mandat* or compulsor* or passport* or certificat*)).tw,kf. 2471
 11 9 or 10 15617
 12 react*.mp. 2786137
 13 Trust/ 13427
 14 trust.tw,kf. 52202
 15 motivation/ or intention/ 96668
 16 Vaccination Hesitancy/ 1070
 17 (intent* or motivat* or Hesitan* or confiden*).tw,kf. 1059081
 18 or/12-17 3872767
 19 11 and 18 3757
 20 exp canada/ 184979
 21 (Alberta or British Columbia or Manitoba or New Brunswick or Newfoundland or
 Labrador or Northwest Territories or Nova Scotia or Nunavut or Ontario or Prince Edward Island
 or Quebec or Saskatchewan or Yukon).tw,kf. 87409
 22 canad*.tw,kf. 167400
 23 exp United States/ 1475628
 24 (Alabama or Arkansas or American Samoa or Arizona or California or Colorado or
 Connecticut or "District of Columbia" or Delaware or Florida or Georgia or Guam or Hawaii or
 Iowa or Idaho or Illinois or Indiana or Kansas or Kentucky or Louisiana or Massachusetts or
 Maryland or Maine or Michigan or Minnesota or Missouri or Mississippi or Montana or North
 Carolina or North Dakota or Nebraska or New Hampshire or New Jersey or New Mexico or
 Nevada or New York or Ohio or Oklahoma or Oregon or Pennsylvania or Puerto Rico or Rhode
 Island or South Carolina or South Dakota or Tennessee or Texas or Utah or Virginia or Virgin
 Islands or Vermont or Washington or Wisconsin or West Virginia or Wyoming).tw,kf.
 490823
 25 (usa or united states).tw,kf. 455589
 26 exp United Kingdom/ 393043
 27 (uk or united kingdom or england or scotland or ireland or wales).tw,kf. 284709
 28 exp Australia/ 173858
 29 australia*.tw,kf. 180730
 30 New Zealand/ 44785
 31 new zealand*.tw,kf. 65457
 32 or/21-31 2895147
 33 19 and 32 930
 34 limit 33 to yr="2022 -Current" 364

35	limit 34 to english language	364
36	remove duplicates from 35	361

Appendix B

Data extraction template

Study characteristics													
Authors	Year	Title	Aim	Design	Analysis	Time of data collection	Country	Subgroups of interest (e.g., gen pop, HCWs, public service)	Sample size	Race/ethnicity	Age	Gender	Other demographic variables
Vaccine mandates and outcomes													
Mandate description	Vaccine type	Hypothetical / Actual mandate	Time frame	Main findings	Impact on intention / Reactance / Trust	Other factors implicated	Other findings						