

## Consolidating a research agenda for vaccine mandates

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### ABSTRACT

A workshop on mandatory vaccination was pitched to the World Public Health Congress in 2019 and the resultant special issue was pitched to *Vaccine* in 2020. During this project, the COVID-19 pandemic pushed vaccine policy to the forefront of global public health policy, and the imposition of vaccine mandates prompted a new wave of scholarship in the field. This introductory article employs the heuristic of Lasswell's (1956) policy cycle to synthesise the findings of the articles in the special issue. It considers the temporal lifetime of mandates and highlights findings regarding: the emergence of mandates as a policy option, public support and policy instrument design, what matters in the implementation of mandates, and what we can learn from evaluating them. The second half of the paper categorizes the included papers in terms of what aspects of mandates they study and the methods they employ to do so, in order to formulate a guide for future researchers of vaccine mandates. Scholars study either speculative or existing mandates – research can address several stages of the policy cycle or just one of them, ranging from attitudinal research to implementation studies and impact studies. Historical and contextual studies that take deep dives into a particular mandate are a much needed resource for studying emerging mandates, too, and scoping and framework- building work will undoubtedly be valuable in understanding and appreciating the wealth of knowledge production in this growing field. This special issue can serve as a roadmap for a consolidation of this interdisciplinary research agenda, and provide a helpful resource for decisionmakers at this historical juncture.

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### 1. Introduction

When we pitched a workshop on mandatory vaccination to the World Public Health Congress in Italy in late 2019, we were in an exciting position to consolidate and present the cutting edge of the field. For years, a small group of scholars interested in vaccine policy design and optimisation had studied the existence, operation, introduction, and impact of mandatory childhood vaccination systems from a range of academic disciplines [1–5], with much scholarly activity focused on the United States [6–11]. In recent years, governments across the world started responding to the problem of parents refusing vaccines for their children by redesigning mandatory systems or imposing new consequences on refusers [12]. Empirical work flourished [13,14], and normative critiques expressed concerns about unintended consequences [15]. Bioethicists dived into the ethical considerations [16–21] and scholars developed conceptual frameworks detailing important

features and considerations for mandatory vaccination regimes [22,23]. Meanwhile, empirical work continued to explore particular aspects of mandatory vaccination in other contexts [24,25]. A workshop focusing on empirical studies could provoke further theoretical developments and foster new collaborations by bringing together the global scholars from different disciplines who research vaccine mandates. Following the workshop, we planned to pitch a special issue to this journal.

Although our workshop featured in the conference, none of us made it to Italy. Amidst the horror of the global pandemic, one very minor casualty was our face-to-face event and hence our vision for crafting new research agendas collaboratively. Instead, we ran our workshop online and followed it up with our planned pitch to *Vaccine*. By then, the SARS-CoV-2 (henceforth COVID-19) pandemic had pushed our 'niche but interesting' subject area – which predominantly pertained to childhood vaccination – to the forefront of global public health policy, affecting millions of people in diverse political and epidemiological contexts. Over the coming months and years, governments and organisations across the world employed a variety of policy instruments to promote uptake of new COVID-19 vaccines. Adult vaccine mandates had previously

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applied largely to workers in key industries, such as healthcare and aged care, if they applied at all [26,27]. The pandemic saw novel vaccine mandates applied to large adult populations for the first time. The use or potential usage of these policy instruments and their likely effects on attitudes and behaviours prompted a new wave of mandate scholarship, as COVID-19 vaccine mandates prompted new questions, new problems, and new areas of enquiry. Naturally, our ‘formerly-niche’ special issue became the home for some of this new work.

As many readers will know, the journal publishing world spun out of control during the pandemic. Some locked-down scholars began writing and submitting many more articles, but others faced delays and barriers as sickness and home-schooling disrupted their working lives. Vaccine policy and uptake work burgeoned, and some of us found our inboxes full every day with multiple requests to review while we were busy trying to inform public health responses with scientific evidence. Editors struggled to find reviewers as public health and vaccine experts were preoccupied with pressing real-world problems at home and internationally. We struggled to do the same.

Special issues may appear as collections of works that represent a snapshot in time, but this special issue reflects the fast-moving arc of the pandemic. Some COVID-19 mandate studies included here were undertaken before we had vaccines available, others came later. Some took a long time for authors to write and revise, others were quick. By comparison, the submitted works on childhood vaccine mandates operated on a more traditional timescale, but we still ended up receiving new submissions for over a year, growing well beyond our World Public Health Congress workshop. Many papers had long journeys through the review process due to some of the issues we described above, but several have been in the public domain through early view publication. We hope that they have already enjoyed wide readership and played their part in informing public health responses.<sup>1</sup>

Two and a half years into the global pandemic we find ourselves systematically organising and evaluating the diverse mandate studies that comprise this special issue. This enables us to consolidate existing frameworks for thinking about vaccine mandates and how to study them. We undertake these activities in two ways. First, in order to consolidate the papers’ findings and synthesise some important conclusions, we employ the heuristic of the policy cycle [28]. We explore and assess mandates through their temporal lifetime and spatial locations, highlighting findings regarding the emergence of mandates as a policy option, public support and policy instrument design, what matters in the implementation of mandates, and what we can learn from evaluating them. In the second half of this article, we categorize the papers in terms of what they study and the methodologies by which they do so, formulating a guide for future researchers of vaccine mandates.

## 2. The features and lifecycle of a vaccine mandate

The pandemic and the imposition of vaccine mandates upon novel adult populations and in new settings has necessitated a revision of the questions that scholars ask of mandatory vaccination systems. Pre-dating the pandemic, two established frameworks for thinking about vaccine mandates both pertained to childhood vaccines. First, MacDonald et al suggested the major

components for consideration include the justification for the policy; the means of enacting it; the geographical scope of application; the structure and rigidity of the mandate; which vaccines it covers; penalties and incentives; enforcement; and questions around no fault compensation for vaccine injuries and wider systemic accountability [22]. Second, Attwell and Navin’s simplified framework used some of these factors in their 5S taxonomy: scope (which vaccines); sanctions and their severity (what happens to you if you don’t vaccinate and how serious is it?); selectivity (enforcement and exemptions); and salience, which is the combined effect of the other four factors and determines whether the mandate will push an individual to vaccinate [23].

New ways of thinking about mandates for COVID-19 were required early in the pandemic, so we sought to build on the 5S model as part of a conceptual contribution to this special issue [29]. We identified novel issues including the enhanced role of the private sector in mandating vaccines for employment and entry into facilities; ‘public space’ mandates affecting gatherings, social life and events; a new wave of travel mandates; and a novel practice we called “collective requirements”, whereby governments impose or remove policies for populations (such as lockdowns or the ability to travel) based on aggregate vaccine coverage rates [29].

However, refining the matrix of a vaccine mandate’s features to encompass adult COVID-19 vaccines was not the only conceptual work required. The articles in this special issue – on both COVID-19 and childhood vaccine mandates – demonstrate the hitherto neglected temporal domain of vaccine mandates. Mandates – their shape and content, and political reception – change over time and they do so differently across regulatory contexts. Accordingly, this special issue compiles papers that focus on different temporal phases of what policy analysts have labelled the policy cycle [28]. The heuristic of the policy cycle, in its most commonly used version, consists of five stages: agenda-setting and problem definition, policy formulation, policy decision-making, implementation, and evaluation [30]. Importantly, not all policies will move through all these stages – for instance, decisionmakers often forego systematic evaluations of policies. Moreover, the lifetime of a policy should be understood as iterative, rather than linear, and the different stages will overlap [31]. These overlaps are not merely temporal, but spatial, too: policies emerge across different sites – be it parliaments, health departments, traditional and social media, or even social science research. Likewise, vaccine mandates require systematic assessment at different moments and across different sites, making full use of the social-scientific methodological toolkit.

While the contributions to this special issue vary in their analytical focus and approach, the policy cycle can function as a useful heuristic to help us understand their overall value and contribution to the field, as laid out below and at Fig. 1.

### a. Emergence

Papers in this special issue focus on the emergence of vaccine mandates on policy agendas in different regulatory contexts, addressing both extant vaccine mandates and possible future mandates. Attwell et al [29] report on confusion about mandate instruments as incentives or punishments, even with populations that are used to vaccine mandates for childhood settings, such as in Western Australia. While some opposition to COVID-19 vaccine mandates persists, the experience of mandates for childhood vaccines appears to prime populations for their use. In Italy, where childhood vaccine mandates have also been in place for some time, Caserotti et al [32] found higher support for COVID-19 vaccine certificates (a mandate excluding non-vaccinated population from participating in public and cultural life) amongst those who generally favour vaccination. Similarly, Sprengholz et al [33] for the case of Germany and Slotte et al [34] for the Finnish context uncovered that those who perceive vaccination as unnecessary and who focus

<sup>1</sup> Readers may note that we are authors on some studies in this special issue. To avoid conflict of interest, the following strategies were followed. The article by Navin et al, on which KA was senior author, was handled exclusively by KP. The article led by KA and MR et al was submitted directly to the journal and not handled by the special issue editorial team until it was accepted. A third article led by KA was submitted the same way and rejected by the journal following peer review. (We believe it is important to share failure stories!)

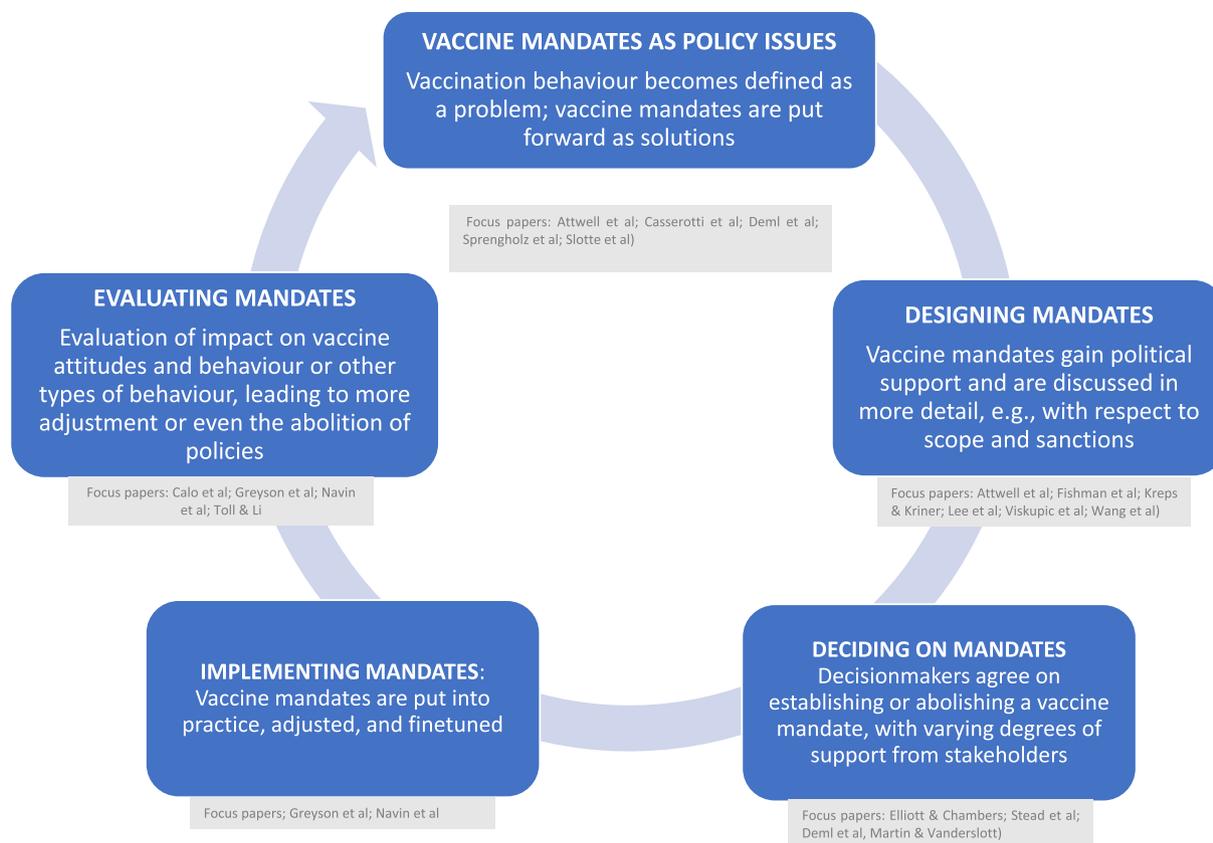


Fig. 1. Vaccine Mandate Studies on the Policy Cycle.

more on the individual risk of vaccine injury than the overall benefits of immunisation also express less support for mandatory vaccination. Amongst health care providers, Dietrich et al [35] found only limited support for vaccine mandates in Switzerland, even among those who support vaccination more generally. Taken together, these studies indicate that vaccine mandates are pervasive on policy agendas across divergent contexts but may be met with similar concern or even resistance.

b. Policy design

Contributions in this special issue also offer insights regarding support for specific policy designs at the stage where vaccine mandates have successfully been placed onto the political agenda and concrete policy ideas are being formulated. In China, coercive measures regarding COVID-19 vaccination have effectively become part of the regulatory repertoire – mirroring the stringent nature of other pandemic measures there, too. Wang et al [36] found that support for such measures (particularly in the form of certificates that restrict the mobility of unvaccinated people) correlate with higher levels of education. Meanwhile, in the US, most COVID-19 vaccine mandates are implemented either at the state or local level, or by private entities for their employees. Fishman et al [37] found similar support for either employer mandates or mandates by organisations like airlines and restaurants, as well as lottery or cash incentives, echoing the findings from Attwell et al [29] on attitudes towards mandates in Australia. Pointing to the potential value of employer-led mandates, Lee et al [38] found that workplace mandates can contribute to improving COVID-19 vaccination coverage among health care workers. As for the general population, Kreps et al [39] suggest that mandatory policies are unlikely to harm public confidence in vaccines overall, but policy instruments that would reduce access to economic and social life for the unvaccinated would provoke different reactions across social groups. The study by Viskupič et al [40] offers some insights

into addressing possible resistance to mandates: social messaging – reminding people of extant mandates – reduces resistance to the introduction of further mandates, specifically those targeting the spread of SARS-CoV2. Turning to more routine vaccines, Calo et al [41] assessed American parents’ views about adding the vaccine against Human Papilloma Virus (HPV) to existing school enrolment mandates. The scholars found that parents are more supportive of doing so if medical or religious exemptions are built into the policies, but that there was strong support for requiring external documentation in support of these exemptions.

c. Policy Decision-making

Some papers engage with the stage of the lifetime of vaccine mandates where political decisionmakers will – knowingly or not – rely on the support of stakeholders in deciding on whether to introduce vaccine mandates. Scholars in this issue uncover critical attitudes towards mandates among health care providers [35] and the general population [42], where values of individual autonomy and perceptions of mandates as state coercion emerge in both off-line and online spaces [43]. Moreover, both historical [44] and social media studies [43] of ongoing debates on vaccination policies and other public health measures during the COVID-19 pandemic indicate that cultural and historical context matters for the ways in which the public perceives (re-)emerging discussions of vaccine mandates. Elliott and Chambers [44] suggest that while a COVID-19 specific vaccine mandate for military personnel in the US has historical backing, factors other than scientific disagreements may be driving COVID-19 vaccine refusal and should be addressed in light of historical knowledge on vaccine hesitancy in this population.

d. Policy Implementation

Our special issue makes a significant contribution to understanding the fourth stage of the policy cycle, how vaccine mandates are implemented, pointing to the broad spectrum of sites

and actors involved in implementing mandates and the challenges therein. The collection offers particular insights regarding immunisation data: Navin et al found that while front-line school staff in Michigan (US) support vaccination, their role has remained fairly technocratic and their potential as public health advocates is unfulfilled [45]. Greyson et al [46] assess the impact of a regulation in British Columbia, Canada, which requires documenting the vaccination status of children in public, private, and home schooling and introduces an education component for parents who refuse to vaccinate their children. Their study indicates high support for both the mandatory documentation and education elements in association with pro-vaccine attitudes. Taken together, these studies show that the quality and impact of vaccine mandates ultimately hinge upon the role of frontline workers – what has been termed street-level bureaucracy – in the context of healthcare and education [47]. Implementation issues are often neglected in political discourse on mandates, and at times only emerge when vaccine mandates are failing, as in the recent case of Austria. Here, a COVID-19 vaccine mandate for the adult population was introduced in February 2022 amidst resistance from across the social and political spectrum [48]. The many exemptions the law allowed for, the impossibility to identify and fine the unvaccinated in a timely manner, as well as the social rift caused by the mandates eventually led to the abolition of the law. Decisionmakers cited what they perceived to be the milder nature of the Omicron variant as well as the ineffectiveness of the law in increasing vaccination rates as reasons [49].

#### e. Evaluation

This brings us to the final stage of the policy cycle heuristic: evaluation. This can focus on the outcomes for vaccination, by exploring whether mandate policies raise vaccination rates, but can also consider wider impacts and unintended consequences. In assessing Australian states' No Jab No Play policies that restrict access to childcare for unvaccinated families, Toll and Li [50] found that the policies had a small positive impact on vaccine uptake, but that equitable access to childcare remained a critical issue in some socioeconomic areas. Contributions to this special issue highlight that assessing extant mandates with respect to their impact on vaccine attitudes and behavior or other types of behavior is key to informing future policies. The studies of Navin et al [45], Greyson et al [46] as well as insights from Calo et al [41] could be instructive for informing future school-based vaccination campaigns. Ideally, then, evaluation will lead to finetuning, adjustment, or where necessary, the abolition of vaccine mandates. The contributions to this special issue can serve as important evidentiary foundations on which such decisions can be made.

### 3. Consolidating a research agenda

When viewed in their entirety, the articles in this special issue lay out a timely research agenda, showing us *what needs to be studied* when thinking about a specific vaccine mandate. The special issue allows us to map out this field of study in new ways, categorizing studies according to their methodology, purpose, and how they pertain to the different stages of a policy's lifetime: that is, the introduction, implementation, adjustment, or even abolition of a vaccine mandate. The features and operation of mandates can be organised into the types of studies that scholars conduct – many of which can be seen in this special issue. For this exercise, we borrow the metaphor from the poem of John Godfrey Saxe titled “The blind men and the elephant”, captured in Fig. 2 [51].

Unlike the blindfolded individuals in Fig. 2, scholars in this special issue are not mistaken in their analysis of vaccine mandates, but make sense of them in selective ways. Like the illustrated scientists exploring the elephant, they focus closely on one or two specific aspects of the mandatory vaccination phenomenon. To

provide a comprehensive overview of the papers collected in this issue, we have built upon pre-existing categorisations of types of work in the field [52], using an informal grounded theory approach [53] to develop the parts of the mandatory vaccination ‘elephant’, in order to see the scope of empirical work being conducted and to organise it into a guide for future work. We hope that our *sui generis* guide for scholars engaging with mandatory vaccination aligns types of questions asked and related empirical work with the more conceptual framework provided by the policy-cycle described above. We provide a visual aid to assist in this process of linking the empirical to the conceptual in Table 1.

So having situated the *findings* of the articles in our special issue at the various stages of the policy-cycles in the previous section, the next question is, what do these studies practically do? It is immediately apparent that researchers are often interested in *speculative* mandates – the idea of introducing a mandate in a context or region where one does not currently exist, or expanding an existing mandate to cover new vaccines [29,33–37,39–43]. Future scholars can continue to design effective *speculative* mandate policy studies by incorporating the questions in Table 1 so that they can collect data that will be useful for public policy. Other scholars study *existing* policies [32,38,44–46,50]. Again, if future scholars attend to the questions in Table 1, they will be sure to report the important features of the policies they are researching.

Whether considering speculative or existing mandates, there are some core activities that scholars of mandates engage in. Notably, some studies do more than one thing – for example, a study that seeks to measure public attitudes may also try to ascertain the potential impact of a mandate, or an implementation study may also take participants' attitudes into account.

*Mandate attitude studies* are often undertaken when there is no existing vaccine mandate (*speculative* studies), and capture public (or specific publics') sentiment regarding the imposition of new mandatory policies. Governments rarely conduct their own public opinion research or extensive public consultation when introducing vaccine mandates, although there are exceptions [14]. However, when researchers ask participants to think about a type of mandatory policy, they should pay attention to the design features of speculative or real-world mandates. Several studies in this special issue have done this for various types of (then) hypothetical COVID-19 vaccine mandates in Australia, the United Kingdom, the United States, Germany, and Switzerland [29,33,35,37,39,40,42]. Mandate attitude studies can employ a range of methodologies including qualitative interviews [29,34,35,41,42,46], large-scale surveys [32,33,35–41,46], and social media studies [43]. Mandate attitude studies may also be conducted once mandatory policies are in place [32], including as part of an evaluation [45], or may explore stakeholders' opinions on changing requirements or exemption policies, as is the case for childhood vaccination policies in the United States and Canada in this issue [41,46].

*Implementation studies* investigate the processes that occur when mandatory policies are introduced, modified, or established as routine [45]. Such studies aim to uncover issues and areas for development, and can form part of an evaluation. Implementation studies are only conducted with real-world mandates.

*Impact studies* seek to uncover the effects of a mandatory vaccination policy. They can be experimental studies conducted with regard to how a speculative mandate might change attitudes or behaviours, including with regard to vaccine intentions and wider personal or societal experiences [37,39]. They can also evaluate the effects of existing mandates or mandatory policy changes on vaccine attitudes, uptake, or other experiences [50].

*History and contextual studies* take deep dives into a particular mandate [44], while *scoping and framework building* studies seek to identify all the key features of existing or theoretical vaccine

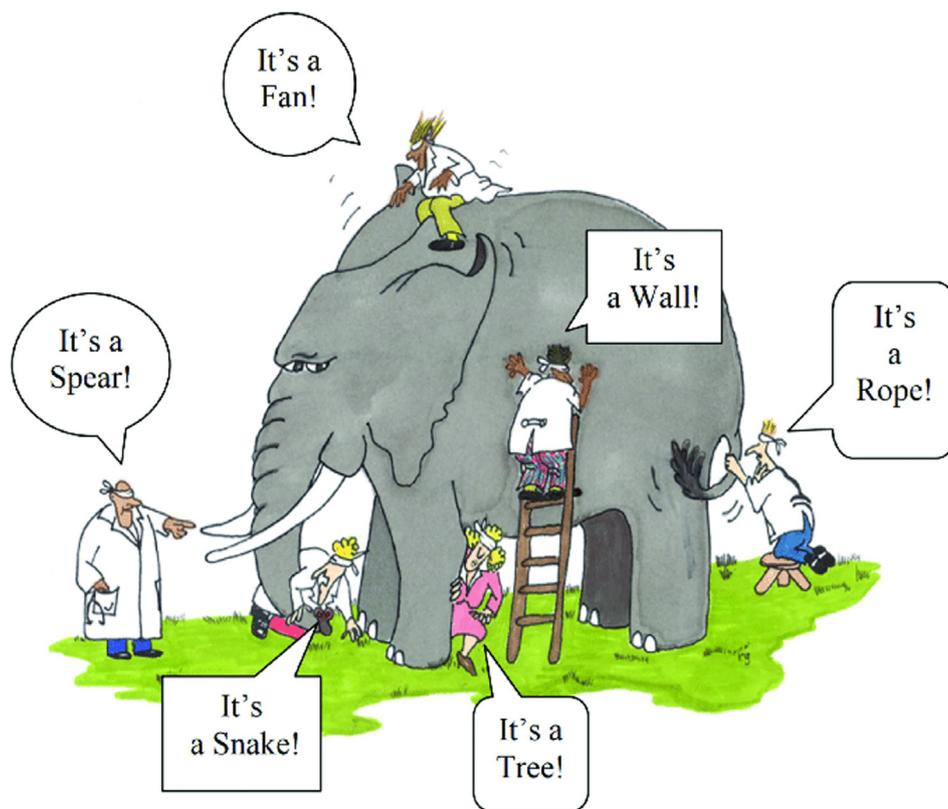


Fig. 2. Blind people “seeing” the elephant (reproduced with permission from Himmelfarb et al., 2002, G. Renee Guzlas, artist).

**Table 1**  
Considerations for future studies of vaccine mandates.

		Mandate lifetime moment
<b>WHO</b>	<ul style="list-style-type: none"> <li>Who is introducing or has introduced the mandate (government or private sector).</li> <li>Who is the target population (e.g. school-children, health-workers, the general population).</li> </ul>	Emergence
<b>WHAT</b>	<ul style="list-style-type: none"> <li>What is the setting in which the mandate is employed (e.g. hospital, sporting facilities, resources sector).</li> <li>What are the consequences for people who don't vaccinate?</li> </ul>	Policy design
<b>HOW</b>	<ul style="list-style-type: none"> <li>What (if anything) can people do to get out of these consequences? (e.g. exemptions)</li> <li>How is the mandate established (executive order, legislation, private company policy).</li> <li>How does the imposing organisation go about introducing the mandate, including seeking to establish its legitimacy (e.g. stakeholder consultation, research).</li> </ul>	Implementation
<b>WHY</b>	<ul style="list-style-type: none"> <li>Why are governments mandating vaccines?</li> <li>What is the mandate's stated purpose?</li> <li>What public statements do officials offer to justify the mandate?</li> </ul>	Decision-making
<b>WHAT DOES IT DO (IMPACT)</b>	<ul style="list-style-type: none"> <li>What does the mandate do to people's stated vaccine attitudes or intentions? Does it make them more likely to vaccinate?</li> <li>What does the mandate do to people's vaccination behaviour (as measured through vaccine coverage rates or other reliable data). Does it make more people vaccinate?</li> <li>What does the mandate do to people's other behaviours (e.g. do mandates encourage vaccinated people or the immune-suppressed to attend or participate in activities where they mix with others because they feel more protected from disease?)</li> <li>What is the longer-term impact of the mandate on non-compliers who still choose not to vaccinate? (e.g. political polarisation, social conflict)</li> </ul>	Evaluation

mandates and to push the field further forward. We did this in our early contribution to this special issue [29]; this present article seeks to push the field forward at the conclusion of the collection process.

**4. Where to from here**

This special issue makes an empirical and conceptual contribution to a field that is no longer a niche area of study. A vast array of interdisciplinary literature – originating from political science,

social psychology, sociology, public health, economics, and legal studies – has emerged alongside increasing public debates regarding the potential value, but also political costs, of vaccine mandates, especially in the context of the COVID-19 pandemic. To fully appreciate the scope of this field, we have provided two instruments: First, we employ the heuristic of the policy cycle to organize the findings of the papers. Scholars explore and assess vaccine mandates in terms of their lifetime: from when policy ideas emerge, to support for and decision-making regarding designs, to implementation practices, and evaluation. Second, we

categorize the papers in terms of what they study and how they do so. Scholars study either speculative or existing mandates, and research can address several stages of the policy cycle or just one of them, ranging from attitudinal research to implementation studies and impact studies. Historical and contextual studies that take deep dives into a particular mandate are a much-needed resource for studying emerging mandates, too, and scoping and framework building work will undoubtedly be valuable in understanding and appreciating the wealth of knowledge production in this growing field. This special issue can serve as a roadmap for a consolidation of this interdisciplinary research agenda. Beyond this, this special issue can be a helpful resource for decisionmakers at this historical juncture.

### Data availability

No data was used for the research described in the article.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. KA received funding from the Australian Research Council of the Australian Government under DE190100158. KP received funding from the FWF - Austrian Science Fund: Elise Richter grant V561.

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