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# "Guided by Science and Evidence"? The Politics of Border Management in Canada's Response to the COVID-19 Pandemic

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The limited and coordinated use of travel measures to control the international spread of disease, based on scientific evidence and respect for human rights, are core tenets of the World Health Organization's (WHO) International Health Regulations (IHR). Yet, during the COVID-19 pandemic, there has been near universal and largely uncoordinated use of travel measures by national governments, characterized by wide variation in what measures have been used, when and how they have been applied, and whom they have been applicable to. Given the significant social and economic impacts caused by travel measures, analyses to date have sought to understand the effectiveness of specific measures, in reducing importation and onward spread of SARS-CoV-2, or needed efforts to strengthen compliance with the IHR. There has been limited study of the role of national-level policy making to explain these widely varying practices. Applying path dependency theory to Canadian policies on travel measures, this paper analyses the interaction between science and politics during four key periods of the pandemic response. Bringing together systematic reviews of the scientific literature with parliamentary records, we argue that the evidentiary gap on travel measures during the initial pandemic wave was filled by political and economic influences that shaped when, how and for whom testing and quarantine measures for travelers were applied. These influences then created a degree of path dependency that limited the capacity of government officials to change policy during subsequent waves of the pandemic. This was accompanied by frequent government claims of reliance on science and evidence but limited transparency about what and how scientific evidence informed policy decisions. We argue that, over time, this further politicized the issue of travel measures and undermined public trust. We conclude that fuller understanding of the interaction between science and politics in national decision-making about border management during the COVID-19 pandemic is essential to future efforts to strengthen international coordination under the IHR.

**Keywords: COVID-19, expert advice, policy, travel restrictions, travel measures, border management, Canada**

## INTRODUCTION

The International Health Regulations (IHR), revised in 2005, are an international treaty developed under the auspices of the World Health Organization (WHO) "to prevent, protect against, control and provide a public health response to the international spread of disease." Under the IHR, States Parties commit to using public health measures in ways that are "commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade (World Health Organization, 2005)." Such measures should be coordinated across countries, based on scientific evidence, and respect human rights. These core tenets of international health law are intended to ensure countries do not adopt measures unsupported by existing evidence or for purposes other than the protection of public health. Moreover, the adverse economic and social impacts often caused by such measures can create disincentives to open reporting of disease outbreaks (Davies and Youde, 2015).

Travel measures manage the "movement of people…across two or more jurisdictions with the stated intent of achieving a health goal (Lee et al., 2021a)." Travel measures include restrictions (including bans) on the movement of selected populations, screening measures such as testing and contact tracing to identify travelers posing potential disease risks, and quarantine and isolation to contain such risks. Evidence from previous major international infectious disease outbreaks suggests that restrictions on the movement of selected populations are rarely effective at controlling public health risks and can even be counterproductive (Gostin and Katz, 2016). It is in this context that, when WHO declared the COVID-19 pandemic a public health emergency of international concern (PHEIC) on 30 January 2020, it recommended against the use of travel restrictions (WHO, 2020).

Despite the above, there has been near universal and uncoordinated use of a broad range of travel measures, including restrictions by national governments, during the COVID-19 pandemic. Their use has been characterized by wide variation in what measures have been used, when and how they have been applied, and whom they have been applicable to. This has led to significant social and economic impacts. The novel nature of the coronavirus SARS-CoV-2, and the limited evidence to guide policy decisions, was undoubtedly a major factor during the initial months of the COVID-19 pandemic. Rapidly evolving events, and lack of knowledge about transmission and infection, along with limited relevance of evidence from previous outbreaks, led many to adopt a precautionary approach to travel measures. Following these initial weeks, however, despite commitments under the IHR, the wide-ranging practices of States Parties during the pandemic raise questions about the relative roles of science and politics.

In contrast with previous major infectious disease outbreaks, a growing body of research indicates that travel measures have been among the most effective non-pharmaceutical interventions (NPIs) for controlling SARS-CoV-2 importation and onward transmission. Of 6,068 non-NPIs implemented in 79 countries between March and April 2020, only small gathering cancellations and the closure of educational institutions were found to be more effective at controlling the spread of the virus (Haug et al., 2020). Not all travel measures were found to be equally effective. Evolving research identifies early intervention, enforced hotel quarantine of at least 14 days, at least two tests, control of travel volume, and well-managed case and contact management as important components of effective border management (Baker et al., 2020; Baniamin et al., 2020; Bou-Karroum et al., 2021; Chung et al., 2021; Steyn et al., 2021). Subsequent literature stresses the importance of traveler immunity status (Zachreson et al., 2021). When and how specific travel measures should be used individually and in combination, and alongside domestic public health measures, over time and place is still not well understood. Countries identified as having most effectively prevented virus importation and onward spread via travel have all initially opted, officially or informally, for an elimination (or COVID zero) strategy, including Taiwan, South Korea, Singapore and New Zealand (Baker et al., 2020).

Other analyses of travel measures during COVID-19 have focused on the problems created by the lack of international coordination and the need to strengthen compliance with the IHR. There is growing evidence of the adverse impacts of travel measures on key economic sectors and specific populations (Klinger et al., 2021). Other studies draw attention to the lack of provisions under the existing treaty for enforcement or sanctions for non-compliance by States Parties (Gostin and Katz, 2016; Vinuales et al., 2021; Worsnop et al., 2021). This research also concerns the international negotiations for a potential pandemic treaty (Duff et al., 2021; Labonté et al., 2021).

To date, there have been few studies of national-level policy making as a contributing factor to the uncoordinated use of travel measures across countries. We argue that, while shortcomings in the IHR are likely to have played a role during the early phase of the pandemic, how governments used travel measures in such varied ways has been strongly shaped by domestic contexts. In particular, the relationship between science and politics in shaping national policies on travel measures over time has received limited attention. What scientific evidence or expertise appear in government narratives about border management? How did shifts in the adoption or lifting of travel measures align (or not) with evolving evidence on travel measures?

This paper conducts a case study of Canada's use of travel measures during the COVID-19 pandemic between January 2020 and September 2021. Canada provides an informative national context for this analysis for several reasons. First, as a longstanding supporter of multilateralism and the global health security agenda (Nixon et al., 2018), the Canadian government sought to uphold its commitments under the IHR during the early phase of the pandemic. Second, as a highly globalized country dependent on population mobility by air, land and sea, policy debates on travel measures have been highly fraught in Canada during the pandemic response. Third, throughout the pandemic, the government has consistently claimed that its use of travel measures has been based on scientific evidence amid strong political pressures.

We begin by briefly setting out the institutional arrangements for pandemic preparedness and response in Canada within which policy making on travel measures has been located. We then

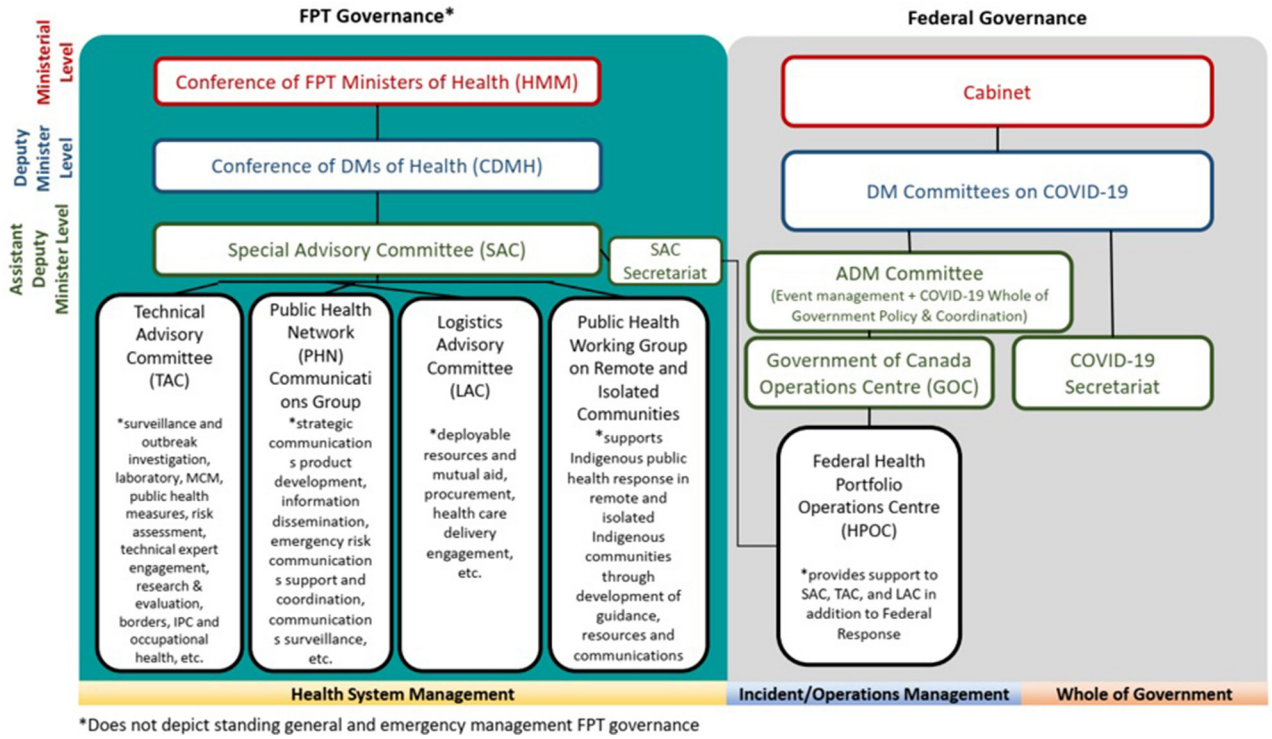


**FIGURE 1 |** COVID-19 governance structure. Source: PHAC (2021e).

discuss path dependency theory as the conceptual framework for understanding the ways tensions between science and politics have shaped Canadian travel measures policy over time. We argue that the government's early and sustained reliance on claims of policy guided by scientific evidence, with limited transparency about the policy making process, created a degree of path dependency that constrained the capacity to change policy based on evolving evidence. We argue that, over time, this further politicized the issue of travel measures and undermined public trust. We conclude that fuller understanding of the interaction between science and politics in national decision-making about border management during the COVID-19 pandemic is essential to future efforts to strengthen international coordination under the IHR.

## BACKGROUND

Canada is a highly globalized country, measured by its diverse and mobile population, economic dependence on trade and investment, and cultural openness (The Global Economy.com, 2022). High volumes of travel occur across Canadian borders by land, air and sea, including the world's longest international border with the United States. National border management falls under the authority of the federal government although multiple departments are responsible for aspects of this role.

During the pandemic, the Public Health Agency of Canada (PHAC) has played a lead role in mitigating the public health risks from travel. PHAC was created in 2004, following the SARS-CoV-1 outbreak in 2002-2003 "to strengthen Canada's capacity to protect and improve the health of Canadians and to help reduce pressures on the health-care system," including by protecting Canadians from infectious diseases (PHAC, 2019). The following year in 2005, a Pan-Canadian Public Health Network was created as a formal intergovernmental governance table for coordinating public health capacity and cooperation to "anticipate, prepare for, and respond to public health events and threats," across federal, provincial and territorial (F/P/T) jurisdictions (Pan-Canadian Public Health Network, 2005). The network convenes a regular conference of F/P/T Ministers of Health, and in cases of emergency triggers the creation of a Special Advisory Committee (SAC) of experts which oversees other committees mobilized to address different aspects of emergency response (**Figure 1**). The SAC, composed of representatives from several federal departments, members of the Public Health Network Council, and the Council of Chief Medical Officers of Health, is linked to the Health Portfolio Operations Center (HPOC) in PHAC, and provides expertise to guide F/P/T decision-making in health emergency responses.

In response to COVID-19, the federal HPOC and SAC were activated on January 15 and 28, 2020 respectively (Government of Canada, 2020a; PHAC, 2020b). On March 4, 2020, decision-making was politically elevated with the creation of a COVID-19 Cabinet Committee (Prime Minister of Canada Justin Trudeau, 2020), shortly after which many significant travel measures were announced. It is unclear how influential the SAC has been in informing federal decision-making on border management.

Federal ministers have regularly claimed that Canada has implemented "among the most stringent measures in the world (House of Commons of Canada, 2021a)." During the COVID-19 pandemic, Canada has experienced early and continuous importations of the SARS-CoV-2 virus, including all variants of concern, in four discernible waves between January 2020 and September 2021 (January–June 2020; September 2020–February 2021; March–June 2021; and August–October 2021) (Our World in Data, 2021).

## CONCEPTUAL FRAMEWORK

Given the complexity of border management during COVID-19, this analysis is informed by a broad literature on global health governance (Lee and Kamradt-Scott, 2014), health security (Fidler, 2005; McInnes and Lee, 2006; Gostin and Katz, 2016), evidence-based policy-making (Cairney, 2016; Maani and Galea, 2021), and wicked policy problems (Auld et al., 2021). To understand the interactions of science and politics on the Canadian government's policy-making on travel measures, this paper applies an analytical lens from theories and frameworks of path dependency. There are many interpretations and applications of the concept of path dependence in political science. The basic premise is that, once a given policy path is taken, it can be difficult to subsequently deviate from it.

Applying the concept in this study, we begin by recognizing that path dependency has been criticized for overly focusing on rational human agency, thus downplaying the multiple, complex, and interacting systems, structures and norms that shape policy decisions (Kay, 2012). Another shortcoming is that the theory is less helpful for explaining change when it does occur (Greener, 2005). Further theorizing has addressed these limitations, including recognition that policy decisions are cumulative, resulting in path dependency in sub-systems or discrete policies, even when overarching policy systems experience change (or vice versa). Moreover, some political path dependency frameworks incorporate both structure and agency (institutions and actors), along with structural and cultural systems (institutions and ideas) influences, on decision-making.

For our analysis of Canadian travel measures, we find Greener's integration of morphogenetic analysis into a path dependency framework particularly useful. According to Greener, path dependence is most likely to emerge in a system "where both structural and cultural vested interest groups are dependent upon one another to hold power," and where their interests are compatible. These emergent properties create situational logics where "vested and cultural interests have a high opportunity cost for challenging the system," leading to a high likelihood of path dependence. This framework provides a useful lens for capturing the dynamics of Canadian border management policies, amid evolving scientific evidence over time, from January 2020 to September 2021.

Importantly, this framework distinguishes between critically analyzing policy processes during COVID-19, including limited transparency of Canadian government claims about evidence-based border management policy, and the competencies and intentions of individuals working within existing institutional structures. Applying a conceptual lens of path dependency shifts away from popular, often politicized public discourse, which has focused on attributing individual blame for real-time policy choices made amid limited or evolving scientific evidence during a public health emergency. Instead, it focuses on a broader understanding of how such choices are shaped by institutional structures that are challenged by inadequate systems or capacities.

## METHODOLOGY

### Search Strategy

We drew on a wide range of publicly available sources to create as comprehensive of a picture as possible on border management in Canada in response to the COVID-19 pandemic. To understand approaches to the use of travel measures prior to this pandemic, we previously conducted detailed literature searches of the academic and gray literature. We then conducted additional searches of other sources including government news releases, statements, and Orders-in-Council (OICs), as well as publicly available reports and assessments. Through these sources, and pre-existing datasets like the WHO Public Health and Social Measures Dataset (WHO, 2021), travel measures implemented by the Canadian federal government have been systematically identified, reviewed, and recorded in a chronological database.

To understand federal government rationales and justifications for how travel measures have been used during the pandemic, the authors searched records on openparliament.ca, an independent searchable platform which combines publicly available transcripts of debates in the House of Commons and its various committees (also posted on the official website ourcommons.ca). The searches were conducted between September and November 2021. To cast the net widely, the broad keyword "travel" was used to search all House of Commons discussions between January 2020 and September 2021. A total of 3,692 entries were identified and reviewed. The inclusion criteria were relevance to travel measures and COVID-19, with relevant materials transferred to a Word document for thematic review (see details below in the Data Analysis sub-section).

For additional information on policy content, documents issued during the same period on travel measures from federal government authorities, task forces and expert advisory groups, the Office of the Auditor General, and private sector groups were read and reviewed. These provided additional detail and relevant insights on the government's border management strategy.

### Data Analysis

To structure our analysis, we focused on four research questions: (1) when and how was "science" (or related terms) employed by government, opposition and other actors in discussions about travel measures; (2) what evidence or expertise was cited to justify or oppose government policies and decisions related to border management; (3) to what extent and how was emerging evidence reflected in political discourse on travel measures; and (4) how was Canada's response positioned in relation

to other national responses and international commitments? Qualitative thematic analysis, based on a hermeneutic approach (Boell and Cecez-Kecmanovic, 2014), was applied to all records and documents, with analysis focusing specifically on the federal government's border management strategy, its decision-making process, and the evidence used to support it. Thematic analysis is a well-established and highly flexible approach which can help researchers produce a "rich and detailed, yet complex account" of large datasets (Nowell et al., 2017). Guided by the six-phase process of thematic analysis laid out in Nowell et al. (2017), we first familiarized ourselves with the collected data, keeping records of all notes and progressively adding reflective thoughts (Phase 1). The openparliament.ca entries (spanning from January 2020 to September 2021) were specifically coded using 15 themes, agreed among the authors after preliminary analysis of a small subset of documents (Phase 2). We then incrementally searched for, defined, reviewed, tested, and refined our themes (Phases 3–5). Data triangulation (Phases 3–5) was conducted as a three-step process. First, to interpret travel-related statements and discussions within the context of the time, the authors searched contemporaneous online news media and other public documents, searching the keywords "border", "travel", "COVID-19" and Canada using Google and Factiva. Second, we conducted nine interviews with stakeholders across three relevant groups (implementers, experts, affected groups) between January and November 2021, which provided valuable background information and further contextualization. Authors selected interviewees based on their experience with Canada's travel measures since the beginning of the pandemic. Interviewees were provided with a participant information sheet in advance, outlining potential risks of taking part, and a consent form including confidentiality and anonymity options. Questions focused on Canada's decision-making process on travel measures in the context of the COVID-19 pandemic, the implementation of such measures, their impacts, and decision making on easing restrictions. Third, we reviewed an additional 400 pages of documentation provided by PHAC to the House of Commons Standing Committee on Health (these included relevant memoranda, letters, emails, meetings' agendas, and partly redacted meeting notes) (House of Commons of Canada, 2020). Phase 6 centered on the final analysis and write-up of the report, focusing on interpreting patterns, larger meanings, and implications for policy and research.

## Limitations

The authors did not have access to extensive internal government documents (e.g. full records of meetings and communications[1] with external experts/stakeholders, or as part of relevant task forces and advisory groups), and at the time of writing had not secured interviews with key decision-makers, despite repeated invitations to several government departments. In addition, public discussions in the House of Commons involving political representatives necessarily involve a degree of political posturing, which meant the authors could not take statements at face value. In this context, and in the absence of a publicly available detailed risk assessment methodology from the federal government, determining with certainty what factors have been most influential in border management decision-making has proven challenging. To address these difficulties, the authors relied on the mixed-methods approach described above.

# RESULTS

## Canada's Border Management During COVID-19

Canada has implemented a wide range of travel measures during COVID-19 (see **Table 1** and **Figure 2**). Between January-March 2020, initial measures included region-specific travel advisories, targeted health screening for selected travelers, and additional signage at airports (PHAC, 2020e). Days after the WHO declared COVID-19 a global pandemic, further measures were adopted. From March 13 to 25, 2020, Canada implemented several unprecedented travel measures, including postponement of the cruise ship season, a travel advisory for Canadians to avoid all non-essential international travel, restrictions on entry of foreign nationals, and mandatory 14-day self-isolation for all international arrivals. Most of these measures were initiated as OICs[2] by the Minister of Health, under the authority of the *Quarantine Act,* with related orders and policies issued by relevant regulatory or implementing agencies (e.g., Transport Canada, Canada Border Services Agency - CBSA). During the remainder of 2020, amendments made some measures more restrictive, such as mandating that self-isolation could not take place where a vulnerable person could be exposed (PHAC, 2020d), and prohibiting asylum claims outside of regular border entry points (Government of Canada, 2020f). Other amendments exempted categories of travelers from entry restrictions and/or self-isolation requirements (Government of Canada, 2021a).

By the end of 2020, the emergence of SARS-CoV-2 variants of concern (VOCs) prompted renewed attention to the risks of virus importation and onward transmission posed by international travel. From late December 2020 to March 2021, new travel measures were introduced. Flight restrictions for selected countries were adopted; for non-essential travel, negative results from PCR tests taken within 72 h of departure were required, as well as testing upon- and post-arrival, and for air arrivals, 3 days (of a mandatory 14-day) quarantine at a government-designated hotel at travelers' expense (Transport Canada, 2020a, 2021a; PHAC, 2021a).

From July 2021, the government began relaxing the above measures based on immunity status. As of July 5, fully vaccinated Canadian citizens and permanent residents were exempt from the mandatory quarantine. On August 9, 2021, the hotel

[1] For instance, the Interim Chair of the Board of Directors at the Canadian Tourism Commission told MPs the group had been providing "a large volume of data and research" to the government – something the authors could not review (Standing Committee on Industry Science Technology, 2021a).

[2] An Order in Council (OIC) is a legal instrument made by the Governor in Council pursuant to a statutory authority or, less frequently, the royal prerogative. OICs are made on the recommendation of the responsible federal Minister and take legal effect when signed by the Governor General. Privy Council Office (2021). Available at: https://www.canada.ca/en/privy-council/services/orders-in-council.html (Last accessed December 6, 2021).

**TABLE 1 |** Chronology of select international travel measures (January 2020–October 2021).

| Date of effect | Measure adopted |
|---|---|
| January 29, 2020 | Travel advisory against non-essential travel to China and all travel to Hubei province |
| February 9, 2020 | Health screening at all international airports in Canada |
| March 2, 2020 | Advisory to avoid non-essential travel to northern regions of Italy |
| March 5, 2020 | Advisory to avoid all travel to Iran |
| March 9, 2020 | Advisory against all cruise ship travel |
| March 13, 2020 | Advisory against non-essential travel outside of Canada until further notice |
| March 13, 2020 | Cruise ship season is delayed |
| March 18, 2020 | Most international flights restricted to arriving at 4 airports: Vancouver, Montreal, Toronto and Calgary |
| March 16, 2020 | All international travelers requested to self-isolate for 14 days upon return to Canada |
| March 18, 2020 | Restriction prohibiting entry of foreign nationals (except from U.S.) from entering Canada (with exemptions for air crews, transiting travelers, diplomats, immediate family members) |
| March 16, 2020 | Canadians abroad advised to return as soon as possible |
| March 21, 2020 | Restriction prohibiting entry of non-essential US travelers |
| March 25, 2020 | All non-essential travelers entering Canada required to self-isolate for 14 days |
| March 31, 2020 | Expansion of previously targeted contact-tracing to all travelers |
| April 6, 2020 | Passenger vessels prohibited in Canadian waters (with some exceptions) |
| April 14, 2020 | Returning travelers required to provide credible quarantine plan (or complete 14 -day quarantine in a government-designated facility) |
| April 29, 2020 | Launch of the ArriveCAN app (for travelers to upload quarantine plan) |
| June 8, 2020 | Exemption to entry restriction: asymptomatic foreign nationals who are immediate family members of Canadian citizens and permanents residents |
| October 2, 2020 | Exemption to entry restriction: certain extended family members of Canadian citizens and permanent residents, travel for compassionate reasons, and international students |
| October 30, 2020 | Quarantine exemption: residents of certain locations for life necessities, and cross-border students |
| November 21, 2020 | ArriveCAN app required for arrivals by air |
| December 21, 2020 | 72-h suspension of all flights from the UK in response to new variant (later known as Alpha) (later extended to January 6, 2021) |
| January 7, 2021 | Negative PCR test results taken within 72 h of departure required for air travelers to Canada over the age of 5 (with exemptions) |
| January 31, 2021 | Suspension of all Canadian airlines-operated direct flights to and from Mexico and Caribbean countries |
| February 3, 2021 | Previous exceptions removed; all international passenger flights restricted to arrival at Vancouver, Calgary, Toronto and Montreal international airports |
| February 15, 2021 | Negative PCR test results taken within 72 h of departure required for land-border travelers to Canada over the age of 5 (with exemptions) |
| February 22, 2021 | For non-exempt travelers, molecular test required upon arrival, and toward end of 14-day quarantine |
| February 22, 2021 | Non-exempt air travelers required to complete first 3 nights of quarantine at a government-designated hotel at travelers' expense |
| April 22, 2021 | Suspension of all direct passenger flights from Pakistan and India (those traveling via indirect routes will need to obtain a negative molecular test from the last connecting country) |
| July 5, 2021 | Exemption: fully vaccinated travelers eligible to enter Canada no longer required to quarantine or take a day-8 test |
| August 9, 2021 | Hotel quarantine program discontinued |
| August 9, 2021 | Reopening of non-essential travel to Canada for fully vaccinated US citizens and permanent residents (not required to quarantine or take a day-8 test) |
| August 9, 2021 | Testing on arrival for fully vaccinated travelers shifts to randomized testing |
| August 9, 2021 | International flights permitted to land at additional five Canadian airports (Halifax, Québec, Ottawa, Winnipeg, Edmonton) |
| August 29, 2021 | Suspension of all direct passenger flights from Morocco (those traveling via indirect routes will need to obtain a negative molecular test from the last connecting country) |
| September 7, 2021 | Reopening of non-essential travel to Canada for all fully vaccinated foreign nationals |
| October 21, 2021 | Global advisory against non-essential travel lifted, replaced by country specific advisories |

quarantine program ended. Fully vaccinated US citizens and permanent residents were then permitted entry to Canada for non-essential reasons. On September 7, 2021, this relaxation of travel measures was extended to all fully vaccinated travelers, regardless of origin of departure or citizenship.[3]

[3]Fully vaccinated is defined as vaccinated with a full dose of any Health Canada approved vaccines (PHAC, 2021c).

## Evidence Supporting the Effective Implementation of Travel Measures

As discussed above, there is now substantial evidence that travel measures have been among the most effective non-pharmaceutical interventions during COVID-19 for controlling virus importation and onward transmission. When and how specific travel measures should be used – individually and in combination, together with domestic public health measures, and

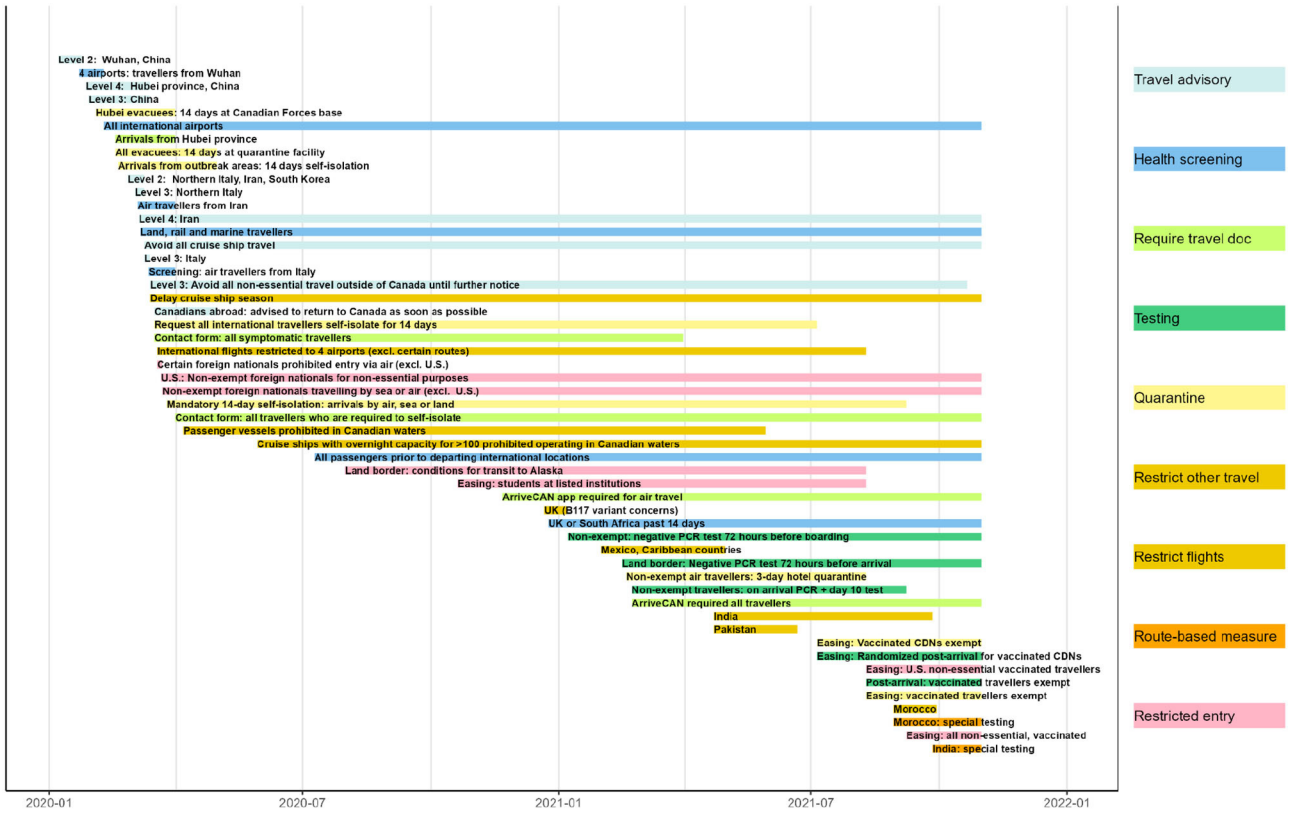


**FIGURE 2 |** Select travel measures in Canada (January 2020–October 2021). Source: Compiled from WHO public health and social measures dataset, Canadian government news releases and statements and online media coverage from January 2020–October 2021.

over time and place – is still not well understood. This includes a lack of risk assessment methodologies upon which to base border management decisions.

In Canada, only two pilot studies have been conducted on the effectiveness of testing to reduce the risk of international travel-related virus importation. The first, conducted at Toronto Pearson International Airport between September and October 2020, collected data on 16,361 non-exempt international arrivals who agreed to upon arrival and follow up PCR testing for SARS-CoV-2. The purpose of the study, conducted by McMaster Health Labs and funded by Air Canada and the Greater Toronto Airports Authority, was to measure participants' test positivity rates and assess risk based on country of travel origin. The results found 248 passengers (1.5%) tested positive, with 27% of those detected on day 7 and 6% on day 14 after arrival (Goel et al., 2021). The second, a publicly-funded study conducted by the Alberta Border Testing Pilot Programme (ABTPP), tested volunteers upon arrival among asymptomatic non-exempt international arrivals on direct flights to Calgary International Airport, and land arrivals at the Coutts/Sweetgrass border crossing. Of the 9,310 travelers who tested at least once, between November 2 and November 30, 2020, 200 tested positive (2.15%). Sixty-two (31% of positive cases) "were identified among participants that had been released from quarantine following a negative test result on arrival (Lunney et al., 2021)."

While both studies found similar test positivity rates and proportion of cases detected by testing after arrival, it is notable that they drew different conclusions for border management policy. While the Toronto study concluded that "a reduced quarantine combined with testing can be as effective as a 14-day quarantine," the Alberta study stressed "the need for ongoing vigilance in travelers testing negative on arrival and highlights the value of follow-up testing and contact tracing to monitor and limit secondary transmission where possible." As discussed below, both studies have been widely cited during the pandemic by policy-makers, to both describe international travel-related risk and support different policy positions on the use of travel measures to manage this risk. Beyond these two studies, the expertise of three independent expert groups featured prominently in parliamentary discussions.

## Committees, Panels, and Expert Witnesses

The Canadian government has relied on expertise for decision-making on border management during COVID-19 from various task forces and expert advisory groups, parliamentary committees (**Figure 3**) and reports from the Office of the Auditor General (OAG). Representatives from task forces and expert advisory groups have spoken in Parliament on several occasions. Although their positions have been regularly cited in government announcements (PHAC, 2021b), Member of

**Breakdown of external witnesses in House of Commons committee meetings**[4]

- 3,692 interventions in the House of Commons were identified across 60 relevant committee meetings on travel and health.
- 48 external witnesses[5] (i.e. excluding government officials) spoke specifically on travel and COVID-19 during these meetings.
- 29 (60%) were private sector representatives.
- For discussions on travel and health, the Standing Committee on Health proportionally relied on fewer external witnesses (9 relevant external witnesses in 24 meetings) compared with the three other key committees (Transport – 18 in 9, Industry, Science & Technology – 8 in 7, and Finance – 7 in 6).
- The Standing Committees on Finance and Industry, Science & Technology were most active during the reopening phase (respectively 5 and 4 meetings in Spring-Summer 2021, leading up to the easing of travel restrictions).
- The Standing Committee on Transport was most active when new travel restrictions were adopted (7 relevant meetings in December 2020-March 2021).

**FIGURE 3 |** Breakdown of external witnesses in house of commons committee meetings[4].

Parliament (MP) statements, by industry actors (Air Canada, 2021) and in media coverage (Turnbull, 2021; Zimonjic, 2021; Kelleher, 2022), there has been limited transparency about the scientific evidence or political interests underpinning their positioning.

The COVID-19 Testing and Screening Expert Advisory Panel, established by the Ministry of Health in November 2020, has been the most transparent in the scientific evidence reviewed for its report on testing and quarantine for border management (Government of Canada, 2021b). The panel was primarily composed of senior physicians and biomedical scientists, with no members having specific expertise in border management. The panel reviewed the two pilot studies described above and available studies using modeling and simulation of testing of travelers. The broader literature on travel measures during COVID-19 was not cited (Adekunle et al., 2020; Baker et al., 2020; Baniamin et al., 2020; Bielecki et al., 2020; Chinazzi et al., 2020; Haug et al., 2020; Linka et al., 2020a,b; Murphy et al., 2020; Burns et al., 2021; Steyn et al., 2021). Importantly, in addition to the limited reviewing of evidence, the panel consulted "with more than 60 health, public policy, border and transportation experts, as well as other industry stakeholders who are impacted by the COVID-19 border measures. The Panel will continue to consult with a variety of stakeholders as we prepare further reports." No list was provided of those consulted to enable transparency of any potential tensions between public health and commercial interests.

The Industry Advisory Roundtable on COVID-19 Testing, Screening, Tracing and Data Management, was formed on October 5, 2020 by Health Canada in consultation Innovation, Science and Economic Development Canada (ISED), to "complement the science and policy-related work of the COVID-19 Testing and Screening Expert Advisory Panel." Its membership includes the Chief Medical Officer of Air Canada, and its role is to provide "recommendations on testing and screening and how industry can help to restart the economy." The roundtable provides a mechanism through which "federal government engages and collaborates with leaders from all industry sectors in Canada (Government of Canada, 2021c)." One of its main recommendations is to "unlock the capacity of the private sector." The roundtable has released four reports between April and August 2021, including one focused on border measures. Long-term recommendations include to "[r]e-position Canada as competitive in global tourism and trade sectors, through border management which enables the movement of people and goods across international borders," urging the government to "develop an enhanced framework to better prepare for and respond to future pandemics," and collaboration with the private sector. Few methodological details are included in the report, other than that the group relied on "international scans and observations from industries that move goods and people across borders (Government of Canada, 2021d)."

Finally, the Air Travel Restart Working Group, led by Transport Canada, also includes PHAC, Health Canada, ISED, CBSA, the Privy Council Office, and "key industry stakeholders" such as Air Canada, WestJet, the Greater Toronto Airports Authority and Vancouver International Airport. Its website notes that the group is "committed to consulting industry associations going forward," a similar approach to the one used by Transport Canada to develop "Canada's Flight Plan for Navigating COVID-19" (Transport Canada, 2020b). Throughout Canada's third COVID-19 wave (March-June 2021),

[4]Committee MPs suggest external witnesses who are then formally invited by Committee staff.

[5]When an external witness spoke in several meetings, each participation was counted separately.

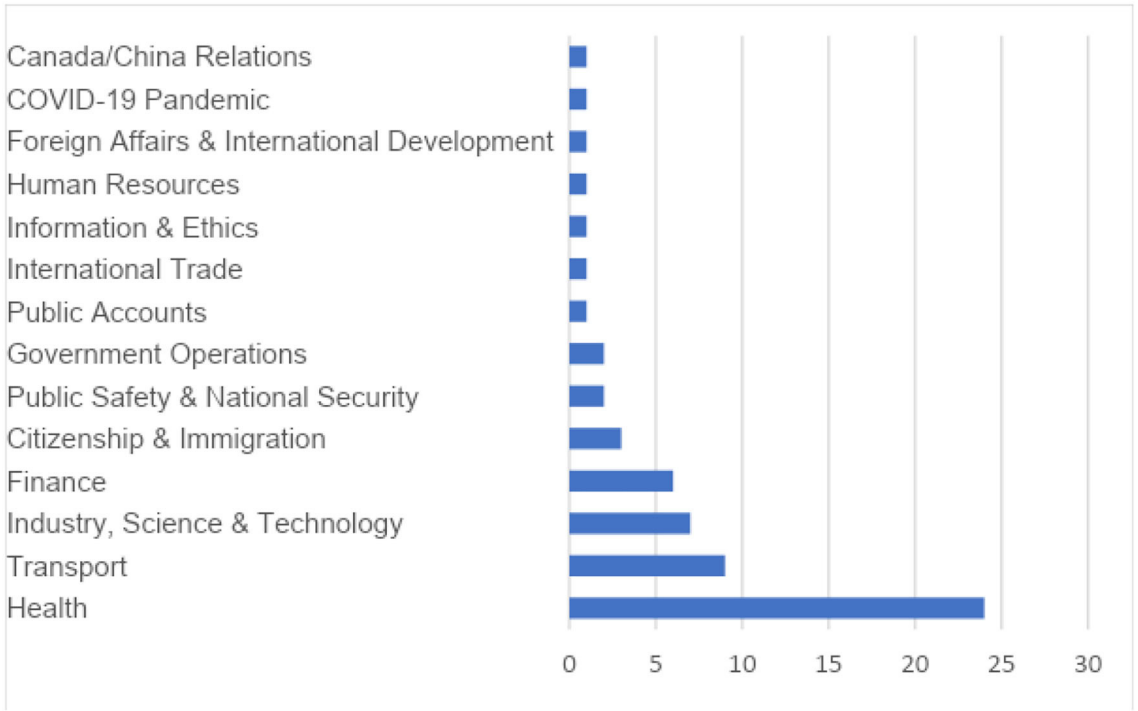


**FIGURE 4 |** House of commons committees where travel and COVID-19 was discussed most frequently (per number of meetings), January 2020–September 2021. Source: Compiled from public records of openparliament.ca, based on proceedings that included discussion of "travel" between January 2020–September 2021.

a number of private sector groups, including the Air Line Pilots Association and the National Airlines Council of Canada, praised the work of these groups, calling on government to communicate "its plan for the restart of the industry without further delay (Air Line Pilots Association International, 2021; Canadian Press, 2021)." This included hopes against mandatory vaccine passports.

Our review of the witnesses providing evidence on travel measures to the House of Commons shows that 60% have been private sector representatives (**Figure 3**). The remainder have been largely physicians and senior scientists highly accomplished in biomedical fields. Other relevant areas of expertise, such as border security and management, risk assessment, population mobility or health policy do not seem explicitly represented (**Figures 3**, **4**).

## Evidence, Expertise and Effectiveness During Four Periods of Canada's Border Management

This section analyses the relationship between science and politics in Canada's use of travel measures during COVID-19. Applying a lens of path dependency, we focus on concepts of "science" including evidence, expertise, and effectiveness, in government narratives of actors, ideas, institutions, and systems in Canada's border management. We distinguish between changes in specific policies (e.g. the adoption or easing of specific travel measures), and overarching decision-making processes which have produced enduring characteristics in Canada's border management. Our findings point to path dependency in the latter, in at least four interdependent characteristics: a strategy of mitigation, "wait and see" timing, balancing policy trade-offs, and implementation capacities. The following sub-section will outline claims and counter-claims on science and policy in the discourse on travel measures in Canada. Four periods of border management in Canada's COVID-19 response are then examined: (1) the initial adoption of travel measures (January–March 2020); (2) the application of exemptions to travel measures (April–November 2020); (3) response to new VOCs (December 2020–Spring 2021); and (4) easing of travel measures (Spring–Summer 2021). This analysis does not cover the reintroduction of selected measures from November 2021 in response to the Omicron VOC (Schermerhorn et al., 2022).

## Claims and Counterclaims

Throughout the COVID-19 pandemic, Canadian federal government officials and Liberal Party members of parliament (MPs) have often claimed that Canada's border management has been "guided by science and evidence." In parliamentary discussions, our analysis found that government officials and Liberal MPs made a version of this claim on at least 40 separate occasions up to September 2021 (House of Commons of Canada, 2021b,c,d,e,f,g,h,i; Standing Committee on Health, 2021a; Standing Committee on Public Safety National Security, 2021). For example, Minister of Health Patty Hajdu repeatedly stated versions of "we have been following the science and

the evidence." Similar assurances have been made by the Parliamentary Secretary to the Minister of Health, Deputy Prime Minister and Minister of Finance (Standing Committee on Finance Meeting, 2021), and Minister of Transport (Standing Committee on Transport, 2021a).

Affected communities, private industry actors and opposition MPs have raised concerns about the scientific basis for the Canadian government's use of travel measures. Criticisms include the limited sharing of data, scientific evidence and methodologies which inform policy decisions and Canada's overall border management strategy. Despite specific requests by various parties to do so, our review finds limited information has been shared in House of Commons debates or committee meetings (House of Commons of Canada, 2021b,j,k,l,m). The resultant and powerful counterclaim which emerges from opposition MPs is that if the government has not provided the data to support their claims, it must be because it does not exist (House of Commons of Canada, 2021n).

It is within this politicized context of claims and counter-claims about the underlying basis of Canada's border management policy during COVID-19 that we apply a path dependency lens to better understand the relationship between science and politics over four periods of the pandemic response.

## Canada's Initial Response (January–March 2020)

Analysis of Canada's initial use of travel measures in early 2020 suggests at least three important contributing factors to path dependence in subsequent decision-making on border management. First, the importance of grounding policy in scientific evidence and expertise was central to border management discourse very early on. Questions of effectiveness underpin much of the debate on whether Canada's border management has been guided by science. While some of these questions challenge the government's strategy, policy goals and implementation of travel measures, the centrality (and elusiveness) of assessing the "effectiveness" of such measures is at the core of discussions on evidence and expertise. What has been the overarching goal of Canada's travel measures and has it been achieved? Canada's overall strategic approach to border management during COVID-19 was set early on as one of mitigation rather than elimination, using travel measures to limit but not entirely prevent virus importation and onward transmission. This was clear from January to early March 2020 when travel measures consisted mainly of airport screening focused on self-reporting by symptomatic travelers, and repatriating (and quarantining) Canadians from specific outbreak areas (**Table 1**, **Figure 2**).

Public records suggest that Canada's approach at this time was aligned with prevailing scientific consensus against the use of travel restrictions or bans during public health emergencies, which WHO recommendations affirmed. On January 29, 2020; Theresa Tam, explained: "WHO does not recommend travel bans, and any measures that a country is to take must not be out of proportion to the risk and must not inappropriately impact travel and trade. We are a signatory to the International Health Regulations [IHR] and we'll be called to account if we do anything different (Standing Committee on Health, 2020a)."

The role of existing scientific advice, in delaying the government's use of additional travel measures, is reflected by public officials stating at the time that travel restrictions "may do more harm than good (Tam, 2020)." The limited screening measures and advisories adopted in early 2020 were described as taken "out of an abundance of caution, while the risk is low, we're actually in quite a special period globally of containment. If anything is going to be done to limit spread, it will be now." On March 5, 2020, amid growing public concerns about travel, Prime Minister Justin Trudeau stated that "knee-jerk reactions" were not helpful and Canada would not limit travel (Harris, 2020). On March 13, 2020, Minister of Health Hajdu argued that "border measures are highly ineffective and, in some cases, can create harm (Dyer, 2020a,b)."

This framing of Canada's limited use of travel measures in its initial response, as guided by existing science, has proven in some cases to be based on evidence that is of limited relevance to COVID-19. The risks posed by a novel and highly transmissible respiratory virus, capable of asymptomatic transmission, was heightened in a world interconnected by travel. In April 2020, New Democratic Party (NDP) Shadow Minister of Health MP Don Davies noted in the parliamentary health committee that the final report of the 2006 Independent Commission to Investigate the Introduction and Spread of Severe Acute Respiratory Syndrome (SARS) (The SARS Commission, 2006) had recommended that: "In any future infectious disease crisis, the precautionary principle guide the development, implementation and monitoring of worker safety procedures, guidelines, processes and systems." Davies described that PHAC may have been "too slow to close borders and impose travel restrictions (Standing Committee on Health, 2020b)." An analysis of media coverage in this initial phase on Canada's travel measures similarly found that the dominant narrative focused on the need for earlier intervention (Reddy et al., 2021). Unfavorable comparisons began to be made to New Zealand, Australia, Taiwan, South Korea and other countries where travel measures were adopted earlier and more fully despite facing the same scientific vacuum (Hollingsworth et al., 2006; World Health Organization Writing Group, 2006; Bitar et al., 2009). These governments took a precautionary approach, adopting a broad range of mandatory travel measures, notably widespread and frequent testing, and monitored quarantine for all travelers with few exemptions (House of Commons of Canada, 2021o,p,q).

Findings of the March 2021 report from the OAG suggest that institutional capacities can also explain PHAC's initial response. The OAG report evaluated the government's emergency preparedness and pandemic response between January-June 2020, describing limited institutional capacity, data collection and analysis challenges, resulting in an inability to act swiftly in response to shifting evidence (Office of the Auditor General of Canada, 2021a). The report states that, at the onset of the COVID-19 pandemic, PHAC had not tested or updated its pandemic readiness plan. Sequential governments had failed to address previously identified shortcomings in disease surveillance and reporting systems from past audits (1999, 2002,

2008). Finally, the report raises concerns about the assessment of risk to Canada of COVID-19 as low until mid-March 2020, almost a week after WHO declared a global pandemic, and despite more than 400 confirmed cases of COVID-19 identified domestically. A review of internal PHAC risk assessments in January and February 2020 suggests the government did not recognize the risks from the rapid spread of SARS-CoV-2, and did not adapt to the escalation of WHO warnings of global risk during February 2020 (House of Commons of Canada, 2021r). PHAC situation reports (sitreps) between January 17 and February 26, 2020 continued to rank the risk within Canada as "low." There is no indication that this assessment was revisited between February 2–26, 2020 (House of Commons of Canada, 2021r), despite acknowledgment, as early as January 27, of a WHO sitrep stating "risk of this event continues to be very high in China, high at the regional level and high at the global level (PHAC, 2020c)." This suggests Canada's initial limited use of travel measures in response to COVID-19, stemmed from institutional and systemic limitations which prevented government recognition of and adaptation to an evidentiary gap apparent to other countries, when faced with a novel pathogen.

## Exemptions for "Essential" Travel (April 2020–November 2020)

From mid-March 2020, the government began to apply additional measures to air, land and sea travel into Canada with the continued claim that policy decisions were informed by science. Reflecting on this period in 2021, Prime Minister Trudeau remarked that "Every step of the way, we were guided by one straightforward principle, which was that we would have Canadians' backs and that we would listen to science as we did it (House of Commons of Canada, 2021j)." We argue that this period set a particular course for how the government would subsequently attempt to balance complex economic, social and public health trade-offs involving travel measures.

From April to November 2020, alongside relatively minor measures [e.g. temperature screening at Canadian airports (Transport Canada, 2020c)], the introduction of exemptions was notable. Our review of media reports during this period showed disagreement about the merits of travel measures, amid the evidence vacuum described above. On the one hand, 87% of the Canadian public (IPSOS, 2020) supported measures to "close the borders and protect Canadians," as Conservative MP Richard Martel stated. He claimed that "[i]t took pressure from the Conservatives, the provinces and the media for [Prime Minister Trudeau] to finally decide to close the borders (House of Commons of Canada, 2021d)." On the other hand, the importance of international travel and trade to the economy prompted simultaneous calls to limit harms to business interests. Other populations affected by travel measures, such as students, cross-border workers and foreign property owners also voiced their concerns.

These different interest and population groups represent the policy trade-offs that government has had to navigate as the pandemic has evolved. Our review of travel measures adopted during this period suggests that these trade-offs resulted in observable gaps and inconsistencies in both application (who measures apply to) and implementation (how they are operationalized). The stated need to keep "essential" travel and trade flowing initially focused on cross-border healthcare workers and critical medical supplies and medicines. Foreign nationals traveling for "non-essential" or "discretionary" reasons (i.e., leisure) were not permitted to enter Canada. Given constitutional rights regarding the movement of Canadians domestically and internationally, the government was limited to only advising against non-essential international travel for nationals and permanent residents (Government of Canada, 2020b).

While MP Sean Fraser (then Parliamentary Secretary to the Deputy Prime Minister) claimed the government "restricted non-essential travel from the beginning of the pandemic," what was deemed essential was broadened to exempt growing categories of travelers from many travel measures. This is illustrated by orders restricting entry for travelers other than from the US. The government announced that,

> Beginning March 18, 2020, the Government of Canada will, for air travel specifically bar foreign nationals from all countries except the United States from entering Canada. The measure [does] not apply in designated exceptional circumstances, including to air crews, travelers arriving in Canada in transit to a third country, Canadian permanent residents, diplomats, or immediate family members of Canadian citizens (Government of Canada, 2020c).

On March 27, 2020, exemptions were further expanded to include "foreign nationals who have already committed to working, studying or making Canada their home (IRCC, 2020c)." By June 8, 2020 an additional twelve categories of exemptions were added (Government of Canada, 2020d) compared to the original Order-in-Council (Government of Canada, 2020e). Over the next year, categories of travelers exempted from specific measures grew to include entry for asymptomatic foreign nationals who are immediate family members of Canadian citizens and permanent residents (CBSA, 2020), extended family members of citizens and permanent residents, foreign nationals on compassionate grounds (IRCC, 2020a), and international students attending designated learning institutions (IRCC, 2020b). Between March 21 and November 12, 2020, it was reported that 81% of travelers to Canada were exempt from quarantine (Aiello, 2020).

The large proportion of travelers exempt from Canada's travel measures contrasts with countries adopting a Zero COVID approach (e.g., China, Singapore, Taiwan, Vietnam, Thailand, South Korea, Australia, New Zealand). These countries were "tightly managing their respective borders to prevent new infections entering their safe or green zones (Standing Committee on Health, 2021c)." When later questioned about Canada's initial approach to travel measures, Prime Minister Trudeau suggested there was little the government could have done differently: "The reality is that COVID-19 came to Canada when Canadians returned from their March break vacations in March 2020 carrying the virus. We are obviously not going to stop Canadians from coming home (House of Commons of Canada, 2021s)." However, while restrictions to travel by Canadians are a potential violation of constitutional rights, this response does not acknowledge the effective role that testing and quarantine play in identifying imported cases and controlling

onward transmission by unrestricted travelers. In other words, the exemption of so many travelers from these measures reflected policy choices based on agreed trade-offs among political and economic interests.

The alignment of exemptions with agreed ideas, interests and institutions is not necessarily problematic. Indeed, weighing policy trade-offs through such processes as cost-benefit or stakeholder analysis, and normative judgements, is a fundamental part of policy-making (Maani and Galea, 2021). We argue that obscuring what are fundamentally political choices with justifications based on constitutional law or, the focus of this paper, scientific evidence is problematic. Applying a path dependency lens, we suggest that the "stickiness" of these exemptions has been sustained through compatible vested interests across government, private industry, and certain communities. As a result, rather than a balancing of economic and social goals with protecting public health, a situational logic has been produced that has maintained exempted travel for selected interest and population groups, despite the evolving scientific evidence on travel measures. These exemptions, in turn, have impeded efforts to mitigate the importation and onward transmission of SARS-CoV-2. As discussed below, our analysis suggests that repeated claims of scientific rationale without transparency about corresponding data and methodology undermine credibility and eventually public trust.

## Canada's Response to Variants of Concern (December 2020–Spring 2021)

The emergence of VOCs in late 2020 prompted further changes to the scope and nature of travel measures in Canada. These policy changes were shaped by the path dependency described above. On December 20, 2020, government ministers and officials pointed to identification of the Alpha variant (B.1.1.7) as the rationale for introducing new measures, beginning with a 72-h ban on flights from the UK (later extended to the first week of January) (Dangerfield, 2020), followed by other travel measures (PHAC, 2020a; Standing Committee on Health, 2021d). These included further targeted (country-specific) flight bans, mandatory pre-departure and on-arrival testing, and a 3-day mandatory quarantine at designated hotels for non-essential travelers arriving by air (**Table 1**).

These measures continued to reflect a strategy of mitigation rather than elimination, exemplified by government statements that "we know that, with viruses, it's practically impossible to prevent new variants from arriving here in Canada (Gilmore, 2021; House of Commons of Canada, 2021t)." In response to comparisons to countries with minimal exemptions to testing and quarantine in order to identify imported cases and prevent onward transmission, an Associate Deputy Minister from PHAC stated in March 2021 that the government had looked at experiences of other countries, such as Australia and New Zealand, when introducing hotel quarantine (Standing Committee on Public Safety National Security, 2021). PHAC President Iain Stewart argued that the government had learned lessons from "watching how others are dealing with the pandemic (Standing Committee on Public Accounts, 2021)." In general, however, government officials and Liberal MPs dismissed international comparisons. Liberal MP Mark Gerretsen stated he was "perplexed" by comparisons of Canada to "non-comparables (House of Commons of Canada, 2021q)." MP Adam Vaughan (then Parliamentary Secretary to the Minister of Families) stated: "I would like to know from the member opposite whether any trucks crossed an international border to get to Australia during the pandemic (House of Commons of Canada, 2021af)." Similarly, MP Chris Bittle (then Parliamentary Secretary to the Minister of Transport) suggested that comparing Canada's response to other countries was "glossing over constitutional requirements and authority" and "comparing apples and oranges (House of Commons of Canada, 2021u)."

Despite the government's official position that the new measures were based on a "decisive, public health rationale from the Public Health Agency of Canada (Transport Canada, 2021b)," interpretation of scientific evidence on travel measures varied among government officials. A December 1, 2020 Transport Committee meeting on the impact of COVID-19 on the air transport sector offers a window into the different – and at times conflicting – objectives and priorities of the diverse departmental mandates situated within a whole-of-government (WOG) approach (Standing Committee on Transport, 2020). Records suggest Transport Canada and PHAC officials interpreted the policy implications of the two abovementioned Canadian pilot studies on traveler testing differently. Referring to the studies as efforts to determine the "most effective types of tests to use and where to apply them," an Associate Assistant Deputy Minister from Transport Canada noted that "[t]esting of some kind or another…is showing a lot of promise as an alternative to quarantine (Standing Committee on Transport, 2020)." He also pointed to considerations being given to congestion issues at land border entries and airports. An Acting Assistant Deputy Minister from Health Canada told MPs that the pilot projects "can help us acquire science-based evidence to inform how best to reopen our borders (Standing Committee on Transport, 2020)." However, she characterized the approximately 1–2% COVID-19 importation rate from international travelers reported by the studies as "fairly high." The Vice-President of PHAC's Health Security Infrastructure Branch was also cautious in her interpretation of the early findings:

> We still do not have all the results from that project. For the data we need, a number of factors must be considered. For example, we have to consider not only the type of test but also its duration. As you know, that is not always clear. The symptoms of the virus do not necessarily appear when the illness starts (Standing Committee on Transport, 2020).

By March 12, 2021, all three circulating VOCs – Alpha (B.1.1.7), Beta (B.1.351), and Gamma (P.1.) – had been imported into Canada and were spreading domestically (PHAC, 2021d). Health Minister Hajdu acknowledged that "[t]he data is incomplete internationally. We are, as a world, trying to figure out what the best approach is to prevent the importation of COVID-19, the combination of quarantine and testing. It is under study (Standing Committee on Health, 2021d)." Despite assurances

that the government "always used science and evidence to decide how we should proceed next in our fight with COVID-19 (Standing Committee on Public Safety National Security, 2021)," this did not satisfy opposition MPs or provincial premiers. When introduced, the government was challenged on the intended policy goals of new measures. These challenges and the varied messaging from public officials in response highlight the value conflicts and policy trade-offs of travel measures during this period. For example, despite advisories against holidays abroad during this period, there were media reports of public officials and other Canadians traveling overseas for leisure (CBC, 2021). The new testing and hotel quarantine requirements were introduced in part as a deterrent to reduce travel volumes. Conservative MPs Michelle Rempel Garner and John Barlow rhetorically enquired whether the program was only set up to deter travel (Standing Committee on Health, 2021e). A PHAC official "disagreed with those statements" and pointed to, in the example of hotel quarantine, the "public health benefit…to stop people from arriving internationally and then getting onto domestic flights while they are in an infected state (Standing Committee on Health, 2021b)." Some officials have stressed reduced travel volume as a measure of success, while others have been reluctant to acknowledge deterring travel as a key intent.[6,7,8,9,10,11] After reporting a decline in arrivals to Canada (for some originating points, by more than 90%), then Parliamentary Secretary to the Minister of Transport, MP Chris Bittle, qualified this data with the statement,

> I do not suggest this is cause for celebration, nor do I wish to give the impression that air travel is bad or unsafe. On the contrary: through a multi-layered approach, the government and industry have worked hard to put in place a number of measures to ensure that air travel is safe (House of Commons of Canada, 2021v).

The apparent contradiction between Ministers and government officials at times downplaying the need for travel measures, claiming risks posed by travel was low (House of Commons of Canada, 2021v), while also claiming to implement "some of the strictest measures at the border in the world (House of Commons of Canada, 2021e,w,x)," reflects the competing political narratives at play.

Implementation capacity also remains significant in shaping science and policy dynamics in border management. Policy inconsistencies exempted large volumes of travelers from the new requirements. Most notably, the hotel quarantine applied only to travelers arriving by air. To explain why land arrivals were not required to quarantine at hotels, PHAC President Iain Stewart noted there were "substantially more people arriving at airports (Standing Committee on Health, 2021b)." This is unsupported by CBSA data, compiled by Statistics Canada between November and December 2020 (the last two months before new travel restrictions were implemented), which reports 588,980 crossings into Canada by land and 394,665 by air(see text footnote[6], respectively). Stewart also stated air arrivals would be more likely to be infected than land arrivals although no supporting evidence was provided (Standing Committee on Health, 2021b). Minister of Public Safety and Emergency Preparedness Bill Blair justified this exemption by asserting that most travelers entering Canada by land were moving essential goods (repeat crossings by truck drivers) (Standing Committee on Public Safety National Security, 2021). He also explained that, logistically, the government could manage hotel quarantine for air arrivals at four Canadian international airports, but this was not possible at the 117 land crossings (Standing Committee on Public Safety National Security, 2021).

In practice, the hotel quarantine system implemented in February 2021 was fraught with implementation challenges, with issues debated by MPs including personal safety (Karadeglija, 2021; Standing Committee on Health, 2021d), safe transport to designated hotels (House of Commons of Canada, 2021y), lack of enforcement (Standing Committee on Health, 2021b), ease of booking (House of Commons of Canada, 2021a), sufficient availability, and public and private cost (House of Commons of Canada, 2021ae). Implementation has been challenged by increased workloads and ever-changing policies. For example, as of 21 April 2021, there were 45 COVID-19-related OICs which CBSA agents were required to operationalize (Standing Committee on Public Accounts, 2021; Standing Committee on Public Safety National Security, 2021). Because of capacity limitations, the government relied heavily on private contractors, resulting in oversight and accountability issues. Arrival testing has been subject to particular public and political scrutiny. On Switch Health, the main company contracted to conduct such testing, MPs cited reports of 17% of arriving passengers in the first two weeks of the program having to wait for their on-arrival test results longer than the 14-day quarantine period. They enquired whether the government's decision to change the date of the second post-arrival test from Day 8 to Day 10 was to accommodate Switch Health's operational challenges rather than evolving scientific evidence (House of Commons of Canada, 2021g; Levitz, 2021).

[6] "Travel volumes are down by 95% from the volumes prior to COVID-19 striking our shores. I want to thank Canadians for their incredible sacrifices." – Patty Hajdu, Minister of Health (House of Commons of Canada, 2021aa).

[7] "We know that reducing mobility is a way to protect from the importation of virus, and we will continue to use science and evidence to guide our way." - Patty Hajdu, Minister of Health (House of Commons of Canada, 2021ab).

[8] "We introduced measures that are among the most effective in the world, both for departures, since airlines have cancelled all such flights, and for arrivals. This will discourage people from travelling (…)" – Pablo Rodriguez, Leader of the Government in the House of Commons (House of Commons of Canada, 2021ac).

[9] "In fact, we know these requirements are working because air travel has reduced by 96%, compared to pre-pandemic travel levels." – Jennifer O'Connell, Parliamentary Secretary to the Minister of Health (House of Commons of Canada, 2021ad).

[10] "The OICs are designed to restrict travel and establish public health requirements so that we can reduce the spread of the virus into Canada. The measures have resulted in 96% less air traffic and a 90% drop in non-commercial traffic entering Canada by land, compared with pre-pandemic volumes." - John Ossowski, President, Canada Border Services Agency (Standing Committee on Health, 2021b).

[11] This Statistics Canada dataset does not distinguish between essential and non-essential travelers, so some of these numbers, particularly for the land crossing, may be the same travelers (e.g. truck drivers) making multiple cross-border trips. A separate Government of Canada document indicates that truck drivers (classified as 'essential') represented 63.8% of land crossings on November 1-21, 2020 (Statistics Canada, 2021).

Many critiques of the hotel quarantine and testing regimes have been framed in terms of evidence and effectiveness. Conservative MPs in particular, characterized the hotel quarantine program as unscientific, citing the lack of publicly available evidence to justify the introduction of the program and its efficacy in minimizing the spread of COVID-19 (House of Commons of Canada, 2021k). Noting that he had received no response to his request for government data demonstrating that hotel quarantine was more effective than at-home quarantine, Conservative MP John Barlow concluded the data did not exist (House of Commons of Canada, 2021b,w). PHAC President Iain Stewart reported to the Standing Committee on Health that the government was "tracking indicators such as the infection rates in the local populations, as well as the infection rates of people coming across air and land borders." He reported that "testing data is on our website (Standing Committee on Health, 2021b)." A review by the current authors found limited detail data and methodology provided to assess the effectiveness of testing and quarantine measures at managing travel-related risk (Lee and Nicol, 2021). PHAC provided journalists with the number of air passengers testing positive for SARS-CoV-2 including variants between February 22-April 22, 2021, but did not include the number of positive tests by travelers following the three-day hotel quarantine (i.e. during the remainder of the 14-day quarantine), or by the 297 people who were fined for refusing to stay in a quarantine hotel (Rabson, 2021). A November 2021 report by the OAG also found many gaps in data regarding testing and quarantine compliance by travelers (Office of the Auditor General of Canada, 2021b).

The above analysis suggests decision-making processes during this period to exhibit path dependency shaped by strategies of mitigation and policy trade-offs. The emergence of VOCs provided an opportunity for governments to apply lessons on the use travel measures from the early phase of the pandemic. This was supported by accumulating evidence from other countries on how to reduce virus importation and onward spread through the proactive use of testing and quarantine for all travelers. While new measures were introduced, the strategy underpinning Canadian policy remained one of "wait and see," with new measures continuing to exempt large categories of travelers. Alternative approaches adopted by other countries were dismissed as irrelevant to the Canadian context or beyond available capacity to implement. While the government continued to claim that policies were based on science and that Canada compared well to other countries, there remained limited scientific transparency. Both at the federal level, and between the federal and provincial governments, political debate on travel measures intensified during this period, reflecting competing ideas, interests, and institutions.

## Easing of Travel Measures (Spring–Summer 2021)

By June 2021, as the fully vaccinated proportion of the Canadian population climbed to 65–70%, and the third wave of variant-driven infections began to wane, strong political pressure to ease travel measures had re-emerged. These pressures came from several directions. The beleaguered tourism sector, estimated to have lost C$52 billion in 2021 (Stevenson, 2021), saw the opportunity to stem further declines as summer approached. Communities along the Canada-U.S. border pressed for the reopening of land border crossings to non-essential travel to revive local economies. The abovementioned questions about the scientific validity of travel measures and implementation challenges added to these calls. Lack of fairness, wide-ranging exemptions, weaknesses in enforcement and inconsistencies between air and land arrivals were raised in questioning the utility of travel measures. Public questioning of travel measures was bolstered by reports of international air travelers successfully avoiding the hotel quarantine program by flying to the U.S. before returning to Canada by land (Clementson and Nicholson, 2021). Given disparities in enforcement of non-compliance across provinces, others flew directly into Canada but chose to ignore public health directives on testing and quarantine, at times without repercussion (Grant, 2021). Finally, the up to three-day duration of hotel quarantine was inconsistent with the incubation period of SARS-CoV-2 (with many countries requiring 14–21 days) (Government of Canada, 2021e; Lee et al., 2021b). In May 2021, a report by the government-appointed COVID-19 Testing and Screening Expert Advisory Panel recommended that the hotel quarantine program be replaced with a schedule of testing requirements based on immunity status (Government of Canada, 2021g).

Our review finds that during the spring of 2021, representatives from the airline industry and tourism sector, along with other private sector stakeholders featured prominently in parliamentary discussions on the easing of travel measures, notably in the Standing Committees on Transport; Finance; and Industry, Science & Technology (**Figures 3**, **4**). Private sector interests frequently called on the federal government to put into place a plan based on scientific data, including clear metrics and a timeline for "reopening." For example, a senior director at the Tourism Industry Alliance of Quebec (*Alliance de l'industrie touristique du Québec*) called for an exit strategy for travel restrictions based on a "border reopening plan (Standing Committee on Finance, 2021a)." A director at the Canadian Chamber of Commerce raised the need to work toward a safe and gradual reopening of the border, noting a letter written by the Chamber and 60 business industry associations to the Prime Minister for the federal government to work with other countries on benchmarks for easing travel restrictions (Business Council of Canada, 2021; Canadian Chamber of Commerce, 2021; Standing Committee on Finance, 2021b). A Vice-President at Calgary Airport Authority pressed for "a thoughtful, data-driven and tailored approach to restarting domestic travel (Standing Committee on Health, 2021f)." On another occasion, a Managing Director at Air Canada noted the company was "a strong proponent of a science-based, data-driven reopening of our borders (Standing Committee on Transport, 2021b)." A director with WestJet Airlines had called for ending the hotel quarantine program, only two and a half weeks after it was implemented, on the grounds that it acted as a deterrent to travel, and for replacing it with a testing regime which would balance all objectives (including curbing new

variants and restarting travel) (Standing Committee on Industry Science Technology, 2021b). The CEO of the Tourism Industry Association of Canada similarly emphasized: "we need to get the borders open, and we need to be putting in place proof of vaccination, testing and contact tracing so that we can eliminate the need for quarantines on arrival (Standing Committee on Finance, 2021c)." In early February 2021, the aforementioned WestJet representative had already noted they were "pushing so hard for a safe restart plan (Standing Committee on Transport, 2021b)." "With the vaccine rollout to the public being planned, it's important to have a plan in place now to safely resume travel," a Managing Director at Air Canada concurred that day, adding: "The most important thing is to get the wheels turning again (…) to regain the place we had in the economy (Standing Committee on Transport, 2021b)."

When private sector stakeholders were not present in parliament, opposition MPs and other witnesses cited the negative impacts of travel restrictions on the tourism sector, and the airlines industry in particular, as reasons to ease travel restrictions. Notably, Conservative MP Michelle Rempel Garner (then Shadow Minister for Health) cited the Canadian Federation of Independent Business, the Tourism Industry Association of Canada and Unifor (Canada's largest private sector union) in asking for support for a motion for "the government to table within 20 calendar days (…) a clear data-driven plan to support safely, gradually and permanently lifting COVID-19 restrictions" – including at the border (House of Commons of Canada, 2021af). Conservative and NDP MPs have expressed concerns of their constituents, including people in the tourism sector wanting to get back to work (House of Commons of Canada, 2021ag), being desperate for a reopening plan as well as separated families, and "businesses that are struggling to survive (Standing Committee on Finance Meeting, 2021)." On May 25, 2021, Conservative MP Blake Richards referred to the C$19.4 billion losses incurred by the sector due to the absence of international visitors and deplored the extension of the US-Canada border closure, stating that "without any kind of plan or any metrics on how or when it might be willing to safely reopen that border (House of Commons of Canada, 2021ah)." NDP MP Brian Masse asked: "When will the government follow the science and open the border to Canadians and Americans who are fully vaccinated? Canadians need a clear plan. When will the Liberals do it (House of Commons of Canada, 2021i)?" A month later, Conservative MP Pat Kelley reiterated the impact of travel restrictions on "thousands of small businesses" "dependent on tourism," urging the government to "finally table a comprehensive, detailed reopening plan (House of Commons of Canada, 2021ai)."

Findings from the two Canadian pilot studies on testing were often referred to in the House of Commons as a scientific rationale for easing travel measures. Public records show repeated reference to these studies by Conservative MPs, airline industry witnesses, government officials and Liberal MPs in support a variety of positions related to travel measures (Standing Committee on Transport, 2020). Conservative MPs and private sector stakeholders praised the studies, arguing that they clearly demonstrated the safety of air travel and that the duration of at-home quarantine should be reduced. Conservative MP Stephanie Kusie noted that these pilot programs showed "the possibility to reduce the quarantine time by up to an entire week (House of Commons of Canada, 2021aj)." The Executive Chairman of Porter Airlines, citing the two pilot studies, told MPs that rapid testing had "proven (…) to be an effective way of getting some activity going in terms of removing some of those restrictions that in fact cause some dampening of travel in the first place (Standing Committee on Transport, 2021c)." An Air Canada executive noted the Pearson airport study "clearly demonstrated that a reduced quarantine requirement, in line with CDC guidelines, would protect against the spread of COVID-19 while allowing for a measured restart of the industry (Standing Committee on Transport, 2021b)." The VP of the Greater Toronto Airports Authority said the program "safely reduces quarantine times for arrivals (Standing Committee on Transport, 2021a)." The CEO of the Canadian American Business Council similarly told Parliament the pilot project in Alberta could help reduce the quarantine period (Standing Committee on International Trade, 2020). Similarly, at the press conference announcing the program, Ed Sims, CEO of Calgary-based WestJet, and Bob Sartor, CEO of the Calgary Airport Authority both lauded the initiative, calling it a "lifeline" for the airline and travel industry (Pihach, 2020). A WestJet representative later told MPs the federal government should replace the hotel quarantine program with "something like the Calgary pilot", using "testing as a tool instead of blunt instruments like hotels (Industry Science Technology Committee, 2021)." A Conservative MP qualified the pilot programs as a "great example of a private sector success, only to be shut down by the federal government (House of Commons of Canada, 2021ak)."

The active engagement of private actors in operationalising Canada's travel measures has been essential to their implementation. Moreover, industry actors have provided important sector-specific knowledge and experience to help inform government decision-making, including drawing attention to evolving evidence on the effective implementation of travel measures. In this analysis, we consider the prominence of private sector actors in political discussions of travel measures in terms of both policy trade-offs and institutional capacities. Despite calls from Bloc Québécois MPs to "start managing it properly," rather than ending hotel quarantine (House of Commons of Canada, 2021ai), on July 19, 2021, the federal government announced that the hotel quarantine program would be terminated on August 9, 2021 (PHAC, 2020c). The government also announced reopening to non-essential travel by fully vaccinated US citizens and permanent residents on August 9, 2021 and by all other fully vaccinated foreign nationals on September 7, 2021. While pre-arrival PCR testing requirements remained in place, fully vaccinated arrivals would no longer be required to take tests upon or after arrival unless randomly selected. Gradually, more airports were also reopened to international travel – starting with five additional ones on August 9, 2021 (PHAC, 2021c).

The goal of safely re-opening Canada's border to pre-pandemic levels of international travel is widely shared among industry, government and communities affected by travel measures in response to COVID-19. Private sector actors, and the

travel and tourism industry, have widely and prominently relied on arguments of evidence-based policy to advance agendas of easing travel measures. At this stage in the pandemic and given Canada's high levels of COVID-19 immunization coverage, the cumulative economic and political vested interests in facilitating higher volumes of resumed travel represent a formidable force. The political space through which the easing of travel measures was influenced by these actors was supported by Canada's overall strategy of mitigation, balancing policy trade-offs, and likely to some extent the limits of institutional capacity to sustain testing and quarantine requirements.

## DISCUSSION

During the COVID-19 pandemic, travel measures and border management have become an unexpectedly complex and highly contested policy issue. From public health measures of last resort under the IHR, which WHO initially recommended against, travel measures have played a key role in the pandemic response by national governments. As such, public debates on the scientific evidence about their effectiveness, and the impacts they create on wider society and globally, have been prominent. At the same time, given the unprecedented and complex task of using travel measures during a pandemic caused by a novel pathogen, scientific evidence to inform decision-making processes has been limited and evolving in real-time. It is in this context that this paper analyzed the fraught interplay between politics and science in Canada to understand how national policy making processes contributed to the "chaos" (Hiltner, 2021) that has characterized border management during COVID-19.

The above analysis suggests an overly simplistic characterization of the role of science in policy decisions in the government's framing of Canada's border management. When evidence is available to inform policy, effectiveness depends as much on design and implementation as it does on underpinning scientific rationales. Moreover, framing science as a "determining influence on policy," fundamentally "mischaracterizes how science is conducted, how it is packaged and operationalized by democratically elected representatives, and the breadth and nuance of policy options available in response to any combination of evidence presented (Maani and Galea, 2021)." To a certain degree, these challenges are inherent in the concept of "evidence-based policy making." Cairney defines "evidence" as an assertion backed by information, "policy" as one of the worst defined words in politics, and "based" as a metaphor linking the two together (Cairney, 2016). Ultimately, "policymakers have to make important decisions in the face of uncertainty, which is based on limited information, ambiguity, which is based on the fact that there are many ways to understand a policy problem (this kind of uncertainty cannot be solved by more information), and competition between actors to draw conclusions (Cairney, 2016)." In any political environment – let alone a global health emergency caused by a novel pathogen – there is invariably insufficient evidence to remove all uncertainty and ambiguity (Cairney, 2016). In place of evidence or certainty, politicians and public officials must rely on tools of persuasion and argument.

Focusing on Canada as a case study, it is arguable that the initial "wait and see" approach to travel measures during the early weeks of the pandemic can be explained by lack of precedent and available evidence from previous outbreaks against their use. Our analysis suggests that this initial evidentiary vacuum was soon occupied by political and economic interests impacted by travel measures. This subsequently shaped the interaction between the evolving science and politics, creating a degree of path dependency in the approach taken by government. Claims about the use of scientific evidence to guide decisions have been extensively made but with limited disclosure of what constitutes that scientific evidence. This limited public transparency extended to policymaking processes on border management in Canada. While PHAC was mandated with providing public health guidance on travel measures, how this advice was combined with the positions of other government departments (e.g. transport, trade and investment, foreign affairs) and ultimately weighed by political leaders remains unknown. Our review of parliamentary records above suggests transparency of both science and politics of border management has been an ongoing question.

In this context, it is difficult to determine the extent to which the government listened to experts, who they listened to, and to what effect. Government definitions of, and reliance on, "experts" in response to COVID-19 have manifested through the activation of many institutionalized and *ad-hoc* expert committees, advisory groups and task forces (Government of Canada, 2021f). Based on available information, there has been no independent expert group convened to consider border management holistically during COVID-19, though certain groups have considered specific measures such as testing and quarantine (Government of Canada, 2021f). Experts consulted often comprised the same senior physicians, biomedical scientists and epidemiologists who were engaged on other policy issues related to the pandemic. We found little evidence of a whole-of-government approach to consulting non-medical expertise on such issues as border security, operational logistics, economic and social impacts, and risk communication.

At senior government levels, members of the Cabinet Committee on the federal response to the coronavirus disease (COVID-19) (later becoming a sub-committee of the Cabinet Committee on Safety, Security and Emergencies) extended beyond the Minister of Health, with Public Safety and Transport most prominent on border management policy. The degree to which external experts and advice were influential, and how trade-offs among different ministerial mandates were weighed, remains veiled in cabinet confidence. Advice to Cabinet ministers was presumably channeled through federal ministries but there is no comprehensive public record of the individuals or experts within government tasked with providing recommendations. While various reports and recommendations have been issued, expert advisory groups are not directly involved in decision-making, and there are no institutional mechanisms to hold the government to account on whether or to what degree they follow expert recommendations.

Finally, parliamentary proceedings reflected, and were shaped by this unclear relationship between science and politics. The government's rhetorical use and narrow interpretation of

"science," "evidence" and "expertise," in other words, provided space for opposition MPs, private industry and the media to shape the narrative (Reddy et al., 2021). That individuals who appeared as external expert witnesses for parliamentary committees were identified by committee members (MPs), and invited by the Chair, to balance member interests, reinforces the influence of political interests and priorities of MPs and their parties in shaping "expertise."[12] Findings show that, across committees and parliamentary debates, invited experts on travel measures largely fell into two categories: epidemiologists/physicians and private sector representatives (**Figure 3**).

Findings suggest gaps in non-medical expertise were not filled. Instead, vested interests and their framing of border management policy were inserted into the public debate as experts and/or expertise. Private sector voices – particularly from the airline industry – presented evidence largely supporting the moderate use or easing of travel measures. Gathering evidence from such actors is understandable given their significant contributions to Canada's COVID-19 border management response. They offer critical perspectives about economic impacts and logistics at the frontline of policy implementation. However, amid transparency gaps about science and politics in government decision-making, and apparent paucity of non-medical and non-industry expertise, this raises concerns about the capacity for government to appropriately assess the complex public health, social and economic trade-offs from travel measures. Indeed, there are inherent tensions between public health and economic goals which have been obscured by this blurring of boundaries between science and politics in such proceedings. This is further complicated by the increased reliance, given limitations in public sector capacity, on private companies to implement travel measures such as hotel quarantine, enforcement of at-home quarantine, contact tracing and traveler testing. Implementation problems for some of these privately contracted services have been used by other private sector interests to support the easing of travel measures (Office of the Auditor General of Canada, 2021a).

The findings of this case study raise broader implications for the role of science and politics in strengthening future national and international policy making during public health emergencies. First, oversimplifying, conflating or co-opting concepts of "data," "science," "evidence" and "expertise" for the purposes of public reassurance or political positioning, without sufficient transparency about the science, may confuse public understanding and expectations of what "evidence-based" policy is. This risks the dual erosion of public trust in the scientific community and political processes. There is need for further study of the degree to which erosion of trust contributed to non-compliance to travel measures by many Canadians.

Second, lack of transparency about the science and politics of travel measures in Canada opened a policy space for counter-narratives and vested interests. The result has been further politicization, often characterized by fractious public debate about border management, and the creation of path dependency pressures. Case studies of national policy making in other countries are needed to understand the relationship between science and politics in the use of travel measures, and the impact this has had on achieving public health and other policy goals.

Finally, an unclear picture of the evidence on which policy is based, amid claims of following the science and politicization of border management issues, risks undervaluing the need for a robust scientific research agenda on these issues, including better understandings of gaps and opportunities for systemic whole of government approaches to current and future global health emergencies. The assertion that government policies are already evidence-based may suggest less need for future investments.

Based on this analysis, there are key lessons to be learned for strengthening the relationship between science and politics in decision-making on border management during public health emergencies. First, data infrastructure needs to be strengthened at regional, national and global levels. Data collection and sharing, including on the volume of travelers, test positivity rates, and compliance with different public health measures, are the backbone of risk-based approach. Increased public investment in such capacities, especially in PHAC and CBSA, is urgently needed for future pandemic preparedness. Second, there is need for greater transparency about what is known and not known rather than blanket claims of evidence-based policy. Finally, there is need for political transparency to prevent undue influence of vested interests and ensure inclusion of sufficiently broad expertise. While the "black box" of policy making is likely to remain obscured, public trust in both science and politics, and how the two domains come together, has proven essential to the effectiveness of COVID-19 responses.

## CONCLUSION

Understanding of the effective use of travel measures to control the global spread of a highly transmissible pathogen has changed significantly during the COVID-19 pandemic. This paper finds that the Canadian government struggled to integrate this evolving science into policy due to a degree of path dependency. Frequent claims of being "guided by science and evidence," in response to public concerns or political opposition, were unsupported by transparency about the evidence collected and used. Scientific expertise was narrowly defined and opened the way for vested interests to exert influence in parliamentary committees. The claims about evidence-based policy making also obscured the invariable politics of border management. We conclude that the reliance on science-driven narratives, in this context, increased politicization in ways that ultimately undermined the use of science. There is a need to better understand these complex dynamics in national policy making during the COVID-19 pandemic if we are to prevent the uncoordinated and chaotic use of travel measures in future.

## DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article. Further inquiries can be directed to the corresponding author.

[12] Private email correspondence with MP office staff.

## ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Simon Fraser University Research Ethics Board. The participants provided their written informed consent to participate in this study.

## AUTHOR CONTRIBUTIONS

KL and JP conceived the idea for this analysis. BG collected and analyzed data, wrote drafts of the methodology, and results sections. JP collected and analyzed data, wrote drafts of the background and discussion, and revised the results. KL drafted the initial outline, wrote the abstract and introduction, drafted the discussion, and revised the results. All authors read, provided substantial comments and edits, and approved the final manuscript.

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