



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Resources or trust: What matters more in the vaccination strategies of high-income liberal democracies?

Michelle Falkenbach^{*}, Charley Willison

Department of Public and Ecosystem Health, Cornell University, 618 Tower Rd., Ithaca, NY 14850, USA

ARTICLE INFO

Keywords:

Trust
Vaccination strategies
High-income Western democracies
Denmark
United States
Canada

ABSTRACT

Objectives: This paper presents an overview of the vaccination policy responses to the COVID-19 pandemic in Denmark, Canada, and the United States until September 1, 2021. The article seeks to understand the reasons for vaccination differences among high-income, liberal democracies.

Methods: The country cases were selected based on tiers of population-level vaccination uptake within six months after vaccines became broadly available (for high-income countries). We conducted a rapid review of primary data for each country case. Through a graphical and descriptive analysis, we evaluated common patterns as well as significant divergences in the vaccination rollout across countries and its relationship with COVID-19 health outcomes, government policy responses, resource constraints, and socio-political factors. This inductive analysis provides a sense of how resource constraints compare with current political contexts in each country case that may influence the public's response to a national vaccination strategy.

Results: Resources, socio-economic factors, and health outcomes related to COVID-19 do not ensure vaccination policy success as the case of the United States makes clear. Instead, trust in government and health systems appear to promise a higher vaccination uptake and maintained support for measures during a pandemic. Trust in government can be defined as the confidence citizens have that governmental actions will do what is right and perceived as fair.

Conclusion: Denmark, the United States, and Canada are high-income liberal democracies with very different vaccine strategies and subsequently different vaccination outcomes across their populations. What appears to be critical to successful vaccination outcomes is high trust in government or health officials, along with the depoliticization of the COVID-19 pandemic among the country's political parties.

Introduction

The first cases of COVID-19 in Denmark (February 27, 2020), Canada (January 25, 2020), and the United States (January 21, 2020) have been well documented [1–3]. Differences in the country's policy responses to the initial waves have also been well researched [4–6]. Countries attempted to apply a newer and more proactive policy response with the introduction of the COVID-19 vaccines at the end of 2021. Vaccines reduce morbidity and mortality from COVID-19 and, in turn, lessen the strain on healthcare systems [7]. As countries reach for hope to end the pandemic, vaccines are the first line of defense. In fact, vaccines were in such high demand that high-income countries hoarded crucial vaccine supplies and production capacity for their own populations. Yet, despite this extreme country-level demand (while shirking responsibility and ethics to support vaccination strategies in low-income countries), we see

considerable heterogeneity among high-income countries in the speed and total population level uptake of COVID-19 vaccines. This article has two goals. Firstly, we aim to discern the reasons for vaccination rate differences among high-income, liberal democracies. Secondly, we seek to understand how resource constraints (based on welfare state models), and COVID-19 risk (related to containment policies and morbidity and mortality in each country), compare with socio-political factors shaping citizens' perceptions about government (or their perceptions about governments' COVID-19 vaccination policies), that may influence vaccine uptake. This inductive analysis provides a sense of how resource constraints compare with current political contexts in each country case that may influence the public's response to a nationwide vaccination strategy.

Our article examines the cases of Denmark, Canada, and the United States, selected based on stratifications of vaccination rates across high-

^{*} Corresponding author.

E-mail address: mfalkenbach@cornell.edu (M. Falkenbach).

<https://doi.org/10.1016/j.hlpt.2022.100618>

income, liberal democracies, six months after vaccines became widely available to these economies (not globally). We combine a variety of national health services data to measure and compare resource capacity and COVID-19 risk to populations, with deeper contextual sociopolitical factors in each country to begin to identify why countries with outsized access to COVID-19 vaccine supplies had such heterogeneous experiences in rates of vaccine uptake among their populations.

The layout of the article will ensue as follows: section two describes the theoretical basis of sociopolitical factors that may be related to a country’s vaccine uptake: welfare state classifications and trust in government. Section three describes the methods used to identify divergent vaccine policy success factors in each country. Section four depicts the data collection of the three countries’ demographic, epidemiological, and healthcare system data. Section five provides an overview of the vaccination programs across the countries, and our discussion and conclusion is presented in section six.

Health and welfare state profiles and the role of trust

Welfare state model configurations provide an important context to understanding citizen’s access to social policy benefits – everything from unemployment to health insurance to healthcare commodities like vaccination. According to Esping-Andersen’s typology of the welfare state, Canada and the United States fall under the liberal welfare model implying that the state "encourages the market by subsidizing private welfare schemes" whereby it makes sure to "peg entitlements and benefits to employment, work performance and contributions" thereby insuring and strengthening "work incentive and productivity" [8]. Despite falling into the same welfare category, the difference between the two countries lies within their its redistributive properties and health insurance model (Table 1). While the American system is minimally redistributive, the Canadian system is highly redistributive regarding income [9]. In addition, unlike Canada, the United States does not offer universal health care and lacks statutory sickness and maternity benefits. Alternatively, the Scandinavian countries, of which Denmark is a part, fall under the social democratic welfare regime model. They have egalitarian benefit structures, comprehensive and universal benefit coverage, and publicly funded and administered social programs.

One of the most significant drawbacks of Esping-Andersen’s typology is that it does not consider healthcare, one of the largest areas of social welfare, considering the average OECD country spends 8,8% of GDP on health [10]. Fortunately, this was revisited by Bambra [11] through her use of the health care index as a way to operationalize the decommodification of healthcare. By decommodification, Bambra follows the definition presented by Esping-Andersen and adjusts it to apply to healthcare: "the extent to which an individual’s access to health care is dependent upon their market position and the extent to which a

country’s provision of health is independent of the market" [11]. Her findings suggest that Canada and Denmark are more similar in their healthcare systems’ ability to decommodify health, while the United States is ranked in the lowest decommodification group along with Australia.

What is strikingly different among all three countries is their government type, ranging from constitutional monarchy (Denmark) to federal constitutional monarchy (Canada) to federal presidential constitutional republic (USA). These differences impact many issues (governing continuity), including authority and responsibility for public health policy design and implementation, and accountability for those choices. For example, the distribution of power across the various actors within the federal government. Federalism is another critical point – vaccination strategies, like other types of health and social policy, may find benefits and challenges when working across multiple federated jurisdictions compared to fewer [12]. A further another important argument that could be made regarding government type is that constitutional monarchies are seen as being more stable, which can lead to an increase in trust due to that stability [13].

Access to social and health benefits, especially those that provide for basic necessities, play a crucial role in the relationship between citizens and trust in their government. Trust in government can be defined as the confidence a countries citizens have that governmental actions will do what is right and perceived as fair [14,15].

A growing body of literature demonstrates that low-resourced welfare models or social service policies providing constrained and incomplete access to benefits may fuel discontent or reduce trust in government [16–18]. Thus, we consider the intersection of welfare state resource capacity and the sociopolitical context of trust in each country case as possible determinants of vaccine uptake at the national level. We also hypothesize that the relationship between welfare state capacity and trust may be affected by COVID-19 morbidity and mortality, possibly increasing or decreasing trust in government if the public considers responses to COVID-19 as successful or not. This relationship may be subjected to further changes depending on countries individual political contexts. For example, the recent growth of populist political movements that are dependent on misinformation for mobilization, may influence the relationship between citizens trust in government and their perceptions of welfare state capacity or resources to address COVID-19 [19,20].

Methodology

In order to answer the questions proposed within the introduction, a rapid review of primary data from Denmark, Canada, and the United States was conducted. These cases were selected based on stratifications of high-income countries vaccine rollout six months after vaccines became widely available (for high-income countries) as well as their comparability across welfare state models, which may that may influence access to vaccines [21]. Case selection is discussed in detail below. Through a graphical and descriptive analysis, we identify common patterns as well as significant divergences in the vaccination rollout across countries and its relationship with COVID-19 health outcomes, government’s policy responses, resource constraints, and socio-political factors. Dataset characteristics, data sources and descriptive statistics are collected from international databases (e.g., OurWorldinData, WHO, John Hopkins, etc.) and countries institutional websites (e.g., Ministry of Health, etc.). For each country case, we combine extant literature with public opinion surveys and news media to measure trust and understand the current political context. This inductive analysis provides a sense of how resource constraints compare with current political contexts in each country case that may influence the public’s response to a nationwide vaccination strategy.

The three countries in this article were chosen based on the Most Similar Systems Design (MSSD). Denmark, Canada, and the United States are all Western or liberal Democracies implying the existence of

Table 1
Political characteristics.

	Denmark	Canada	US
Government	Constitutional Monarchy	Parliamentary democracy (federal constitutional monarchy)	Federal presidential constitutional republic
Federalism	No	Yes (10 provinces, 3 territories)	Yes (50 states, 1 federal district, 5 overseas territories)
Party in Power	Social Democrats	Liberals	Democrats
Welfare System (Esping-Andersen)	Social Democratic welfare model	Liberal welfare model	Liberal welfare model
Welfare and Health (Bambra)	Social Democratic Model	Social Democratic Model	Liberal Model

the rule of law that ensures the presence of a legal authority and the independence of the judiciary [22]. In addition, all three countries are considered high-income economies defined by the World Bank Group as "those in which 2020 GNI per capita was \$12,696 or more" [23]. Finally, these three countries all belong to the countries that had fully vaccinated more than 50% of their population six months after vaccine availability. As shown in Fig. 1 [24], by September 1, 2021, Denmark belonged to the top third with a 72,58% fully vaccinated population, Canada was in the middle with 66,93% of the population fully vaccinated, and the United States was in the bottom third with 51,91%. Cases were chosen based on World Health Organization data to stratify across tiers of vaccine uptake at this critical time point (See Fig. 1).

While country population size (the US being much bigger than both Canada and Denmark) may be a point of concern for bias in the case selection, we argue (being much larger than both Canada and Denmark) that the time lag between access to vaccines and vaccination campaigns or shots in arms across each population allows us to draw comparisons more accurately between the three countries, controlling for population size. This is because the United States received access to vaccines earlier than any other nation [28]. While some high-income countries received vaccines in the winter to vaccinate healthcare workers, most had to wait until the summer of 2021 to begin rolling out access to their populations overall. Eligibility for adults living in the United States began in March 2021, compared to May in Canada and Denmark. In Canada, eligibility for the second dose was based on extended intervals between doses, 6–12 weeks, further extending the vaccination process for most Canadians. Adults living in America could receive vaccines at a shortened interval between doses, at 3 and 4 weeks. We argue that this four-month time lag in the United States to begin actively vaccinating the population likely accounts for differences in population across countries and that further delays in population-level vaccination are likely related to factors other than population size (see Fig. 4 pg. 13 for a timeline).

The analytical value of these three similar cases is that despite being similar on these many levels, their public health measures and outcomes concerning vaccination are quite different. In this article, we attempt to explore and analyze these differences to shed light on the factors that make countries more or less successful regarding the acceptance of COVID-19 policies, specifically in the form of vaccination rates.

Results: resources, health indicators, and vaccine uptake

Resources

As previously mentioned, we have chosen three similar countries, stratified across vaccination rates, based on the fact that they are high-income, liberal democracies with comparable welfare state structures. The high income is justified through the depicted via the similar GDP per capita, life expectancy, percentage of people over 65, and the employment rate in the three countries (Table 2).

While there are certain similarities among these three countries, Table 3 below displays some of the main differences in supply factors pre (before 2020) and during (2020–2021) the COVID-19 pandemic. What stands out is the fact that Denmark and Canada offer universal healthcare, while the United States still has over 10% of people uninsured and with limited access to care. In addition, while the expenditure on health is relatively similar in Denmark and Canada, the United States, as is commonly known, tops the ranking worldwide with 17.7% of GDP. The assumption moving forward is that given the amount of money spent on healthcare in the US, one would expect the country to be better prepared and better able to contain the pandemic.

Health indicators

The metrics and epidemiological trends considered to determine the various COVID-19 measures in Denmark, the United States, and Canada are similar to those in most countries (Figs. 2–4). We consider these

health risks and resource constraints (related to health system strain) as factors that may influence countries' vaccination uptake. For example, if governments, and citizens, perceive COVID-19 as a very high risk to individual and population health, and healthcare resources, vaccine uptake may be higher.

The number of patients infected with COVID-19 that had to be hospitalized was initially a number that governments kept track of very closely. However, with the onset of the Delta variant at the beginning of 2021, the focus moved more to the number of COVID-19 infected patients in an intensive care unit (ICU) (Fig. 2).

As can be seen in Fig. 2, the United States surpasses Canada and Denmark by far with regards to the number of COVID-19 hospital admissions and, except for a short period of time in the spring and early summer of 2021 where Canada has a high number of COVID-19 patients on the ICU, does the same for COVID-19 ICU patients.

As can be expected, given the number of COVID-19 patients in US ICUs, the cumulative amount of people that died from COVID-19 is significantly higher in the United States than in Canada or Denmark (Fig. 3). In fact, the United States consistently ranks under the top ten highest cumulative COVID-19 deaths worldwide.

Vaccine uptake

Given the comparison that Figs. 2 and 3 have shown, it is clear that health expenditure did not help the United States prevent COVID-19 deaths. Clearly, both Denmark and Canada were able to contain the virus more efficiently than the United States. The next assumption that one could make is that perhaps Denmark and Canada were given earlier access to vaccinations, which might be able to explain their prevention of mass casualties in relation to COVID-19.

Looking at Fig. 4, it becomes clear that the United States actually had access to vaccines months before Denmark or Canada could fully start their rollout programs for the general public. What is also interesting to note is that both Denmark and Canada surpassed the United States by the late summer regarding vaccination rate, signifying that the uptake of vaccination in the United States was waning.

As far as the types of vaccines approved in each of the three countries, the FDA in the United States was the strictest, approving only three vaccines, while the EMA in Europe approved four and Health Canada approved five (Table 4). Further differences between the healthcare governance of the three countries can be found in vaccination mandates and the use of a digital certification.

Results: contextualizing vaccine uptake within country cases

Given the Figures and Tables shared within the previous sections, we find that high-level resource and health data alone does not offer a holistic explanation as to why the United States, the most prepared in terms of health capacity measures (resources), exhibited the worst vaccination outcomes out of the investigated country cases. Therefore, it is necessary to build on the presented data while simultaneously looking deeper into each of the country's measures surrounding the vaccination rollouts.

Denmark

On March 11, 2020, Denmark was the first country in Northern Europe to implement COVID-19 restrictions and lockdowns [33]. With a population of 5.8 million, the country managed to fully vaccinate over 72% of its inhabitants over the age of 12 [34]. As of September 1, 2021, only the United Arab Emirates, Portugal and Singapore had a higher full vaccination rate worldwide.

The vaccination priority was based on "a professional assessment of how best to protect the most vulnerable citizens and frontline staff while ensuring that the spread of infection is curbed" [35]. In addition, vaccinations are voluntary and completely free in the country. There are three reasons why the vaccination campaign in Denmark was so

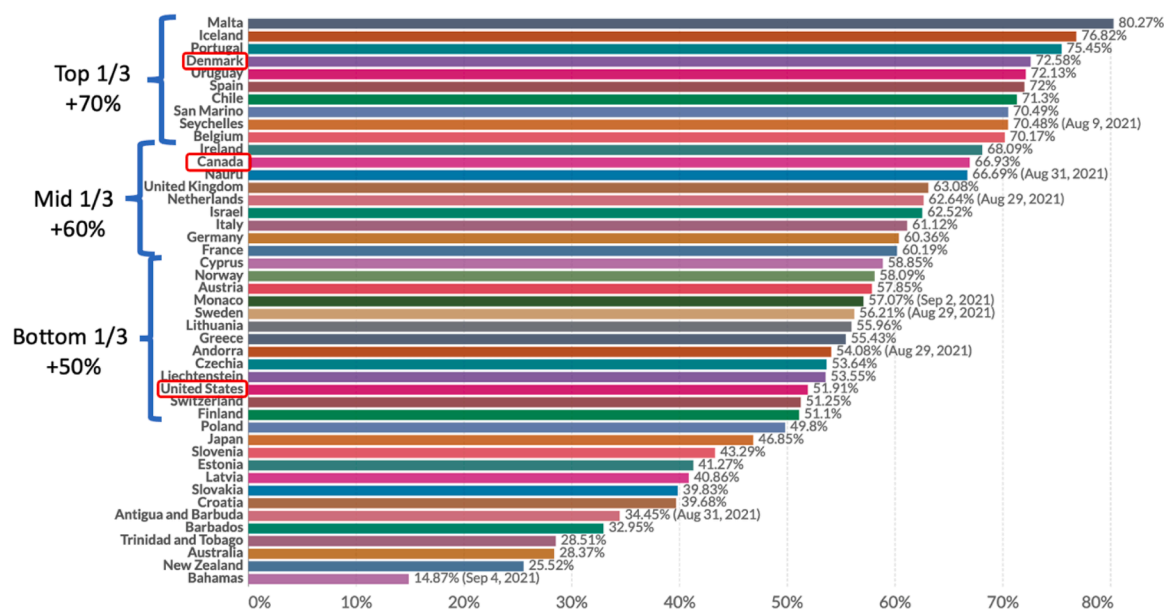


Fig. 1. Share of the population fully vaccinated against COVID-19, September 1, 2021, *The total number of people who received all doses prescribed by the vaccination protocol, divided by the country’s total population. All countries represented on the graph are both considered high-income [25] and liberal democracies [26]¹. Source: Authors’ analysis on data retrieved from Our World in Data [27].

Table 2

Country characteristics.

	Denmark	Canada	United States
Population	5,831,404	38,005,238	329,484,123
Density people/Km ²	145.785	4.239	36
Median age	41.1	40.1	37.4
Life expectancy at birth	81 (2019)	82 (2019)	79 (2019)
% People over 65 years old	20	18	17
Old-age dependency ratio	57	51	54
GDP per capita (USD)	\$60,908.84	\$43,241.62	\$63,543.578
Employment rate	66.8% (2021)	60.9% (2021)	58.7% (2021)

*Data is from 2020 unless otherwise stated.

Source: [29]

Table 3

. Supply factors.

	Denmark	Canada	United States
	National Healthcare System (NHS)	National Healthcare System (NHS)	Mixed Public and Private
% of the population with access to healthcare	All citizens Universal Healthcare	All citizens Universal Healthcare	92% ¹ (2019)
% of the population uninsured	0 citizens	0 citizens (excludes dental care, vision, some prescription drugs, and behavioral healthcare [30])	10.9% [31]
Total general government expenditure (% GDP)	54%	52.45%	46.18%
% Health expenditure on GDP	10% (2019)	11.5% (2019)	17.7% (2019)

*All data are from 2020 unless otherwise specified

¹ The percentage of people with health insurance coverage for all or part of 2019 [87].

successful: trust in the government and its health officials, a collective mentality, and the agreement not to politicize COVID-19.

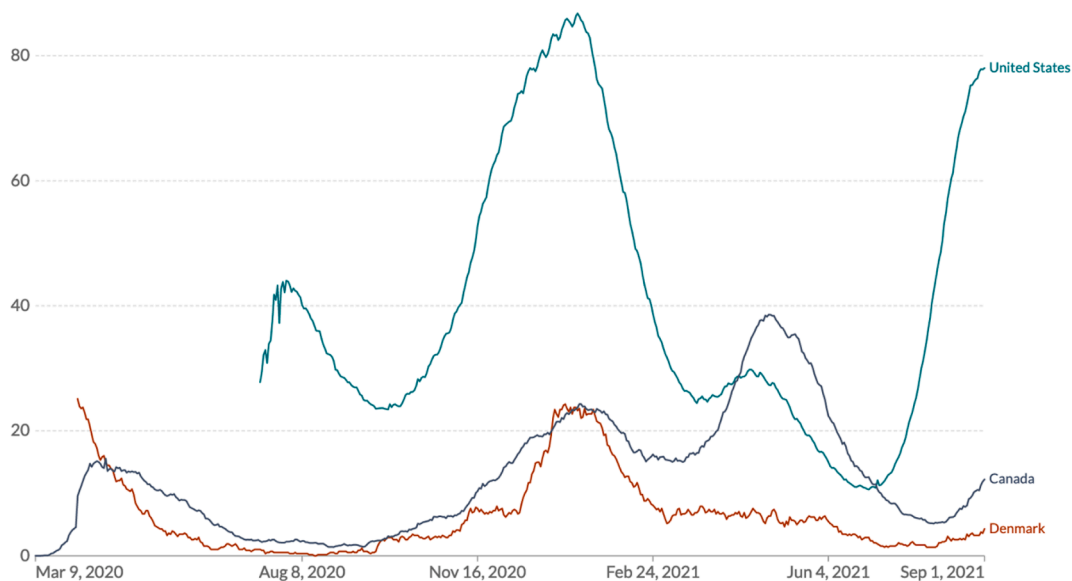
Compared with other OECD countries, Denmark shows a high level of trust in the Danish health authorities and the government. Because of this, when the Danish health authorities stated that compliance with testing and other COVID-19 guidelines such as vaccination was a moral obligation, citizens followed the call and pursued a collective effort to end the pandemic. Finally, the governing Social Democrats agreed with oppositional parties to leave COVID-19 out of political discussions [36].

The high levels of trust in government and, almost more significantly, in the country’s health authorities led to increased acceptance of (health) policies and adherence to official (health) recommendations [37]. In Denmark, over 90% of the citizens trust the Danish health authorities, and over 70% trust the Danish government [38]. These tremendous levels of confidence in officials resulted in high vaccination rates and the widespread acceptance of key policies such as testing and COVID-19 passports [39]. Intersecting with trust in government are exceptionally low rates of vaccine hesitancy in Denmark compared to other EU nations. Notably, Danes of all ethnicities have comparably low rates of vaccine hesitancy, with hesitancy no higher among racial/ethnic minority groups compared to ethnic Danes [40].

While other country’s struggle to provide their populations with a "reason" to get vaccinated, the Danish health authorities presented vaccinations as a social contract. This eliminated the social dilemma where individuals fought against the societal goal of disease elimination and instead only presented the collective option of disease eradication [41]. The Danish society is generally based on trust, which is why the population agrees to pay one of the highest rates of income tax worldwide. This agreement provides for which provides for an extensive security net granting citizens subsidies throughout their life course. Because of this collective mentality, Denmark steadily increased the number of citizens fully immunized.

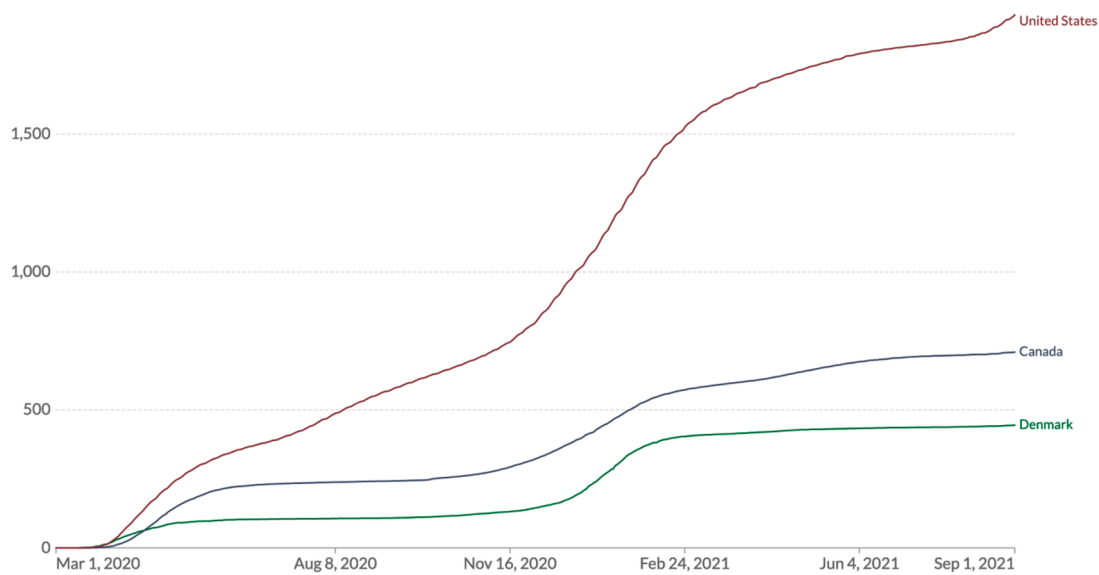
On August 27, 2021 the Danish government released a press statement saying they no longer considered COVID-19 a "socially critical disease" [42]. In the same statement, Health Minister Magnus Heunicke announced that "the epidemic is under control" [42] despite warning that the epidemic was not over.

As a result, Denmark became the first country worldwide to drop all COVID-19 restrictions and measures in September 2021. Face masks



Source: (32)

Fig. 2. Number of COVID-19 patients in ICU per million relative to the population, Source: [32].



Source: (32)

Fig. 3. Cumulative confirmed COVID-19 Deaths per million people, Source: [32].

were no longer required (the exception is at the airport), the COVID-19 passport was no longer necessary to enter restaurants, events, or hairdressers, and distancing measures, although still recommended, was no longer a top priority. The only measures still active were those at the borders and the airport.

ⁱ Japan, Australia, and New Zealand are not included in our study despite being high income liberal democracies because they are not representative of this country group. In these three countries, the COVID-19 rates were so low they opted not to prioritize vaccine campaigns [86]. In addition, Japan the Olympic summer games were held during the summer of 2021 making it an outlier case in and of itself.

The final reason why compliance with measures and vaccination was so high in Denmark is that COVID-19 was not politicized. A highly partisan atmosphere is rarely beneficial during a pandemic as it often impedes the decision-making process necessary for early diagnosis, prevention, and treatment [43]. In Europe, Populist Radical Right (PRR) parties (see [44] for a comprehensive definition) often chose to discredit governments' COVID-19 strategies [20], thereby causing confusion and mistrust. Although not one of the cases discussed here, Austria (as well as other countries: AfD in Germany, Lega, Fratelli d'Italia, Casa Pound in Italy, etc.) had a particularly big problem with the PRR Freedom Party (FPÖ) and their continuous attacks on government COVID-19 measures, calling them useless and freedom inhibiting [45]. Once vaccinations were introduced, the FPÖ actively questioned the effectiveness of the

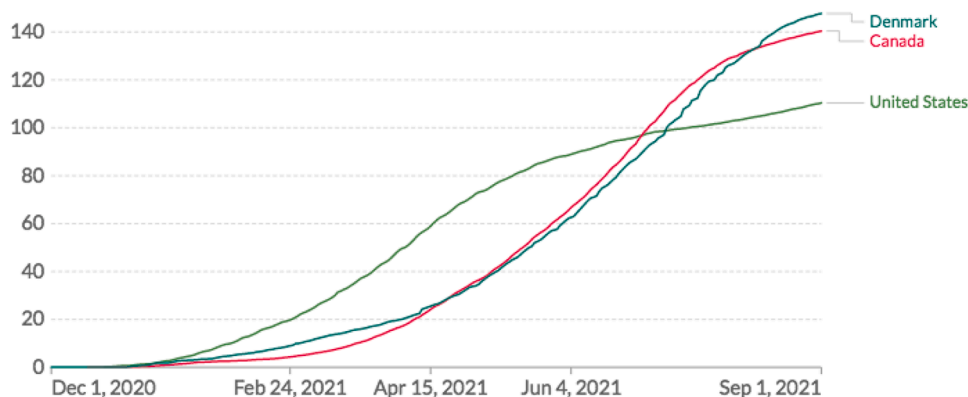


Fig. 4. Vaccination Timelines – the number of COVID-19 vaccine doses per 100 people, This figure depicts the number of COVID-19 vaccine doses per 100 people (y-axis) over the time period of study (x-axis). Total number of doses administered, divided by the total population of the country, Source: [32].

vaccines and openly suggested that vaccines were not necessary for citizens with a strong those citizens having a strong immune system.

The governing Social Democrats in Denmark, made up of a minority coalition including the Social Democrats, the Socialist People's Party, and the Red-Green Alliance, agreed on Social Democrat Mette Frederiksen as Prime Minister. The coalition agreed with the opposition parties to leave COVID-19 out of political discussions [36]. This led to two significant outcomes: (1) the governing party involved the opposition parties in the decision-making process, thus working together [46,47]. (2) This unified approach, in turn, increased the population's trust in the government because all parties agreed with the measures passed, thereby giving critics little to no room to oppose the decisions made by the Danish government.

The United States

The United States was rated by the Johns Hopkins University Global Health Security Index as the most prepared nation in the world for a global pandemic [48]. Yet, six months after the beginning of the pandemic and nearly two years later, the United States is in the top four countries with the highest death rate per 100,000 and the most significant number of COVID-19 deaths overall [49]. Figs. 2–4 show that the United States consistently had the highest COVID-19 cases, deaths, and ICU beds occupied compared to Canada and Denmark. Due to broad failures under the Trump Administration in 2020 to contain the pandemic through public health measures [12], the new administration under President Biden sought to pursue an aggressive and fast-tracked vaccination campaign, guaranteeing eligibility to all Americans for vaccination by May 1, 2021, with a hope to return to a 'new normal' by July 2021 [50].

While the US vaccination campaign was broadly successful in the spring of 2021, surpassing other Western democracies with vaccination rates and rollout [51], the United States fell substantially behind as vaccination uptake steeply declined over the summer and into fall 2021. By September 2021, as shown in Fig. 1, the United States fell to the bottom third of OECD nations in their proportion of the population fully vaccinated against COVID-19, with only 50% of eligible persons fully vaccinated.

There are two primary reasons why the United States lags other OECD nations once again, despite being hailed as a likely public health champion at the beginning of the pandemic. These reasons are *access to vaccinations* and *vaccine hesitancy*.

Access to vaccinations includes the ability to navigate systems of care, pay for care, and physically receive care. The US healthcare sector is infamous for its complexity and inequality. The US spends more on healthcare than any other country while simultaneously having nearly 30 million uninsured [52]. This high spending on healthcare comes with tradeoffs at the expense of preventative public health bureaucracies

where the US has historically underfunded capacity. Spending on public health infrastructure at the federal and local levels has been cut by nearly 20% over the past three years, following a trend of continuous reductions over the past ten years [53].

With very low healthcare decommodification [11] and an outlier in its' limited welfare state generosity [8], access to health services plagues the US' high rates of uninsurance and underinsurance inhibit access to care, including challenges accessing vaccines. Although the Biden Administration made vaccines free of charge, many Americans were unaware of this benefit given the historic challenges rife with the ability to pay for medical care in the country [54]. Decades of insufficient funding for public health systems made the rollout of vaccine programs challenging. These resource constraints adversely affected public health vaccine outreach efforts to low-income and minority groups that may face more significant barriers navigating the complex healthcare system to access a vaccine or experience other barriers such as time, transportation, and administrative barriers that restrict vaccine access. In late spring of 2021, more than half (55%) of unvaccinated Black adults and almost three-quarters (64%) of Hispanic adults were concerned about having to miss work due to vaccine side effects, and over half of Hispanic adults were concerned about having to pay out of pocket costs for vaccine access [55].

Vaccine hesitancy is a complicated issue in the United States given the influence of rising rates. Vaccine hesitancy is particularly complicated given the influence of rising rates of populism and mistrust in government and the anti-vax movement. Wealthier countries are broadly more vaccine skeptical, yet the United States remains an outlier [56].

The anti-vax movement in the United States received a notable boost intersecting with the populist radical right agenda of the Trump administration [57]. While the Antivax movement in the United States began as a movement among wealthy liberals [58], in 2020, vaccine skepticism was highest among conservative or Republican Americans [59]. Populism has long existed in American politics [60]. Still, it increased notably since the early 2000s as racial resentment and animus rose among white Americans against racial and ethnic minorities [61] over economic concerns and threats to the status quo during the 2008 economic recession and election of Barack Obama [62,63]. Rising populism overall challenges the legitimacy of government officials, elected and unelected, which may have adverse consequences for bureaucrats tasked with protecting public safety like public health officials.

Mistrust in government increased substantially over the past decade [64]. The Trump campaign in 2016 leveraged and stoked public opinions of economic threat and racism resentment, campaigning on a platform of populist radical right rhetoric, denouncing existing norms, political institutions, and processes [65]. The Trump campaign and administration's use of populism to simultaneously reduce the legitimacy of government and feelings of threat or resentment among core

Table 4
Vaccination supply & healthcare governance.

	Denmark	Canada	United States
Regulatory Body	European Medicines Agency (EMA)	Government of Canada (Health Canada)	US Food and Drug Administration (FDA)
Vaccine approved and date of approval	1. Pfizer/BioNTech (Approval: 12/21/20) 2. Moderna (Approval: 3/11/21) 3. Janssen (Johnson & Johnson) (Approval: 1/6/21) 4. AstraZeneca (1/29/21)	1. Pfizer/BioNTech (Approval: 12/11/20) 2. Moderna (Approval: 12/23/20) 3. Janssen (Johnson & Johnson) (Approval: 3/5/21) 4. Oxford/AstraZeneca (Approval: 2/26/21) 5. Serum Institute of India Covishield (Oxford/Astrazeneca formulation) (Approval: 1/23/20)	1. Pfizer/BioNTech (Approval: 12/10/20) 2. Moderna (Approval: 12/18/20) 3. Janssen (Johnson & Johnson) (Approval: 2/27/21)
Contract type	Conditional Marketing authorization (requires annual renewal application)	Authorized (with terms and conditions)	Vaccines Authorized for Emergency Use by FDA
Administration (central vs. regional)	The 5 regions are partly responsible for the distribution and transportation of the vaccines and responsible for vaccinating the population	Regional (Provinces and territories are responsible for vaccinating individuals)	Regional (each state, tribe, and territory developed its own plan for distributing the vaccine to people in their jurisdiction)
Mandates to vaccinate	No	Yes, vaccination for employees of the executive branch and contractors who do business with the federal government	Yes, core public service, air travel, and rail employees by the end of October 2021
Digital certification/QR code for coronavirus status (Health pass or green pass)	Yes (EU Digital COVID certificate)	Not Standardized-varies by province	No digital vaccine verification
Mandates of digital certification to frequent indoor public venues	Yes (EU Digital COVID certificate can be used for event/venue access and travel within the EU)	No	No

supporters likely substantially influenced risks of violence against public health officials by promoting racialization in government and undermining democracy. President Trump frequently used racialized rhetoric to incite blame against racial/ethnic minority groups for the pandemic and further inflame anti-government protests over public health measures [66]. During the first wave of the COVID-19 pandemic, Trump supporters stormed local and state government buildings and homes of elected officials in armed protests against elected officials [67]. Public opinion research conducted prior to the 2020 election demonstrated strong support for authoritarianism, anti-government sentiment, and violence among white Trump supporters [68].

In addition to promoting anti-government sentiment, the Trump

administration wielded misinformation about the risks of the COVID-19 pandemic. The broad use of misinformation by elected officials and high-ranking Republican Party members continued through 2021, even after Donald Trump left office [69]. The continued promotion of misinformation about the risks of COVID-19, public health measures, and vaccines all contribute to rising vaccine hesitancy among Americans but especially among conservatives [59]. This high level of misinformation promoted by public officials was further exacerbated by ongoing challenges faced around the world with a lack of regulation of vaccine misinformation on social media. Not until the fall of 2021 did Facebook and YouTube agree to retract posts containing misinformation about coronavirus or the COVID-19 vaccines [70].

Canada

Canada has broadly been the dark horse in the COVID-19 pandemic, with comparably low cases and deaths rates of cases and deaths compared to other OECD nations and in particular compared to other western democracies [71]. Canada leveraged a more precautionary approach with multiple layers of public health measures leading to the longest lockdown in health measures [72]. Canada was more cautious than most countries in the third pandemic wave, leading to the longest lockdown in North America in the spring of 2021. While vaccine access was increasing in high-income countries, Canada framed vaccines as a necessary part, or the most important part, of a broad public health strategy to protect the population from COVID-19 and avoid lockdowns [72].

Canada's vaccination program was rife with supply-side challenges in the spring of 2021. While their neighbors to the south received vaccines with no wait times four months earlier for the general public [73], Canadians experienced a staggered rollout related to supply shortages, prioritizing at-risk populations for initial first doses, and delaying first doses to the general, non-elderly population until at-risk groups had received their second dose in the late spring, early summer of 2021. Most adult (non-elderly) Canadians could not book their first dose appointment until the summer of 2021 [74]. Despite these substantial delays, Canada had surpassed the United States with a higher proportion of the population fully vaccinated by July of 2021 (See Fig. 4). As shown in Fig. 1, Canada was at the top of the second-third of OECD nations in their proportion of the population fully vaccinated against COVID-19 by September 2021, with 66% of eligible persons fully vaccinated.

There are two primary reasons why the Canadian vaccine campaign was more successful than in the United States, but not as successful as in Denmark. These reasons are vaccine access and prioritization, and trust in government and public health.

While Canada's healthcare system is more fragmented than Denmark, creating more administrative barriers, the Canadian healthcare system is much more centralized with substantially reduced access barriers and complexity compared to the United States [75]. By virtue of a single-payer healthcare system, Canadians never had to worry about not being able to access vaccines due to costs. The federal government provided additional funding directly to provinces to develop educational marketing and direct outreach campaigns to increase vaccine access and uptake [76].

Canada established a vaccine prioritization strategy early on for highly at-risk indigenous communities. The federal government sent targeted outreach teams to remote communities, specifically indigenous groups, in the winter of 2021 to offer vaccinations and information about vaccines [77]. Members of indigenous communities were recruited to lead outreach efforts. These efforts were so successful that over 60% of indigenous communities nationally were fully vaccinated by the summer of 2021 as the general population gained access to their first dose [78]. Notably, in a survey conducted prior to the availability of vaccines in Canada, over two-thirds of members of most indigenous groups in Canada were likely to get the vaccine, or had low-self-reported rates of vaccine hesitancy [79]. While vaccine uptake was high and

hesitancy remained low among indigenous populations, other at-risk groups in Canada, specifically Black and Latinx identifying Canadians, reported the highest rates of vaccine skepticism, with just over 50% of Black Canadians and just under two-thirds of Latinx Canadians reporting they would receive the vaccine. Despite this initially reported hesitancy, vaccine hesitancy declined across groups throughout 2021 [80] likely related to Canadian's high trust in government and public health.

Trust in government or support for government health officials has remained strong in Canada. Where other western democracies have experienced populist radical right waves and authoritarian tendencies [20], Canadian national politics has evaded these trends and taken national action to oust radical regimes [81]. Limited influence from anti-government political movements and strong support for public bureaucracies likely influenced high rates of support for governmental public health officials during the COVID-19 pandemic. Public opinion data demonstrate Canadians have a high degree of trust in Chief Medical Officers at the provincial level and strongly value the role of scientific evidence and medical advice in *government decision-making and emergency response* [82]. During the vaccine rollout, public health bureaucrats, including Chief Medical Officers, were highly involved in public health messaging around the scientific merit and critical value of the vaccines for protecting public safety. The confidence the public placed in these officials underscores the substantial importance of the messages they convey to the public and the support for and value of governmental public health intervention.

Despite the intense degree of trust and confidence in government, science, and public health among most Canadians, a small but vocal anti-vax movement in the Western Province of Alberta contributed to the lowest vaccination rates in the country [83]. Misinformation and far-right ideologies are associated with the anti-vax movement in Alberta [84].

Discussion and conclusion

The introduction of vaccines against the COVID-19 virus gave policymakers a proactive tool with which to fight the ongoing pandemic. Yet, despite vaccine demand, high-income countries took concerted efforts to hoard vaccine supplies to protect their own populations (at the expense of global virus mitigation efforts). There is considerable heterogeneity and limited success in vaccine uptake among these nations. Denmark, the United States, and Canada are high-income liberal democracies that each had very different vaccine strategies and subsequently also vaccination outcomes.

There are three takeaways from this paper. The first is access to healthcare. As the case of the United States showed, despite vaccines being free, many Americans were unaware of this and opted not to get vaccinated for fear of the costs. Universal health coverage and access, as practiced in most other high-income liberal democracies, prevented this issue, thereby increasing vaccination uptake.

The second takeaway is trust in the government or health officials. There is a notable relationship between high trust in government or health officials and high vaccination uptake in the case countries. The United States is the counterfactual case demonstrating that resources alone do not necessitate success [85]. Compared to the United States, Denmark and Canada exhibit evidence that trust in government, trust in health officials and the public health system, trust in vaccines, and access appear to count more than resources (financial or otherwise) during a pandemic. That is to say, while supply and demand-side economics or resource capacity might make a difference in many countries, trust appears to be a moderating factor influencing vaccination rates even in the face of high resource capacity. The more professional, informed, and credible a government and its health officials present themselves, the easier it is for citizens to receive and support new information. In addition, a collectively oriented mindset, as is typical in Scandinavian countries, also supports high levels of vaccine uptake.

Finally, the lack of politicization of COVID-19, or politicization of

public health, within the political realm increases the support for governmental messaging and evidence-based messaging, while decreasing the amount of anti-vax or other counterproductive rhetoric within a population. There are many strategies to increase vaccination uptake (authoritarian force, bribery, or punishment). Still, within high-income liberal democracies, it seems that trust in officials and a collective depoliticization of the pandemic carried the most weight.

The findings of this analysis are provisional as they only cover the first six months of the vaccination campaigns in these three countries. The findings are based on a descriptive analysis of the situation and the campaigns in the countries during the time of research. Despite these limitations, our results provide fodder for public health policy going forward in efforts to improve vaccination rates and end the pandemic. Notably, resources alone are insufficient, especially if a high level of resource availability in one area (here vaccine supply) co-exists on a foundation of a fractured and low-resourced welfare state. Secondly, the degree to which policymakers can improve trust in government and *depoliticize* public health to mitigate vaccine skepticism and increase trust in public health campaigns will be crucial going forward. Future analysis on the continuing vaccination campaigns (including the booster campaigns) will undoubtedly be able to add to these findings.

Funding

None.

Ethical approval

Not required.

Patient consent

Not required.

Declaration of Competing Interest

None declared.

Acknowledgments

We thank Maria Rahman for her help with the data collection.

References

- [1] Holmager TL, Lynge E, Kann CE, St-Martin G. Geography of COVID-19 in Denmark. *Scand J Public Health* 2021;49(1):88–95.
- [2] Detsky AS, Bogoch II. COVID-19 in Canada: experience and response. *JAMA* 2020;324(8):743–4.
- [3] CDC C, Team R, Jorden MA, Rudman SL, Villarino E, Hoferka S, et al. Evidence for limited early spread of COVID-19 within the United States, January–February 2020. *Morb Mortal Wkly Rep* 2020;69(22):680.
- [4] Desson Z, Weller E, McMeekin P, Ammi M. An analysis of the policy responses to the COVID-19 pandemic in France, Belgium, and Canada. *Heal Policy Technol* 2020;9(4):430–46.
- [5] Mishra S, Scott JA, Laydon DJ, Flaxman S, Gandy A, Mellan TA, et al. Comparing the responses of the UK, Sweden and Denmark to COVID-19 using counterfactual modelling. *Sci Rep* 2021;11(1):1–9.
- [6] Carter DP, May PJ. Making sense of the US COVID-19 pandemic response: a policy regime perspective. *Adm Theory Prax* 2020;42(2):265–77.
- [7] Cook TM, Roberts JV. Impact of vaccination by priority group on UK deaths, hospital admissions and intensive care admissions from COVID-19. *Anaesthesia* 2021;76(5):608–16.
- [8] Esping-Andersen G. *The three worlds of welfare capitalism. The three worlds of welfare capitalism.* Princeton, NJ: Princeton University Press; 1990. p. 1–33.
- [9] Kudrle R, Marmor T, Flora P, Heidenheimer A. *The development of the welfare state in North America. The development of the welfare state in Europe and America.* New Brunswick: Transaction Books; 1981.
- [10] OECD. *Health expenditure in relation to GDP [Internet]. Health at a glance 2019: OECD indicators.* Paris; 2019. Available from: <https://www.oecd-ilibrary.org/docserver/592ed0e4-en.pdf?expires=1631873478&id=id&accname=guest&checksum=B9B367A41B9E4BCDAF0EE1B5C0E01D3E>.

- [11] Bamba C. Worlds of welfare and the health care discrepancy. *Soc Policy Soc* 2005; 4(1):31–41.
- [12] Singer PM, Willison CE, Moore-Petina N, Greer SL. Anatomy of a failure: COVID-19 in the United States. *Coronavirus politics: the comparative politics and policy of COVID-19*. 2021. p. 478–93.
- [13] Tridimas G. Constitutional monarchy as power sharing. *Const Political Econ* 2021; 32(4):431–61. <https://doi.org/10.1007/s10602-021-09336-8> [Internet] Available from: .
- [14] OECD O.. Trust in government, policy effectiveness and the governance agenda. *Government at a glance*. 2013. p. 2013.
- [15] Easton D. An approach to the analysis of political systems. *World Politics* 1957;9(3):383–400.
- [16] Soss J, Fording RC, Schram SF. *Disciplining the poor: neoliberal paternalism and the persistent power of race*. University of Chicago Press; 2011.
- [17] Michener J. *Fragmented democracy: medicaid, federalism, and unequal politics*. Cambridge: Cambridge University Press; 2018 [Internet] Available from: <https://www.cambridge.org/core/books/fragmented-democracy/9A69DF1567190EF38883D4766EBC0AAC>.
- [18] Tani KM. States of dependency: welfare, rights, and american governance, 1935–1972 [Internet]. *Studies in legal history*. Cambridge: Cambridge University Press; 2016. Available from: <https://www.cambridge.org/core/books/states-of-dependency/082BC67469253538642EBF9165887202>.
- [19] Greer SL, Bekker M, de Leeuw E, Wismar M, Helderman JK, Ribeiro S, et al. Policy, politics and public health. *Eur J Public Health* 2017;27(suppl_4):40–3. Oct.
- [20] Falkenbach M, Greer SL, Falkenbach M, Greer SL. *The populist radical right and health: national policies and global trends*. Springer; 2021.
- [21] Esping-Andersen G. *The three worlds of welfare capitalism*. Princeton, NJ: Princeton University Press; 1990.
- [22] Nehru BK. Western democracy and the third world. *Third World Q* 1979;1(2): 53–70.
- [23] The World Bank. High income. World Bank Group; 2021 [Internet] [cited 2021 Sep 17]. Available from: <https://data.worldbank.org/country/XD>.
- [24] Ritchie H., Mathieu E., Rodes-Guirao L., Appel C., Giattino C., Ortiz-Ospina E., et al. Coronavirus pandemic (COVID-19) [Internet]. *OurWorldInData.org*. 2020 [cited 2021 Sep 17]. Available from: <https://ourworldindata.org/coronavirus>.
- [25] The World Bank. High income. World Bank Group; 2021.
- [26] Freedom House. *Freedom in the World*. Washington D.C.; 2021.
- [27] Ritchie H., Mathieu E., Rodes-Guirao L., Appel C., Giattino C., Ortiz-Ospina E., et al. Coronavirus pandemic (COVID-19). *OurWorldInData.org*. 2020.
- [28] BBC News. Covid-19: first vaccine given in US as roll-out begins. *BBC News*; 2020 [Internet] [cited 2021 Oct 12]. Available from: <https://www.bbc.com/news/world-us-canada-55305720>.
- [29] The World Bank. World Bank open data [Internet]. *data.worldbank.org*. 2021 [cited 2021 Oct 12]. Available from: <https://data.worldbank.org/>.
- [30] Tikkanenn R., Osborn R., Mossialos E., Djordjevic A., Wharton G.A. *International health care system profiles Canada* [Internet]. The Commonwealth Fund. 2020. Available from: <https://www.commonwealthfund.org/international-health-policy-center/countries/canada>.
- [31] Tolbert J., Orgera K., Damico A. Key facts about the uninsured population [Internet]. Kaiser Family Foundation. 2020. Available from: <https://www.kff.org/uninsured/issue-brief/key-facts-about-the-uninsured-population/>.
- [32] Ritchie H., Mathieu E., Rodes-Guirao L., Appel C., Giattino C., Ortiz-Ospina E., et al. Coronavirus pandemic (COVID-19). 2021.
- [33] Gronholt-Pedersen J., Skydsgaard N. Fast in, first out: Denmark leads lockdown exit [Internet]. Reuters. 2020 [cited 2021 Oct 6]. Available from: <https://www.reuters.com/article/us-health-coronavirus-denmark/fast-in-first-out-denmark-leads-lockdown-exit-idUSKBN2U1TC>.
- [34] Mathieu E., Ritchie H., Ortiz-Ospina E. A global database of COVID-19 vaccinations [Internet]. *OurWorldInData.org*. 2021 [cited 2021 Oct 4]. Available from: <https://ourworldindata.org/covid-vaccinations>.
- [35] Danish Health Authority. Target groups for vaccination. Danish Health Authority; 2021 [Internet] Available from, <https://www.sst.dk/en/English/Corona-eng/Vaccination-against-COVID-19/Who-should-be-vaccinated>.
- [36] ORF Zeit im Bild II. Gesundheitsexperte über die Impfquote [Internet]. Austria: ORF; 2021. Available from: <https://tvthek.orf.at/profile/ZIB-2/1211/ZIB-2/14105445>.
- [37] Olganier D, Mogensen TH. The Covid-19 pandemic in Denmark: big lessons from a small country. *Cytokine Growth Factor Rev* 2020;53:10–2 [Internet]. 2020/05/13 Jun Available from: <https://pubmed.ncbi.nlm.nih.gov/32405247>.
- [38] OECD. Trust in government (indicator) [Internet]. 2021. Available from: <https://data.oecd.org/gga/trust-in-government.htm>.
- [39] Lindholt MF, Jørgensen F, Bor A, Petersen MB. Public acceptance of COVID-19 vaccines: cross-national evidence on levels and individual-level predictors using observational data. *BMJ Open* 2021;11(6):e048172.
- [40] European Union. Denmark: special efforts for COVID-19 vaccination in areas with ethnic minority residents [Internet]. European Web Site on Integration. 2021 [cited 2021 Oct 10]. Available from: <https://ec.europa.eu/migrant-integration/news/denmark-special-efforts-for-covid-19-vaccination-in-areas-with-ethnic-minority-residents>.
- [41] Korn L, Böhm R, Meier NW, Betsch C. Vaccination as a social contract. *Proc Natl Acad Sci* 2020;117(26):14890–9.
- [42] Sundhedsministeriet. Regeringen vil ikke forlænge kategorisering af covid-19 som en samfundskritisk sygdom i Danmark [Internet]. Sundhedsministeriet. 2021 [cited 2021 Oct 6]. Available from: <https://sum.dk/nyheder/2021/august/regeringen-pl-anlaegger-ikke-at-forlaenge-kategorisering-af-covid-19-som-samfundskritisk-sygd-om>.
- [43] Waksman R. COVID-19: leave politics out of practicing medicine. *Cardiovasc Revasc Med* 2020;21(8):937–8 [Internet] 2020/05/15 Aug Available from: <https://pubmed.ncbi.nlm.nih.gov/32423792>.
- [44] Mudde C. *Populist radical right parties in Europe*. Cambridge University Press; 2007.
- [45] Falkenbach M, Heiss R, Falkenbach M, Greer SL. *The Austrian freedom party in government: a threat to public health? The populist radical right and health: national policies and global trends*. Springer; 2021.
- [46] Petersen M.B., Bor A. Denmark appears to have beaten covid-19 — for now. Here's how it did it. [Internet]. *Washington Post*. 2021 [cited 2021 Oct 4]. Available from: <https://www.washingtonpost.com/politics/2021/09/20/denmark-appears-have-beaten-covid-19-now-here-is-how-it-did-it/>.
- [47] Aarhus University Denmark. HOPE - how democracies cope with COVID19 a data-driven approach. School of Business and Social Sciences Aarhus University; 2021 [Internet] [cited 2021 Nov 1]. Available from: <https://hope-project.dk/#/>.
- [48] Cameron E.E., Nuzzo J.B., Bell J.A. *Global health security index: building collective action and accountability*. Balt Johns Hopkins, Bloom Sch Public Heal. 2019.
- [49] Johns Hopkins University and Medicine. Mortality analyses. Johns Hopkins University and Medicine; 2021 [Internet] Available from: <https://coronavirus.jhu.edu/data/mortality>.
- [50] The White House. Fact sheet: president Biden to announce all Americans to be eligible for vaccinations by May 1, puts the nation on a path to get closer to normal by July 4th [Internet]. Washington D.C.; 2021. Available from: <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/11/fact-sheet-president-biden-to-announce-all-americans-to-be-eligible-for-vaccinations-by-may-1-puts-the-nation-on-a-path-to-get-closer-to-normal-by-july-4th/>.
- [51] Jacobs E. They had leftover COVID vaccines. So they offered them to their canadian neighbors [Internet]. NPR. 2021. Available from: <https://www.npr.org/2021/05/17/996938155/border-communities-offer-surplus-covid-vaccines-to-canadian-neighbors>.
- [52] Berchick ER, Hood E, Barnett JC. *Health insurance coverage in the United States: 2018*. Washington, DC: US Department of Commerce; 2019.
- [53] Krisberg K. Trump budget proposal a disinvestment in US health: cuts to CDC, HRSA. *Nations Health* [Internet]. 2020;50(2):1–10. Available from: <https://www.thenationshealth.org/content/50/2/1.2>.
- [54] Morris D.Z. Nearly 7 million Americans might not get a COVID-19 vaccine because they don't know it's free [Internet]. *Fortune*. 2021 [cited 2021 Oct 14]. Available from: <https://fortune.com/2021/03/10/covid-vaccine-free-people-not-getting-coronavirus-vaccines-cost-price/>.
- [55] Kaiser Family Foundation. Most see low hospitalization rates among vaccinated as a sign that vaccine are working, but unvaccinated view breakthroughs as a sign that they are not [Internet]. KFF COVID-19. 2021 [cited 2021 Oct 14]. Available from: <https://www.kff.org/coronavirus-covid-19/dashboard/kff-covid-19-vaccine-monitor-dashboard/#concernsorbarriers>.
- [56] Trujillo K.L., Motta M. Why are wealthier countries more vaccine skeptical? How internet access drives global vaccine skepticism. 2020.
- [57] Singer PM, Willison CE. *Rhetoric and reality in the United States of America: Trump, populism and health policy. The populist radical right and health*. Springer; 2021. p. 157–67.
- [58] Lillvis DF, Kirkland A, Frick A. Power and persuasion in the vaccine debates: an analysis of political efforts and outcomes in the United States, 1998–2012. *Milbank Q* 2014;92(3):475–508.
- [59] Wright A. Republican men are vaccine-hesitant, but there's little focus on them [Internet]. *Pew Research Center*. 2021 [cited 2021 Oct 15]. Available from: <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/04/23/republican-men-are-vaccine-hesitant-but-theres-little-focus-on-them>.
- [60] Bonikowski B., Gidron N. Multiple traditions in populism research: toward a theoretical synthesis. *APSA Comparative Politics Newsletter*. 2016;26(12):7–14.
- [61] Jardina A. *White identity politics*. Cambridge University Press; 2019.
- [62] Mutz DC. Status threat, not economic hardship, explains the 2016 presidential vote. *Proc Natl Acad Sci* 2018;115(19):E4330–9.
- [63] Skocpol T, Williamson V. *The Tea Party and the remaking of Republican conservatism*. Oxford University Press; 2016.
- [64] Doherty C., Kiley J., Tyson A., Jameson B. Beyond distrust: how Americans view their government. *Pew Res Cent*. 2015.
- [65] Lacatus C. Populism and the 2016 American election: evidence from official press releases and Twitter. *PS Political Sci Politics* 2019;52(2):223–8.
- [66] Gollust SE, Nagler RH, Fowler EF. The emergence of COVID-19 in the US: a public health and political communication crisis. *J Health Politics Policy Law* 2020 Dec 1; 45(6):967–81. <https://doi.org/10.1215/03616878-8641506> [Internet] Available from: .
- [67] Ecarma C. Trump supporters are staging armed protests to stick it to coronavirus. *Vanity Fair*. 2020.
- [68] Bartels LM. Ethnic antagonism erodes Republicans' commitment to democracy. *Proc Natl Acad Sci* 2020;117(37):22752–9.
- [69] Kamarck E. COVID-19 is crushing red states. Why isn't Trump turning his rallies into mass vaccination sites? [Internet]. *Brookings*. 2021 [cited 2021 Oct 12]. Available from: <https://www.brookings.edu/blog/fixgov/2021/07/29/covid-19-is-crushing-red-states-why-isnt-trump-turning-his-rallies-into-mass-vaccination-sites/>.
- [70] De Vynck G. YouTube is banning prominent anti-vaccine activists and blocking all anti-vaccine content [Internet]. *Washington Post*. 2021 [cited 2021 Oct 14]. Available from: <https://www.washingtonpost.com/technology/2021/09/29/youtube-ban-joseph-mercola/>.
- [71] Grenier E. Pandemic-rattled Canadians still cautious about everything from schools to 2nd lockdowns, polls say [Internet]. *CBC*. 2020 [cited 2021 Oct 15]. Available

- from: <https://www.cbc.ca/news/politics/grenier-covid-caution-pandemic-polling-1.5652609>.
- [72] Government of Canada. Coronavirus disease (COVID-19): Canada's response [Internet]. canada.ca. 2021 [cited 2021 Oct 13]. Available from: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/canadas-reponse.html>.
- [73] AMJC. A timeline of COVID-19 vaccine developments in 2021 [Internet] Am J Manag Care 2021 [cited 2021 Oct 14] Available from: <https://www.ajmc.com/view/a-timeline-of-covid-19-vaccine-developments-in-2021>.
- [74] Balch B. Canada took a risk delaying second COVID-19 vaccine doses. Now, its vaccination campaign is one of the best in the world [Internet]. AAMC. 2021 [cited 2021 Oct 14]. Available from: <https://www.aamc.org/news-insights/canada-took-risk-delaying-second-covid-19-vaccine-doses-now-its-vaccination-campaign-one-best-world>.
- [75] Tuohy C. Remaking policy. University of Toronto Press; 2018.
- [76] Government of Canada. Government of Canada funds four new projects to encourage COVID-19 vaccination in Canada [Internet]. canada.ca. 2021. Available from: <https://www.canada.ca/en/public-health/news/2021/06/government-of-canada-funds-four-new-projects-to-encourage-covid-19-vaccination-in-canada.html>.
- [77] Warburton M. Northern territories, home to many of Canada's indigenous people, lead COVID-19 vaccine rollout [Internet]. Reuters. 2021 [cited 2021 Oct 14]. Available from: <https://www.reuters.com/article/us-health-coronavirus-canada-vaccine/northern-territories-home-to-many-of-canadas-indigenous-people-lead-covid-19-vaccine-rollout-idUSKBN2A00IV>.
- [78] Government of Canada. Government of Canada COVID-19 update for indigenous peoples and communities, week of July 26 [Internet]. canada.ca. 2021 [cited 2021 Oct 15]. Available from: <https://www.canada.ca/en/indigenous-services-canada/news/2021/07/government-of-canada-covid-19-update-for-indigenous-peoples-and-communities-week-of-july-26.html>.
- [79] Statistics Canada. COVID-19 vaccine willingness among Canadian population groups [Internet]. Statistics Canada. 2021 [cited 2021 Nov 11]. Available from: <https://www150.statcan.gc.ca/n1/pub/45-28-0001/2021001/article/00011-eng.htm>.
- [80] Parkin A., Sweetman A., Rego V., Li Y. Vaccine hesitancy is decreasing in Canada, but it's too soon to celebrate [Internet]. Canadian Healthcare Network. 2021 [cited 2021 Nov 1]. Available from: <https://www.canadianhealthcarenetwork.ca/vaccine-hesitancy-decreasing-canada-its-too-soon-celebrate>.
- [81] Dryden J. Independent MP, ousted by Tories over donation from white nationalist, leaves Ontario to run in Alberta [Internet]. CBC2. 2021 [cited 2021 Oct 14]. Available from: <https://www.cbc.ca/news/canada/calgary/derek-sloan-calgary-conservative-doreen-barrie-duane-bratt-1.6146827>.
- [82] Fafard P, Wilson LA, Cassola A, Hoffman SJ. Communication about COVID-19 from Canadian provincial chief medical officers of health: a qualitative study. CMAJ Open 2020;8(3):E560 [Internet] Jul 11P-E567 Available from: <http://www.cmajopen.ca/content/8/3/E560.abstract>.
- [83] Tang X, Gelband H, Nagelkerke N, Bogoch II, Brown P, Morawski E, et al. COVID-19 vaccination intention during early vaccine rollout in Canada: a nationwide online survey. Lancet Reg Health 2021;100055.
- [84] Jarry J. The anti-vaccine movement in 2020. McGill University Office for Science and Society; 2020 [Internet] [cited 2021 Oct 14] Available from: <https://www.mcgill.ca/oss/article/covid-19-pseudoscience/anti-vaccine-movement-2020>.
- [85] Kavanagh MM, Singh R. Democracy, capacity, and coercion in pandemic response: COVID-19 in comparative political perspective. J Health Politics Policy Law 2020; 45(6):997-1012. <https://doi.org/10.1215/03616878-8641530> [Internet] Dec 1 Available from:.
- [86] Rich M., Albeck-Ripka L., Inoue M. These countries did well with covid. So why are they slow on vaccines? [Internet]. The New York Times. 2021 [cited 2021 Oct 15]. Available from: <https://www.nytimes.com/2021/04/17/world/asia/japan-south-korea-australia-vaccines.html>.
- [87] Keisler-Starkey K., Bunch L.N. Health insurance coverage in the United States: 2019 [Internet]. 2020. Available from: <https://www.census.gov/library/publications/2020/demo/p60-271.html>.