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Original Article/Research

## Finding the way forward: COVID-19 vaccination progress in Germany, Austria and Switzerland

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### ARTICLE INFO

#### Keywords:

COVID-19  
Vaccination  
DACH  
Policy

### ABSTRACT

**Objectives:** : This paper presents an overview of the procurement and deployment of COVID-19 vaccinations in Germany, Austria and Switzerland (DACH) from the success of the first vaccine trials until the end of August 2021. Data regarding vaccination procurement and deployment is presented, followed by an analysis of the challenges these countries face in improving their vaccination rates.

**Methods:** : A review and analysis of available data from the DACH countries was conducted. Data was collected from official government sources whenever possible and supplemented by information from international databases and local reports. The data was analyzed to identify common patterns as well as divergences across the DACH region, especially as they relate to vaccine hesitancy and health policy.

**Results:** : Following initial global supply problems, the DACH countries were largely successful at administering vaccinations to their populations. However, by the end of August 2021 their vaccination progress had plateaued. This was primarily due to vaccine hesitancy in the region, which is correlated with a multitude of complex factors. These factors need to be better understood before this issue can be effectively addressed. Unlike other countries, the DACH countries have not (yet) used financial incentives or mandates to increase vaccination rates.

**Conclusions:** : The DACH countries displayed effective governance in their deployment of COVID-19 vaccines, but vaccine hesitancy is slowing progress. Due to various social and political factors, Germany, Austria and Switzerland have not been able to employ effective policy levers to overcome this barrier and a more nuanced strategy will have to be developed.

**Public Interest Summary:** : Germany, Austria and Switzerland (DACH) were largely successful at procuring COVID-19 vaccine doses and administering them to their populations. After the first doses were acquired, their vaccination rates continued to steadily rise, but progress began to slow down substantially by August 2021 due in part to vaccine hesitancy. Unlike in other countries, the DACH governments have not been able to implement vaccine mandates to try and overcome this issue due to their specific political and social circumstances. A deeper understanding of the factors driving vaccine hesitancy in the region will be required before effective solutions can be found.

### Introduction

In early 2020, the SARS-CoV-2 virus, which causes COVID-19, began to spread rapidly around the world, causing the first wave of a global pandemic that presented governments with formidable health policy challenges. [1] In Austria, Germany, and Switzerland (the DACH

countries), the damage caused by this first wave was managed relatively well, but the emergence of new and more virulent variant strains of the virus led to a devastating second wave of infections at the end of 2020 that resulted in far more hospitalizations and deaths in the region. [2, 3] However, governments in DACH also gained an important addition to their pandemic response toolkit during this period, as several COVID-19

The authors have no acknowledgements to include.

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<https://doi.org/10.1016/j.hlpt.2021.100584>

Available online 28 November 2021

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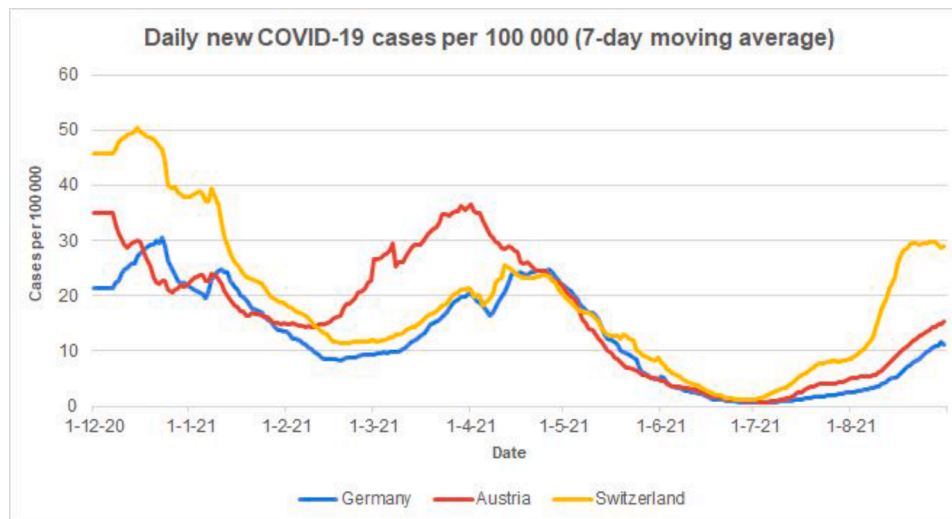


Fig. 1. - COVID-19 Case numbers in DACH during the early vaccination campaigns [13, 14, 15].

vaccine candidates passed through phase 3 clinical trials and obtained regulatory approval before the year's end. [4]

Despite early constraints to vaccine supply, all three DACH countries were able to begin their public immunization campaigns by the end of December 2020, coinciding with the emergence of the new, highly contagious Delta variant which would become the dominant strain of the virus as the pandemic continued through 2021. [5] However, by August 2021 vaccination rates had stagnated and the vaccination coverage in Germany, Austria and Switzerland began to lag behind that of most of their European counterparts.

Within the context of this still-evolving crisis, this paper focuses on understanding the factors that influenced the DACH countries' deployment of COVID-19 vaccines. This includes an analysis into the initial procurement challenges faced by the three countries, their vaccine deployment strategies, and the possible reasons behind their slow vaccination progress compared to most other Western countries. Following the model of another contemporary policy analysis conducted during the early stages of the COVID-19 pandemic [6], this analysis aims to provide insight into the key lessons to be learned from the region and the actions that may still need to be taken before the full benefits of vaccinations can be realized in the region, with a specific focus on the emerging challenge of vaccine hesitancy. The contemporary analysis provided by this paper will also contribute to evidence-based decision-making in future health emergency scenarios, improved vaccination deployment strategies and public health policy implementation. The data presented will also offer value to future research exploring public health policy, emergency governance, vaccination strategy, and healthcare systems.

## Background

All three DACH countries share borders, a common language, and a deeply intertwined history with one another, which has also led to many common elements across their collective cultural and social systems. All three countries share the typical demographic characteristics of highly developed nations, with 18–22% of their population aged 65 or older and average life expectancies between 80 and 84 years old, although Germany is home to a much larger population of 83 million compared to 8.8 and 8.5 million for Austria and Switzerland, respectively. [7] All three countries offer mandatory universal health insurance covering essential healthcare for all citizens, although Austria and Germany rely on a social health insurance system while Switzerland relies more on private actors. The healthcare systems in all three countries were also successfully able to adapt to the increased demands presented by

COVID-19 patients during the early stages of the pandemic. [6]

The DACH countries also share relevant similarities in their governance systems, with highly federalist structures normally granting broad decision-making autonomy to their individual states (Germany and Austria) and cantons (Switzerland). During the first waves of COVID-19, federalism and fragmented policy implementation in the region played a significant role in the DACH countries' ability to manage the pandemic. By the time vaccines became available, their governments had demonstrated sufficient institutional adaptation to minimize this fragmentation and manage public health policy through more centralized mechanisms. [6] Despite this, the advent of COVID-19 vaccination served to demonstrate that there were still fundamental structural differences between the three countries, as evidenced by significant variations in their respective regulatory and procurement processes for these vaccines.

## Regulatory and procurement decisions

Several key characteristics played a role in creating differences in vaccine regulation and procurement across the three DACH countries. The most substantial of these is Germany and Austria's membership in the European Union (EU), which ties them to the European Medicines Agency (EMA) as the authority responsible for the marketing authorization of all pharmaceutical products to be used in these countries. Switzerland, on the other hand, has its own regulatory agency called Swissmedic which governs their available pharmaceutical products and has historically had longer median approval times for new products (480 days) compared to the EMA (416 days). [8] Unsurprisingly, these fundamental institutional differences led to some variation in the approval timelines for the four principal vaccines that were deployed across Europe from the companies Pfizer-BioNTech (Pfizer), Moderna, AstraZeneca and Jansen.

The EMA approved the Pfizer, Moderna and Jansen vaccines for use in adults over 16 years of age on 21 December 2020, 6 January 2021 and 11 March 2021 respectively [9], while Swissmedic passed these same approvals on 19 December 2020, 12 January 2021 and 23 March 2021. [10] While these timelines are functionally similar, the two agencies diverged greatly in their evaluation of the AstraZeneca vaccine, which was approved by the EMA on 29 January 2021 but was still not approved by Swissmedic through the end of September 2021. [9, 10] However, controversy surrounded AstraZeneca's vaccine in Austria and Germany after the EU filed a dispute resolution procedure against the company on 19 March 2021, after it announced that it was not going to be able to deliver 90 million doses it had promised by the end of the second quarter

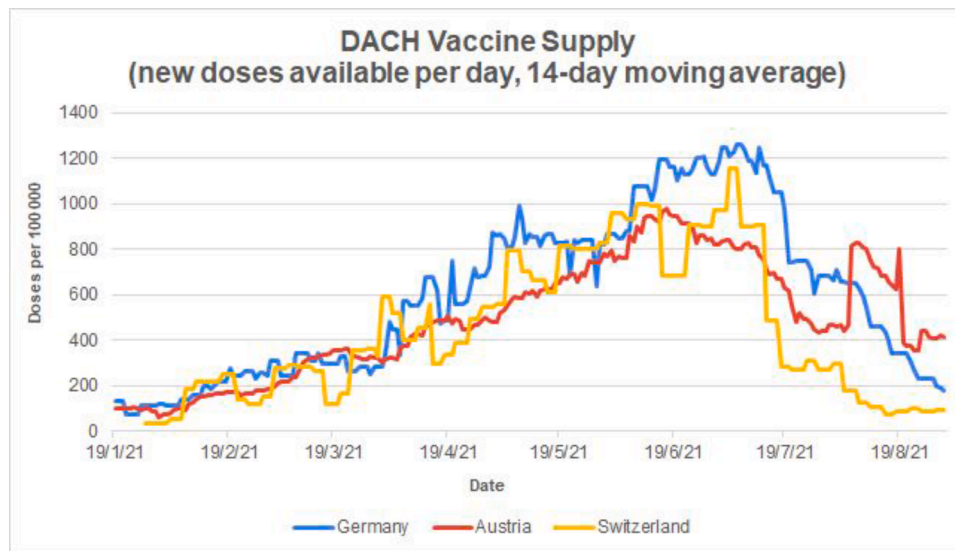


Fig. 2. Reported vaccine supply (new doses available per day) in Germany, Austria and Switzerland [13, 14, 15].

of 2021. [11] This was combined with growing safety concerns about the product that led Austria and Germany to restrict its use to older age groups [12], and as a result the product accounted for only 7.1% [13] (Austria) and 12.4% [14] (Germany) of all vaccination doses given in the two countries as of September 2021. The Jansen vaccine also encountered safety concerns. While it was approved by all three DACH countries, as of September 2021, Switzerland had not ordered a single dose of the product and it accounted for only 2.6% [13] (Austria) and 2.9% [14] (Germany) of all vaccination doses administered in the other two countries. A general lack of transparency throughout the procurement processes also makes it difficult to determine why certain vaccines were given approval while others, such as those produced in Russia and China, were not.

It is also important to consider the context within which these regulatory and procurement decisions were being made, as the arrival of the highly contagious Delta variant in Europe caused new spikes in case numbers during the early stages of the vaccination campaigns in DACH (Fig. 1), adding complexity to the decision-making process in the form of public pressure to procure vaccine doses as quickly as possible. This pressure was intensified after all three countries faced significant challenges with vaccine supply during the early stages of their immunization campaigns, despite having ordered enough doses to vaccinate their entire populations many times over. For Germany and Austria, access to vaccines was initially limited by their commitment to the European Union’s joint procurement scheme, which struggled to secure sufficient doses following regulatory approvals. These difficulties were further exacerbated by new divisions between the bloc and the United Kingdom (U.K.), which officially concluded its ‘Brexit’ on 31 December 2020, taking its significant vaccine production capacity out of the EU single market in the process. [16] The EU scheme received harsh criticism from the bloc’s own Member States and was frequently compared to the more

rapid progress taking place in the U.K., the United States and Israel, but it is possible that vaccine deliveries to these other countries were prioritized by industry because the EU had secured deals that guaranteed lower prices and thus offered lower profits. [17] This criticism reached a peak on 4 March 2021 when Austria, along with Denmark and Israel, announced the establishment of a vaccine supply alliance outside of the bounds of the EU procurement scheme, a development that caused political tension but ultimately did not result in meaningful shifts in vaccine procurement. [18]

As a state without EU membership, Switzerland was free to pursue its own strategy for vaccine procurement and chose not to participate in the EU process, but this did not save it from similar challenges in securing doses. The Swiss government also faced criticism over perceived missed opportunities, such as when the government failed to secure a meaningful agreement with a Swiss company (Lonza) after it became a major producer of the Moderna vaccine. [19] Swissmedic drew further criticism when it rejected the approval of AstraZeneca’s vaccine on 3 February 2021, during a period when delays in the delivery of Pfizer vaccines were forcing cantons to cancel existing immunization appointments, leading to high public frustration with the overall vaccination campaign. [10]

### Vaccine deployment

Eventually, all three DACH countries received their first shipments of vaccines and were able to administer their first doses before the end of 2020. Despite the initial setbacks and criticism, vaccine supply steadily increased in all three DACH countries and was eventually able to keep up with demand (Fig. 2), which appeared to peak in late June and early July. It should, however, be noted that data reporting of available vaccine supply reflects considerable inconsistency and time-lag,

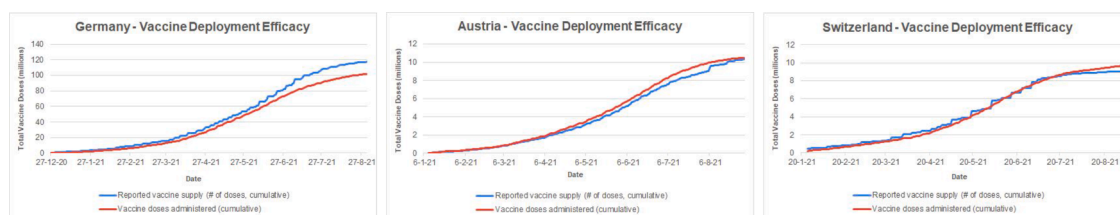


Fig. 3. - Vaccine deployment efficacy in Germany, Austria, and Switzerland (note that due to inconsistent data reporting the official number of doses administered may appear higher than the reported supply of available doses in Austria and Switzerland) [13, 14, 15].

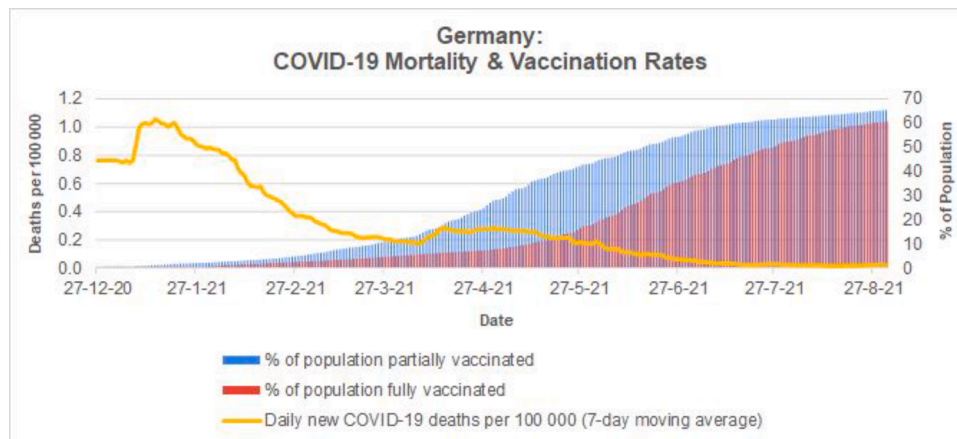


Fig. 4. - Vaccination progress in Germany compared with overall COVID-19 mortality [14].

particularly in Austria and Switzerland.

A possible positive consequence of the initial supply crunch is that the DACH countries were well prepared to deploy doses once they arrived, with all three demonstrating effective capabilities regarding vaccine administration and exemplifying how their federal structures had generally adapted to the crisis in order to avoid the issues of fragmentation observed earlier in the pandemic (Fig. 3). The governments of all three countries made it clear that residents would receive all required doses of approved vaccines in line with the recommended administration timelines, unlike in places like Canada and the United Kingdom where there were frequent large-scale changes in strategy.

In Germany, the acquisition of vaccine doses was financed by the central government, but these doses were then sent directly to individual states which were tasked with their deployment. The states were required to comply with the national “Ordinance on the entitlement to vaccination against the SARS-Cov-2 Coronavirus” which set the priority order for which population groups would be vaccinated first, starting with people over 80, people living in long-term care facilities and healthcare workers with a risk of exposure to the virus. [20] The states financed and set up 430 vaccination centres around the country and in most cases engaged in contracts with local medical-care aid organizations such as the Red Cross, Malteser and Caritas for their management. The first doses that arrived in each state were delivered either to hospitals for administration to healthcare providers, or directly to these vaccination centres, which used them to furnish mobile vaccination teams who were first tasked with vaccinating citizens and staff in

long-term care facilities before moving on to focus on homeless populations. [20]

By 4 March 2021, the vaccination campaign had advanced to the second priority groups, with vaccines being administered to people over 70 and those with high-risk comorbidities. On 7 April 2021 the states began to deliver vaccine doses directly to general practitioners and the immunization campaign reached full speed at the end of April with over 1 million doses being administered per day. [14] By 17 May 2021 most states had lifted all prioritization regulations and doses were available to all willing citizens over 18 years of age, leading to a steady rise in immunization numbers that continued through the summer. Despite this surge, vaccination rates had plateaued by the end of August 2021 with less than 65% of the population fully vaccinated (meaning they received all required doses of a certain vaccine), possibly indicating a barrier caused by vaccine hesitancy (Fig. 4).

In Austria, vaccine deployment followed a very similar approach, with procurement and a set of priority guidelines being set by the national government and the National Vaccination Council (Nationales Impfgremium), and the responsibility for the actual administration of vaccines being left with the individual states. [21] As occurred in Germany, the Austrian states financed and organized the establishment of regional vaccination centres and deployed mobile vaccination teams to long-term care facilities, with priority being given to immunocompromised people and those older than 80 with gradual access for younger and healthier groups. However, unlike in Germany, the Austrian government took extra steps at the national level to further standardize the

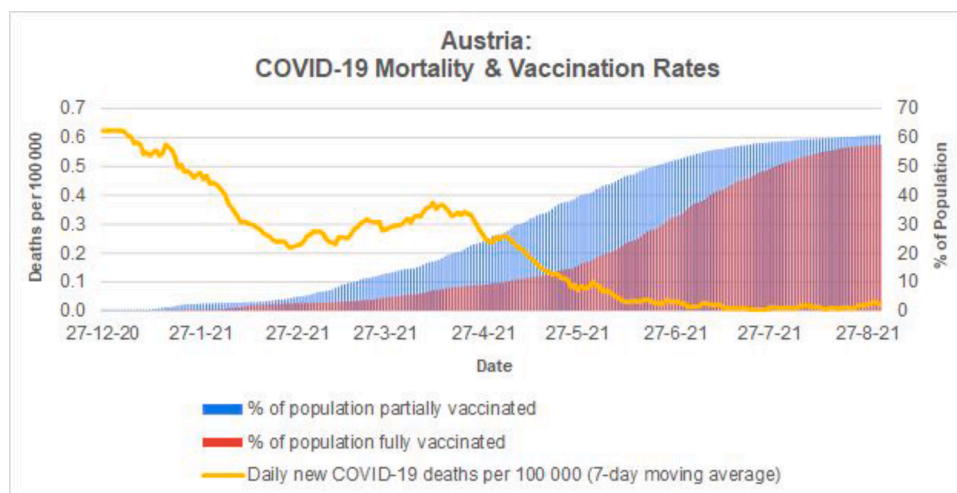


Fig. 5. - Vaccination progress in Austria compared with overall COVID-19 mortality [13].

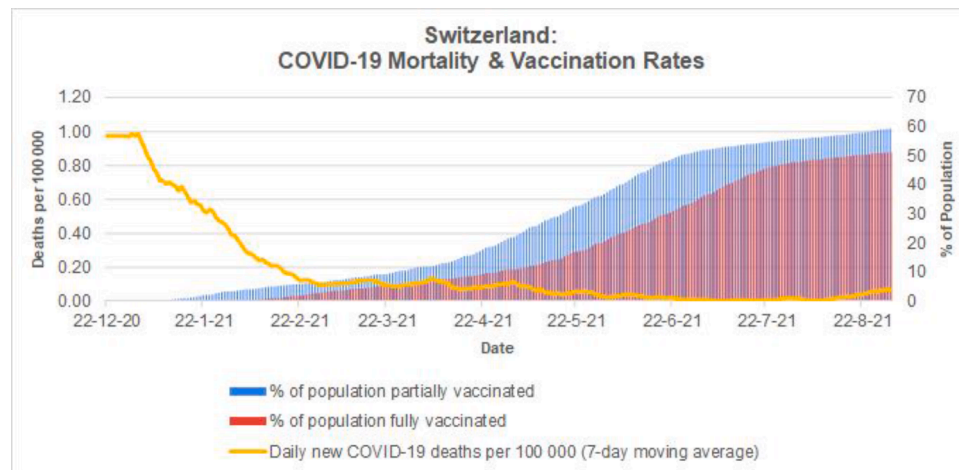


Fig. 6. - Vaccination progress in Switzerland compared with overall COVID-19 mortality [15].

approach taken across the country, such as engaging in a partnership with the Austrian Red Cross at the national level and enacting a decree on 3 December 2020 giving all physicians in the country, regardless of specialization or practice setting, the authority to administer vaccine doses. [21] Overall, vaccination progress in Austria followed a very similar pattern to that observed in Germany, with rates rising quickly after vaccination priority rules were removed in May but slowing to a plateau with under 60% of the population fully vaccinated by the end of August 2021 (Fig. 5).

Of the DACH countries, Switzerland's federal governance structure normally gives the most authority to the individual cantons over the central government, and this was reflected in the Swiss vaccine deployment strategy. Similar to Austria and Germany, the responsibilities for financing and implementing vaccine administration were delegated explicitly to the cantons, but there was greater variety in implementation as some delivered doses through hospitals, others organized the establishment of local vaccination centres and others focused primarily on general practitioners and their main avenue for vaccine deployment. [15] Another difference was that Switzerland's Federal Office of Public Health did not impose a strict vaccination priority order on the cantons, as happened in the other two countries, but rather published a general priority framework for them to follow, leaving space for interpretation of definitions such as "essential workers" and creating some confusion about which people were in which priority group in which canton. However, priority was still given to immunocompromised people and those older than 80 with gradual access for younger and healthier groups across the country until the cantons began to remove priority restrictions completely in May and June 2021. [15] Possibly as a result of this more fragmented approach, Switzerland also lagged behind the other two countries with less than 55% of the population fully vaccinated by the end of August 2021, although vaccination progress had not slowed down to quite the same degree (Fig. 6).

Despite their differences in vaccine regulation, procurement, and deployment strategies, the DACH countries also shared similar approaches to some aspects of vaccination strategy. Notably, vaccine approvals were extended to children aged 12–15 by the EMA at the end of May 2021 and by Swissmedic in early June 2021, starting with the Pfizer product. [9, 10] This should be taken into consideration when evaluating the overall vaccination rates of the population in the three countries, as children under 12 who were not eligible to receive a vaccine as of September 2021 account for approximately 11% of the population in Germany [14], 10% in Austria [13], and 11.7% in Switzerland. [15]

Decisions regarding costs associated with the vaccines were another area where the three DACH countries were primarily in alignment. The governments of all three countries stated that none of their residents

would be asked to pay for the costs of a vaccine out-of-pocket, with the national governments and health insurers covering the full costs. In Austria and Germany, traditionally hard-to-reach homeless and migrant populations were also targeted with specific outreach strategies. [20, 21] In Switzerland, however, vaccines were originally only covered for official residents, although this was expanded to include all people living in Switzerland without mandatory health insurance in August 2021. [22]

Although individual residents did not incur any costs for the vaccine, the amounts that the DACH governments paid for vaccine doses are not officially known. A leaked report showed that the EU had negotiated per dose prices of €12.66 with Pfizer, €15.50 with Moderna, and €1.85 with AstraZeneca [17], but the reliability of these figures is uncertain due to their unofficial source. Switzerland's negotiated prices remain confidential as well, and there is an overall lack of transparency regarding the costs associated with vaccine procurement around the world.

## Analysis

While the procurement of vaccine doses proved to be a significant initial barrier to vaccination campaigns in DACH, it was eventually overcome as supply chains were expanded and production increased. What may prove to be a substantially more challenging barrier to overcome is that of vaccine hesitancy, which appears to be evidenced by national vaccination rates that plateaued between 50 and 65% in all three DACH countries by the end of September 2021 despite adequate vaccine supply (Figs. 4, 5 & 6). While these vaccination rates are within the range that had originally been estimated to allow for herd immunity in 2020, they will now likely not be sufficient to achieve herd immunity following the emergence of the Delta variant and its increased transmissibility compared to the previous variants. [23] This means that vaccine hesitancy, which can be defined as either a delay in acceptance or a refusal of vaccination influenced by factors such as complacency, convenience, and confidence [24], represents an important threat to public health in the face of a continuing spread of COVID-19.

In May 2021, around 25% of people from across Europe said that they would likely not get vaccinated. [25] The most often cited reasons for hesitancy towards COVID-19 vaccines grow out of the wider "Anti-vax" movements which were gaining strength prior to the pandemic. They range from doubts about the safety of the vaccines, a perceived lack of evidence about their long-term effects and fears of under-reporting of adverse events, to a wide range of dubious conspiracy theories such as beliefs that the vaccines are being used as a vector to implant mind control microchips into the population. [26] These beliefs are often further entrenched by the widespread dissemination of false information using a variety of online platforms, a relatively recent

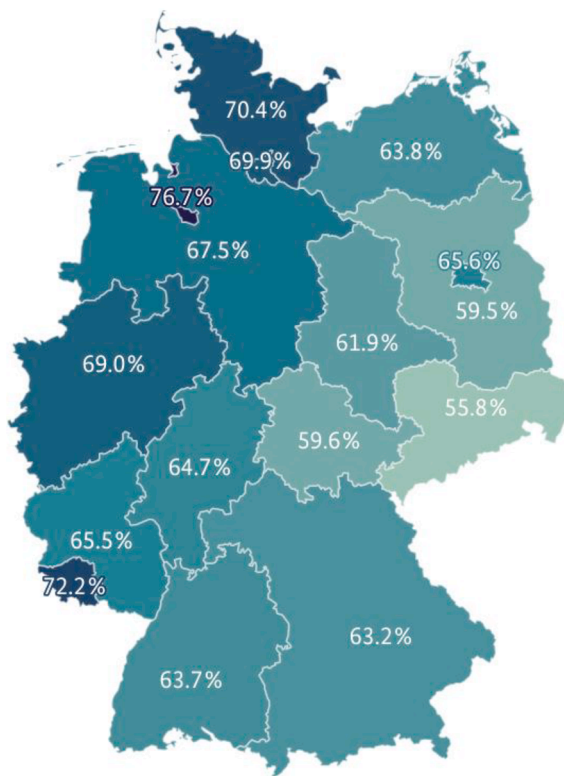


Fig. 7. - Rate of full vaccination by federal state in Germany as of August 2021 [Image Source: <https://impfdashboard.de/en/>].

phenomenon that complicates attempts to put forward factual counter-narratives. [27] The confusion and lack of cohesive official communication surrounding the safety and recommended age requirements for receiving the AstraZeneca and Jansen vaccines may have further fed into these narratives.

The factors leading to vaccine hesitancy are varied and incredibly complex, but there are some clearly observable trends in the DACH countries that may provide value to future efforts to develop effective policy to increase vaccination rates. One of these trends is the regional variation in vaccine rates, which may offer some insight into the factors causing vaccine hesitancy in the region. This is especially true in Germany, where there are wide gaps in the rate of full vaccination between states, exemplified by the state of Bremen with 76.7% compared to only 55.8% in Saxony. In general, the most obvious regional variation is between states in the West of the country which have higher vaccination rates than those that were part of former East Germany (Fig. 7). In Austria, the gap in vaccination rates between states is somewhat smaller but still notable, with the highest vaccination rate in Burgenland at 67.2% and lowest in Oberösterreich at 54.8%. [13] Switzerland also displays differences between its cantons, with the highest rate at 57% in Ticino (the lone Italian-speaking canton) compared to the lowest rate of 41.9% in Appenzell Innerrhoden (See Appendix 1). [15] These variations alone do not provide enough information to understand the factors causing vaccine hesitancy, but they can help to highlight possible areas where further efforts could be directed, such as a comparison of socio-economic factors in East and West German states that relate to vaccination acceptance.

One of the possible factors related to vaccine hesitancy in DACH that may merit further attention is the rates of support for specific political parties. The example of partisan division in the United States being correlated with vaccine hesitancy, particularly along the more conservative end of the political spectrum, is well known and has been widely reported on. [28] However, the relationship between right-wing political support and lower COVID-19 vaccination rates in the DACH region

has not received the same level of attention, especially in English-language publications. Fig. 8 shows that there are clear correlations between support for the most right-leaning political parties in the region and lower vaccination rates; those parties being the Alternative for Germany (AfD), the Freedom Party of Austria (FPÖ), and the Swiss People's Party (SVP). This same analysis was also conducted using data on support for left-wing parties, and the correlation was reversed.

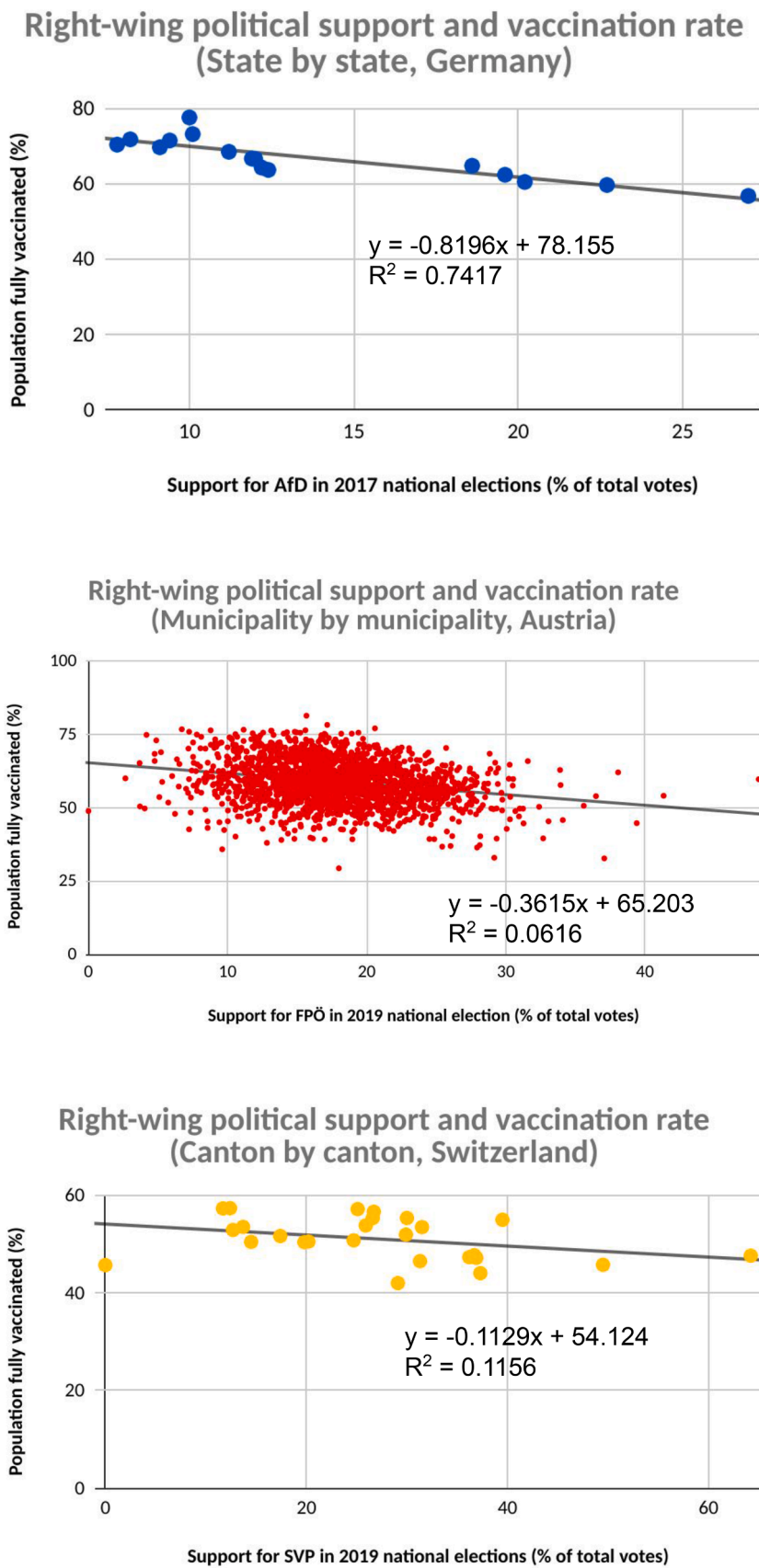
While by no means comprehensive, this analysis helps to further define a possible direction for future policies designed to combat vaccine hesitancy, especially when combined with other existing research. In Germany, specific sociodemographic variables have been found to be correlated with a positive attitude towards vaccines, and higher vaccination rates are correlated with higher age, higher education levels, and higher incomes. [31, 32] Similar work has been done in Austria, finding that higher education and political participation levels are associated with higher vaccination rates, along with higher unemployment rates. [33] Swiss trends appear to be similar, with higher income, age, and education levels correlated with higher vaccination rates, with urban areas also outpacing rural areas at 61% compared to 52%. [34]

Though insightful, these broad correlations only begin to scratch the surface of the information required to develop truly effective vaccination policy strategies. Meaningful understanding will only be through deeper and more complex analysis, ideally at the individual or at least at the municipal level rather than the state or national level, because despite broad similarities in attitude, people across the DACH region exhibit important differences when looked at through a more granular lens. For example, research has found that women are more likely to exhibit negative attitudes towards vaccines in Germany but more likely to have positive attitudes in Austria. [35] Residents not born in Austria are also less likely to be vaccinated than those who were [35], and Swiss employees in scientific fields are more often vaccinated than those in the agricultural sector. [36] These findings, among many others, show that there are likely substantial regional and sub-regional variations in which factors contribute to vaccine hesitancy, so further work will need to be done to build the evidence base for policy development.

#### Policy considerations

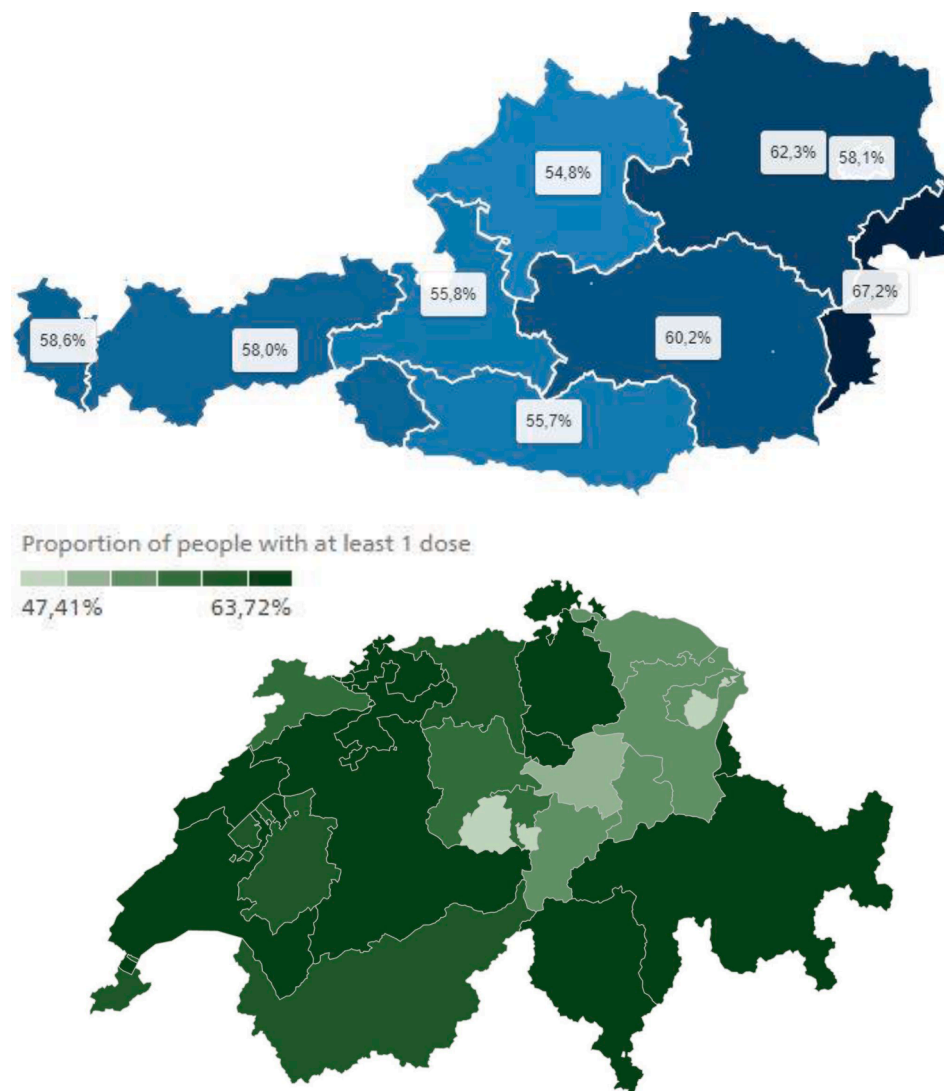
It is clear that for the public health benefits of COVID-19 vaccination to be completely realized and to reduce the risk of another resurgence of the virus, governments in the DACH region will need to find the right policy tools to overcome the challenges presented by vaccine hesitancy. Vaccination mandates, either for the whole population or for specific groups, have been used as such a policy tool in several other Western countries including France, Italy and the United States. [37] While this has shown to be effective in pushing up vaccination rates, all three DACH countries seem to perceive the idea as broadly unfeasible, with the concept of mandatory vaccinations for adults being largely avoided by their governments. Governments in all three countries have also continued to base the easing of social restrictions on case numbers and hospitalization rates rather than vaccination progress, further limiting their policy toolkit.

Jens Spahn, the German Health Minister, specifically stated that mandatory vaccinations would not be imposed on either the population as a whole or on healthcare workers. [38] The unwillingness of the German government to move forward with vaccination mandates raises interesting ethical and legal questions. Through the political lens of the DACH region, mandatory vaccination is clearly viewed as a severe imposition on individual freedom, but such a mandate could be legally justified if low vaccination rates were proven to be a greater public threat than this limiting of freedoms. As this situation revolves around balancing legal, ethical and scientific concerns, it is difficult to take it out of the political realm. However, in Germany's recent history a vaccine mandate was indeed implemented for certain groups such as children and healthcare workers through the "Measles Screening and Prevention Act" of 2020, showing that there is legal precedent for this



**Fig. 8.** - Recent electoral support for right-wing political parties compared with rates of full COVID-19 vaccination in German states, Austrian municipalities and Swiss cantons as of September 15, 2021<sup>11</sup> [13, 29, 30].





**Appendix 1.** - Rates of full vaccination by Austrian state and rates of partial vaccination (one of two doses) by Swiss canton as of 15 September 2021 [Austria Image Source: <https://info.gesundheitsministerium.gv.at/>] [Switzerland Image Source: <https://www.covid19.admin.ch/en/vaccination/persons>].

policy lever. [39] This example strengthens the idea that the German government's refusal to implement vaccine mandates stems in part from political calculus, likely tied to the impending national elections in late September 2021 but possibly also with the intention to blunt the influence of the far-right party Alternative for Germany (AfD), which has employed anti-vaccination messaging as a core campaign strategy. [40]

While the Austrian central government has also explicitly opposed a general vaccine mandate, it has left open the possibility of a mandate for people working in certain healthcare and educational settings. However, Chancellor Sebastian Kurz stated that any such mandate would have to come from individual state authorities because they are better placed to manage their respective health situations, weakening the overall

political will for such a move to be made. [41]

In both Austria and Germany, historical legacies may also play a role in building societal resistance to a vaccination mandate, as the collective national memories of state surveillance and disrespect for the principle of bodily autonomy arising out of the Nazi era (and the Cold War era in former East Germany) continue to influence individual attitudes and trust towards government action. [42] The German government, through the Robert Koch Institute (RKI), may have mitigated some of this inherent mistrust by providing transparent and easily accessible information about vaccination, although this stopped short of a full information campaign [14]. The Austrian government, on the other hand, may have directly contributed to vaccine hesitancy in the country through contradictory messaging that eroded public trust. The Chancellor's remarks in June 2020 that the health consequences of the pandemic were over, and subsequent remarks in July 2021 that the vaccine has made the pandemic a "private matter" are key examples of this type of counterproductive messaging. [43]

Swiss society is also influenced by similar surveillance legacies that erode trust [44], but there are also several other factors that make vaccine mandates politically untenable in the country. The Swiss Epidemics Act technically does allow for the introduction of vaccine mandates in certain circumstances and for specific groups such as healthcare

<sup>1</sup> Switzerland has one outlier canton with 0% voting share of SVP (Glarus). In the national election, which is a majority vote in this canton as it has only one seat in the national parliament, the party did not put up a candidate. However, SVP is the largest party in this canton receiving 27% of the vote in the cantonal elections, almost 10%-points more than the runner-up party (FDP) [[https://www.gl.ch/public/upload/assets/5144/180610\\_Zusammenfassung\\_Landratswahlen\\_2018.pdf](https://www.gl.ch/public/upload/assets/5144/180610_Zusammenfassung_Landratswahlen_2018.pdf)]. Excluding this canton from the analysis, the R2 rises to 0.25 and the coefficient to  $-0.18$ . These numbers hardly change when instead of excluding the canton the voting share is set to 27%.

workers, but in practice it has never been implemented and there are questions about whether such a mandate would even be legally enforceable. In fact, the Act does not even include a penalty for persons who refuse to get a mandated vaccination. [45,46] The Swiss president has made explicit statements against the imposition of such a mandate in the context of the pandemic [47], and there will also likely be a public referendum in 2022 on changes to the Swiss constitution that would make vaccination mandates completely illegal in the future. [48] All of these factors combined, but in particular the constant lingering threat of public referendum to reject new laws, make Switzerland the least likely of the DACH countries to move toward any sort of vaccine mandate.

As an alternative to mandatory vaccination, governments in DACH have turned to other policy options based on persuasion, such as the introduction of “vaccination passport” documentation which shows proof of COVID-19 immunity status, which seems to be a much more politically viable option. On 23 August 2021, Germany’s central government began to enforce a so-called “3G” rule, requiring individuals to show proof of either vaccination, a negative PCR test, or a recovery from COVID-19 before they are legally allowed to enter hotels, gyms, clinics and other indoor public venues. [38] Austria and Switzerland also implemented similar “3G” vaccination passports on 15 August and 13 September 2021, respectively. [15, 49] As an additional means of persuasion, the German and Swiss governments stated that PCR tests for COVID-19 would no longer be free of charge for vaccine-eligible individuals as of October 2021, with the justification that vaccination is a freely available and superior alternative to testing. [50, 51]

## Conclusions & further research

The DACH countries were largely successful when it comes to the logistical management of health services, as evidenced by their ability to procure and deploy vaccines rapidly despite initial supply challenges. All three countries were all able to rapidly administer doses to their most vulnerable populations and offer vaccination to every resident by June 2021.

Despite this initial success, progress had stalled by August 2021, with the drive towards higher vaccination rates in the region being hindered by societal vaccine hesitancy. This hesitancy is driven by several identifiable factors, including political affiliation and regional situation. Further research is needed to develop a deeper understanding of these and the broader socioeconomic factors that may be creating a barrier for policy efforts aimed at improving vaccine uptake. This understanding is especially important for improving the policy response in the DACH region, as Germany, Austria and Switzerland have fallen behind many of their counterparts across the Western world in terms of national vaccination rates.

It remains to be seen how effective recent measures to persuade more people to get vaccinated, such as the 3 G passports, will prove to be at overcoming the challenge presented by vaccine hesitancy, and there may yet be some lessons to be learned from policy tools implemented in other countries, such as the material rewards for vaccination schemes used in the United States, or the use of cafés and restaurants as vaccination gatekeepers in France. Ultimately however, the relatively weak attempts to improve vaccination rates made by Germany, Austria and Switzerland as of August 2021 have made them outliers among highly developed nations. Continued improvements in vaccine uptake will likely be necessary to avert a new wave of the pandemic, but this will require unique policy solutions that can address the DACH region’s specific societal challenges.

## Funding

None.

## Ethical approval

Not required.

## Patient consent

Not required.

## Declaration of Competing Interest

None declared.

## Appendix

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