

JITSUVAX:
Jiu-Jitsu with Misinformation in the Age of Covid

A cross-national comparison of HCPs' vaccination behaviour and attitudes

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Cross-national comparison of HCPs' vaccination behaviour and attitudes

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Summary

This document describes the data collection and validation of the final International Healthcare Professionals Vaccine Confidence and Behaviours (I-Pro-VC-Be) survey and provides a detailed description of results found within each country and cross-national comparisons of HCPs' vaccination behaviours and attitudes.

Scope and purpose of this document

This document describes the data collection for the final, international version of the Pro-VC-Be questionnaire to measure HCP vaccination behaviours and attitudes across participating European countries. This document briefly explains the validation of this tool; a more thorough explanation of the validation of the long- and short-form I-Pro-VC-Be has been submitted for publication in February 2023 to *Expert Review of Vaccines*. It also presents the results of a test-retest implemented in France among interns of general medicine in February-March 2023. Finally, this document presents the descriptive results of vaccination behaviours and attitudes of HCPs' and an analysis of the data. This document includes a cross-national comparison of the HCPs' vaccination behaviours and attitudes, HCPs' attitudes towards COVID-19 mandates, and their attitudes towards Complementary and Alternative Medicine (CAM) practices. Further analyses are still ongoing and will result in three publications to be submitted to relevant journals in the Spring of 2023.

Project overview

Vaccine hesitancy—the delay or refusal of vaccination without medical indication—has been cited as one of the most serious threats to global health by the World Health Organization (WHO), attributing it in particular, to misinformation on the internet. The WHO has also identified Health Care Professionals (HCPs) as the most trusted influencers of vaccination decisions.

JITSUVAX will leverage those insights to turn toxic misinformation into a potential asset based on two premises:

1. The best way to acquire knowledge and to combat misperceptions is by employing misinformation itself, either in weakened doses as a cognitive “vaccine”, or through thorough analysis of misinformation during “refutational learning”.
2. HCPs form the critical link between vaccination policies and target populations to help ensure highest possible vaccine uptake.

The principal objective of JITSUVAX is to leverage misinformation about vaccinations into an opportunity by training HCPs through inoculation and refutational learning, thereby neutralizing misinformation among HCPs and enabling them to communicate more effectively with patients. We will disseminate and leverage our new knowledge for global impact through the team's contacts and previous collaborations with WHO and UNICEF.

Background

Although most HCPs generally endorse vaccination, vaccine hesitancy has been found among HCPs in several studies (Dini 2018, Napolitano 2018, Paterson 2016), including a narrative review completed within the confines of the JITSUVAX project (Verger 2022). Research shows that HCPs with lower confidence in vaccines are less willing to recommend vaccines to their patients (Paterson 2016; Karlsson 2019; Verger 2015; Raude 2016). This is problematic, as receiving a vaccine recommendation from an HCP is frequently reported by laypeople as an important reason for why they have accepted vaccination (Yaqub 2014; Bianco 2014; Yeung 2016). The majority of individuals also consider HCPs to

be the most reliable source of information about vaccines (Charron 2020; Eller 2019; O’Leary 2018). Low vaccine confidence among HCPs is therefore likely to affect public vaccine uptake. Additionally, HCPs with lower vaccine confidence have been found less likely to accept vaccinations for their children and themselves (Paterson 2016; Karlsson 2019), which increases the risk that they transmit infection to vulnerable patients. Vaccine hesitancy among HCPs can thus be considered a risk to public health. One of the objectives of Work Package (WP) 1 in JITSUVAX is to provide a validated, international instrument that can measure the determinants of vaccine confidence in HCPs. A second objective is to provide a systematic assay of HCPs’ attitudes towards vaccination across all participating countries using the developed instrument, and to conduct cross-national comparisons of determinants of vaccine confidence and behaviours in HCPs. The developed instrument maximizes comparability between countries by being carefully designed to apply to each national context. In the present document we report the results from these cross-national comparisons. In addition, analyses are being finalized to study associations between vaccination attitudes and behaviours (as measured by the I-Pro-VC-Be) and 1) HCPs’ attitudes toward COVID-19 mandates, and 2) HCPs’ attitudes toward CAM practices, which are not presented in this document but will be described in detail in two resulting publications.

Methods

The detailed methods related to the adaptation and development of the final, I-Pro-VC-Be tool can be found in Deliverable 1.1 (submitted June 2022). These adaptation methods, along with more detailed descriptions of the validation methods and results described within this document, have been submitted for publication in February 2023 to the peer-reviewed journal *Expert Review of Vaccines*.

The I-Pro-VC-Be long-form tool

The final version of the I-Pro-VC-Be, after the adaptation process described in Deliverable 1.1, consists of questions related to HCPs’ vaccination behaviours and ten psychosocial determinants of these vaccination behaviours (as described in depth in a previous publication; Verger 2022).

The vaccination behaviour questions include two main elements of vaccination behaviour; recommendation behaviour (HCPs’ tendency to recommend vaccines to their patients) and self-vaccination behaviour (HCPs’ personal vaccine uptake). Recommendation behaviour is measured in two ways: with questions concerning vaccines in general and with questions concerning the recommendation frequency of specific vaccines in specific populations and vaccine contexts. The general questions probe how often HCPs bring up, recommend, or prescribe vaccines and can be used as a generic measure of vaccine recommendation behaviour, applicable anywhere and for any type of HCP. The recommendation frequency questions probe how often HCPs recommend certain vaccines to certain patients and can be used to examine specific “vaccine situations”, for example by focusing on vaccines with sub-optimal uptake in some populations and contexts. Self-vaccination behaviour is measured separately for different vaccines.

The psychosocial determinants, or attitudes, can be divided into two categories: (1) core determinants of vaccination behaviours, that have been shown to most directly impact HCPs’ vaccine confidence in previous studies (Betsch 2018; MacDonald 2015, Thomson 2016), and (2) possible intermediary factors behind HCPs’ vaccination behaviour. These factors can influence vaccination behaviours directly, independently from the core determinants, or by modifying links between the core determinants and vaccination behaviour, or by mediating or moderating these links.

Below are the 10 core and intermediary psychosocial determinants within the I-Pro-VC-Be:

Core determinants:

- Perceived vaccine risks (i.e., how safe HCPs perceive certain vaccines to be)
- Complacency (i.e., how useful HCPs perceive vaccines to be)

- Perceived benefit-risk balance of vaccines (i.e., the degree to which HCPs perceive that the benefits of vaccines outweigh the risks)
- Perceived collective responsibility (i.e., the extent to which HCPs recommend vaccines to contribute to community immunity)
- Trust in authorities to inform about vaccines (i.e., trust in institutions and health authorities to provide reliable vaccine information and to define the vaccination strategy)

Intermediary determinants:

- Commitment to the vaccination of patients (i.e., the extent to which HCPs are proactive in motivating their patients to accept vaccinations)
- Self-efficacy in addressing hesitancy (i.e., how prepared HCPs feel in terms of knowledge and skills to address vaccination with patients)
- Perceived constraints to vaccinating patients (i.e., perceived practical constraints, such as cost of or access to vaccines)
- Reluctant trust (i.e., the extent to which HCPs trust the vaccination system and recommend vaccines despite potential concerns)
- Openness to patients' concerns regarding vaccination (i.e., attitudes toward [hesitant] patients)

Two additional items were added related to professional norms around vaccination; "I think that most medical doctors in my country recommend that people get vaccinated" and "I think that most medical doctors in my country are in favour of vaccination" (for analyses, these two items were merged into a single measure perceived professional norms with higher scores representing more favourable norms). Three additional statements concerning HCPs' attitudes towards COVID-19 mandates that were put in place during the COVID-19 pandemic were within the questionnaire as well. One measured attitudes to vaccine mandates for HCPs ("Vaccination against Covid-19 should be mandatory for healthcare workers in my country"), another measured attitudes to public vaccine mandates ("Vaccination against Covid-19 should be mandatory for the general public in my country"), and the last one measured attitudes towards a Covid-19 health pass ("I am in favour of the use of a "health pass" to allow vaccinated people to access public spaces and travel"). The question on the health passport was not asked in Germany because several types of health passports were applied Germany at the time of data collection and changing rules related to the passes were common. Adequately addressing the HCPs' attitudes to the health passes would have required the inclusion of more than one question. It was decided not to include these questions in order not to increase the length of the questionnaire. Also, the comparability of the questions between countries would have been limited. Finally, five items were administered to get information on HCPs' attitudes toward CAM practices (Appendix 1; for analyses, the five CAM items were merged into a single measure of CAM attitudes with higher scores representing CAM endorsement).

Population

The final, translated versions of the long-form I-Pro-VC-Be (<https://osf.io/vha92/>) were sent via electronic, cross-sectional surveys to HCPs involved in vaccination in Finland, France, Germany, Portugal, and the UK from March to June 2022. HCPs were recruited through invitation emails sent to relevant networks of HCPs in each country (Table 1).

Table 1. Types of HCPs recruited, data collection sources, and number of responses

Country	HCPs recruited	Source	Number of responses
UK	GPs and nurses	National Institute for Health and Care Research (NIHR) Clinical Research Network support team	999
France	GPs	Collège National de Généralistes Enseignants (CNGE) mailing list of GPs	1299
Finland	GPs and paediatricians	The Finnish Medical Association	389
Germany	GPs, paediatricians, and gynaecologists	Panel provider Schlesinger Group Germany	580
Portugal	GPs and paediatricians	Portuguese Society of Pediatricians and the Portuguese Association of General Practice and Family Medicine	607

Upon analysis, the research team discovered that distributions of the UK responses deviated from expected distributions of similar variables in previous studies. Moreover, response times for the survey were substantially faster for the UK sample compared to the other countries, and compared to the time taken by the UK pilot sample for the same items. Therefore, data collected from the UK was not included in main statistical analyses due to this unreliable data quality, and results mentioned in this document are shown only for Finland, France, Germany, and Portugal. Only 135/999 participants in the UK sample took at least as long as the minimum response time (compared to pilot items) to answer these items in the survey, and these participants were included in sensitivity analyses, which are detailed within the manuscript submitted for publication.

Test-retest reliability

To study the extent to which the I-Pro-VC-Be is reliable over time, i.e., the extent to which the responses of the same individual to the different items could vary between two surveys carried out at two different times, the I-Pro-VC-Be questionnaire was administered twice to general medical interns enrolled at the Faculty of Medicine in Marseille, approximately three weeks apart. Invitations to participate were sent to 600 interns, with three separate reminders sent to those who did not complete the test or re-test.

Intra-individual reliability was assessed using the intraclass correlation coefficient (ICC), which takes into account the repeated nature of the data. The ICC takes values between -1 and 1: the closer the estimate of the parameter is to 1, the higher the intra-individual correlation, and thus the more reliable the measure is over time. The following criteria were used for interpreting the ICC: ≥ 0.9 = excellent; ≥ 0.75 =good; ≥ 0.5 = moderate; < 0.5 =poor (Koo 2016). The evolution of the measures over time, i.e., the concordance of the answers to the same question between the two given times, was also assessed using Wilcoxon signed rank test, which allows for testing the deviation of the distributions of the answers to the same question for matched samples. A significant p-value (< 0.05) reveals a significant change in responses between the two measurement times.

Validation of the I-Pro-VC-Be: long- and short-form versions

The statistical analyses involved in the validation of the I-Pro-VC-Be have been detailed within a publication entitled “International adaptation and validation of the Pro-VC-Be: measuring the psychosocial determinants of vaccine confidence in healthcare professionals” which has been submitted. These analyses drew upon previous methods used for the validation of the original Pro-

VC-Be (Verger 2022; Garrison 2022). Briefly, this analysis included the following steps: 1) structural validity of the long-form I-Pro-VC-Be (to verify that the international version has the same structure as the original version), 2) measurement invariance to validate that the long-form version measures the same constructs in the same way across countries (thus allowing for cross-national comparison), 3) construct validity of the long-form version (as was done for the original), and 4) criterion validity of the long- and short-form versions of the I-Pro-VC-Be (testing associations between vaccination attitudes and behaviours).

Cross-national comparisons and analyses

Cross-national results from the I-Pro-VC-Be include: 1) descriptive results and comparison of I-Pro-VC-Be responses between the four participating countries, 2) a comparison of HCPs' perceived professional norms between countries, 3) a comparison of HCPs' attitudes toward COVID-19 mandates between countries, and 4) a comparison of HCPs' attitudes toward CAM practices between countries.

Statistical comparisons of I-Pro-VC-Be responses between the four countries were conducted using chi-square analyses or Fisher's exact test, where appropriate. Differences between the countries in perceived professional norms, attitudes to COVID-19 mandates, and attitudes to CAM practices were analysed using analysis of variance (ANOVA). Statistically significant ANOVA results were followed up with Tukey post hoc tests. In the Tukey test, all potential pair-wise comparisons between country means are conducted while controlling for multiple tests.

Results

Descriptive results

HCPs who had not responded to all I-Pro-VC-Be questions were excluded, which resulted in a final sample of 2797 HCPs (1222 from France, 580 from Portugal, 388 from Finland, and 607 from Germany). Most HCPs were female, GPs, and 50 years or older. The gender, profession, and age distributions of the sample are shown in Figure 1.

Test-retest reliability

Of 109/600 interns who answered the first questionnaire (including 9 partially), 73 also answered it (including 2 partially) a second time, between 11 and 48 days later (mean 21 ± 9 days; median [Q1; Q3] = 19 [14;27]). Test-retest analyses were performed for each factor score of participants who responded to each questionnaire (n between 71 and 73 participants depending on score considered, Appendix 2).

On the other hand, for the determinants of vaccine confidence, ICC estimates revealed moderate (.5-.75) to good (.75-.90) reliability and Wilcoxon signed rank tests revealed that there were no significant differences in scores between the two measurement times among participants, revealing an acceptable time stability. Wilcoxon signed rank tests revealed that there were no significant differences in scores between the two measurement times among participants. The attitudinal measures can theoretically be assumed to vary to some extent over time. Lower ICC estimates could hence be due to contextual changes or the fact that interns were the population who completed the test-retest, a population undergoing their initial medical training and therefore developing their competencies during the testing period and in general having less experience with vaccination. For past influenza vaccination behaviour, a variable that theoretically should be subject to less change (provided that the participants were not vaccinated against influenza between the two time points), the ICC estimate was almost excellent (.89).

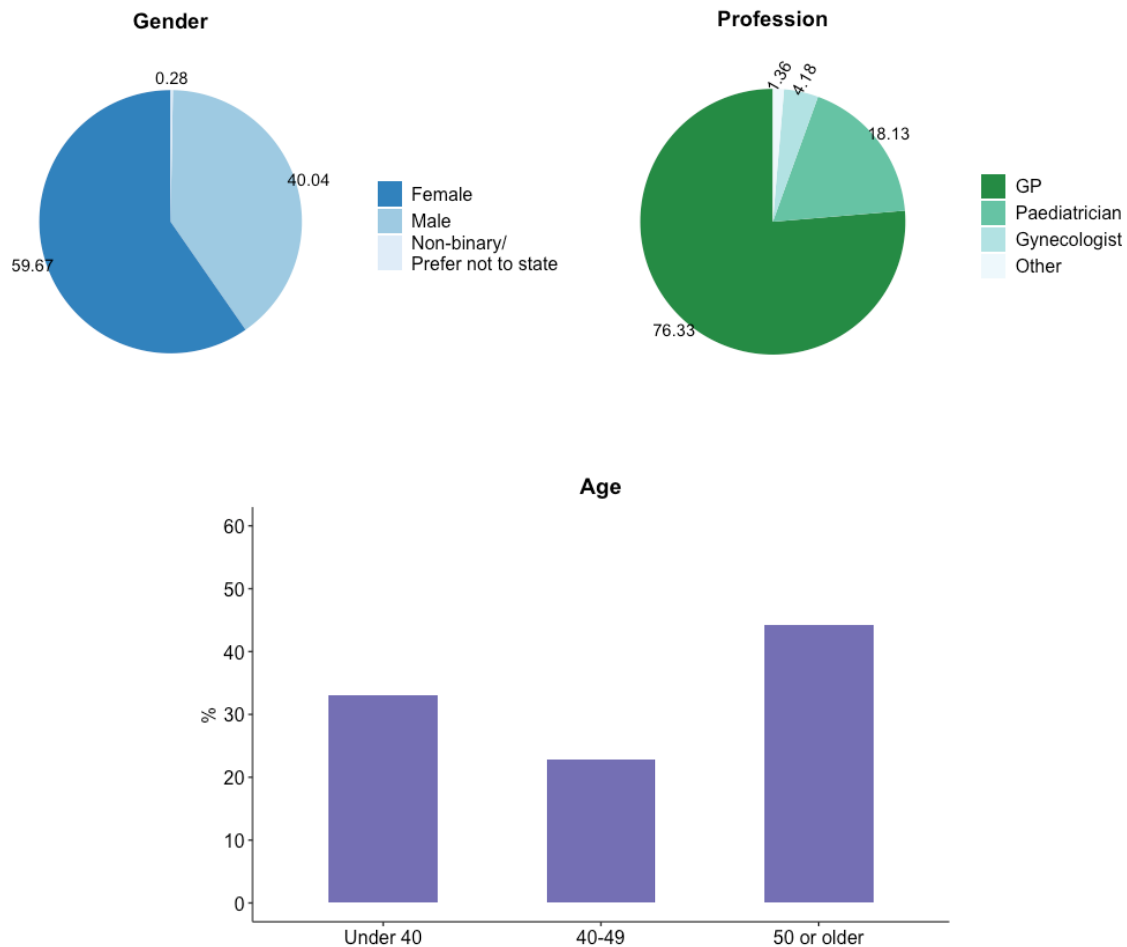


Figure 1. Gender, profession and age distribution in the samples of HCPs from the four countries.

Cross-national comparison: Determinants of vaccine confidence

The HCPs' responses to the questions on determinants of vaccination confidence can be seen in Appendix 3. There were statistically significant differences between the countries on all variables of the I-Pro-VC-Be. As a general pattern, HCPs in Portugal and Finland held the most positive attitudes when it came to vaccine safety, complacency, benefit/risk balance, trust in authorities, and collective responsibility. HCPs in Portugal and Germany reported the highest commitment to vaccination and self-efficacy. The countries reporting the largest constraints and highest reluctant trust varied between items.

As examples, the response distributions of two of the questions—one related to trust in authorities and one to commitment to vaccination—are shown in Figure 2. The figure shows that HCPs in Finland and Portugal more often reported high trust in national health authorities compared to HCPs in France and Germany. HCPs in Portugal also more frequently reported being committed to developing their vaccine-communication skills than HCPs in the other countries.

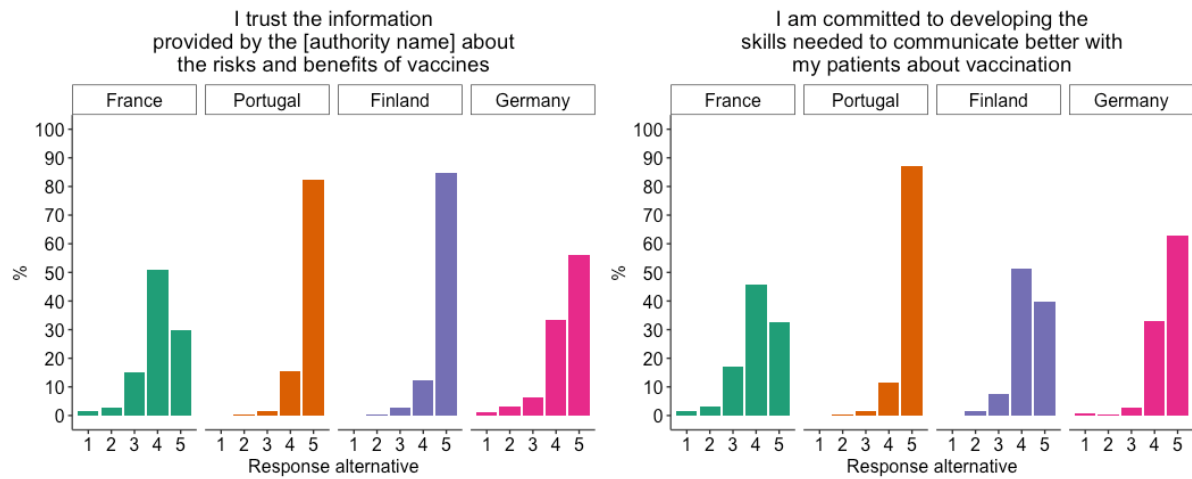


Figure 2. HCPs' responses to two of the international Pro-VC-Be questions by country. Response alternatives range from 1 (strongly disagree) to 5 (strongly agree), with the middle response alternative labelled "undecided".

Cross-national comparison: Vaccination behaviours

Appendix 3 shows the HCPs' responses to the questions about vaccine recommendation behaviours and the questions about the HCPs' own vaccinations. All comparisons between countries related to how frequently the HCPs report that they recommend vaccines were statistically significant. As a general pattern, the HCPs in Portugal reported the highest frequency of vaccine recommendations and HCPs in Germany the lowest, although some exception to this pattern existed. For example, Finnish HCPs reported the highest recommendation frequency of COVID-19 vaccines for pregnant women, and the lowest recommendation frequency of HPV vaccines for adolescents. The recommendation frequency of COVID-19 vaccines for adolescents was lowest in France.

As examples, Figure 3 shows the HCPs' responses to the question on how frequently they recommend COVID-19 vaccines to adults and how many times they have been vaccinated against seasonal influenza over the past three years. The figure shows that the great majority of HCPs reported that they actively recommend COVID-19 vaccines to all adult patients who have not yet had the vaccine. COVID-19 recommendation frequency was highest in Portugal. Furthermore, the great majority of the HCPs had been vaccinated against seasonal influenza all three years. The rate of HCPs vaccinated against influenza all three years was highest in Finland. Influenza vaccination has since 2017 been mandatory in Finland for HCPs working with risk groups. In the other countries, influenza vaccination is recommended but voluntary.

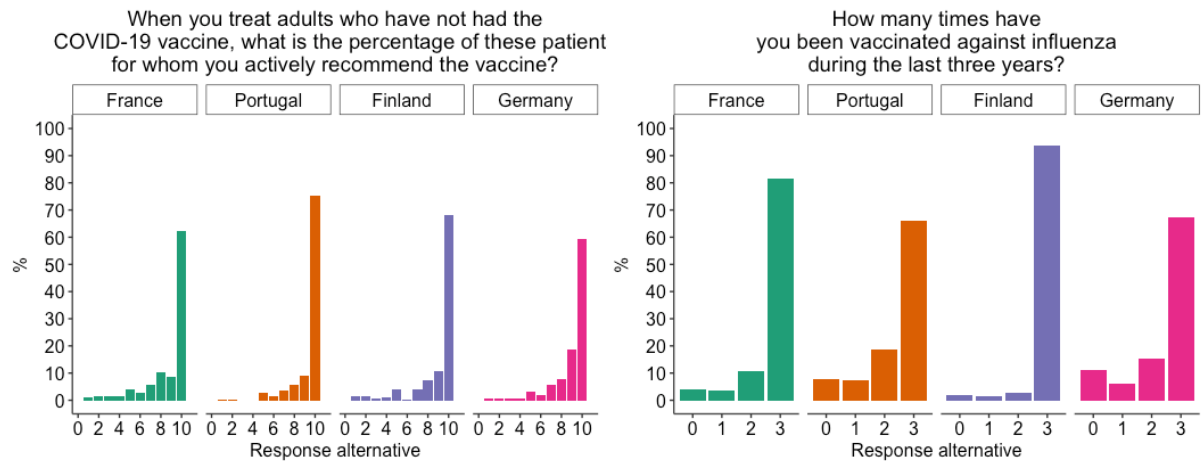


Figure 3. HCPs' responses to COVID-19 vaccine recommendation frequency. Response alternatives range from 0% (I do not actively recommend it to any of these patients) to 100% (I actively recommend it to all of these patients).

Perceived professional norms

The HCPs' responses to whether they think that most medical doctors in their country recommend that people get vaccinated are shown by country in Figure 4. The response distribution to the two questions on professional norms was highly similar. Overall, the HCPs perceived the professional norm to be favourable of vaccination. However, there was a statistically significant difference between countries (a variable with the scores averaged over the two items used for analysis), $F(3, 2793) = 179.34, p < .001$. Pair-wise comparisons (Appendix 4) revealed that the perceived professional norm was lowest in France ($M = 4.16, SD = 0.56$)—significantly lower than in all the other countries. The German HCPs ($M = 4.27, SD = 0.51$) also reported significantly lower professional norms than the HCPs in Finland ($M = 4.66, SD = 0.53$) and Portugal ($M = 4.73, SD = 0.51$). The difference between Finland and Portugal was not statistically significant.

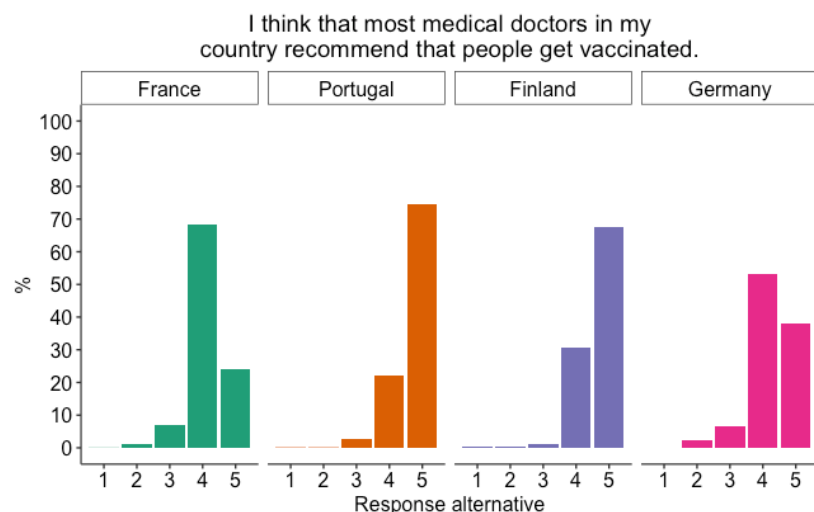


Figure 4. HCPs' responses to one of the questions related to perceived professional norm. Response alternatives range from 1 (strongly disagree) to 5 (strongly agree), with the middle response alternative labelled "undecided".

Attitudes toward COVID-19 mandates

The response distributions of the three mandate questions are shown in Figure 5. Overall, the HCPs were positive towards mandating COVID-19 vaccines for HCPs and towards the implementation of health passes. Their attitudes towards mandates for the public were less favourable.

There was a statistically significant difference between countries in the HCPs' attitudes to vaccine mandates for HCPs, $F(3, 2792) = 124.61, p < .001$. Pair-wise country comparisons (Appendix 4) revealed that the HCPs in France reported the strongest agreement with an HCP mandate ($M = 4.44, SD = 0.99$); significantly stronger than Finland ($M = 4.23, SD = 1.08$), Germany ($M = 4.01, SD = 1.32$), and Portugal ($M = 3.29, SD = 1.49$). The HCPs in Portugal reported significantly lower agreement with HCP mandates than all other countries. There was no statistically significant difference between the German and Finnish HCPs' attitudes to HCP mandates.

The HCPs' attitudes to vaccine mandates for the public also differed significantly between countries, $F(3, 2792) = 44.63, p < .001$. Pair-wise comparisons showed that the French ($M = 3.45, SD = 1.25$) and German ($M = 3.46, SD = 1.38$) HCPs reported significantly stronger agreement with public vaccine mandates than Finnish ($M = 2.88, SD = 1.27$) and Portuguese ($M = 2.82, SD = 1.41$) HCPs. There was no significant difference between French and German HCPs' attitudes to vaccine mandates for the public. Neither was there a significant difference between Finnish and Portuguese HCPs.

Lastly, the HCPs' attitudes to a health pass differed significantly between countries, $F(2, 2186) = 17.64, p < .001$. The pair-wise analyses showed that HCPs in Finland reported significantly stronger agreement with the use of a health pass ($M = 4.11, SD = 1.09$) than HCPs in France ($M = 3.69, SD = 1.23$) and Portugal ($M = 3.77, SD = 1.26$). There was no statistical difference between HCPs in France and Portugal.

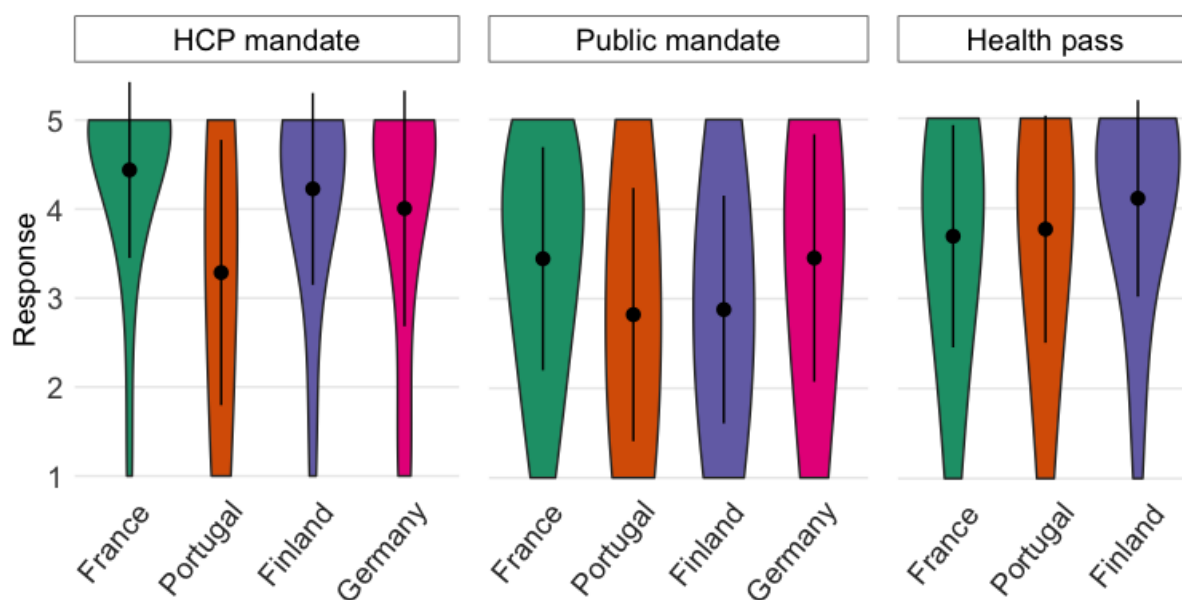


Figure 5. HCPs' agreement with COVID-19 vaccine mandates for HCPs, COVID-19 vaccine mandates for the public, and the use of a health pass on a scale from 1 (strongly disagree) to 5 (strongly agree). The outer borders of the violin shapes represent the distribution of responses within a country. Dots represent means and bars standard deviations. The question about health passes was not administered in Germany.

Attitudes toward CAM practices

The HCPs' responses to the questions about attitudes towards CAM practices (averaged over the five items) are displayed by country in Figure 6. There was a statistically significant difference between countries in the HCPs' attitudes to CAM, $F(3, 2782) = 97.14, p < .001$. Pair-wise comparisons (Appendix 4) showed that the HCPs in Finland ($M = 1.55, SD = 0.67$) were significantly less positive towards CAM practices than the HCPs in the other countries. Furthermore, HCPs in Germany ($M = 2.66, SD = 1.28$) were more positive towards CAM than HCPs in France ($M = 2.10, SD = 1.04$) and Portugal ($M = 1.96, SD = 0.96$). The difference between HCPs in France and Portugal was not statistically significant.

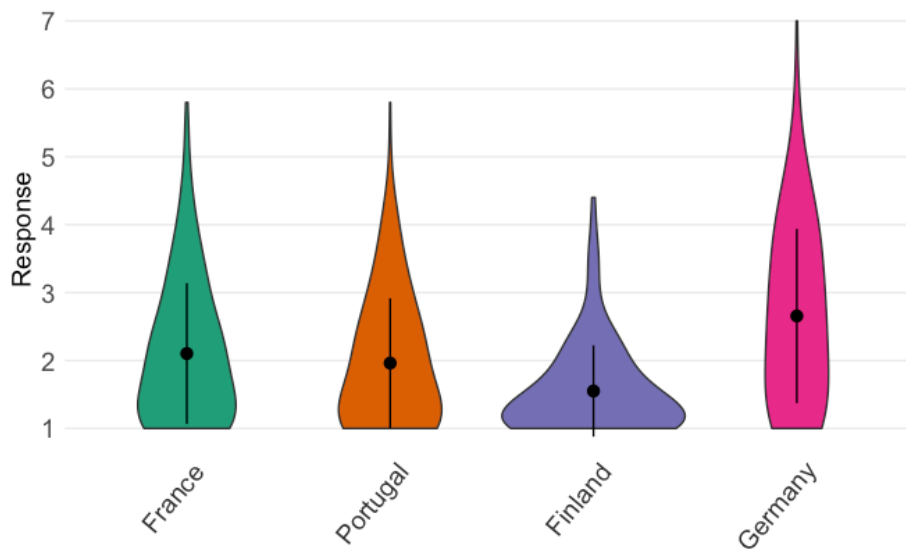


Figure 6. HCPs' responses to the questions about attitudes to CAM practices on a scale from 1 (strongly disagree) to 7 (strongly agree). The outer borders of the violin shapes represent the distribution of responses within a country. Dots represent means and bars standard deviations.

Conclusion

The ability to assess the psychosocial factors of vaccine confidence and their influence on vaccination behaviours in a systematic and culturally aware manner is important for the development and selection of interventions to increase HCPs' confidence in vaccines. Our final, international tool provides the possibility to comprehensively assess factors that contribute to vaccine hesitancy among HCPs, and the short-form tool provides a time- and cost-effective solution for measuring these factors across HCP type. Test-retest analysis among interns indicated moderate to excellent reliability of the long-form tool. The tools prove reliable measurements of vaccination attitudes and behaviours even in the presence of cultural and contextual variations. Due to its cross-country adaptability, the I-Pro-VC-Be can be used for cross-national comparisons of vaccine attitudes and behaviours among HCPs. Being able to compare countries can be useful for investigating, for example, how country characteristics (i.e. health policy, education, social cohesion) may affect HCPs' vaccine confidence and behaviours. As described in the Results section, differences in determinants of vaccine hesitancy, attitudes to mandates, and attitudes to CAM practices exist between the investigated countries. This suggests that different efforts are needed to reduce vaccine hesitancy among HCPs in the four countries. For example, the Finnish HCPs reported high confidence in vaccine safety and trust in authorities, but lower commitment to vaccination and self-efficacy. In Germany, on the other hand, the HCPs had relatively higher commitment to vaccination and self-efficacy, but lower confidence in

vaccines. These differences can be taken into account in interventions. Future research should assess the effectiveness of interventions tailored according to country-specific needs.

The work presented here will result in three scientific publications. The first is a manuscript detailing the validation process of the long- and short-form I-Pro-VC-Be in this population, based on the methodology used in the validation of the original Pro-VC-Be. This manuscript has already been submitted for publication and is currently under review in *Expert Review of Vaccines*. The second manuscript will detail the cross-national comparison of HCPs' attitudes toward COVID-19 mandates and explore associations between the I-Pro-VC-Be and mandate attitudes. The third manuscript will detail the cross-national comparison of HCPs' attitudes and acceptance of CAM practices and, likewise, explore association between the I-Pro-VC-Be and CAM attitudes. These manuscripts will also provide hypotheses to explain differences in attitudes that are seen between countries, with relevant literature. For example, the role of professional norms, social cohesion, or public trust in institutions, which varies between participating countries, could be potential hypotheses to explain these differences. Analyses and drafting of these manuscripts are currently underway and are expected to be completed in the Spring of 2023.

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Appendix

Appendix 1. Items administered related to perceived professional norm (2), COVID-19 mandates (3) and CAM practices (5) and corresponding response scales.

[Perceived professional norm]

Please indicate your agreement with the following statements.

1. I think that most medical doctors in my country recommend that people get vaccinated.
2. I think that most medical doctors in my country are in favour of vaccination.

[Response scale:]

Strongly disagree
Somewhat disagree
Undecided
Somewhat agree
Strongly agree

[Vaccination mandates]

Please indicate your agreement with the following statements.

1. Vaccination against Covid-19 should be mandatory for healthcare workers in my country.
2. Vaccination against Covid-19 should be mandatory for the general public in my country.
3. I am in favor of the use of a "health pass" to allow vaccinated people to access public spaces and travel.

[Response scale:]

Strongly disagree
Somewhat disagree
Undecided
Somewhat agree
Strongly agree

[Attitudes toward CAM practices]

Please indicate your agreement with the following statements.

1. Complementary medicine can be dangerous in that it may prevent people getting proper treatment.
2. Complementary medicine builds up the body's own defenses, so leading to a permanent cure.
3. Homeopathy has been shown again and again to be ineffective as a cure for anything.
4. Complementary medicine has often saved the lives of patients when conventional doctors had already given up on them.
5. Complementary medicine is superior to conventional medicine in treating chronic ailments such as allergies, headaches, and back pains.

[Response scale:]

1 = strongly disagree,
2 = moderately disagree
3 = slightly disagree
4 = neutral
5 = slightly agree
6 = moderately agree
7 = strongly agree

Appendix 2. Analyses of the stability of responses between test and retest questionnaires (n=73).

	n	ICC	Wilcoxon signed-rank test
Score of perceived safety of vaccines	72	0.67 [0.52;0.78]	0.24
Score of complacency	72	0.56 [0.38;0.70]	0.12
Score of benefits/risks balance perception	71	0.68 [0.53;0.78]	0.81
Score of collective responsibility	71	0.51 [0.31;0.66]	0.50
Score of trust in authorities	71	0.71 [0.57;0.81]	0.63
Score of commitment to vaccination	71	0.71 [0.57;0.81]	0.28
Score of self-efficacy	71	0.68 [0.54;0.79]	0.08
Score of openness to patients	71	0.64 [0.48;0.76]	0.16
Score of perceived constraints	71	0.57 [0.40;0.71]	0.31
Score of reluctant trust	71	0.64 [0.49;0.76]	0.38
Past influenza vaccination behaviour	71	0.89 [0.83;0.93]	0.77

The following criteria were used for interpreting the ICC: ≥ 0.9 = excellent; ≥ 0.75 =good; ≥ 0.5 = moderate; < 0.5 =poor (Koo 2016).

Appendix 3. HCPs' responses to the items of the international Pro-VC-Be by country.

	Country					χ^2 or Fisher p-value ^a
	France	Finland	Portugal	Germany	All	
<i>Vaccine recommendation or intention to recommend frequency</i>						
When you treat mothers who have just given birth and who have not had the whooping cough vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?						<.0001
0%	46	0.6	7.5	0.0	1.8	1.7
10%	23	0.7	0.5	0.0	2.2	0.8
20%	19	0.8	0.0	0.0	1.5	0.7
30%	22	0.8	0.3	0.4	1.5	0.8
40%	16	0.6	0.8	0.2	0.8	0.6
50%	87	3.5	2.1	0.7	5.3	3.2
60%	35	1.5	0.8	0.0	2.3	1.3
70%	63	2.3	0.3	0.2	5.5	2.3
80%	118	5.1	1.9	0.9	7.3	4.3
90%	174	6.2	4.3	1.4	12.4	6.3
100%	1690	75.6	29.3	59.1	55.4	61.5
I do not treat patients within this age/target group	455	2.3	52.3	37.2	4.0	16.6
Please imagine you are treating a mother who has just given birth, who has not had the whooping cough vaccine, and has no contraindications.						<.0001

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
How likely is it that you would recommend the vaccine to the patient? (n=455)							
0%	9	0.0	3.6	0.0	8.3	2.0	
10%	3	0.0	0.5	0.5	4.2	0.7	
20%	3	0.0	1.5	0.0	0.0	0.7	
30%	2	0.0	1.0	0.0	0.0	0.4	
40%	4	0.0	1.0	0.0	8.3	0.9	
50%	13	3.6	5.6	0.5	0.0	2.9	
60%	4	0.0	1.5	0.0	4.2	0.9	
70%	8	10.7	1.5	0.5	4.2	1.8	
80%	12	10.7	3.6	0.5	4.2	2.6	
90%	17	3.6	7.1	1.0	0.0	3.7	
100%	380	71.4	73.0	97.1	66.7	83.5	
When you treat young girls and boys aged [insert age range] who have not had the human papilloma virus vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?						<.0001	
0%	55	1.4	5.3	1.1	2.0	2.0	
10%	32	0.8	1.3	1.1	1.8	1.2	
20%	23	1.2	0.8	0.2	0.8	0.8	
30%	37	1.4	1.1	0.7	2.0	1.4	

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
40%	17	0.8	0.0	0.2	1.0	0.6	
50%	143	6.4	5.1	2.3	5.6	5.2	
60%	72	3.4	2.4	0.9	2.8	2.6	
70%	150	7.3	2.9	1.8	6.8	5.5	
80%	208	9.5	5.3	4.0	8.5	7.6	
90%	205	7.9	9.3	3.6	9.0	7.5	
100%	1679	59.5	42.9	83.7	54.7	61.1	
I do not treat patients within this age/target group	127	0.5	23.5	0.5	5.0	4.6	
Please imagine you are treating a young girl and boy aged [insert age range] who has not had the human papilloma virus vaccine and has no contraindications.							0.19
How likely is it that you would recommend the vaccine to the patient? (n=127)							
0%	3	0.0	1.1	0.0	6.7	2.4	
10%	1	0.0	1.1	0.0	0.0	0.8	
20%	3	0.0	3.4	0.0	0.0	2.4	
30%	2	0.0	1.1	0.0	3.3	1.6	
40%	1	0.0	1.1	0.0	0.0	0.8	
50%	10	0.0	8.0	0.0	10.0	7.9	
60%	5	16.7	4.6	0.0	0.0	3.9	
70%	3	16.7	1.1	33.3	0.0	2.4	

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
80%	12	16.7	8.0	0.0	13.3	9.5	
90%	9	16.7	9.1	0.0	0.0	7.1	
100%	78	33.3	61.4	66.7	66.7	61.4	
When you treat adults over [insert age] years old who have not had the seasonal flu vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?							<.0001
0%	15	0.5	0.3	0.5	0.8	0.6	
10%	12	0.1	1.1	0.2	1.0	0.4	
20%	15	0.5	0.5	0.4	0.8	0.6	
30%	17	0.4	0.8	0.2	1.3	0.6	
40%	20	0.6	0.8	0.0	1.7	0.7	
50%	106	4.5	3.2	2.0	4.8	3.9	
60%	70	2.6	1.9	1.8	3.5	2.6	
70%	165	7.7	2.9	3.1	7.3	6.0	
80%	255	11.6	6.4	3.6	11.6	9.3	
90%	271	9.7	9.1	5.0	15.3	9.9	
100%	1422	61.8	44.8	39.1	47.4	51.8	
I do not treat patients within this age/target group	380	0.1	28.3	44.2	4.5	13.8	
Please imagine you are treating an adult over [insert age] years old who has not had the seasonal flu vaccine and has no contraindications.							0.004

	Country					χ^2 or
	France	Finland	Portugal	Germany	All	Fisher
	<i>column %</i>					p-value ^a
How likely is it that you would recommend the vaccine to the patient? (n=380)						
0%	2	0.0	0.0	0.8	0.0	0.5
10%	1	0.0	0.0	0.4	0.0	0.3
20%	1	0.0	0.9	0.0	0.0	0.3
30%	1	0.0	0.0	0.0	3.7	0.3
40%	1	0.0	0.0	0.4	0.0	0.3
50%	8	0.0	0.0	2.4	7.4	2.1
60%	6	0.0	0.0	2.4	0.0	1.6
70%	12	0.0	3.8	2.0	11.1	3.2
80%	17	0.0	4.7	3.3	14.8	4.5
90%	22	0.0	9.4	4.1	7.4	5.8
100%	309	100.0	81.1	84.2	55.6	81.3
When you treat adults who have not had the COVID-19 vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?						<.0001
0%	28	1.1	0.8	0.9	1.2	1.0
10%	23	1.1	1.3	0.2	0.7	0.8
20%	26	1.4	1.1	0.2	0.7	1.0
30%	24	1.4	0.5	0.0	0.8	0.9

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
40%	22	1.3	0.8	0.0	0.5	0.8	
50%	88	4.0	3.2	1.6	3.2	3.2	
60%	51	2.8	0.3	0.9	1.8	1.9	
70%	129	5.8	3.5	2.3	5.5	4.7	
80%	211	10.3	5.6	3.8	7.3	7.7	
90%	273	8.4	8.5	5.4	18.1	9.9	
100%	1569	62.5	54.4	46.1	58.0	57.1	
I do not treat patients within this age/target group	304	0.0	20.0	38.6	2.3	11.1	
Please imagine you are treating an adult who has not had the COVID-19 vaccine and has no contraindications.							
How likely is it that you would recommend the vaccine to the patient? (n=304)						<.0001	
0%	4		0.0	1.4	7.1	1.3	
20%	1		0.0	0.0	7.1	0.3	
30%	1		0.0	0.5	0.0	0.3	
40%	1		1.3	0.0	0.0	0.3	
50%	5		2.7	0.9	7.1	1.6	
60%	2		0.0	0.9	0.0	0.7	
70%	4		2.7	0.9	0.0	1.3	
80%	11		1.3	4.7	0.0	3.6	

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
90%	20	18.7	2.8	0.0	6.6		
100%	255	73.3	87.9	78.6	83.9		
When you treat [insert age range] old adolescents who have not had the COVID-19 vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?						.0001	
0%	187	10.3	4.0	4.0	4.2	6.8	
10%	115	5.9	2.4	0.5	5.1	4.2	
20%	109	5.5	4.5	0.5	3.7	4.0	
30%	93	4.8	2.7	1.3	3.0	3.4	
40%	51	2.9	0.5	0.5	1.8	1.9	
50%	300	14.3	8.5	7.0	9.3	10.9	
60%	123	5.4	2.1	2.5	6.0	4.5	
70%	168	7.7	2.9	4.3	6.6	6.1	
80%	256	10.0	6.7	7.2	11.6	9.3	
90%	178	4.1	6.9	5.4	11.9	6.5	
100%	1065	28.3	39.5	66.4	33.8	38.8	
I do not treat patients within this age/target group	103	0.9	19.2	0.4	3.0	3.8	
Please imagine you are treating a [insert age limit] old adolescent who has not had the COVID-19 vaccine and has no contraindications. How likely is it that you would recommend the vaccine to the patient? (n=103)						0.33	

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
0%	2	9.1	0.0	0.0	5.6	1.9	
10%	3	9.1	1.4	0.0	5.6	2.9	
20%	2	0.0	2.8	0.0	0.0	1.9	
40%	2	0.0	1.4	0.0	5.6	1.9	
50%	8	9.1	6.9	0.0	11.1	7.8	
60%	4	9.1	2.8	0.0	5.6	3.9	
70%	9	0.0	9.7	0.0	11.1	8.7	
80%	11	18.2	12.5	0.0	0.0	10.7	
90%	10	18.2	9.7	0.0	5.6	9.7	
100%	52	27.3	52.8	100.0	50.0	50.5	

When you treat pregnant women who have not had the COVID-19 vaccine,

what is the percentage of these patients for whom you actively recommend the vaccine?

<.0001

0%	104	3.6	1.1	2.9	6.6	3.8
10%	26	0.7	1.3	0.2	1.8	1.0
20%	27	0.9	0.0	0.2	2.5	1.0
30%	31	0.5	0.3	0.7	3.3	1.1
40%	24	0.6	0.3	0.2	2.5	0.9
50%	113	4.7	0.8	2.7	6.3	4.1

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
60%	59	2.1	1.1	0.9	4.0	2.2	
70%	85	4.0	0.3	1.6	4.5	3.1	
80%	142	5.5	1.9	2.3	9.1	5.2	
90%	175	5.5	5.1	4.7	10.5	6.4	
100%	1500	69.0	52.0	42.4	38.5	54.6	
I do not treat patients within this age/target group	462	2.8	36.0	41.3	10.5	16.8	
Please imagine you are treating a pregnant woman who has not had the COVID-19 vaccine and has no contraindications.						<.0001	
How likely is it that you would recommend the vaccine to the patient? (n=462)							
0%	13	5.9	0.0	2.2	9.5	2.8	
10%	5	2.9	0.0	0.0	6.4	1.1	
20%	2	2.9	0.0	0.0	1.6	0.4	
30%	5	0.0	0.0	1.3	3.2	1.1	
50%	32	11.8	3.7	4.8	19.1	6.9	
60%	3	0.0	0.8	0.9	0.0	0.7	
70%	20	0.0	3.0	6.1	3.2	4.3	
80%	32	5.9	10.5	5.7	4.8	6.9	
90%	36	2.9	11.2	6.1	9.5	7.8	
100%	313	67.7	70.9	73.0	42.9	67.9	

	Country					All	χ^2 or Fisher p-value ^a
	France	Finland	Portugal	Germany			
N=2,748							
<i>column %</i>							
When you treat infants who have not had the MMR vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?							<.0001
0%	19	0.3	2.4	0.0	1.2	0.7	
10%	10	0.1	0.3	0.0	1.3	0.4	
20%	3	0.0	0.3	0.0	0.3	0.1	
30%	4	0.1	0.3	0.0	0.3	0.2	
40%	4	0.0	0.5	0.0	0.3	0.2	
50%	17	0.3	0.8	0.4	1.5	0.6	
60%	11	0.0	0.8	0.2	1.2	0.4	
70%	24	0.4	0.8	0.4	2.3	0.9	
80%	43	0.8	2.9	0.7	3.0	1.6	
90%	103	1.3	6.7	0.7	9.6	3.8	
100%	2326	95.4	66.7	97.3	62.5	84.6	
I do not treat patients within this age/target group	184	1.4	17.6	0.4	16.4	6.7	
Please imagine you are treating an infant who has not had the MMR vaccine and has no contraindications. How likely is it that you would recommend the vaccine to the patient? (n=184)							0.37
0%	5	5.9	0.0	0.0	4.0	2.7	
10%	1	0.0	0.0	0.0	1.0	0.5	

	Country					χ^2 or	
	N=2,748	France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
30%	1	0.0	0.0	0.0	1.0	0.5	
40%	1	0.0	0.0	0.0	1.0	0.5	
50%	4	0.0	0.0	0.0	4.0	2.2	
70%	2	0.0	0.0	0.0	2.0	1.1	
80%	4	0.0	0.0	0.0	4.0	2.2	
90%	9	0.0	9.1	0.0	3.0	4.9	
100%	157	94.1	90.9	100.0	79.8	85.3	
When you treat [insert age range] old children who have not had the COVID-19 vaccine, what is the percentage of these patients for whom you actively recommend the vaccine?						<.0001	
0%	534	34.0	12.3	.	12.6	24.4	
10%	304	18.9	5.6	.	9.0	13.9	
20%	143	7.6	4.8	.	5.5	6.5	
30%	153	8.2	2.9	.	7.0	7.0	
40%	55	2.6	1.9	.	2.8	2.5	
50%	258	12.4	11.2	.	11.0	11.8	
60%	57	1.7	3.7	.	3.8	2.6	
70%	68	1.9	4.0	.	5.0	3.1	
80%	88	2.7	3.5	.	7.0	4.0	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
90%	61	0.6	5.9	.	5.3	2.8	
100%	247	7.8	20.8	.	12.3	11.3	
I do not treat patients within this age/target group	223	1.7	23.5	.	18.9	10.2	
Please imagine you are treating a [insert age limit] old children who has not had the COVID-19 vaccine and has no contraindications.						<.0001	
How likely is it that you would recommend the vaccine to the patient? (n=223)							
0%	17	33.3	0.0	.	8.8	7.6	
10%	18	4.8	4.6	.	11.4	8.1	
20%	18	0.0	6.8	.	10.5	8.1	
30%	13	4.8	1.1	.	9.7	5.8	
40%	7	4.8	3.4	.	2.6	3.1	
50%	38	9.5	17.1	.	18.4	17.0	
60%	10	9.5	5.7	.	2.6	4.5	
70%	3	0.0	2.3	.	0.9	1.4	
80%	15	4.8	10.2	.	4.4	6.7	
90%	11	0.0	9.1	.	2.6	4.9	
100%	73	28.6	39.8	.	28.1	32.7	
<i>Self-vaccinations</i>							
Have you been vaccinated against COVID-19?						0.004	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
No	19	0.3	0.3	0.7	1.8	0.7	
Yes, I am partially vaccinated (one dose of the Pfizer-BioNTech, Moderna, or Oxford/AstraZeneca vaccine)	10	0.4	0.0	0.2	0.7	0.4	
Yes, I am fully vaccinated (two doses of the Pfizer-BioNTech, Moderna, or Oxford/AstraZeneca vaccine, or one dose of the Yes, I am fully vaccinated and received a booster (third dose of Pfizer-BioNTech or Moderna, or a second dose of the Joh	133 2586	4.0 95.4	4.0 95.7	6.6 92.5	5.5 92.0	4.8 94.1	
How many times have you been vaccinated against influenza during the last three years?						<.0001	
0	166	4.0	1.9	7.9	11.1	6.0	
1	126	3.7	1.6	6.8	6.1	4.6	
2	340	10.9	2.7	19.0	15.3	12.4	
3	2116	81.5	93.9	66.3	67.5	77.0	
<i>Perceived safety of vaccines</i>							
Vaccines against measles are safe						<.0001	
Strongly disagree	19	1.4	0.3	0.2	0.0	0.7	
Somewhat disagree	21	1.2	0.0	0.0	1.2	0.8	
Undecided	32	1.7	0.5	0.2	1.5	1.2	
Somewhat agree	495	28.8	7.5	4.3	15.6	18.0	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Strongly agree	2181	67.0	91.7	95.3	81.8	79.4	
Vaccines against influenza are safe							<.0001
Strongly disagree	16	1.2	0.3	0.2	0.0	0.6	
Somewhat disagree	22	1.0	0.0	0.2	1.5	0.8	
Undecided	36	1.4	0.5	0.0	2.8	1.3	
Somewhat agree	501	25.5	7.2	7.4	20.6	18.2	
Strongly agree	2173	71.0	92.0	92.3	75.1	79.1	
Vaccines against hepatitis B are safe							<.0001
Strongly disagree	17	1.1	0.3	0.4	0.2	0.6	
Somewhat disagree	17	1.2	0.0	0.2	0.3	0.6	
Undecided	29	1.6	0.3	0.0	1.5	1.1	
Somewhat agree	464	27.7	5.3	2.9	15.3	16.9	
Strongly agree	2221	68.5	94.1	96.6	82.8	80.8	
Vaccines against human papillomaviruses are safe							<.0001
Strongly disagree	20	1.3	0.5	0.2	0.2	0.7	
Somewhat disagree	23	1.3	0.3	0.0	1.0	0.8	
Undecided	63	3.1	0.8	0.2	3.7	2.3	
Somewhat agree	566	30.6	10.7	4.5	21.6	20.6	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Strongly agree	2076	63.7	87.7	95.2	73.6	75.6	
Vaccines against COVID-19 in my country are safe							<.0001
Strongly disagree	38	1.8	0.8	0.2	2.0	1.4	
Somewhat disagree	41	2.4	0.5	0.0	1.7	1.5	
Undecided	157	7.9	1.1	2.0	7.6	5.7	
Somewhat agree	886	41.8	18.9	18.9	33.7	32.2	
Strongly agree	1626	46.1	78.7	79.0	55.1	59.2	
<i>Complacency</i>							
Today, some vaccines recommended by [insert relevant authority] are not useful, because the diseases they prevent are not serious							<.0001
Strongly disagree	1932	66.9	75.5	88.0	57.6	70.3	
Somewhat disagree	531	22.9	20.5	6.3	23.4	19.3	
Undecided	117	5.1	1.6	1.8	6.5	4.3	
Somewhat agree	133	4.3	1.9	3.4	9.1	4.8	
Strongly agree	35	0.7	0.5	0.5	3.5	1.3	
Children are vaccinated against too many diseases							<.0001
Strongly disagree	2193	79.5	87.2	91.2	65.3	79.8	
Somewhat disagree	359	13.9	11.2	4.1	20.7	13.1	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Undecided	87	3.7	0.5	1.6	5.1	3.2	
Somewhat agree	78	2.3	0.5	2.2	6.0	2.8	
Strongly agree	31	0.6	0.5	0.9	2.8	1.1	
Children are vaccinated at too young an age							<.0001
Strongly disagree	2253	83.8	86.1	91.6	66.8	82.0	
Somewhat disagree	321	11.4	11.2	4.3	19.4	11.7	
Undecided	88	2.9	2.1	1.1	6.5	3.2	
Somewhat agree	54	1.2	0.3	1.4	5.0	2.0	
Strongly agree	32	0.7	0.3	1.6	2.3	1.2	
<i>Benefits/risks balance perception</i>							
The benefits of the vaccine against measles outweigh its potential risks							<.0001
Strongly disagree	4	0.2	0.3	0.0	0.2	0.2	
Somewhat disagree	9	0.2	0.0	0.0	1.2	0.3	
Undecided	25	0.5	0.5	0.2	2.7	0.9	
Somewhat agree	292	14.2	5.6	3.1	13.6	10.6	
Strongly agree	2418	85.0	93.6	96.8	82.4	88.0	
The benefits of the vaccine against influenza outweigh its potential risks							<.0001
Strongly disagree	8	0.1	0.3	0.4	0.7	0.3	

	Country					χ^2 or Fisher p-value ^a
	France	Finland	Portugal	Germany	All	
	N=2,748	<i>column %</i>				
Somewhat disagree	34	0.7	0.8	1.8	2.0	1.2
Undecided	110	5.3	0.8	1.6	5.6	4.0
Somewhat agree	685	29.1	14.9	17.8	29.4	24.9
Strongly agree	1911	64.8	83.2	78.5	62.4	69.5
The benefits of the vaccine against hepatitis B outweigh its potential risks						<.0001
Strongly disagree	8	0.2	0.3	0.4	0.5	0.3
Somewhat disagree	7	0.3	0.0	0.0	0.5	0.3
Undecided	40	1.8	0.5	0.2	2.5	1.5
Somewhat agree	416	19.9	13.9	3.2	17.4	15.1
Strongly agree	2277	77.8	85.3	96.2	79.1	82.9
The benefits of the vaccine against human papillomaviruses outweigh its potential risks						<.0001
Strongly disagree	5	0.1	0.3	0.0	0.5	0.2
Somewhat disagree	21	0.6	1.1	0.5	1.2	0.8
Undecided	108	6.0	0.8	0.5	4.8	3.9
Somewhat agree	595	30.2	18.1	5.6	21.6	21.7
Strongly agree	2019	63.2	79.7	93.4	72.0	73.5
The benefits of the vaccines against COVID-19 available in my country outweigh their potential risks						<.0001
Strongly disagree	25	0.5	0.8	0.2	2.5	0.9

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Somewhat disagree	30	1.0	0.5	1.1	1.7	1.1	
Undecided	149	6.0	1.1	4.3	8.0	5.4	
Somewhat agree	680	27.5	21.3	21.9	24.1	24.8	
Strongly agree	1864	65.1	76.3	72.5	63.9	67.8	
<i>Collective responsibility</i>							
I recommend the vaccines on the vaccination schedule to my patients because it's essential to contribute to the protection of the population (community immunity)							<.0001
Strongly disagree	17	0.6	0.5	0.2	1.2	0.6	
Somewhat disagree	42	1.5	1.1	0.4	3.0	1.5	
Undecided	90	4.6	2.1	0.4	4.0	3.3	
Somewhat agree	554	23.8	18.7	7.4	25.5	20.2	
Strongly agree	2045	69.5	77.6	91.7	66.3	74.4	
I recommend the vaccines in the official schedule to my hesitant patients, explaining to them the importance of community immunity							<.0001
Strongly disagree	23	1.1	0.5	0.2	1.2	0.8	
Somewhat disagree	68	3.3	1.3	1.3	2.7	2.5	
Undecided	139	7.8	2.1	1.1	5.0	5.1	
Somewhat agree	727	33.2	24.0	9.9	29.7	26.5	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Strongly agree	1791	54.6	72.0	87.6	61.5	65.2	
<i>Trust in authorities</i>							
I trust the information provided by the [insert relevant authority] about the risks and benefits of vaccines							<.0001
Strongly disagree	27	1.6	0.0	0.0	1.3	1.0	
Somewhat disagree	54	2.6	0.3	0.4	3.2	2.0	
Undecided	237	15.2	2.1	1.4	6.1	8.6	
Somewhat agree	957	50.9	13.6	15.8	33.3	34.8	
Strongly agree	1473	29.8	84.0	82.4	56.1	53.6	
I trust the [insert relevant authority] to establish the vaccination strategy							<.0001
Strongly disagree	61	1.8	0.0	0.0	6.5	2.2	
Somewhat disagree	135	3.8	0.5	1.6	12.9	4.9	
Undecided	383	18.9	2.1	1.6	22.7	13.9	
Somewhat agree	1054	49.9	21.3	26.2	37.0	38.4	
Strongly agree	1115	25.6	76.0	70.6	20.9	40.6	
I trust the [insert relevant authority] to ensure that vaccines are safe							<.0001
Strongly disagree	29	1.6	0.0	0.2	1.5	1.1	
Somewhat disagree	57	2.8	0.3	0.9	2.8	2.1	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Undecided	243	16.1	1.1	1.1	6.3	8.8	
Somewhat agree	917	48.9	13.9	15.8	30.5	33.4	
Strongly agree	1502	30.7	84.8	82.1	58.9	54.7	
<i>Commitment to vaccination</i>							
I am committed in ensuring that my patients are vaccinated.							<.0001
Strongly disagree	7	0.1	0.8	0.0	0.5	0.3	
Somewhat disagree	17	0.1	3.2	0.2	0.5	0.6	
Undecided	82	1.6	12.5	0.4	2.3	3.0	
Somewhat agree	814	35.8	54.7	6.1	23.4	29.6	
Strongly agree	1828	62.5	28.8	93.4	73.3	66.5	
I am committed to keeping my knowledge about vaccination up-to-date (e.g. through CME, conferences, reading)							<.0001
Strongly disagree	3	0.2	0.0	0.0	0.2	0.1	
Somewhat disagree	9	0.5	0.3	0.2	0.2	0.3	
Undecided	108	4.6	8.0	0.7	3.0	3.9	
Somewhat agree	904	43.0	47.7	8.3	26.2	32.9	
Strongly agree	1724	51.8	44.0	90.8	70.5	62.7	
I am committed to developing the skills needed to communicate better with my patients about vaccination							<.0001
Strongly disagree	22	1.4	0.0	0.0	0.8	0.8	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
Somewhat disagree	48	3.1	1.6	0.2	0.5	1.8	
Undecided	254	16.9	6.9	1.3	2.7	9.2	
Somewhat agree	1013	45.9	50.9	11.9	33.0	36.9	
Strongly agree	1411	32.7	40.5	86.7	63.0	51.4	
<i>Self-efficacy</i>							
I feel comfortable advising my patients about the risks and benefits of vaccines						<.0001	
Strongly disagree	3	0.1	0.3	0.2	0.0	0.1	
Somewhat disagree	45	1.3	3.2	1.8	1.2	1.6	
Undecided	118	5.5	3.2	2.7	4.0	4.3	
Somewhat agree	1244	52.8	44.3	37.9	37.5	45.3	
Strongly agree	1338	40.2	49.1	57.5	57.4	48.7	
I feel comfortable discussing vaccines with my patients who are highly hesitant about vaccination						<.0001	
Strongly disagree	11	0.3	0.5	0.7	0.2	0.4	
Somewhat disagree	108	4.9	5.6	3.1	1.8	3.9	
Undecided	253	11.3	11.5	5.9	6.6	9.2	
Somewhat agree	1279	48.6	48.0	48.3	40.0	46.5	
Strongly agree	1097	35.0	34.4	42.0	51.4	39.9	
I feel sufficiently trained and informed to discuss vaccines with all patients						<.0001	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
Strongly disagree	9	0.2	0.3	0.7	0.3	0.3	
Somewhat disagree	66	1.9	5.1	2.7	1.5	2.4	
Undecided	228	9.1	12.5	6.1	6.1	8.3	
Somewhat agree	1393	52.5	53.3	57.1	39.5	50.7	
Strongly agree	1052	36.4	28.8	33.4	52.6	38.3	
I feel sufficiently trained on how to bring up the question of vaccines with hesitant patients						<.0001	
Strongly disagree	19	0.8	0.8	0.7	0.3	0.7	
Somewhat disagree	117	4.1	6.9	4.0	3.2	4.3	
Undecided	352	14.5	15.7	9.9	10.3	12.8	
Somewhat agree	1357	50.4	55.7	53.3	39.8	49.4	
Strongly agree	903	30.2	20.8	32.1	46.4	32.9	
<i>Openness to patients</i>							
Patients who are hesitant about the benefits and risks of vaccines have legitimate questions						<.0001	
Strongly disagree	121	3.9	0.5	11.5	1.3	4.4	
Somewhat disagree	507	17.3	8.0	33.2	13.6	18.5	
Undecided	497	23.4	6.1	13.6	18.9	18.1	
Somewhat agree	1138	42.0	51.2	33.8	41.3	41.4	
Strongly agree	485	13.4	34.1	7.9	24.9	17.7	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
I inform my patients about the benefits and risks of vaccines without trying to influence them						<.0001	
Strongly disagree	125	4.8	2.7	7.5	2.5	4.6	
Somewhat disagree	577	22.7	32.8	19.8	11.4	21.0	
Undecided	357	16.9	9.9	9.5	10.3	13.0	
Somewhat agree	1091	39.3	40.3	36.5	43.1	39.7	
Strongly agree	598	16.3	14.4	26.8	32.7	21.8	
I am open to patients delaying immunization of their children						<.0001	
Strongly disagree	718	20.6	20.0	43.5	25.0	26.1	
Somewhat disagree	1119	41.4	50.4	37.7	36.2	40.7	
Undecided	357	16.1	11.2	4.7	15.6	13.0	
Somewhat agree	430	17.5	16.3	11.7	15.3	15.7	
Strongly agree	124	4.5	2.1	2.5	8.0	4.5	
<i>Perceived constraints</i>							
The cost of some vaccines is a problem for some patients and can keep me from prescribing them						<.0001	
Strongly disagree	778	39.7	9.1	8.1	36.2	28.3	
Somewhat disagree	577	20.8	23.2	9.9	30.4	21.0	
Undecided	254	10.9	12.0	1.4	11.4	9.2	
Somewhat agree	834	22.3	44.3	52.6	17.4	30.4	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Strongly agree	305	6.4	11.5	28.0	4.6	11.1	
The lack of availability of certain vaccines in my country is sometimes a problem that can keep me from prescribing them to my patients							<.0001
Strongly disagree	1111	49.3	19.5	55.1	22.1	40.4	
Somewhat disagree	773	28.6	35.2	18.0	32.2	28.1	
Undecided	353	10.6	24.5	8.4	14.1	12.9	
Somewhat agree	408	9.1	18.7	14.7	24.2	14.9	
Strongly agree	103	2.4	2.1	3.8	7.5	3.8	
The lack of availability of certain vaccines in my place of work is sometimes a problem that can keep me from prescribing them to my patients							<.0001
Strongly disagree	1183	48.9	34.1	55.8	25.0	43.1	
Somewhat disagree	730	23.5	38.7	18.1	33.0	26.6	
Undecided	324	11.8	16.0	7.0	13.6	11.8	
Somewhat agree	386	11.7	9.3	14.7	21.1	14.1	
Strongly agree	125	4.1	1.9	4.3	7.3	4.6	
<i>Reluctant trust</i>							
I may sometimes recommend vaccines from the official schedule even if I feel I am not sufficiently informed							<.0001
Strongly disagree	862	32.7	25.1	34.8	29.5	31.4	
Somewhat disagree	892	34.3	31.7	23.5	37.5	32.5	
Undecided	357	13.6	15.2	8.6	14.4	13.0	

	N=2,748	Country					χ^2 or
		France	Finland	Portugal	Germany	All	Fisher
		<i>column %</i>					p-value ^a
Somewhat agree	488	14.8	22.1	24.4	14.9	17.8	
Strongly agree	149	4.7	5.9	8.6	3.7	5.4	
I may sometimes recommend vaccines from the official schedule even if I feel the vaccination policy is not sufficiently clear							<.0001
Strongly disagree	884	32.9	29.9	38.4	26.4	32.2	
Somewhat disagree	785	29.2	31.5	21.0	32.5	28.6	
Undecided	435	15.3	19.2	12.6	17.7	15.8	
Somewhat agree	513	17.7	14.1	22.1	20.2	18.7	
Strongly agree	131	4.9	5.3	5.9	3.2	4.8	
I may sometimes recommend the vaccines on the official schedule even in cases where I have doubts about their safety							<.0001
Strongly disagree	1245	48.5	38.4	49.4	39.5	45.3	
Somewhat disagree	802	31.6	29.9	23.2	29.5	29.2	
Undecided	322	10.5	17.3	9.9	12.4	11.7	
Somewhat agree	285	6.7	10.7	13.3	14.9	10.4	
Strongly agree	94	2.8	3.7	4.3	3.7	3.4	
<i>Professional norm</i>							
I think that most medical doctors in my country recommend that people get vaccinated.							<.0001
Strongly disagree	2	0.0	0.3	0.2	0.0	0.1	
Somewhat disagree	28	1.0	0.5	0.2	2.2	1.0	

	Country					χ^2 or Fisher p-value ^a	
	N=2,748	France	Finland	Portugal	Germany		All
		<i>column %</i>					
Undecided	143	6.9	1.1	2.7	6.6	5.2	
Somewhat agree	1388	68.1	30.7	22.6	53.2	50.5	
Strongly agree	1187	24.0	67.5	74.3	38.0	43.2	
I think that most medical doctors in my country are in favour of vaccination.						<.0001	
Strongly disagree	3	0.0	0.3	0.4	0.0	0.1	
Somewhat disagree	20	0.7	0.3	0.0	1.8	0.7	
Undecided	137	7.3	0.8	2.0	5.8	5.0	
Somewhat agree	1359	66.8	29.6	19.4	54.7	49.5	
Strongly agree	1229	25.3	69.1	78.3	37.7	44.7	

Appendix 4. Results from Tukey post hoc comparisons

Variable	Comparison	Estimate	adjusted <i>p</i>
Perceived professional norms	FRA – POR	0.58	< .001
	FRA – FIN	0.50	< .001
	FRA – GER	0.12	< .001
	POR – FIN	-0.07	.197
	POR – GER	-0.46	< .001
	FIN – GER	-0.39	< .001
Attitudes toward CAM practices	FRA – POR	-0.14	.037
	FRA – FIN	-0.55	< .001
	FRA – GER	0.55	< .001

	POR – FIN	-0.41	< .001
	POR – GER	0.69	< .001
	FIN – GER	1.10	< .001
Attitudes towards HCP mandates	FRA – POR	-1.15	< .001
	FRA – FIN	-0.21	.014
	FRA – GER	-0.43	< .001
	POR – FIN	0.94	< .001
	POR – GER	0.72	< .001
	FIN – GER	-0.22	.022
Attitudes towards public mandates	FRA – POR	-0.62	< .001
	FRA – FIN	-0.57	< .001
	FRA – GER	0.01	.999
	POR – FIN	0.05	.932
	POR – GER	0.63	< .001
	FIN – GER	0.58	< .001
Attitudes towards health pass	FRA – POR	0.08	.222
	FRA – FIN	0.42	< .001
	POR – FIN	0.34	< .001
