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1 **Vaccine hesitancy among healthcare workers in Europe: A qualitative study**

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35

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45

46 **Abstract**

47 Healthcare workers (HCWs) are often referred to as the most trusted source of vaccine-  
48 related information for their patients. However, the evidence suggests that a number of  
49 HCWs are vaccine-hesitant. This study consists of 65 semi-structured interviews with  
50 vaccine providers in Croatia, France, Greece, and Romania to investigate concerns HCWs  
51 might have about vaccination. The results revealed that vaccine hesitancy is present in all  
52 four countries among vaccine providers. The most important concern across all countries  
53 was the fear of vaccine side effects. New vaccines were singled out due to perceived lack of  
54 testing for vaccine safety and efficacy. Furthermore, while high trust in health authorities was  
55 expressed by HCWs, there was also strong mistrust of pharmaceutical companies due to  
56 perceived financial interests and lack of communication about side effects. The notion that it  
57 is a doctor's responsibility to respond to hesitant patients was reported in all countries.  
58 Concerns were also seen to be country- and context-specific. Strategies to improve  
59 confidence in vaccines should be adapted to the specific political, social, cultural and  
60 economic context of countries. Furthermore, while most interventions focus on education  
61 and improving information about vaccine safety, effectiveness, or the need for vaccines,  
62 concerns raised in this study identify other determinants of hesitancy that need addressing.  
63 The representativeness of the views of the interviewed HCWs must be interpreted with  
64 caution. This a qualitative study with a small sample size that included geographical areas  
65 where vaccination uptake was lower or where hesitancy was more prevalent and it reflects  
66 individual participants' beliefs and attitudes toward the topic. As HCWs have the potential of  
67 influencing patient vaccination uptake, it is crucial to improve their confidence in vaccination  
68 and engage them in activities targeting vaccine hesitancy among their patients.

69 **Keywords:** Vaccine hesitancy, healthcare workers, patients, Europe

## 70 **Introduction**

71 Healthcare workers (HCWs) are considered the most trusted source of vaccine-related  
72 information(1). However, studies are showing that HCWs are losing confidence in  
73 vaccination for their children, themselves, or their patients(2-5). Public health experts refer to  
74 this loss of confidence as “vaccine hesitancy”, which has recently been defined by the SAGE  
75 Working Group on Vaccine Hesitancy as “a behaviour, influenced by a number of factors  
76 including issues of confidence, complacency, and convenience.”(6) Vaccine hesitant HCWs  
77 can have a powerful influence on vaccination decisions, as they might recommend vaccines  
78 less frequently to their patients, and/or otherwise undermine confidence and contribute to  
79 vaccine hesitancy among the general population(2).

80 The little available research on HCWs’ attitudes is primarily related to seasonal and/or  
81 pandemic influenza vaccines. Most found that HCWs had not taken the influenza vaccine  
82 because of lack of time (7, 8), not feeling at risk of influenza (9, 10), because they  
83 considered they had no medical indication for the vaccine (4, 5), or due to concerns about  
84 safety and efficacy (3, 11).

85 This research aims to better understand vaccine hesitancy among vaccine providers in  
86 Europe, and explore the nature of their concerns, their perceptions of vaccine-related  
87 information, and their perceived role in responding to vaccine hesitancy.

88

## 89 **Methods**

90 The study was conducted in Croatia, France, Greece and Romania, as these countries  
91 responded to ECDC’s call for interest in participating in the project entitled “Comprehensive  
92 expert opinion on motivating hesitant population groups to vaccinate”. These countries have  
93 very different socio-economic and political backgrounds, allowing a more comprehensive  
94 overview of vaccine hesitancy in various contexts. Semi-structured interviews were  
95 conducted with healthcare providers who advise on vaccination for children, pregnant  
96 women and adults and who were working in one of the selected countries at the time of

97 study. Healthcare professionals who only administer the vaccine, after the patient has  
98 already decided to receive it, were not included. Recruitment of participants was done to  
99 include vaccine providers that are either vaccine hesitant or that face vaccine hesitancy in  
100 their practice. The aim was to build a sample of the general population of vaccine providers  
101 in each country to understand what their concerns about vaccines might be and how they  
102 respond to patient hesitancy. Areas with known vaccine hesitancy or low vaccination  
103 coverage were purposively favoured to increase the likelihood of recruiting healthcare  
104 workers either facing hesitancy or being hesitant themselves. The aim was not to determine  
105 levels of hesitancy in healthcare workers. Due to varying quality and quantity of data  
106 available on vaccination coverage rates and vaccine hesitancy in the different countries,  
107 different sampling methods were used in each country. In Croatia and Romania, the  
108 assumption that vaccine hesitancy exists across the whole country was used to select  
109 participants as there was no available data on specific levels of hesitancy in different regions  
110 and populations. In France, MMR vaccine coverage rates were used as a proxy for vaccine  
111 hesitancy. In Greece, this was done by using snowball sampling and first contacting two  
112 vaccine hesitancy vaccine providers. Based on the time and budget available for the study,  
113 and recommended sampling strategies for qualitative research, each country was asked to  
114 recruit approximately 15 HCWs, selected purposively.

115 A 30-minute interview guide, with a consent form and information sheet, was sent to country  
116 teams for translation and adaptation. The questions, which were not piloted due to time  
117 constraints, were designed to be neutral (i.e. "Have you ever had a patient who was hesitant  
118 or opposed to get himself/herself or his/her children vaccinated?", "Do you think that some  
119 vaccines which are officially recommended are not necessary?"). Face-to-face interviews  
120 were conducted at a location chosen by the participant, recorded with their approval, and  
121 transcribed removing identifiers such as names and locations using an automated  
122 programme or manually where software was not available. Interviewers in all countries were  
123 trained experienced researchers in qualitative interviewing.

124 *Sampling methods*

125 Different sampling strategies were used in different countries. In Croatia, a snowball  
126 sampling technique was used to select participants. Vaccination is provided in Croatia by  
127 family doctors, paediatricians, specialist doctors, and epidemiologists. Fifty general  
128 practitioners (GPs) and ten epidemiologists from areas with vaccine hesitancy were  
129 identified from the main general practitioner networks and through the Epidemiological  
130 Society and contacted by mail or telephone. Thirteen GPs and four epidemiologists agreed  
131 to participate.

132 In France, Montpellier and two surrounding villages (Ganges and Le Vigan) were chosen for  
133 this study due to low vaccine coverage. GPs are responsible for 90% of vaccination while  
134 other physicians such as paediatricians and gynaecologists vaccinate some target  
135 populations. GPs and gynaecologists were arbitrarily selected using a telephone directory  
136 and 142 were contacted through a telephone survey platform. Fourteen vaccine providers  
137 agreed to participate. Eight participants came from an area with <55% MMR vaccine  
138 coverage rates (first dose), three from a 55–75% coverage rate area and five from a 75–80%  
139 coverage rate area.

140 In Greece, a snowball methodology was employed as vaccination is mostly carried out  
141 privately by doctors and GPs and they are not connected to a national database recording  
142 vaccination coverage and vaccine hesitancy. Two persons who self-identified as being  
143 vaccine-hesitant – one GP, one paediatrician – were starting points and led to the  
144 identification of an additional 19 contacts from their social networks. Six vaccine providers  
145 refused to participate in the study and 15 interviews were conducted.

146 In Romania, vaccines are either administered by maternity services, paediatricians or by  
147 family doctors who work under the supervision of the National Institute of Public Health, part  
148 of the Ministry of Health. The presidents of Family Doctors Associations in various districts  
149 were contacted with information about the study and asked to share the contact details of  
150 several GPs and/or paediatricians. Twenty-three HCWs were contacted via phone and six

151 refused to participate. At the end of each interview, physicians were asked to refer other  
152 vaccine providers who might be interested to participate in the study.

### 153 *Data analysis*

154 The Vaccine Confidence Project used a deductive approach, based on a comprehensive  
155 literature review, to develop a standardised coding scheme. Country teams reviewed the  
156 scheme and coded the interviews, adding additional codes where needed. Country analyses  
157 were translated into English to allow comparison across the four countries and sent back to  
158 the Vaccine Confidence Project for overall analysis.

### 159 *Ethics*

160 Ethical approval was obtained from LSHTM Research Ethics Committee, as well as the  
161 Croatian and Romanian ethics committees. No ethics approvals were required in France or  
162 Greece.

## 164 **Results**

165 Sixty-five semi-structured interviews were conducted across Croatia (17/65), France (16/65),  
166 Greece (15/65) and Romania (17/65). Most participants were female (66%) and between 25-  
167 44 years old (58%). The majority were GPs (72%), with gynaecologists (9%),  
168 epidemiologists (6%), paediatricians (6%) and internal medicine specialists (6%) also  
169 participating (Table 1).

171 *Table 1: Participants characteristics (n (%))*

|                               | <b>Croatia</b>                               | <b>France</b>  | <b>Greece</b>  | <b>Romania</b>   | <b>Total</b>  |
|-------------------------------|--|--|--|--|---|
| <b>Number of participants</b> | 17   | 16   | 15   | 17   | 65  |
| <b>Age</b>                    | <u>25-44yo:</u><br>17 (100%)                 | <u>25-44yo:</u><br>3 (19%)<br><u>45-64yo:</u><br>12 (75%)<br><u>65+:</u><br>1 (6%) | <u>25-44yo:</u><br>8 (53%)<br><u>45-64yo:</u><br>7 (47%) | <u>*25-45yo:</u><br>10 (59%)<br><u>46-65yo:</u><br>7 (41%) | <u>25-44yo:</u><br>38 (58%)<br><u>45-64:</u><br>26 (40%)<br><u>65+:</u><br>1 (2%) |
| <b>Sex</b>                    | <u>Females:</u><br>15 (88%)<br><u>Males:</u> | <u>Females:</u><br>8 (50%)<br><u>Males:</u>  | <u>Females:</u><br>4 (27%)<br><u>Males:</u>              | <u>Females:</u><br>16 (94%)<br><u>Males:</u>               | <u>Females:</u><br>43 (66%)<br><u>Males:</u>                                      |



|   |  |   |   |  |  |
|---|--|---|---|--|--|
| <b>Profession</b>                                       | 2 (12%)<br>GPs:<br>13 (76%)<br>Epidemiologists:<br>4 (24%) | 8 (50%)<br>GPs:<br>10 (62.5%)<br>Gynaecologists:<br>6 (37.5%) | 11 (73%)<br>GPs:<br>9 (60%)<br>Internal<br>medicine:<br>4 (27%)<br>Paediatricians:<br>2 (13%) | 1 (6%)<br>GPs:<br>15 (88%)<br>Paediatricians:<br>2 (12%) | 22 (34%)<br>GPs:<br>47 (72%)<br>Gynaecologists:<br>6 (9%)<br>Epidemiologists:<br>4 (6%)<br>Paediatricians:<br>4 (6%)<br>Internal medicine:<br>4 (6%) |
| <b>Average years of practice (range)</b>                | 5 (1-11)   | 21 (4-39)   | 18 (2-35)   | 17 (2-31)  | 16 (1-39)  |
| <b>Type of practice</b>                                 | Solo:<br>13 (76%)<br>Group:<br>4 (24%)                     | Solo:<br>9 (56%)<br>Group:<br>7 (44%)                         | Solo:<br>11 (73%)<br>Group:<br>2 (13%)<br>Other:<br>2 (13%)                                   | Solo:<br>14 (82%)<br>Group:<br>3 (18%)                   | Solo:<br>47 (72%)<br>Group:<br>16 (25%)<br>Other:<br>2 (3%)  |
| <b>Number of HCWs practicing alternative medicine**</b> | 0 (0%)   | 1 (6%)  | 0 (0%)  | 3 (18%)  | 4 (6%)   |

172 \* The age categories used in the baseline questionnaires in Romania were different from the ones used in other  
173 countries

174 \*\*Alternative medicine was defined as practicing one or more of these activities at work: acupuncture,  
175 homeopathy, anthroposophy, natural medicine

176

177 The coding themes identified across all countries included: perceived benefits of vaccination  
178 (mentioned 227 times across all interviews – more than one mention per interview is  
179 possible), issues with vaccination (201), role of HCWs in responding to patient hesitancy  
180 (197), trust issues (139), suggestions to improve vaccine confidence (127), quality of  
181 information and communication (120), and decision-making influences (115).

182 HCWs in all four countries identified the following benefits of vaccination: benefits outweigh  
183 risks of vaccination (Croatia(C)=17; France(F)=12; Greece(G)=8; Romania(R)=13), vaccines  
184 prevent dangerous diseases and current outbreaks constitute the best example of the  
185 dangers of not vaccinating (C=16;F=10; G=8;R=10). One HCW in Romania explained:

186 “Vaccines have been used for a long time now (...). They have achieved their purpose: to  
187 prevent disease, to maintain health status, and to stop recurrence of diseases that have life-  
188 long sequelae” (R6). Many HCWs, particularly in France, Romania and Croatia also  
189 emphasised the benefit of herd immunity (C=15; F=11; G=2; R=10), and the responsibility  
190 people (including doctors) have to protect the entire society. As one French participant

191 noted, *"I consider that those people who refuse vaccination are selfish because they take*  
192 *advantage of the vaccination of other people"* (F1). A large number of HCWs in Romania  
193 and Croatia supported vaccination due to the existence of good scientific evidence (C=15;  
194 F=3; G=4; R=10).

195 Concerns about the safety of vaccination was the most recurrent theme in Romania and in  
196 Greece, and was raised by a small number of HCWs in France and Croatia, with some  
197 reporting patients' perceptions of risks. The most common concern reported, particularly in  
198 Greece and Romania was about side effects (C=5; F=3; G=9; R=14), including feelings of  
199 guilt if patients were to suffer from vaccine adverse events. A few HCWs had severe worries,  
200 as one from Romania concluded, *"It's well known that there are vaccines that have been*  
201 *banned in other countries (e.g., anti-hepatitis), precisely because they were proven to cause*  
202 *multiple sclerosis. (...) HPV vaccines can lead to tumours and autism. It's outrageous that*  
203 *they are prescribed"* (R9). Concerns that new vaccines, such as HPV, might not have been  
204 tested long enough were also raised. Issues of low vaccine effectiveness, or beliefs that  
205 vaccines (i.e. influenza) do not always work were particularly common in Greece, which  
206 sometimes led HCWs to avoid recommending vaccines (C=2; F=4; G=10; R=4). One noted,  
207 *"I recommend some vaccines at a later stage than what is recommended to avoid over-*  
208 *stimulating their immune system"* (G11). Many HCWs in Romania and Greece also  
209 mentioned that there might be too many vaccines (C=1;F=2;G=11;R=5) given to children at  
210 a very young age (C=1;F=3;G=6;R=2), which led some interviewed doctors to follow their  
211 own vaccination plans in Greece.

212 Trust issues were raised in Greece, Romania, and Croatia and to a lesser extent in France.  
213 In Croatia, France and Romania, the majority of these positively referred to trust in the  
214 government, health authorities, doctors or research (C=17;F=8;G=6;R=12), and in  
215 vaccination (C=17;F=4;G=5;R=11). In Croatia and Greece, trust in information received by  
216 HCWs from various sources was also observed. Mistrust was extremely prevalent in Greece,  
217 especially towards pharmaceutical companies (C=2;F=4;G=11;R=7). Interviewed HCWs in

218 all countries believed pharmaceutical companies have financial interests, put pressure on  
219 HCWs, and do not provide sufficient information about side effects. A mistrust of health  
220 authorities (C=0;F=3;G=9;R=4) and information about vaccination (C=0;F=3;G=7;R=6) was  
221 also observed among some of the interviewed French, Romanian and Greek HCWs. One  
222 Greek respondent commented, "*I do not trust the Greek Ministry of Health and rightly so.*  
223 *Many patients do not trust them either.*" (G12).

224 HCWs in Croatia and Romania were particularly pleased with the quantity and quality of  
225 information they receive or give to patients through leaflets, posters, books or websites  
226 (C=13;F=1;G=3;R=11). However, other HCWs in Romania and in Greece also reported a  
227 lack of information about safety and the risks of receiving too many vaccines to allow  
228 patients to make an informed decision (C=4; F=2; G=8; R=7). A few doctors in Greece and  
229 Romania (C=0, F=0, G=4, R=3) were also entirely against vaccination, two of which also  
230 mentioned a preference for homeopathy or prescribing natural remedies. "*I do not like*  
231 *vaccines! I tell my patients that I've never vaccinated myself with any vaccine.*"(R1).

232 HCWs in Romania, Greece and France, and to a lesser extent in Croatia, discussed ways  
233 they and their patients are influenced when making decisions about vaccination. HCWs in all  
234 countries reported being influenced by their employers or health authorities in terms of  
235 vaccination schedules or reminders (C=11; F=9; G=4; R=10). Influences by pharmaceutical  
236 representatives who remind HCWs of vaccination schedules were mostly discussed in  
237 France (C=0; F=12; G=0; R=2), where mistrust in pharmaceutical companies was not  
238 reported as much as in other countries. One French HCW commented, "*Pharmaceutical*  
239 *drug representatives visit me; they explain to me how vaccines work, why a vaccine more*  
240 *than another...*" (F6), while another expressed some distrust. "*I listen to (pharmaceutical)*  
241 *companies but do not trust them*" (F5). This shows that HCWs in France receive visits by  
242 pharmaceutical representatives and use the information they provide, but do not necessarily  
243 trust them. Influences from patient experiences (i.e. observing a lack of vaccine side effects  
244 or infections with vaccine-preventable diseases) were reported in Greece and Romania.

245 Other influences mentioned were training courses, the media, online information, and  
246 medical experts and journals. Some HCWs in Greece and Romania believed that their  
247 patients were influenced by the media (C=0;F=1;G=3;R=13), HCWs (C=0;F=0;G=14;R=0),  
248 and families, friends or partners (C=0;F=0;G=3;R=1). HCWs in Romania discussed the  
249 negative, unverified and sometimes contradictory information available online which is  
250 sometimes more persuasive than doctors: *“With the increasing popularity of the Internet,*  
251 *many parents are misinformed by charlatans and crooks that “seduce” them with false and*  
252 *absurd information. (...) If some doctors were fooled by such misinformation, then parents*  
253 *(...) are very vulnerable to such poisoning.”(R5)*  
254 HCWs in all countries discussed their role in responding to patient hesitancy. In Croatia,  
255 Greece and Romania, HCWs mostly believed that it is their role to address and respond to  
256 patient hesitancy (C=17; F=4; G=13; R=11) by sharing *“accurate and reliable information in*  
257 *a way that they can understand” (C3)*. Some HCWs in Croatia, France and Romania, went  
258 one step further and explained they have to try to influence patients’ decision-making  
259 regarding vaccination by emotionally affecting them (i.e. showing them images of  
260 poliomyelitis cases), telling them they vaccinate their own children, or telling them  
261 vaccination is mandatory (C=10; F=6; G=3; R=10): *“I say it is mandatory even if it is not...*  
262 *(...) I don’t want to follow a child, a family who do not vaccinate their children” (F16)*. Some  
263 HCWs, mostly in France, believed they should only provide neutral facts and information  
264 about vaccination, without trying to influence or force patients to vaccinate (C=1; F=10; G=3;  
265 R=4).  
266 Overall, across all countries, HCWs came up with four major suggestions to improve  
267 vaccination confidence: improve information, involve health authorities, ensure skilled  
268 communication between HCWs and patients, and improve HCW training.

## 269 **Discussion**

270 The results from the qualitative interviews with HCWs from Croatia, France, Greece and  
271 Romania confirm the study’s initial assumption of existence of vaccine hesitancy among

272 HCWs and provide an insight into the reasons behind these doubts. Although the reports  
273 from the interviews were overall positive and showed generally high levels of trust and  
274 confidence in vaccination, there were also concerns about safety, questions about the need  
275 for vaccines, and/or mistrust of pharmaceutical companies and health authorities. A few  
276 doctors, some practicing homeopathy, were entirely against vaccination, and actively  
277 decided not to recommend it to their patients. This is of particular concern as many studies  
278 have shown that the attitude and knowledge HCWs have about vaccines can influence their  
279 intentions to vaccinate themselves and their children, and to recommend vaccination to their  
280 patients (12, 13). It is therefore highly important for public health leaders to find ways to  
281 better understand HCW vaccine-related behaviours and attitudes and take steps to counter  
282 hesitancy.

283 The most important concern across all countries was about vaccine safety. Most HCWs  
284 reported these as concerns their patients have, but some shared similar worries. Many  
285 studies have found that HCWs refuse vaccination because of the risk of side effects (11), but  
286 also because they think they are at low risk of infection (15, 16). The latter was also  
287 observed in this study, with HCWs lacking confidence in the need for and the effectiveness  
288 of some vaccines, particularly the seasonal influenza one. HCWs have their patients' health  
289 at heart, and it important that they are reminded of the dangers of vaccine-preventable  
290 diseases and the low risks of vaccine side effects.

291 New vaccines, such as the HPV vaccine, were singled out due to perceived lack of testing  
292 for vaccine safety and efficacy. This confirms previously conducted studies which also  
293 showed HCWs' concerns about new vaccines (17, 18). The HPV vaccine is of particular  
294 concern, as it is delivered by different HCWs in different countries. Making sure all vaccine  
295 providers (nurses, gynaecologists, GPs, etc.) are included in the planning and deployment of  
296 new vaccination campaign will alleviate their doubts and concerns, improve their knowledge  
297 about the vaccine, and facilitate their recommendation to patients.

298 Another important theme which came across the interviews was trust. A 2015 French study  
299 found that eight out of ten GPs trust the Ministry of Health but 50% of them also believe that  
300 the Ministry is influenced by pharmaceutical companies (19). A similar scenario was found in  
301 this study, with high trust expressed in the health authorities but mistrust of pharmaceutical  
302 companies. Interviewed HCWs in Greece also showed high mistrust of the government and  
303 health system, which could have been influenced by the political and economic crisis  
304 situation in which the interviews were conducted and may require interventions to avoid  
305 negative impact on vaccination uptake. This result demonstrates the importance of context in  
306 vaccine hesitancy, and highlights the need for more cross-cutting research looking into the  
307 impact of political, socio-economic and cultural contexts on concerns about vaccination.  
308 Many institutions can be associated with vaccination and the public's credibility of vaccine  
309 information will be influenced by their trust in some or all of these organisations and how  
310 open and transparent these are. Trust can be built by expressing empathy and  
311 acknowledging people's concerns and feelings and depends on the specific social, cultural,  
312 political and economic context of the country or region affected.

313 HCWs stressed the issue of anti-vaccination content in the media and its influence on  
314 patients. With continuous advancements in communication technologies such as social  
315 media, the public is increasingly using the internet to research and share information about  
316 vaccines. Some studies have analysed the content of vaccine information available on  
317 websites and social media and have shown not only that it is of variable quality, but also that  
318 there is a predominance of negative and sometimes incorrect content, which has the  
319 potential to influence vaccine decisions (21-24). However, a study looking particularly at  
320 French websites found that while some websites criticise some aspects of vaccines, not all  
321 disseminate anti-vaccination opinions (25). National authorities and governments should  
322 consider taking advantage of what online media, including social media, have to offer by  
323 promoting and sharing clear, concise and easy to understand information about vaccination.  
324 Increasing the presence of reliable sources of information online will allow countries to

325 counteract anti-vaccine groups and prevent them from reaching parents seeking more  
326 information about vaccines on the internet.

327 Many interviewed vaccine providers felt it was their responsibility to respond to hesitant  
328 patients, with some believing they should do even more and try to actively influence patients  
329 to ensure they get vaccinated. However, in France, most study participants described their  
330 role as providers of neutral information, explaining patients should make that decision for  
331 themselves. HCWs are often seen as having the greatest influence on patients' decision to  
332 get vaccinated. It is therefore important they not only communicate with hesitant patients, but  
333 that they know how to respond to concerns or doubts. A study from 2011 concluded that  
334 HCWs should aim to have open, non-confrontational dialogues with patients as early as  
335 possible. It recommended using personal stories, reports of disease outbreaks and visual  
336 images of individuals suffering from vaccine-preventable diseases to remind patients of the  
337 need for high vaccination coverage (26).

338 This study sheds light on current knowledge gaps that future research could explore further  
339 such as varying opinions about vaccination among different types of vaccine providers, but  
340 also in relation to different vaccines. The wide range of concerns raised related to vaccine  
341 hesitancy points to the need for more comprehensive, context-specific interventions. While  
342 most current interventions focus on education and improving information about vaccine  
343 safety, effectiveness, or the need for vaccines, concerns raised in this study identify other  
344 determinants of hesitancy that need addressing, such as trust in health systems, or HCWs'  
345 perceived roles in responding to patient hesitancy and their levels of confidence in doing so.

346 Although some commonalities between countries can be found, determinants of hesitancy  
347 have also been shown to be country- and context-specific and need to be addressed as  
348 such. National vaccination programmes should consider developing the capacity of  
349 identifying local determinants of vaccine hesitancy, whether in patients or in healthcare  
350 workers and then developing strategies adapted to address these determinants, in a social,  
351 cultural, political and economic context.

352

353 *Limitations*

354 There were a few limitations in this research. The first is the limited sample size and  
355 differential sampling strategy in each country which may have affected the reliability of the  
356 study. Recruitment of HCWs was also intentionally biased as it was done in geographical  
357 areas where vaccination uptake was lower than average or where hesitancy was reported to  
358 be more prevalent. Results for Greece must also be interpreted with caution as it was the  
359 only country where vaccine hesitant providers were directly recruited through snowball  
360 sampling. The representativeness of the views of the HCWs interviewed in this study must  
361 be interpreted with caution, especially as they come from different healthcare systems, with  
362 different approaches to vaccine provision. That said, the study's intent was to start  
363 identifying the characteristics and experience of hesitancy among HCWs where vaccine  
364 hesitancy and low vaccine uptake was known rather than quantify vaccine hesitancy. HCWs  
365 from different countries might also have answered questions differently, due to the influence  
366 of vaccination legislation in their country, which might have led to underreporting of some  
367 perceived issues. Fear of reprisal might have also deterred some HCWs from sharing their  
368 concerns about vaccination.

369

370

371 **Appendix**

372 **Topic guide for the semi-structured interviews**

373 **BASELINE INFORMATION**

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374

375 **1. What is your gender?**

376  Male  Female

377

378 **2. What is your age?**

379  ≤24  25-44  45-64  65+



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**3. What is your profession?**

- General practitioner (family doctor)     Nurse/midwife  
 Specialist, please specify \_\_\_\_\_     Other, please specify \_\_\_\_\_

**4. Where do you currently work (what type of health institution) and how long have you been working there?**

\_\_\_\_\_

**5. Do you practice alternative medicine at work (acupuncture, homeopathy, anthroposophy)? If yes, could you shortly explain what it entails?**

- No                     Yes, \_\_\_\_\_

**VACCINATION PERCEPTIONS AMONGST HEALTH CARE PROVIDERS**

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*For each question, sub questions are there to direct or redirect the conversation if necessary.*

**6. Do you ever explain to patients that getting vaccinated is not only important to protect themselves but also others? Why?**

- How do patients usually respond?

\_\_\_\_\_

**7. Did you receive last season's influenza vaccine?**

- What were your reasons for accepting/refusing?
- Did you experience any doubt or concern about the vaccine and if so what were they?
- In your opinion, should healthcare workers get vaccinated against influenza every season?

\_\_\_\_\_

**8. Do you have children? If so, are your children/is your child vaccinated with the national recommended vaccinations (according to the national immunisation schedule)?**

- How difficult was it for you to make the decision to vaccinate your child/children compared to vaccinating yourself or patients?
- Did you experience any doubt or concern about a particular vaccine recommended to your children and if so, what were they (for which vaccines)?
- Are there some vaccines you offer to your patients but you would not vaccinate your children with?

\_\_\_\_\_

**9. Do you personally give advice to patients on vaccination and if so, what influences the content of your advice?**

- Where do you seek information on vaccines and who do you trust the most? (Fellow doctors, health authorities, health agencies, medical press, internet, pharmaceutical companies, friends and family, others)(Please specify)?

\_\_\_\_\_

**10. In your opinion, does your workplace offer patients enough advice and information about vaccination?**

- What material is available for patients, and what resources are they redirected to?

- 432       ▪ Do you think colleagues take or have enough time to dedicate to discuss patients'  
433       concerns?  
434       ▪ Have you ever disagreed/provided conflicting advice with a colleague?  
435       ▪ Are any of your colleagues against vaccination? If so, why and how did you respond  
436       to their claims?

437 \_\_\_\_\_

438  
439 **11. Have you ever had a patient who was hesitant or opposed to get himself/herself or**  
440 **his/her children vaccinated?**

- 441       ▪ Could you describe what happened, why was the patient hesitant or opposed and  
442       how did you respond?  
443       ▪ Did you feel comfortable to answer his/her questions/concerns? And why?  
444       ▪ Did you have access to information/resources that helped you to address these  
445       concerns? Which ones?  
446       ▪ Did you feel like you agreed or shared some of their doubts and concerns?  
447       ▪ After speaking with this patient, did you re-consider your views on vaccines and  
448       vaccine safety?

449 \_\_\_\_\_

450  
451 **12. How confident are you that vaccinated individuals have more benefits from**  
452 **vaccinations than rare severe adverse events?**

- 453       ▪ What are your concerns or worries about vaccine safety?  
454       ▪ What about new vaccines or vaccines for pregnant women?  
455       ▪ Could you rank your biggest concerns in order of importance?  
456       ▪ Would you feel responsible if something were to happen to your patient after  
457       immunisation?

458 \_\_\_\_\_

459  
460 **13. Are there any particular vaccines about which you have safety concerns?**

- 461       ▪ Which vaccines and which concerns?  
462       ▪ Do you recommend them to patients? Why/why not?  
463       ▪ Have you ever recommended to a patient that he/she should not get vaccinated  
464       (please give examples and reasons explaining the advice you gave patients)?

465 \_\_\_\_\_

466  
467 **14. Do you think that some vaccines which are officially recommended are not**  
468 **necessary? If yes, which vaccines?**

- 469       ▪ How concerned are you that some vaccines might not prevent the disease?  
470       ▪ How effective/necessary do you think vaccines are?  
471       ▪ Do you think children receive too many vaccines?

472 \_\_\_\_\_

473  
474 **15. Do you think there is a need to improve vaccination confidence and uptake**  
475 **amongst health care professionals and patients, and if so, how do you think it could**  
476 **be improved?**

- 477       ▪ Which tools, training, information, or communication skills do you think you would  
478       need to improve vaccination uptake?  
479       ▪ Where, from which organisations do you think you could find support to do this?

480 \_\_\_\_\_

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