



TECHNICAL REPORT

Vaccine hesitancy among healthcare workers and their patients in Europe

A qualitative study

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This report was commissioned by the European Centre for Disease Prevention and Control (ECDC), under the Framework Service Contract ECDC/2014/013, coordinated by Irina Dinca at ECDC, produced by World Health Communication Associates (WHCA) and sub-contracted to the London School of Hygiene and Tropical Medicine (LSHTM).

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It should be noted that the views of the healthcare workers interviewed in this study may not be representative of the views of the general population of healthcare workers and must therefore be interpreted with caution.

The views expressed in this publication do not necessarily reflect the views of the European Centre for Disease Prevention and Control (ECDC).

Suggested citation: European Centre for Disease Prevention and Control. Vaccine hesitancy among healthcare workers and their patients in Europe – A qualitative study. Stockholm: ECDC; 2015.

Stockholm, October 2015

ISBN 978-92-9193-722-6

doi 10.2900/425780

Catalogue number TQ-04-15-687-EN-N

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Abbreviations

GP	General practitioner (family doctor)
HCW	Healthcare worker
HPV	human papilloma virus
LSHTM	London School of Hygiene and Tropical Medicine
MMR	measles, mumps, rubella
SAGE	The Strategic Advisory Group of Experts (advising WHO on vaccines and immunisation)
WHO	World Health Organization

Background

Vaccination has often been referred to as one of the greatest public health achievements of the 20th century, together with family planning and the fluoridation of drinking water [1]. Since the development of the first vaccine against smallpox in 1796 and the widespread use of vaccines in the 1900s, considerable achievements have been made in the reduction of morbidity and mortality from vaccine-preventable diseases. However, along with the increased use and popularity of vaccines in public health there are also growing public concerns about vaccine safety and legislation [2]. In most countries, such concerns remain limited to a small portion of the population, and do not necessarily lead to a refusal of vaccines or significantly affect uptake. Studies have shown that even vaccinated individuals sometimes have apprehensions or doubts about the safety of vaccines [3]. Parents, pregnant women, individuals with immunosuppressive disorders and other population groups targeted by vaccination sometimes express fears about the risk of side effects from vaccines [4–6], the safety of their ingredients and adjuvants [7, 8], or show a lack of understanding about the risk of the diseases they prevent [9, 10]. Monitoring and addressing the concerns of such clusters of individuals who have lost or are losing confidence in vaccines is a key public health challenge as without adequate uptake levels, the benefits of vaccination could be lost. Significant outbreaks linked to under-vaccinated communities have already emerged around the world in the case of measles [11, 12], rubella [13] and poliomyelitis [14].

Public health experts now refer to this loss of confidence as 'vaccine hesitancy', so as to capture concerns in both vaccinated and unvaccinated individuals [15, 16]. The Strategic Advisory Group of Experts [SAGE]¹ on Immunisation defined vaccine hesitancy as 'a behaviour, influenced by a number of factors including issues of confidence [level of trust in vaccine or provider], complacency [do not perceive a need for a vaccine, do not value the vaccine], and convenience [access issues]' [17]. Vaccine-hesitant individuals are part of a heterogeneous group and have different levels of concern about vaccines, ranging from those who refuse vaccines entirely, to individuals who refuse or delay specific vaccines, and those who have doubts and concerns about vaccination but accept all vaccines [3, 18].

Healthcare workers are considered to be the most trusted source of vaccine-related information for patients. They are in the best position to understand hesitant patients, to respond to their worries and concerns, and to find ways of explaining to them the benefits of vaccination. However, more and more studies are now showing that healthcare workers themselves, including those who provide vaccination to patients, can be vaccine-hesitant, whether considering vaccination for themselves, their children, or their patients. Almost all of these studies focussed on healthcare workers' attitudes and concerns related to seasonal and/or pandemic influenza vaccines and many of these found that healthcare workers had not been vaccinated against influenza because they had not had time [19, 20]; were not at risk of influenza [21, 22]; felt healthy or had not had the vaccine prescribed [23, 24], or had concerns about vaccine safety and efficacy [25, 26]. The proportion of hesitant healthcare workers in Europe remains unknown but some studies have shown that many have concerns about vaccines that could lead to them not recommending specific vaccines. A recently published study showed that 16 to 43% of French family doctors admitted not having recommended a specific vaccine for their patients, or only sometimes [27].

In addition to vaccine-hesitant healthcare workers, there has been an increase in the number of doctors who publicly condemn vaccination. The story of how Andrew Wakefield, a former British surgeon, spread unfounded claims about the link between the MMR (measles, mumps, rubella) vaccine and autism is now well-known. Many people, including healthcare workers, are aware of Wakefield's falsified and fraudulent research and often discuss his retracted article as an example of the rise of extreme anti-vaccine groups. There are now other figures that use their influence as doctors to spread their concerns about vaccination and to urge patients not to get vaccinated. On 13 May 2015, a French doctor, Professor Henri Joyeux, initiated a petition against vaccination and received almost 700 000 signatures [28]. In Belgium, Dr Jean-Jacques Crèvecoeur publically criticised the influenza A (H1N1) vaccine and provided a long list of reasons why people should refuse the vaccine [29]. Dr Johann Loibner is an Austrian doctor who founded 'Pathovacc', a symposium for healthcare workers critical of vaccination [30]. Little attention has been paid to these different levels of vaccine hesitancy among healthcare workers and how they could influence patients. As the most trusted source of information on vaccination, there is a risk that hesitant healthcare workers might spread concerns about vaccines to the general population, recommend vaccines less frequently to their patients, and reduce vaccine confidence and uptake by their patients.

¹ SAGE is the principal advisory group to the World Health Organization (WHO) for vaccines and immunisation and was established to advise WHO on immunisation policies and strategies, research and development, delivery, and linkages with other health interventions.

Aims and objectives

The research described in this report was conducted to assess potential concerns among hesitant healthcare workers in Europe. It is part of a European Centre for Disease Prevention and Control (ECDC) project entitled 'Comprehensive expert opinion on motivating hesitant population groups to vaccinate', managed by the World Health Communication Associates and coordinated by the Vaccine Confidence Project at the London School of Hygiene and Tropical Medicine. The aim of this research project is to have a better understanding of vaccine hesitancy and safety concerns among healthcare vaccine providers and their patients in Europe and to explore the link and potential influence between the two groups. The following research objectives were defined:

- Improve our understanding of vaccine hesitancy among healthcare vaccine providers in Europe: shed light on their doubts and concerns over vaccine safety and the reasons behind these doubts.
- Identify reasons for patient vaccine hesitancy in Europe and investigate how healthcare professionals respond to hesitant patients.

The knowledge gained from this study is used to inform the development of a 'Let's Talk About Hesitancy' supplement to the ECDC's 'Let's Talk About Protection' guide. It will also allow public health professionals in Europe to understand the extent of the problem of vaccine hesitancy among healthcare workers and their patients, and to develop more targeted and effective public health measures to prevent and respond to vaccine hesitancy, especially among healthcare professionals.

Methods

A qualitative study was conducted to capture determinants of vaccine hesitancy among healthcare providers and insights into their perceptions of vaccine safety and how they believe their patients perceive vaccine safety. Research teams from Croatia, France, Greece and Romania responded to ECDC's call for interest in participating in the project entitled 'Comprehensive expert opinion on motivating hesitant population groups to vaccinate'. For Croatia, Greece, and Romania, this also included participation in the adaptation of the ECDC 'Let's talk about protection: practical guidance for healthcare providers to enhance childhood vaccination uptake'.

Data collection

The study aimed to conduct 15 semi-structured interviews with healthcare providers who advise patients on vaccination in each country. Research participants were defined as healthcare professionals who provide advice on or recommend vaccination to any population group (from children to pregnant women and adults) and who were living and working in one of the selected countries at the time of the study. Depending on the national healthcare system in place, participants included either nurses, general practitioners, family doctors, or specialists working with patient groups for whom vaccines are commonly recommended, such as gynaecologists. Healthcare professionals who only administer the vaccine, after patients have already decided they want to receive it, were not included in the study. The research followed a targeted approach, according to which participants in each country were recruited only from low coverage areas, or from areas with previously established vaccine hesitancy among individuals. The aim was to decrease the size of the study population, thereby increasing the representativeness of the study sample. A targeted approach also increases the probability of interviewing hesitant healthcare professionals, or healthcare professionals who have to face hesitant patients. Recruitment of participants was organised and undertaken by the four countries in which the interviews took place.

A baseline 30-minute interview guide, with a consent form and an information sheet, was developed by the Vaccine Confidence Project and sent to the country research teams for translation and adaptation. Interviews were conducted face-to-face in private settings at a location chosen by the participant. Interviews were recorded, with the prior approval of participants, and transcribed using an automated transcription programme, removing identifiers such as names and locations. If no programme with a high transcription accuracy was available for the country's language, research teams manually transcribed the interviews.

Sampling methods

In Croatia, family doctors and epidemiologists who deal with hesitant patients in their everyday work were recruited. A total of 50 family doctors and 10 epidemiologists were contacted from different areas, either by mail or by telephone. Epidemiologists in Croatia advise hesitant parents as part of their everyday work. Of these, 13 family doctors and four epidemiologists agreed to participate, with those who refused mostly citing a lack of time. The family doctors were identified from the main general practitioner networks and it was explained to them that they would be contributing to a project which would help to better understand hesitancy concerning vaccines and vaccination.

The study in France was carried out by a senior sociologist in Montpellier and two villages north of Montpellier (Ganges and Le Vigan) that were chosen because of low vaccine coverage. Two participants were recruited from the two villages, while 14 participants were recruited from the central or peripheral parts of Montpellier (with different social profiles and vaccination coverage rates). Family doctors and gynaecologists were contacted by telephone via a survey platform and were selected using the Montpellier telephone directory, which is not organised by district. The mean duration of interviews was 31 minutes. Eight participants came from an area with <55% MMR vaccine coverage rates (first dose), three from a 55–75% coverage rate area and five from a 75–80% coverage rate area.

As vaccination is carried out privately in Greece, and doctors administering vaccines are not registered or connected to a national database recording vaccination rates among regional population groups, a snowball sampling strategy was used to identify healthcare workers that might be facing hesitant parents. A vaccine-hesitant family doctor and a vaccine-hesitant paediatrician were used as starting points to identify the required 15 healthcare workers through their social networks. Healthcare workers were assured that their identification and status would remain confidential.

In Romania, the presidents of the family doctors associations from several regions were contacted to ensure a geographical diversity of participants. They received information about the aim of the study and were asked to share the contact details of several family doctors and/or paediatricians. A total of 23 healthcare workers were contacted by phone, and six refused to participate in the study (the main reason being lack of time, or not being in the city/village). From the 17 participants: nine work in cities (Bucharest; Cluj-Napoca; Suceava, Alba-Iulia; Baia-

Mare; and Craiova); five in towns (Zalau, Sighetul-Marmatiei, Dej, Botosani and Sebes) and three in villages (two from Transylvania and one from the region of Moldova).

Data analysis

Transcripts were analysed thematically by categorising and comparing common and recurring themes across all interviews. A standardised coding scheme was developed by the Vaccine Confidence Project based on a comprehensive literature review, although country research teams were able to adapt this for their own interviews, if required. Codes were then allocated to the different sections of each individual interview by the country research teams. Relevant data, organised by themes and codes, was translated into English and sent back to the Vaccine Confidence Project to allow comparison and analysis of data from the four countries. Ethical approval was obtained from the London School of Hygiene & Tropical Medicine Research Ethics Committee and from ethics committees in Croatia and Romania. No ethical approvals were required in France or Greece.

Results

Vaccination contexts in the four selected countries

Vaccination in Croatia is provided to patients free of charge; by family doctors, paediatricians, specialist doctors, or epidemiologists. Childhood vaccination is mandatory in Croatia, and all medical doctors are obliged by law to participate in the immunisation programme. If parents refuse vaccination, they are asked to undertake counselling and can then be reported by their doctors to the Sanitary Inspection Unit of the Ministry of Health and fined.

In France, two vaccines are compulsory (diphtheria-tetanus and polio), while the rest are recommended. The vaccination schedule is published and updated each year in April by the Ministry of Health, following the recommendations of the High Council for Public Health/Technical Committee for Vaccinations (Haut Conseil de la Santé Publique - Comité technique des vaccinations). All recommended childhood vaccines are reimbursed by the national social insurance system at a rate of 65 % (except for the MMR vaccine which is reimbursed 100%). The rest is supported by supplementary health insurances or by the universal supplementary insurance (CMUC), a programme for those whose annual income is below EUR 9 000. For people with incomes over the threshold who are unable to benefit from this programme but cannot afford to pay a supplementary insurance, a non-reimbursable payment may be a barrier to vaccination, at least for the most expensive vaccines – such as the human papilloma virus (HPV) vaccine.

The Greek vaccination system works through the private sector. The vaccination cost for insured individuals is provided under the national insurance system, EOPYY. Patients can then either make an appointment with doctors working under EOPYY or choose another doctor and then pay for the visit themselves.

In Romania, vaccines are either administered by maternity services or by family doctors who work under the supervision of the National Institute of Public Health, which is part of the Ministry of Health. Parents are allowed to refuse vaccination, as long as they fill in and sign a form explaining their reasons for refusing a specific vaccine.

Overall results

A total of 65 semi-structured interviews were conducted across Croatia, France, Greece and Romania. There were 17 interviews conducted in Croatia, another 17 in Romania, 16 in France and 15 in Greece. The majority of participants were females (66%) between the ages of 25 and 44 years (58%). While most participants were general practitioners (72%), gynaecologists (9%), epidemiologists (6%), paediatricians (6%) and internal medicine specialists (6%) were also included in the study. The average number of years in practice was 16, with a range from 1–39 years. Most participants worked in a solo practice (72%) and four healthcare workers practised homeopathy or other types of alternative medicine. A summary of the participants' characteristics is available below and a table of characteristics for each participant is included in Annex 2.

Table 1. Participants' characteristics study

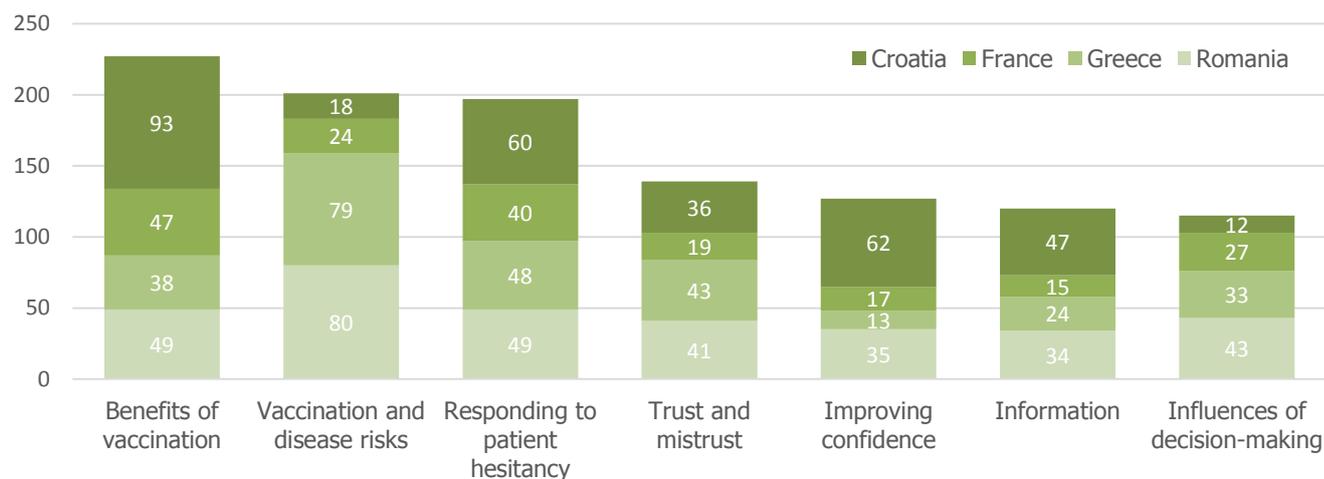
	Croatia	France	Greece	Romania	Total
No. of participants	17	16	15	17	65
Age	25-44 yrs: 100% (17/17)	25-44 yrs: 19% (3/16) 45-64 yrs: 75% (12/16) 65+ yrs: 6% (1/16)	25-44 yrs: 53% (8/15) 45-64 yrs: 47% (7/15)	25-45 yrs: 59% (10/17) 46-65 yrs: 41% (7/17)	25-44 yrs: 58% (38/65) 45-64 yrs: 40% (26/65) 65+ yrs: 2% (1/65)
Sex	Females: 88% (15/17) Males: 12% (2/17)	Females: 50% (8/16) Males: 50% (8/16)	Females: 27% (4/15) Males: 73% (11/15)	Females: 94% (16/17) Males: 6% (1/17)	Females: 66% (43/65) Males: 34% (22/65)
Profession	Family doctors: 76% (13/17) Epidemiologists: 24% (4/17)	Family doctors: 62.5% (10/16) Gynaecologists: 37.5% (6/16)	Family doctors: 60% (9/15) Internal medicine: 27% (4/15) Paediatricians: 13% (2/15)	Family doctors: 88% (15/17) Paediatricians: 12% (2/17)	Family doctors: 72% (47/65) Gynaecologists: 9% (6/65) Epidemiologists: 6% (4/65) Paediatricians: 6% (4/65) Internal medicine: 6% (4/65)
Average years of practice (range)	5 (1–11)	21 (4–39)	18 (2–35)	17 (2–31)	16 (1–39)
Type of practice	Solo: 76% (13/17) Group: 24% (4/17)	Solo: 56% (9/16) Group: 44% (7/16)	Solo: 73% (11/15) Group: 13% (2/15) Other: 13% (2/15)	Solo: 82% (14/17) Group: 18% (3/17)	Solo: 72% (47/65) Group: 25% (16/65) Other: 3% (2/65)
No. of healthcare workers practising alternative medicine	0	1	0	3	4

The themes identified across all countries and interviews were: benefits of vaccination (227 mentions), concerns about vaccination and disease risk (201), responding to patient hesitancy (197), issues of trust and mistrust (139), improving vaccine confidence (127), information and communication (120), and types of influence in vaccination decision-making (115). This last theme refers to potential organisations or individuals influencing healthcare workers when recommending or accepting vaccines, as well as those influencing patients and their perceptions concerning vaccines. A display of these themes, by country, is available in Figure 1. Of all categories, the topics most commonly reported were:

- benefits of vaccination outweighing risks (50 mentions)
- a need to improve information on vaccination (45 mentions)
- the role of doctors being to respond to patient hesitancy (45 mentions)
- vaccines prevent dangerous diseases (43 mentions)
- doctors trusting medical authorities, other doctors and research (43 mentions).

The results section of this report focus sequentially on each of the themes identified and analyses them by country.

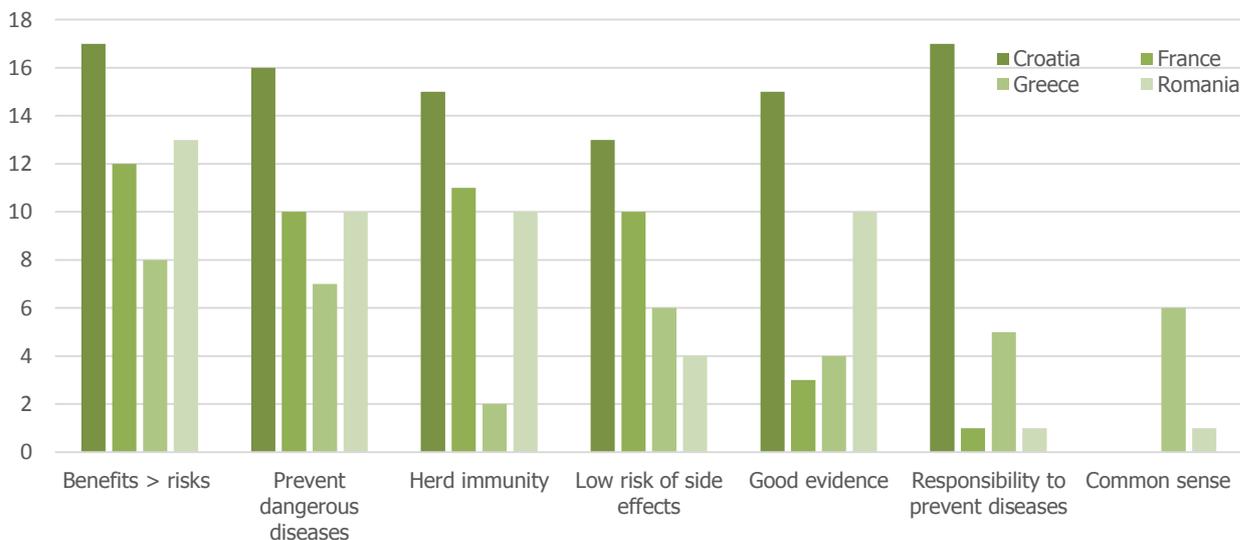
Figure 1. Number of codes identified in each category, by country



Benefits of vaccination

Respondents from all countries discussed the benefits of vaccination. This theme was mentioned 93 times in Croatian interviews, 47 times in France, 49 times in Romania and 38 times in Greece. The advantages reported were: benefits of vaccination outweighing potential risks of vaccine (50 times); vaccines preventing dangerous diseases (43 times); the concept of herd immunity (38 times); low risk of side effects (33 times); good evidence concerning vaccines (32 times); doctors having a responsibility to prevent diseases (24 times) and vaccination being a matter of common sense (7 times).

Figure 2. Benefits of vaccination



Croatia

In Croatia, all healthcare workers discussed how they believe that the benefits of vaccination outweigh the risks (17/17) because vaccines have a low risk of side effects (13/17) and protect the entire community (15/17) against dangerous diseases (16/17). Participants also mentioned that they believe they have a responsibility to prevent these diseases (17/17) and that there is good scientific evidence to support vaccination (15/17).

France

In France, healthcare workers focused on the balance between the benefits of preventing diseases through vaccination (12/16) and the low risk of side effects: *'Vaccination is the most important elements of progress of the 20th century because it prevents many diseases. I am vaccinated and I find that it is a good thing, we do not see a lot of diseases anymore, we do not see measles, or rubella...'* (F3). There is evidence, clinical and epidemiological, to support the argument that the benefits of vaccination are more important than their risks and doctors mention that they have seen many people getting vaccinated, but very few suffering from side effects. They say that it is possible that this balance will change in the future, but not at the moment. Many also mentioned the importance of vaccination in protecting the entire community (11/16): *'When I met people who were strongly opposed to vaccination, I told them – do you realise that all the people who have been inoculated are protecting your children? So it's easy for you to oppose vaccination'* (F14) and *'I consider that those people who refuse vaccination are selfish because they take advantage of the vaccination of other people'* (F1). Study participants defend the concept of herd immunity to their patients, explaining that vaccines are not only providing individual protection but also shielding members of the patients' family, and society as a whole.

Although healthcare workers perceived the benefits of vaccination as outweighing the risks, some declared that this was not always the belief in the general population. One of them stated that *'people just think about the consequences of vaccines. They no longer consider the consequences of diseases because they can no longer see them, thanks to immunisation coverage'* (F11). However, most healthcare workers stated that vaccines were there to prevent dangerous diseases (10/16), and they referred to current outbreaks as proof of the dangers of not vaccinating. They expressed feelings of disappointment that people died from diseases that could be prevented: *'People do not understand the seriousness of hepatitis B, they all focus on the multiple sclerosis described as a side-effect by the media, instead of understanding why the vaccine is administered'* (F15). Ten healthcare workers also discussed the low risk of side effects from vaccines, declaring that vaccines were safe and that if the authorities did not mention any serious side effects, there would only be some small, local and immediate adverse events.

Greece

The idea that benefits of vaccination outweigh any possible risks was very common throughout Greek interviews (8/15), with seven healthcare workers mentioning that vaccines prevent dangerous diseases, and six healthcare workers saying that there was a low risk of side effects. The belief that vaccination is self-evident was expressed six times in Greek interviews. For example one interviewee said: *'I have vaccinated my children without second thought'* (G9). Moreover, a sense of responsibility for preventing diseases was expressed on five occasions. Four healthcare workers declared that there was enough evidence to show the benefits of vaccines and that there was *'too much fuss over this issue – there are many studies out there proving safety'* (G9). Two healthcare workers also discussed the benefits of herd immunity. Vaccines which were perceived positively in Greece were the MMR vaccine (mentioned six times), the HPV vaccine (4), the influenza vaccine (2), and the hepatitis B vaccine (2).

Romania

In Romania, participants highlighted the benefits of vaccines over the risks (13/17), and while they declared that there were adverse effects, they also said that *'when weighing up the benefit that you get from the vaccine and the risks that you would have (...) you cannot hesitate'* (R13). As one healthcare worker put it: *'The benefits are thousands of times greater than the potential risks! Whatever we do in life has good parts and bad parts. If we just go outside, we ingest a pollutant. It's important that the good parts prevail over the bad parts. Thus, vaccines have side effects, but the benefits of vaccination, the chance to save lives, to prevent disability, these benefits are fantastic!'* (R8). Ten healthcare workers mentioned that vaccines prevent very serious and potentially life-threatening diseases, which sometimes cannot be prevented in any other way. They claimed that *'vaccines have saved mankind and extended life expectancy'* (R8) and that *'vaccines have been used for a long time now, even if at first they were less refined, they have stopped the emergence of devastating diseases. They have achieved their purpose: to prevent disease, to maintain health status, and to stop recurrence of diseases that have life-long sequelae'* (R6).

Ten participants also discussed the concept of herd immunity, and the fact that people have a responsibility to vaccinate their children and themselves to protect society as a whole from diseases and outbreaks: *'We have a duty, because there are children who have leukaemia, lymphoma. They have low immunity and they cannot be vaccinated because their body will develop the disease and this will lead to death; and so to protect them, we get*

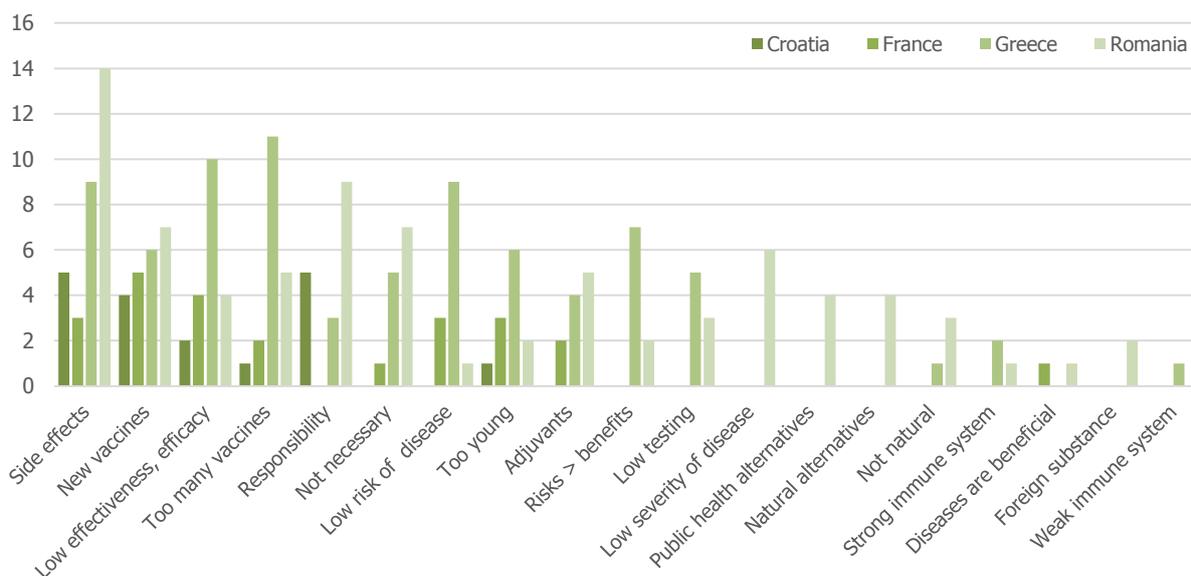
vaccinated, for them not to contract the disease.’ (R2). Ten doctors also referred to the good evidence available proving the benefits of vaccination and another four expressed confidence in the low risk of side effects, explaining that if vaccines were included in the national programme, it had to mean that they had been sufficiently tested and verified.

Vaccines that were positively perceived in Romania were the MMR vaccine (mentioned three times); vaccines included in the national immunisation programme (3); the HPV vaccine (2); the influenza vaccine (2); the tetanus vaccine; the rabies vaccine; vaccines that had been used in Romania for a long time, and optional vaccines not included in the national immunisation programme (each mentioned once).

Concerns about vaccination and vaccine-preventable diseases

Concerns about vaccination and vaccine-preventable diseases were expressed very often across all countries (Figure 3). This was the most recurrent theme in both Greece and Romania, with vaccine risks being mentioned 80 times in Romanian interviews and 79 times in Greek interviews. Of these, 17 mentions in Romania and 14 mentions in Greece were about patients’ perceived risks, with 48 and 47 mentions respectively being about healthcare workers’ own beliefs regarding vaccine risks. Although this theme was less common in France and Croatia it was still important, with 24 mentions in France and 18 in Croatia. Risks mentioned in all interviews, whether for patients or for doctors themselves, were: fear of side effects (31 times); concerns over new vaccines (22 times); low vaccine efficacy or effectiveness (20 times); children receiving too many vaccines (19 times); doctors being responsible in the event of side effects (17 times); vaccines being unnecessary (13 times); there being a low risk of contracting the disease (13 times); children being too young for vaccination (12 times), fear of adjuvants or ingredients (11 times); the risks of vaccination outweighing the benefits (nine times); lack of vaccine testing (eight times); low severity of the diseases prevented by vaccines (six times), use of alternative public health prevention measures (four times), use of natural alternatives (four times); vaccines not being natural (four times), the immune system being strong enough to fight diseases (three times); diseases being beneficial for the immune system (twice); vaccination being the injection of a foreign substance (twice), and the immune system being too weak to defend itself against vaccines (once).

Figure 3. Concerns about vaccination and vaccine-preventable diseases



Croatia

In Croatia, very few respondents discussed risks associated with vaccination, which were only mentioned 18 times in total. Concerns over side effects were mentioned five times, including fears of ‘rare and severe side effects’ (C5) and ‘possible side effects of the HPV vaccine’ (C6). These risks of side effects also gave rise to feelings of responsibility among healthcare workers and there were concerns about new vaccines, especially the HPV vaccine. Finally, two healthcare workers questioned the effectiveness of the HPV vaccine, the rotavirus vaccine and the influenza vaccine. One healthcare worker also believed that children were too young to receive some vaccines: ‘I believe that some vaccines, like hepatitis B, can be given later, but not in the first year of life.’ (C9).

France

French healthcare workers mentioned vaccination risks a total of 24 times. Most comments related to the HPV vaccine, and two out of the eight healthcare workers who expressed concerns about the safety of vaccines were gynaecologists. The most important concern was about new vaccines, and more specifically the HPV vaccine, which had not been tested for long enough to identify side effects or to establish efficacy against cancer. One healthcare worker also mentioned *'There is a lot of lobbying! I am a disappointed physician, I feel lost, maybe the ecologists are right about the additives, I regret having administered the vaccines of 10 or 15 years ago.'* (F9). Beliefs that vaccines do not work, and have low efficacy or effectiveness were also expressed, leading healthcare workers to avoid recommending these vaccines: *'There is a specific issue with the HPV vaccine. It makes me uncomfortable because it is called a vaccine: okay you are vaccinated against the most common viruses [strains], but you still need to do some screening. I am embarrassed to tell people 'get your daughters vaccinated and they will have no problem', it's not true, and I am also embarrassed because of the price.'* (F12).

Three healthcare workers also believed that children, and sometimes their own children, were too young to receive the hepatitis B vaccine as they would not be at risk for many years, and it was better to let them decide whether they wanted to be vaccinated against a sexually transmitted disease when they were older. Another three healthcare workers thought that there was a low risk of contracting meningitis and hepatitis B in France, and therefore no need for vaccination. Healthcare workers made non-specific comments about side effects, referring to the fact that there were too many vaccines, which could create autoimmune disorders, or that there was not enough knowledge about potential side effects. Two healthcare workers also mentioned concerns about adjuvants such as aluminium salts, or ingredients in the hepatitis B vaccine and one believed that vaccines were useless because children benefit more from getting sick than from vaccination: *'Vaccines for the younger generation are useless, for a kid it's better to have measles instead of a vaccine.'* (F9).

Greece

In Greece, the most frequently recurring theme was that there were too many vaccines. The healthcare workers interviewed declared that children receive too many vaccines, often at a very young age. As one of the respondents put it: *'I try to follow a different plan than that of the National Immunisation Committee when vaccinating babies or kids. I recommend some vaccines at a later stage than recommended to avoid over-stimulating their immune system'* (G11). Many healthcare workers also declared that vaccines do not always work, and can have low efficacy or effectiveness. These remarks were most often made about the influenza vaccine: *'The influenza vaccine showed low effectiveness in Europe'* (G7). There were also some concerns about side effects, all of which were connected to healthcare workers' perceptions of what patients' concerns might be. Certain statements also indicated that the risks associated with vaccines can sometimes outweigh the benefits. Finally some healthcare workers believed that vaccines were not always necessary in Greece, especially as they protect against diseases which are not prevalent in their country: *'Most of these diseases have been eliminated for several decades. We don't live at the beginning of the century anymore when it was very likely that you would get this disease and then die'* (G15). There were concerns raised about children who *'receive too many vaccines at a very young age'* (G3), and beliefs expressed that immune systems were strong enough to protect the body against diseases, without the need for vaccines: *'Sometimes, like with the seasonal influenza vaccine, the body can produce antibodies'* (G3). Concerns about vaccination raised in Greece were mostly in connection with the seasonal influenza vaccine (13), the HPV vaccine (9), the MMR vaccine (6), new vaccines in general (5), the pandemic influenza vaccine (3), and the hepatitis B vaccine (1).

Romania

In Romania, the most frequently mentioned risk was concern over side effects and vaccine safety, with 14 mentions across all interviews. Some healthcare workers shared minor concerns about vaccine safety, in terms of the very minor risk of side effects: *'Yes, it can happen to one in thousands of cases... a major undesirable side effect...'* (R6). Some referred to the occurrence of topical reactions, such as allergies and fevers: *'I understand that after vaccine administration redness and swelling or a hardening of the local area may occur, but these are normal effects and you will not die because of that.'* (R16)). Others had much more serious concerns and discussed the banning of vaccines in other countries, serious side effects and how risks outweighed benefits: *'It's well known that there are vaccines that have been banned in other countries (e.g. hepatitis), precisely because they were proven to cause multiple sclerosis. And there are other vaccines that have serious side effects, for instance HPV vaccines can lead to tumours and autism. It's outrageous that they are still being prescribed''* (R9). Some healthcare workers (eight out of 14 mentions) also discussed their patients' concerns and suspicions about side effects, stating that they were sometimes curious or that they believed anything they heard in the media: *'Patients are generally suspicious with regard to vaccination of children because they hear rumours on television or the Internet which claim that vaccines are directly related to autism.'* (R3). The particular focus of interviewed healthcare workers' concerns were those vaccines which were not included in the national programme or which only protected against certain strains of diseases.

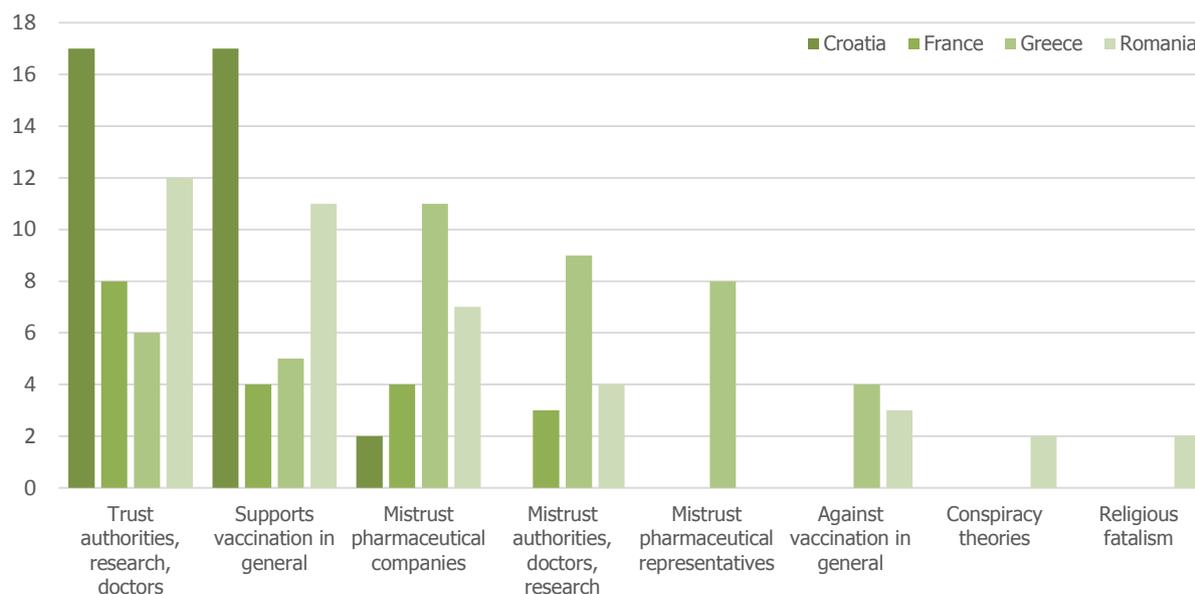
Healthcare workers interviewed in Romania also expressed a feeling of responsibility for any adverse reaction that might have occurred after vaccinating a patient. Some expressed this as a doctor's normal reaction, as with any other medical act, while others voiced strong feelings of guilt, especially if they had not done a thorough check of the patient's health before administering the vaccine: *'If people were strongly against a vaccine, and I convinced them otherwise and, God forbid, something bad happened (because it can happen, once in every few thousand cases), then I would feel a huge responsibility and high levels of guilt.'* (R6). However, a few doctors also said that patients actively took the decision to get vaccinated, and side effects were therefore not a doctor's responsibility: *'It is not my fault if an adverse reaction occurs, because the medical act is minimum. I just inject the vaccine. It's the patient's decision, he signs the form'* (R1). Concerns were also raised regarding new vaccines (three out of seven related to patients' concerns) which had not been tested sufficiently, had not passed the test of time, or were not yet included in the national immunisation programme. One healthcare worker also mentioned that *'it is human nature to be sceptical and it will take some time before some vaccines are largely accepted'* (R14), while another believed that new vaccines were exaggerated as the diseases they prevented were not really present in Romania and *'the risk is overestimated in order to support the introduction of those vaccines'* (R1).

Other themes that came across in Romanian interviews were that vaccination was unnecessary, and that it was just a trend at present. Five healthcare workers also mentioned that children received too many vaccines, often as a result of pressure by doctors, and that this could increase the risk of allergies: *'A one year-old child gets to have 10, even up to 20 vaccines?! This is abusive, cruel, how can you do that to a child!?'* (R1). They would favour traditional vaccines, included in the national immunisation programme, over new vaccines or multivalent vaccines. Six healthcare workers also talked about the low severity of some vaccine-preventable diseases, such as chickenpox, rotavirus infections, rubella, or influenza: *'Come on ... let's be serious... after the summer of 1900, there weren't any serious cases of flu'* (R1). Healthcare workers also discussed the problem of adjuvants either for themselves or for their patients (two out of five), mentioning worries over embryonated eggs, attenuated viruses, heavy metals, a lack of control over the purity of vaccine ingredients and foreign substances in general.

Four healthcare workers, two of whom practised homeopathy, preferred natural alternatives to vaccines, especially for non-serious diseases because *'the organism must be fortified through proper nutrition, rest, natural methods, homeopathy - these methods increase the 'vital force' of the body and help against disease'* (R9). One of the healthcare workers practising homeopathy declared: *'Why should I give him the flu vaccine when I could give him Echinacea, goji berries, and vitamin C? That's the problem, these natural alternatives are not promoted.'* (R1). Some doctors also mentioned public health prevention methods as alternatives or complements to vaccinations, such as the Pap smear test for cervical cancer, hygiene measures, health education, nutrition, or taking measures to avoid crowded places. Finally, there were two reports of children being too young to receive vaccinations, particularly the HPV vaccine, and one of the healthcare workers believed that being exposed to diseases allowed the body to acquire resistance and immunity. Concerns about vaccination in Romania mostly related to the HPV vaccine (7), followed by new vaccines in general (4), the seasonal influenza vaccine (3), the chickenpox vaccine (3), the MMR vaccine (2), the hepatitis B vaccine (2), vaccines for pregnant women (2), the pandemic influenza vaccine (1), and the rotavirus vaccine (1).

Trust and mistrust

Issues of trust or mistrust (Figure 4) were mentioned a total of 139 times: 43 times in Greece, 41 times in Romania, 36 times in Croatia and 19 times in France. Of 139 mentions, 80 were positive and referred to trust in the government, health authorities, doctors or research (43 times), or to supporting vaccination in general (37 times). Mistrust was reported for pharmaceutical companies (24 times), medical authorities (16 times), and pharmaceutical representatives (eight times). Some healthcare workers declared themselves to be against vaccination in general or to have faced patients with such feelings (seven times); while other reported their own or their patients' conspiracy theories (twice). There were two reports of patients refusing vaccinations based on their religious beliefs.

Figure 4. Trust and mistrust around vaccination

Croatia

All doctors in Croatia (17) were supportive of vaccination and trusted the government, health authorities, or research: *'I believe that the authorities and agencies do their job thoroughly'* (C1). Only two doctors reported mistrust in pharmaceutical companies, stating that they force new drugs onto the market.

France

In France, there were 12 reports of trust compared to seven relating to mistrust. Eight healthcare workers (one of whom referred to the general population) trusted the government, their colleagues, doctors, research or public health authorities. There were also four reports of full support for vaccination: *'I have no mental reservation regarding vaccines, I do not hesitate because I really believe the benefits are important'* (F12). The four reports of mistrusting pharmaceutical companies were due to their financial interests and the pressure they exert to sell their vaccines even when they turn out to be toxic: *'I put less and less faith in new vaccines, there is lobbying from the pharmaceutical industry to make us vaccinate a lot of people'* (F9). Finally, three healthcare workers discussed mistrusting the health system, or the French National Authority for Health.

Greece

Out of 43 mentions of "trust or mistrust" in Greece, 11 were about trust and 32 were about mistrust. A total of 11 healthcare workers declared mistrusting pharmaceutical companies (three out of which were shared opinions with patients) and 8 healthcare workers stated mistrusting pharmaceutical representatives more specifically (one out of which was an opinion expressed both by the healthcare worker and his or her patient). One healthcare worker stated that *'there are too many economic interests and gains from vaccination'* (G3). Nine healthcare workers expressed mistrust in the government, health authorities, or doctors; 5 of which were referring to both their opinions and their patients' opinion. One of them said e.g.: *'I do not trust the Greek Ministry of Health and rightly so. Many patients do not trust them either.'* (G12) While four healthcare workers expressed that they were against vaccination; five supported vaccination in general. Finally, 6 respondents shared strong trust in the government, health authorities and other doctors.

Romania

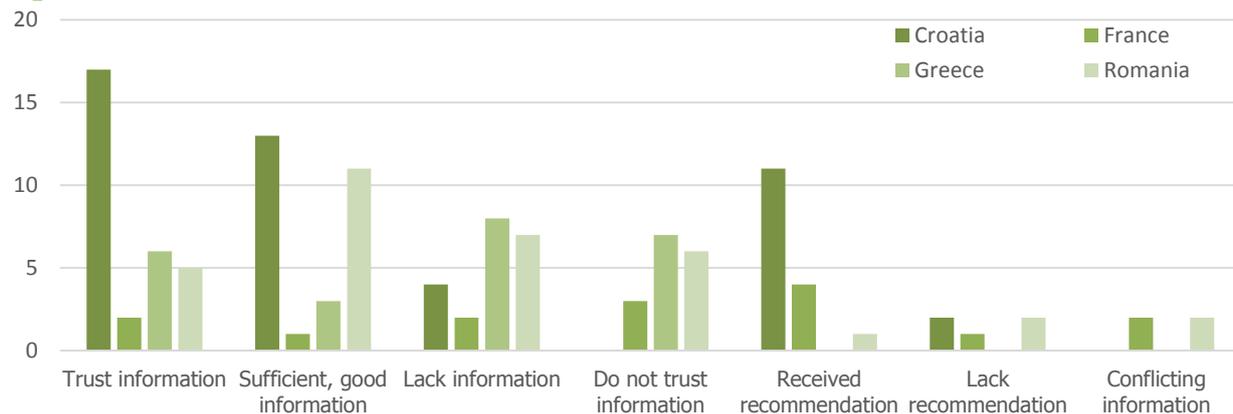
In Romania, confidence and trust was reported 23 times, while issues of mistrust and conspiracy were reported 18 times. Twelve healthcare workers out of 17 mentioned that they trusted the Public Health Department, doctors, research, their health system, WHO, and regulatory agencies: *'Those who produce vaccines are highly intelligent and interested in finding the best antidote against diseases'* (R3). They trust the health system, even if it is not perfect, and they trust vaccines because they are based on evidence and published scientific studies. Eleven healthcare workers also declared their unquestioning support for vaccination because it was effective and necessary. Some of them said that they would get vaccinated, would vaccinate their children and would recommend vaccines to their family: *'I definitely remain a vaccine advocate! I fight for each vaccination. I kind of 'tricked' my daughter into getting the HPV vaccine. I apply 'dirty' methods if nothing else works, the ultimate goal is to do the right thing.'* (R8).

Most mistrust was directed at pharmaceutical companies (1 out of 7 mentions referred to a patient's lack of trust). Problems identified were pharmaceutical companies working for their own financial interests; lack of communication regarding vaccine side effects; companies focusing on competing with one other; lack of knowledge on the source of vaccines, and specific concerns about the HPV vaccine. One healthcare worker felt pressured and persecuted by pharmaceutical companies, stating: *'In the last few years I have felt strong pressure from certain drug companies that wanted to introduce other types of vaccines...they wanted me to be a kind of intermediary agent. I refused. They were aggressive, the pressure was quite strong, they hid the commercial part, the sales interests.'* (R6). Three doctors also mentioned that patients did not trust doctors sufficiently. Two healthcare workers were also against vaccination in general, while another doctor reported a patient being entirely against vaccines. One also described talking to patients about their rejection of vaccination: *'I do not like vaccines! I tell my patients that I've never vaccinated myself with any vaccine. It's a clear decision. I rely on my instincts and inspirations, I haven't felt the need to make this gesture.'* (R1). Finally, one healthcare worker mentioned discussing conspiracy theories with patients (*'I tell them that we don't play with vaccines, we don't test them on our patients just to see if they work or not.'* (R16)). Moreover, two healthcare workers reported having faced patients who had refused vaccination based on their religious beliefs: *'We had patients who were promoting some sort of religion, they were spiritual advisers, had moved into the forest, in a rural area, lived in isolation and told me that they wanted to live naturally.'* (R7).

Information about vaccines

The theme of information about vaccines was recorded 120 times across all countries: 47 times in Croatia, 34 times in Romania, 24 times in Greece, and 15 times in France (Figure 5). Out of these 120 records, 74 were positive and 46 were negative. Beliefs and opinions ranged from trusting the information provided (30 times); receiving sufficient and good information (28 times) to a lack of information (21); a lack of trust in the information (16 times); having received recommendations (16 times); a lack of recommendations (5 times) and having received conflicting information (4 times).

Figure 5. Information about vaccines



Croatia

In Croatia, 41 out of the 47 reports about information were positive. All healthcare workers interviewed reported trusting the information they receive about vaccination: *'I have a positive attitude towards new vaccines, because I believe that they have passed through all the stages of testing and that they can contribute to better health of the individual and society'* (C2). Thirteen healthcare workers also declared receiving sufficient and good quality information, while 11 stated that they had received recommendations for vaccination. Only four respondents expressed a need for more information about vaccines to share with their patients.

France

Interviewees had divided opinions in France, with seven positive reports and eight negative ones about the information they receive on vaccination. A total of four healthcare workers reported having received recommendations about the regular vaccination schedule to be implemented. However, one healthcare worker also complained about the lack of details provided within these recommendations, for example, on when to vaccinate pregnant women against influenza: *'I need more help from the authorities who should say when we are allowed to vaccinate or not, because we are asked to vaccinate pregnant women against seasonal flu, but they do not say at which stage.'* (F7). Three healthcare workers reported not trusting the information coming from the authorities, because of potential conflicts of interests, while another two healthcare workers reported trusting the information coming from research or from experience in other countries. Issues were raised in two interviews concerning conflicting information, mainly due to authorities changing their recommendations or new studies invalidating previous research. Finally, healthcare workers declared that they lacked information on older vaccines, compared to new ones.

Greece

In Greece, the theme of information was mentioned 15 times in a negative context and nine times positively. A perceived lack of information was reported eight times, while mistrust in information was reported on seven occasions. Healthcare workers wanted more information about the safety of vaccines, and the risk of having too many vaccines: *'I think that some additional information would be beneficial in terms of long term side effects.'* (G12). On the other hand, there were six reports of trust in the information provided, and three indicating that sufficient, good quality information had been received.

Romania

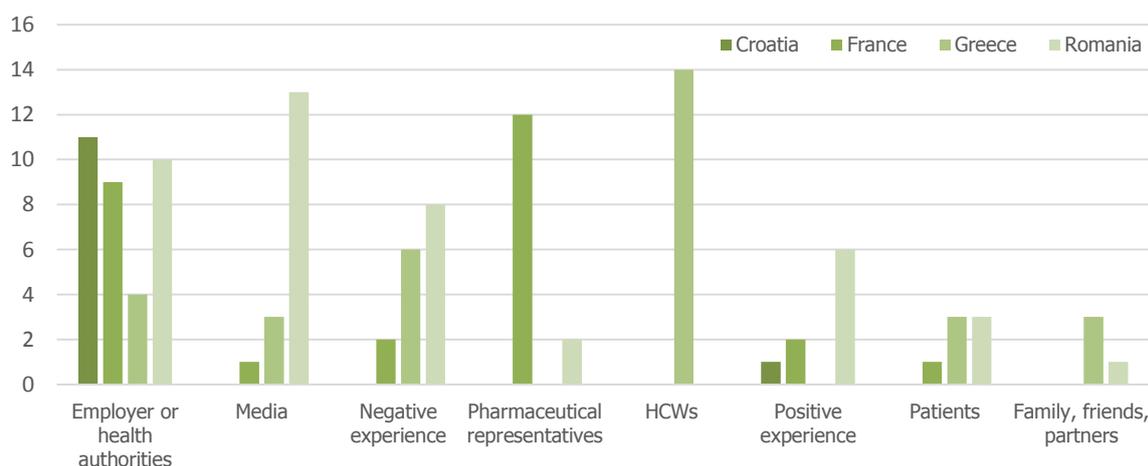
In Romania, healthcare workers reported having sufficient and good information on 11 occasions during interviews. They said that family doctors provided sufficient information to patients, such as leaflets, vaccination notebooks, posters, books, information on websites, information sent to patients and verbal communication. On the other hand, seven healthcare workers declared that patients did not receive sufficient information to make an informed decision about vaccination. Patients were not provided with information about vaccination campaigns, or vaccine-preventable diseases, and the only information they could access was from the Internet or from vaccine leaflets: *'There are many parents who refuse vaccination, and there should probably be a place where they can get information, more detailed information, not Dr. Google and the neighbour'* (R10). One doctor also mentioned that leaflets do not have enough information about how vaccines are produced, and are not detailed enough for patients: *'The leaflet does not provide information on how the vaccine was produced. People have the right to read such information in the leaflet and to decide accordingly!'* (R1).

Six healthcare workers stated that patients did not trust doctors and the information they received from them (*'I tried to explain that it is much worse if she doesn't get the child vaccinated, if she doesn't take action, but she didn't want to understand and now she has an unvaccinated 1 year-old child.'* R16). On the other hand, five healthcare workers explained that they trusted the information they themselves obtained from books and research or on specialised training courses and at conferences. One respondent felt that there was a lack of support for doctors facing hesitant patients yet they were criticised when they could not convince patients to get vaccinated. Two of them also complained about the conflicting information patients received from the Internet.

Influences in vaccination decision-making

Influencing factors affecting vaccination decision-making came out 115 times across all countries: 43 times in Romania, 33 times in Greece, 27 times in France, and 12 times in Croatia (Figure 6). Different possible influences were observed, either influencing doctors or their patients: healthcare workers' employer or health authorities (34 times), the media (17 times), previous negative experiences with the vaccines (16 times), pharmaceutical representatives (14 times), healthcare workers (14 times), previous positive experiences with vaccines (9 times), patients (7 times), and family, friends or partners (4 times).

Figure 6. Influences in vaccination decision-making



HCWs= healthcare workers

Croatia

Interviews from Croatia revealed that 11 healthcare workers felt influenced by their own employers or health authorities regarding vaccination and one from a previous positive experience.

France

In France, 12 interviews showed that healthcare workers were sometimes influenced by pharmaceutical representatives, who provide information to doctors and remind them of vaccination schedules: *'Maybe they are the only medical reps who give rather useful information, I consider they give me reminders, most of the time they come with the most recent vaccination schedule and it is very convenient'* (F14). A few healthcare workers mentioned that they did not like receiving information from pharmaceutical representatives, and did not trust the information provided. Other possible influences were training courses organised by hospitals, the Internet, experts such as professors or doctors, medical journals, the French National Authority for Health, and the National Institute for Prevention and Health Education. Four healthcare workers mentioned how previous experiences with a vaccine or a disease had influenced their decision to vaccinate their children, themselves, or to recommend vaccination to their patients. Two of these had suffered from a negative experience, of vaccine side effects: *'My daughter is 18 months old and she was diagnosed with diabetes after a shot against HBV, I have doubts but no certitude (about the relationship); but I have continued to recommend this vaccination.'* (F2). Another two decided to start vaccinating because their son or family members suffered from a vaccine-preventable disease. One doctor also explained that after watching a documentary about aluminium salts in vaccines, he had doubts about the safety of vaccination; and another was influenced by his patients: *'We should never despise people who doubt; if they are in doubt about something, this must be for a reason,..., and if there is a reason we have to try to understand it'* (F8).

Greece

In Greece, respondents mostly reported the influence of previous negative experiences relating to vaccine side effects, as well as being influenced by their own patients, their employers or health authorities. However, one healthcare worker stated: *'I follow the recommendations of WHO and other international organisations but I do not trust the Greek Ministry of Health so much'* (G12). Healthcare workers also declared that patients could be influenced by the media, family and – if they trust their doctors – by their doctors themselves.

Romania

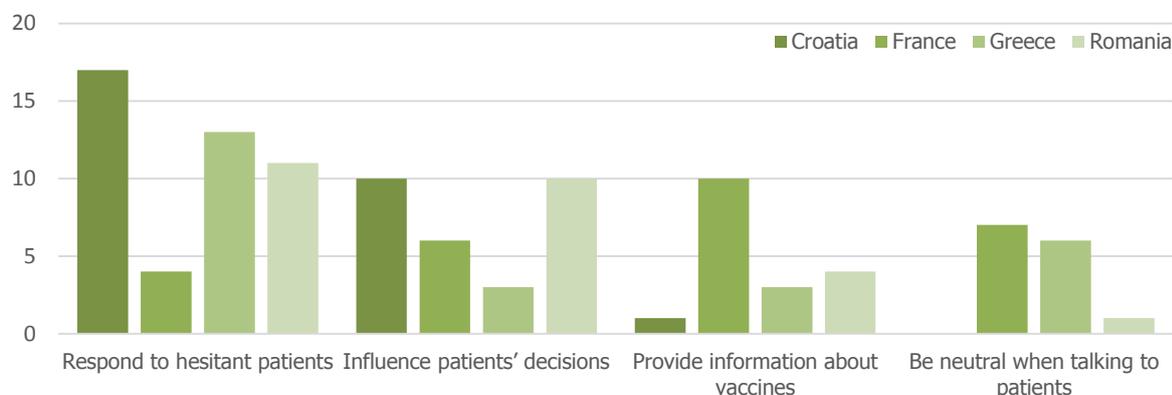
In Romania, there were 13 doctors stating that their patients had been influenced by the media or social media. Respondents stated that patients often heard reports on TV or read articles on the Internet about side effects of vaccines, which made them refuse vaccination for themselves or for their children. Healthcare workers described the information on the media as contradictory and unverified, with too much information creating strong myths in patients which doctors were unable to dispel. One healthcare worker said: *'I realise that, with the increasing popularity of the Internet, many parents are misinformed by charlatans and crooks who 'seduce' them with false and absurd information. They are intoxicants, manipulators. I realise that if some doctors were fooled by such misinformation, then parents who do not have a medical background are very vulnerable to such poisoning. I periodically use Facebook and other online environments and try to respond promptly in order to neutralise this.'* (R5). Some doctors were therefore actively using the Internet to get patients to vaccinate, or suggested having public awareness campaigns in the media about the risks of not vaccinating. One healthcare worker also mentioned that the media coverage of mortality and morbidity from the swine and avian flu had led to many of his patients asking for vaccination.

Healthcare workers also discussed how they were mainly influenced by Romania's Department of Public Health, the national immunisation programme, courses, medical journals, books from drug companies, experts, conferences and consultations with other doctors. One of the 10 healthcare workers concerned explained that a patient of his had read a book against vaccination and when he counteracted, explaining that vaccines were indeed beneficial, the patient replied *'but it's written by a doctor'* (R7). There were many cases where healthcare workers had been influenced by previous negative experience with a vaccine, either through patients, their entourage, or friends who did not vaccinate: *'I had one patient who refused and she refused because she was a lawyer and had seen many cases of malpractice and did not want to vaccinate her child'* (R16). One healthcare worker also said that if a child had an allergic reaction to a vaccine, he would not vaccinate the child again. However, healthcare workers also explained that if they vaccinated and could not see any side effects, they felt more confident the next time they used the vaccine. They also shared experiences concerning children who had become ill as a result of vaccine-preventable infections, which reinforced their perception of the need for vaccines. Finally, three respondents also declared that they had been influenced by their experiences with patients, sometimes leading them to share some of their doubts: *'I get caught up in all this madness, and you know I sometimes think before I vaccinate him [his child]: God, but what if the crazy ones are right and yet I am still vaccinating my child? But I did all of them [his children].'* (R13).

Responding to patient hesitancy

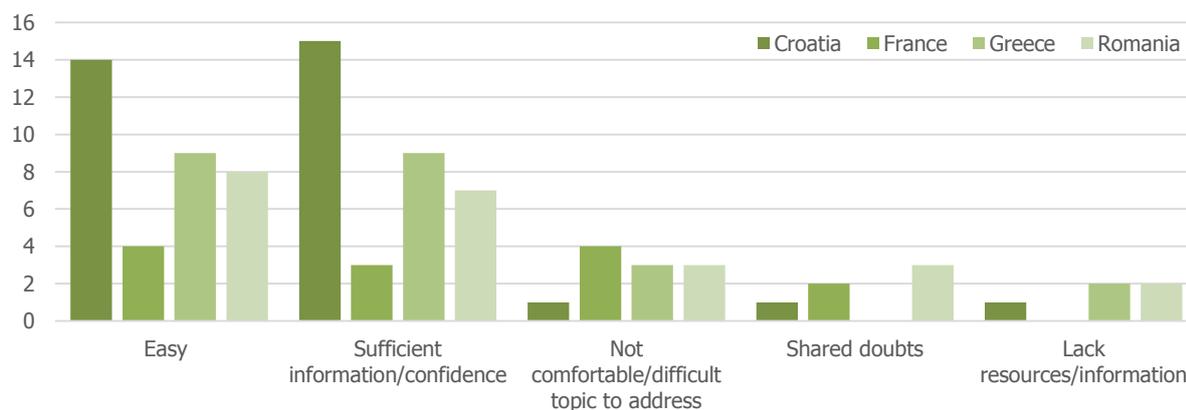
The theme of a doctor’s responsibility to respond to patient hesitancy was reported 197 times across all countries: 60 times in Croatia, 49 times in Romania, 48 times in Greece and 40 times in France. Healthcare workers reported differing opinions on the role of doctors in talking to patients about vaccination (Figure 7). These involved responding to hesitant patients (45 times); influencing patients’ decisions (29 times); providing information about vaccines (18 times), and being entirely neutral (14 times).

Figure 7. Perceived role of doctors



Some healthcare workers felt comfortable responding to patients (35 times) and believed they had sufficient information or resources to do so (34 times) while others did not (11 times). Some also felt that they lacked sufficient information to be able to talk about vaccination (5 times) and sometimes even shared similar doubts to those of their patients in relation to vaccines (six times) (Figure 8).

Figure 8. Confidence in responding to patient hesitancy



Croatia

In Croatia, all healthcare workers interviewed (17/17) felt that it was their role, as doctors, to respond to patient hesitancy. Of these, 15 believed they had sufficient information or resources to do so and 14 felt confident in doing so, while one voiced the need for more promotional material. Another 10 healthcare workers believed that it was the role of doctors to influence patients’ decision-making regarding vaccination, either by sharing ‘*accurate and reliable information in a way that they can understand*’ (C3), or by ‘*strongly affecting them*’ and showing them ‘*among other things, images of children with polio*’ (C7). One healthcare worker stated: ‘*I’m happy when patients change their opinion and decide to get vaccinated after talking with me*’ (C5). Other healthcare workers mentioned that their role was only to provide information (1/17), that they shared similar doubts to their patients in relation to vaccines (1/17) and that they did not feel comfortable addressing vaccine hesitancy (1/17).

France

A total of 40 comments were made in France about the role of doctors in responding to patient hesitancy. Of these, 10 explained that doctors should only provide information to patients and that patients had to decide for themselves whether or not to get vaccinated: it was their own decision. Healthcare workers said that they could not force patients to listen, or convince refusers, so they were not in a position to do anything other than provide

information. One healthcare worker said that he reminded patients but never urged them, and that he usually told them: *'By the way, do you think about vaccination? Do you remember? At 13 years, she has her booster dose and it would fine to consider HPV vaccination. Think about it'* (F6). There were also seven reports of doctors declaring that they had to stay neutral when recommending vaccines. They felt that healthcare workers should not initiate discussions and that they were there to recommend vaccines and give advice only when asked for it. If patients did not want the vaccine, there was nothing else they could do: *'I tell them that I would prefer that they got vaccinated, but if they don't want to do so, I don't insist'* (F8).

On the other hand, six respondents declared that doctors had a role to play in influencing patients' decisions and that this role went beyond simply recommending the vaccine. Some said that this was particularly the case for certain vaccines, such as meningitis, while others said that they needed to emphasise the importance of vaccination because they saw patients as their own children. One healthcare worker shared his strategy, which was to talk about the HPV vaccine far in advance, to get parents used to the idea of the vaccine. Another said: *'For children I prescribe the vaccines – I insist. I say it is mandatory even if it is not... Well I push heavily for it but if they refuse the vaccines we do not continue our relationship! I don't want to follow a child or a family who do not vaccinate their children'* (F16). Four healthcare workers also believed that it was their role to respond to patient hesitancy: *'You have to talk with them, to hear what their questions are. Because sometimes they ask questions we don't even imagine, and sometimes we don't have the answers but we can find them... It's really about talking, to see what the restraints are'* (F15).

While four healthcare workers said that they felt comfortable answering hesitant patients (*'If you are convinced it is much more easy to convince someone else, even if he/she is strongly opposed to it, or just hesitant'* (F14)), another four felt particularly uncomfortable addressing the topic of sexuality with parents in relation to the HPV vaccine, especially with mothers from certain cultures or religions. Finally, two healthcare workers also discussed how hesitant patients could influence their own perception of vaccines: *'If they are already hesitant my speech will be hesitant too and will fuel their hesitancy. Now I have reached a point where it will strengthen their ideas'* (F9).

Greece

In Greece, of the total 48 comments relating to the role of doctors facing patient hesitancy, 13 agreed that doctors should respond to patients, and address their concerns by telling them the truth and sharing facts. Nine healthcare workers expressed confidence in responding to patients, and another nine said they thought they had enough information to advise patients. While six healthcare workers believed they had to remain neutral when recommending vaccines and three others said that their role was only to provide information; another three healthcare workers felt that they were in a position to influence patients and convince them to get vaccinated. Finally, three healthcare workers also said that they felt uncomfortable addressing hesitancy and two healthcare workers said that they did not have enough resources to respond to patients, particularly with regard to the long-term safety of vaccines.

Romania

Of the 49 comments on "responding to hesitancy" in Romania, 11 were from healthcare workers who agreed that their role was to respond to hesitant patients. These healthcare workers felt comfortable addressing concerns by listening and sharing scientific evidence: *'It is my duty to be there for parents and clarify all medical aspects'* (R14). Ten healthcare workers went further, saying that they had a duty to try and influence parents because they had experience, medical expertise, and knowledge about vaccines. Healthcare workers believed they should advise patients about the risks of not vaccinating, and one respondent even said he showed patients pictures of people affected by vaccine-preventable diseases and he had once told a priest: *'If your daughter gets rubella during pregnancy, she will give birth to a deformed child ... how would you feel when looking into your daughter's eyes then? (...) It's your choice, I only want you to know the risks so you can make an informed decision'* (R8). He went on to say: *'There were some people who moved to another family doctor because I kept asking them whether they've changed their minds in favour of vaccination'* (R8). Other healthcare workers told their patients that they vaccinated their own children to try to convince them, and felt that their *'authority and prestige influence them'* (R8). However, some healthcare workers also mentioned that it was difficult to convince hesitant parents, even when providing them with books, manuals, educational material or vaccine leaflets. They then tried alternative solutions: *'In order to have more time to talk to patients or give them the advice they need, I've fixed one day a week for vaccinations only. Then I get to spend more time with mothers and explain more to them about vaccines'* (R6).

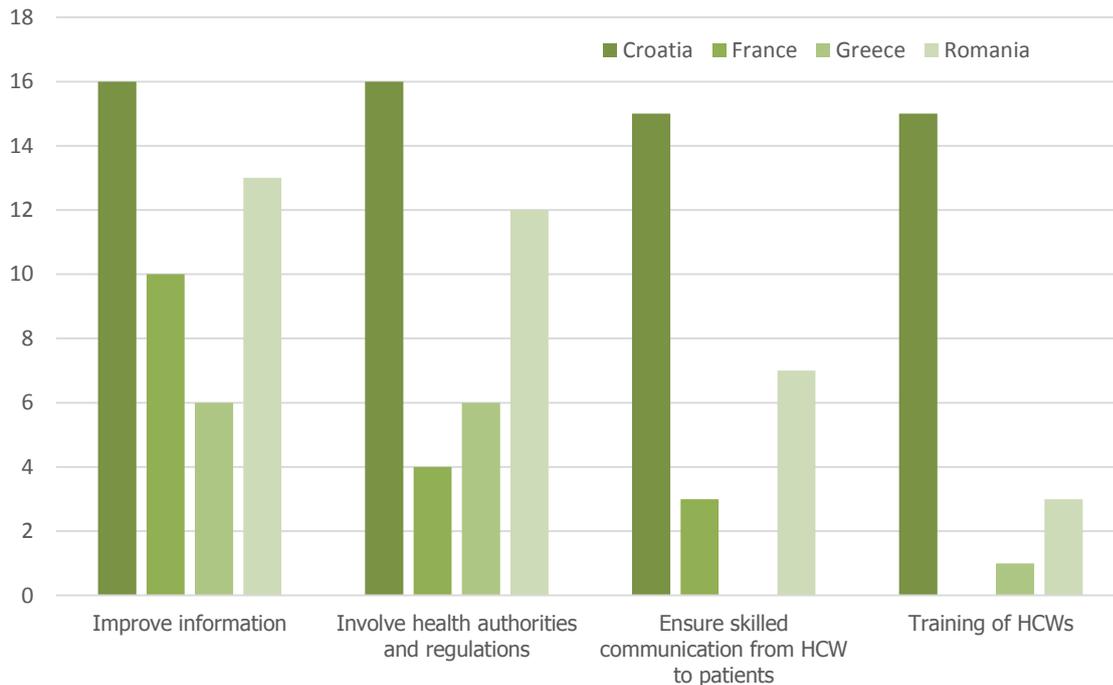
Eight healthcare workers did not perceive responding to hesitant patients as a problem, since it was part of their job and they were well-informed, thanks to their medical training and experience in the field (7/17). Only four healthcare workers said that their role was only to provide information and patients had to decide for themselves what to do. Three doctors also shared similar concerns to parents in relation to vaccines: *'It doesn't matter who enters through your door. You feel empathy, you feel their doubts, their questions, their trust or distrust'* (R17). Three healthcare workers felt uncomfortable responding to hesitant patients for various reasons: one referred to mothers who sometimes felt judged when doctors recommended the HPV for their daughters. Another thought it

was difficult to change such prejudices in parents, and one healthcare worker declared not feeling comfortable because *'you feel their reluctance, their disbelief in what you say and perhaps the information they've read on the Internet or heard from friends has a greater emotional impact... So I feel some discomfort as I have to go to great lengths to convince them'* (R6). Finally the problem of not being able to change parents' opinions after they had obtained information from the media or the Internet was mentioned twice during the interviews.

Suggestions of ways to improve vaccination confidence

When asked about how to improve vaccination confidence, healthcare workers came up with four major suggestions: improve information (45 times), involve health authorities or develop regulations (38 times), ensure skilled communication between healthcare workers and patients (25 times), and improve training of healthcare workers (19 times) (Figure 9). Discussions on how to improve vaccine confidence were reported 62 times in Croatia, 34 times in Romania, 24 times in Greece and 15 times in France.

Figure 9. Improving vaccination confidence



HCW = healthcare workers

Croatia

All but one Croatian healthcare worker addressed the need to improve the information provided about vaccines, and suggested *'non-institutional telephone lines where citizens can get information and advice from healthcare professionals'* (C1). Another 16 healthcare workers in Croatia declared that health authorities needed to get involved in improving vaccine confidence, either by enforcing stricter legislation or by launching vaccination campaigns through the media. The need for better communication between doctors and parents was reported 15 times, with suggestions of *'workshops and round tables about vaccines'* (C4), as well as *'counselling for parents, and courses for pregnant women'* (C10). Finally, the need to improve training for healthcare workers was also addressed 15 times.

France

There was a general consensus among French healthcare workers that information on vaccination needed to be improved and, more specifically, information in the media needed to be managed, whether online or in newspaper articles (10/16). Healthcare workers said that information on the Internet should be *'removed'* because it was not reliable and manipulated people, making it difficult for doctors to address patients' concerns as they became scared, and lost their trust in the medical system: *'Nowadays, people do not listen to their physician anymore because the media is always right... let us stop saying that the media is right all the time when we know perfectly well that they manipulate us'* (F7). Healthcare workers believe that more objective and clearer information needs to be provided to patients, perhaps from health authorities, and that the *'power of journalists should be controlled'*, as they were hostile to medicines and the pharmaceutical industry.

There were three suggestions of how to involve health authorities, either by launching information campaigns, defending physicians when side effects occurred, or making vaccines mandatory for children. One healthcare worker suggested introducing school vaccination: *'We should proceed as in Anglo-Saxon countries where children are vaccinated at school: this would go faster and we would have less problems'* (F7). The problem of communication between patients and doctors was reported three times, partly explained by a lack of dialogue and trust.

Greece

In Greece, six doctors expressed a need for better information and data on side effects and suggested monitoring real time information. Another six doctors discussed the need to involve health authorities, who have some influence on people's decisions. One took the example of a campaign launched by health authorities in France: *'France did a very good job with their vaccination strategy a while back, they had speeches and leaflets, and it was all very well organised'* (G11). Another doctor believed in implementing legal action against healthcare workers who were against-vaccination: *'The Ministry of Health should allow the professional medical association to remove the licence to practice from paediatricians who are against vaccination'* (G12). One healthcare worker also felt that training should be put in place for health professionals: *'it is important for healthcare workers to know how to respond and handle situations where people are negative due to strange religions or practices'* (G8).

Romania

Most doctors in Romania (13/16) agreed that there was a need to improve information about vaccines using various strategies. It was suggested that the media, flyers, leaflets, courses, and meetings could all be used to improve patient knowledge, convince people about the benefits of vaccines and reduce anti-vaccination propaganda. One healthcare worker suggested working with UNICEF to support patient education in hard-to-reach areas. Another gave the example of what was already happening: *'We have meetings where we share vaccine-related discussions. We were praised by WHO for creating a group of excellence in vaccinology, we received recognition for that. We have colleagues all over the country, one of our purposes is to disseminate accurate information to other practitioners'* (R8). However, one respondent stated that it would be difficult to change the situation as it was currently *'fashionable'* to live naturally and there was a growing trend towards refusing vaccines and other treatments.

There were very many discussions about the involvement of health authorities, referred to as a problem in Romania. Those healthcare workers interviewed declared that one of the most important issues they were currently facing was that they did not receive vaccines in time and in sufficient quantities from health authorities. This made it difficult for them to spend more time on issues such as communication with patients. One of the interviewees stated: *'The health authorities should respect the calendar, we do not receive vaccines in time! Sometimes I personally go and buy needles and syringes as the ones we get from the authorities bend'* (R7). Another problem noted was the *'unpredictable vaccination calendar'*, which changed too often and, in the opinion of the interviewee, did not make the Ministry of Health look coherent and trustworthy to patients: *'The Ministry of Health should maintain a coherent and predictable vaccination scheme, and ensure the delivery of vaccines on time. Otherwise, it will only increase patients' distrust in the national vaccination programme. Last year, with the influenza vaccine, it was a total disappointment because we received six vaccines in total! Six vaccines for several hundred people!'* (R6) Doctors suggested including more vaccines in the national immunisation programme, making them free, including the promotion of vaccines as part of the promotion of healthy lifestyles, using media and TV campaigns, creating projects with European funds which would be run by WHO and implemented by NGOs, and learning from successful experiences in other countries. Some doctors also suggested making vaccination mandatory, with clear legislation and consequences, such as fines, for inaction. One of them said: *'There was a case in Czechoslovakia, where they sent parents to prison because they refused the polio vaccine for their child. As a parent, I do not agree that there might be unvaccinated children in the kindergarten where my child goes. Unvaccinated children should not be admitted. (...)Shouldn't we propose punishment for that?'* (R8)

Finally, seven respondents discussed the issue of communication between patients and healthcare workers. They explained that doctors currently lack effective communication skills and should learn how to approach and talk to different types of patients with different beliefs. One way to do this would be to allocate 30 minutes per day for doctors to speak to parents about vaccination, through courses or presentations. This type of movement had begun in Romania with the introduction of the HPV vaccine, but one healthcare worker mentioned that they had not been successful as parents did not listen or trust doctors anymore: *'We need to improve trust between doctors and patients, but it's difficult for us to do that, because the Internet is sometimes too invasive and patients have confidence in what they read there and in discussion forums... where information is more touching or emotional... I don't know but all that is stronger than their trust in the doctor'* (R6). Giving personal examples, to counteract the type of examples provided by anti-vaccine groups, was suggested as a strategy for convincing patients: *'Giving personal examples is important when communicating with patients, it is a convincing strategy. Although I do not want anybody to get sick, sometimes I almost want something to happen to those who refuse vaccination... only to give them a vivid example, so that they see the consequences.'* (R8). Three doctors also discussed training for healthcare workers, to improve their counselling abilities.

Discussion

The interviews with healthcare workers in Croatia, France, Greece and Romania revealed that although those interviewed were aware of the benefits of vaccination, most of them also had some concerns about the risks. Healthcare workers discussed the balance between the risks and benefits of vaccination, their responsibility as doctors to prevent diseases, the low risk of side effects, the importance of herd immunity and the prevention of serious illnesses and large disease outbreaks. However, healthcare workers also discussed their concerns about vaccination, with each country reporting different concerns: For example, Greek healthcare workers mostly discussed the number of vaccines children receive, which they perceived as too high, especially for young children. They also discussed the low efficacy of vaccines, especially influenza, and their patients' concerns about side effects.

These results differ from quantitative studies which looked at healthcare workers' reasons for refusing vaccination, and showed concerns about vaccine safety [31, 32], and the fact that they did not believe their patients were at risk of certain vaccine-preventable diseases (influenza) [9, 33]. A survey in France also showed that family doctors believed that one of the barriers to MMR vaccination was parental opinion that measles was not a severe illness (80%), as well as a fear of vaccine side effects (50%) [34]. It is possible that the difference between the results from this study and others lies in the fact that healthcare workers in this study were not interviewed about their refusal of a vaccine, but about general concerns they might have about vaccination.

Vaccine safety was the most important theme in Romania, where healthcare workers themselves had doubts about the risks of vaccines and expressed strong feelings of guilt and responsibility for side effects. Romanian healthcare workers also stressed the issue of anti-vaccination content on the media and its influence on patients, along with their own concerns about new vaccines, which were not part of the national immunisation programme and might therefore not have been sufficiently tested. Although no study has been conducted to date on Romanian healthcare workers' attitudes towards vaccination, important research was conducted in 2014, analysing the content of discussion forums in the country. This showed that there was a problem with vaccine hesitancy in the media in Romania. The study reported many concerns, including fear of side effects, worries about vaccines not being natural, conspiracy theories, and lack of trust in the authorities [35].

Concerns about new vaccines, and especially the HPV vaccine, were also expressed in France due to a perceived lack of testing for vaccine safety and efficacy. This result confirms those of other studies performed on HPV and influenza in France which revealed healthcare workers' concerns about the lack of evidence on the safety and effectiveness of new vaccines [36, 37]. Other studies found that healthcare workers who refused vaccination mainly did so because of a risk of side effects [26], and because they did not think they were at risk of getting infected [38, 39]. In Croatia, discussions about vaccination risks were related to patients' fears of serious adverse events.

Another important theme that arose from the semi-structured interviews was that of trust and mistrust. Healthcare workers claimed to support vaccination in general and to trust health authorities. However, they also often expressed mistrust towards the pharmaceutical industry as well as governments, health authorities, doctors and research. This was the case both in Croatia and France, with doctors expressing mistrust in pharmaceutical companies due to their financial interests. A 2015 French study found that eight family doctors out of 10 trusted the Ministry of Health but 50% of them also reported that they believed the Ministry to be influenced by pharmaceutical companies. In total, 29% said that they would therefore prefer to rely on their own judgement [40]. A similar scenario was found in Romania, where there was strong trust placed in the Public Health Department, the health system, regulatory agencies and WHO. Meanwhile there was significant mistrust of pharmaceutical companies who not only had financial interests but also did not communicate sufficient information about side effects and tried to exert pressure on doctors. Doctors in Greece were particularly mistrustful, not only of pharmaceutical companies and their representatives but also of the government and the health system.

Research into environmental risk communication has identified three factors potentially affecting trust in institutions: knowledge and expertise, openness and honesty, and concern and care [41]. There are many institutions and organisations which can be associated with vaccination: pharmaceutical companies involved in vaccine production, regulatory agencies licensing vaccines, or health authorities and doctors providing recommendations for vaccines. The public's credibility of vaccine information will be influenced by their trust in some or all of these organisations and how open and transparent they are. The process of rebuilding trust will depend on the specific social, cultural, political and economic context of the country or region affected. It is therefore important to have an accurate understanding of these factors before engaging in trust-building activities such as dialogues and exchanges of information and opinion with affected healthcare workers or other individuals [2]. Although mistrust was present in all countries, it was strongest among Greek healthcare workers and could be a reflection of similar opinions in the general population. This could also be influenced by the current political and economic situation in which the interviews were conducted, however the situation requires action to avoid collateral damage with regard to vaccination uptake.

The provision and quality of information on vaccination was a common topic of discussion, especially in Croatia and Romania, with overall signs of trust in the information provided, which was deemed sufficient and of good-quality. Healthcare workers perceived the information they received from health authorities and the information they gave to patients as being good. In Croatia, all healthcare workers interviewed trusted the information provided to them about vaccines and most of them declared having received good information and recommendations concerning vaccines. In Romania, doctors believed they provided good information to patients, in different formats. However many mentioned the problem that patients did not trust doctors anymore because so much information obtained now came from the Internet. With continuous advancements in communication technologies such as social media, the public increasingly used the Internet to research information on health and more particularly, vaccines. Some studies have analysed the content of information available on vaccines via websites and social media and have shown not only that it was of variable quality, but also that there was a predominance of negative or sometimes incorrect content. Such content may potentially influence hesitant parents looking for answers online [42-45]. While these studies analysed websites in English, a study looking particularly at French websites found that although some of the sites criticised certain aspects of vaccination, they did not all disseminate anti-vaccination opinions [46].

Vaccination programmes could be threatened by the spread of such concerns online, and it was important that healthcare workers contributed contrasting information, addressed misinformation and discussed with patients information they might have found online. Healthcare workers were divided in France, with positive and negative feedback about information on vaccination in the country. The main issue was the fact that the authorities changed recommendations and vaccination schedules too often. The most recent change occurred in 2013, when the schedule was simplified, by reducing the number of doses for some vaccines. In Greece, information was mostly perceived negatively, with healthcare workers citing a lack of information and trust in the information provided. This relates to the previous issue of patients and doctors mistrusting health authorities and other 'messengers' providing vaccination information.

Most doctors were influenced by health authorities and official recommendations, and they discussed patients being influenced by the media. In Croatia, almost all doctors talked about how they listened to official recommendations, health authorities and other doctors and experts. This was also seen in Romania, with healthcare workers specifically referring to the Department of Public Health and the national immunisation programme. There was a strong belief in Romania that patients were influenced by media reports about vaccine side effects. In Greece, patients and doctors mostly reported the influence of previous experiences involving vaccine side effects, whether personal or experienced by others. French healthcare workers were seen to receive a great deal of influence from pharmaceutical representatives, whether with the information they gave to doctors or the reminders they sent about vaccination schedules. This reflected the results of previous studies on trust in relation to vaccination, with countries reporting a strong feeling of trust in health authorities and being significantly influenced by them. These results also reflected those of a previous study among French family doctors which revealed that they received an average of five visits by pharmaceutical representatives per week [47].

The concept that it is a doctor's responsibility to respond to hesitant patients was reported in all countries. Healthcare workers believed that it was their role, as doctors, to respond to patients and sometimes even influence them. Most healthcare workers felt comfortable responding to patients, and believed they had sufficient resources to do so. In Croatia, all healthcare workers believed it was their role to respond to patient hesitancy and most thought they had enough information to do so. Many of them also believed it was their role to influence patients, sometimes using very strong methods. Healthcare workers in Greece and Romania also stated that it was the doctor's role to respond to patient hesitancy and that they felt confident and comfortable doing so. In Romania, many doctors also thought they had a responsibility to try and influence patient decision-making. In France, the study participants mostly described their role as providers of information: it was the patient's decision whether or not to get vaccinated and doctors could not force or convince patients. Many also believed healthcare workers should stay neutral and not initiate discussions concerning vaccination. These results differ from those seen in a previous study, which showed that 90% of family doctors in France believed their role was to encourage patients to get vaccinated, even when they were hesitant [40]. Healthcare workers are often seen as having the greatest influence on a patient's decision to get vaccinated. It was therefore important not only that they communicated with hesitant patients, but that they knew how to respond to their concerns about vaccines. A study from 2011 recommended that healthcare workers should aim to have open, non-confrontational dialogues with patients, particularly parents, as early as possible in the life of their child. They recommended using personal stories, reports of disease outbreaks and visual images of individuals suffering from vaccine-preventable diseases to remind patients of the need for high vaccination coverage rates [48].

The results from the qualitative interviews with healthcare workers in Croatia, France, Greece and Romania revealed that vaccine hesitancy was present in all four countries. Although the reports from the interviews were overall highly positive and showed high levels of trust and confidence in the benefits of vaccination, healthcare workers still shared some concerns about vaccine safety, the need for vaccines, and mistrust in pharmaceutical companies. There were also a few doctors, some of whom practised homeopathy, who were entirely against vaccination, and had decided not to recommend vaccination to their patients. Both these groups' misgivings are of particular concern, as many studies have shown that healthcare workers' attitude and knowledge regarding

vaccines may not only influence their own and their children's vaccine uptake but also their intention to recommend vaccination to their patients and therefore their patients' vaccine uptake [49, 50]. There were also a few reports of hesitant patients influencing their healthcare workers' beliefs. It was therefore very important for public health specialists and institutions in Europe to find a way to better understand the vaccine-related behaviour of healthcare workers and to take steps to counter vaccine hesitancy in healthcare workers and their patients. A further concern, is the finding from another study that many healthcare workers would reconsider their faith in vaccines if the balance between personal risks and benefits was to change substantially [51].

During the interviews healthcare workers suggested some solutions for improving vaccine confidence: better information, more involvement of health authorities and the development of regulations, enhanced communication between patients and doctors, and improvement of training for healthcare workers responding to patient hesitancy. The wide range of concerns raised in relation to vaccine hesitancy points to the need for more comprehensive, context-specific interventions. While most current interventions focus on education and improving information on vaccine safety, vaccine effectiveness, or the need for vaccines, concerns raised in this study and elsewhere identify other determinants of hesitancy. Examples of these determinants, which also need to be addressed, are trust in health systems, healthcare workers' perceived roles in responding to patient hesitancy and their levels of confidence in so doing. Although some commonalities between countries can be found, such as the presence of vaccine-hesitant healthcare workers in all four countries and concerns about vaccine safety and utility, determinants of hesitancy have also been shown to be country- and context-specific and need to be addressed as such. For example, the most important problem in Greece at present seems to be a lack of trust in the health authorities and the government and in the information they provide on vaccine safety. Strategies in Greece will therefore differ to those in France, where many problems stem from a perceived lack of consistency in vaccination schedules provided by health authorities. They will also differ to strategies in Romania where there is a real issue of patients being influenced by anti-vaccine information in the media. National vaccination programmes have to be strengthened to develop the capacity to identify local determinants of vaccine hesitancy, whether in patients or in healthcare workers. Strategies need to be developed which are adapted to addressing these determinants, in a social, cultural, political and economic context.

Limitations

There are some limitations to this study which need to be addressed. Although a standardised interview guide was developed to allow comparability of study results, some differences in the results provided might stem from the interviewers' roles in guiding the discussions. It is possible that interviewers conducted the semi-structured interviews with a varying focus depending on the country. Furthermore, the standardised coding scheme was developed prior to the analysis of the interviews in order to allow comparability among countries. This coding scheme might have influenced the local research teams when coding the interviews. Each country provided slightly different reports of codes, with more information provided for the Romanian and French interviews than for the Greek and Croatian ones. Healthcare workers from different countries might have answered questions differently depending on the status of vaccination legislation in their country. For instance, healthcare workers in Croatia, where vaccination is mandatory, might have felt less at ease when talking about their concerns regarding vaccination. Finally, recruitment of healthcare workers was intentionally biased as it was carried out in geographical areas where vaccination uptake rates were lower than average, or where hesitancy was reported to be more prevalent. Therefore the representativeness of the views of the healthcare workers interviewed in this study must be interpreted with caution. This said, the intent with this study was to identify whether hesitancy occurs at all and to begin to identify its characteristics.

Conclusion

A total of 65 semi-structured interviews were conducted in Croatia, France, Greece and Romania to investigate vaccine hesitancy among healthcare workers and their patients. This report has confirmed the existence of vaccine hesitancy in all four countries but has shown that concerns relating to vaccines are country- and context-specific. Healthcare workers had concerns relating to the risks of vaccination and expressed a lack of trust in health authorities. Some healthcare workers were also against vaccination in general. It is important that strategies to improve confidence in vaccines focus on these concerns and are therefore adapted to the specific political, social, cultural and economic context of the country or region. Improving vaccine confidence among healthcare workers is crucial as they have been shown to have the potential to influence patient vaccination uptake.

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Annex 1. Question guide for semi-structured interviews with healthcare professionals

BASELINE INFORMATION

1. What is your gender?

- Male Female

2. What is your age?

- ≤24 25-44 45-64 65+

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 AMONG HEALTHCARE PROVIDERS

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

11. Have you ever had a patient who was hesitant or opposed to being vaccinated or having their children vaccinated?

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

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

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

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

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

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

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

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

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

Annex 2. Characteristics of participants in all countries

Participant	Sex	Age	Profession	Type of practice	Years of practice	Practice of alternative medicine
<i>C=Croatia F=France G=Greece R=Romania</i>	<i>1=F 2=M</i>	<i>1=≤24 2=25-44 3=45-64 4=65+</i>	<i>1=general practitioner 2=gynaecologist 3=epidemiologists 4=internal medicine 5=paediatrician</i>	<i>1= Solo 2= group 3= other</i>		<i>1= no, 2= yes</i>
C1	2	2	3	2	6	1
C2	1	2	3	2	11	1
C3	1	2	3	2	5	1
C4	1	2	1	1	6	1
C5	1	2	1	1	3	1
C6	1	2	1	1	3	1
C7	2	2	1	1	2	1
C8	1	2	1	1	4	1
C9	1	2	1	1	9	1
C10	1	2	1	1	1	1
C11	1	2	1	1	5	1
C12	1	2	1	1	2	1
C13	1	2	1	1	3	1
C14	1	2	1	1	3	1
C15	1	2	1	1	2	1
C16	1	2	1	1	7	1
C17	1	2	3	2	11	1
F1	2	3	1	1	37	1
F2	2	3	1	1	13	1
F3	1	2	2	2	4	1
F4	1	3	2	2	10	1
F5	1	2	1	1	6	1
F6	1	3	1	2	5	2
F7	2	3	2	2	27	1
F8	2	3	1	2	26	1
F9	2	3	1	1	26	1
F10	2	3	1	1	31	1
F11	1	3	2	1	30	1
F12	2	4	2	1	39	1
F13	1	3	2	1	25	1
F14	2	3	1	2	9	1
F15	1	2	1	2	11	1
F16	1	3	1	1	32	1
G1	1	2	4	1	16	1
G2	2	3	1	1	35	1
G3	1	2	1	3	7	1
G4	2	2	1	2	13	1
G5	2	2	1	2	18	1

Participant	Sex	Age	Profession	Type of practice	Years of practice	Practice of alternative medicine
<i>C=Croatia F=France G=Greece R=Romania</i>	<i>1=F 2=M</i>	<i>1=\leq24 2=25-44 3=45-64 4=65+</i>	<i>1=general practitioner 2=gynaecologist 3=epidemiologists 4=internal medicine 5=paediatrician</i>	<i>1= Solo 2= group 3= other</i>		<i>1= no, 2= yes</i>
G6	2	3	4	1	25	1
G7	2	2	1	3	2	1
G8	1	3	1	1	23	1
G9	2	2	4	1	13	1
G10	2	3	4	1	35	1
G11	2	3	5	1	13	1
G12	2	3	5	1	13	1
G13	1	2	1	1	15	1
G14	2	2	1	1	17	1
G15	2	3	1	1	30	1
R1	1	2	1	1	6	
R2	1	3	1	1	30	2
R3	1	3	1	1	25	1
R4	1	2	1	1	10	1
R5	2	2	5	1	7	1
R6	1	3	1	1	31	1
R7	1	3	1	1	30	1
R8	1	3	1	1	31	1
R9	1	2	1	1	15	2
R10	1	2	1	1	2	1
R11	1	2	1	2	7	1
R12	1	2	1	2	16	1
R13	1	2	1	2	15	1
R14	1	2	5	1	12	1
R15	1	2	1	1	14	1
R16	1	3	1	1	20	1
R17	1	3	1	1	23	1

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