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Physicians' decision processes about the HPV vaccine: A qualitative study

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ABSTRACT

Background: The contemporary crisis of trust in vaccines has severely impaired acceptance of the HPV vaccine, especially in France, where its uptake culminated at 23.7% in 2018 (complete course at age 16). Physicians' recommendations strongly influence its acceptance/refusal. Our study sought to understand the decision processes leading physicians to recommend this vaccine (or not).

Methods: Qualitative interviews of French physicians (general practitioners, gynecologists, and pediatricians). We first randomly selected doctors in a national register of medical professionals and then resorted to snowballing to build a convenience sample. We coded the interviews in a thematic analysis built both inductively and deductively from our research questions and data.

Results: Two thirds of the participants (19/28) were favorable to HPV vaccination, some (4) opposed it, while the others were hesitant about recommending it. In explaining their opinions, most participants mentioned that they trusted the stakeholders within the vaccination system: the less trust they had, the more critical they were of the vaccine and the more importance they attributed to patients' opinions. We identified three different ways they interacted with patients on this topic: informing and convincing; adapting to patients' opinions; refusing compromise about vaccination. Crossing these various themes, we found 5 types of physicians: dissidents (mistrustful of the healthcare system and HPV vaccine), hesitant (finding it difficult to make up their minds about this vaccination), laissez-faire (letting patients decide by themselves, but very favorable to HPV vaccination), educator (very favorable), and uncompromising vaccinators (refusing debate). Pediatricians were overrepresented among the latter two types.

Conclusions: Physicians' judgment was influenced by their trust in the stakeholders involved in designing and implementing the HPV vaccination strategy. In this sense, doctors did not differ substantially from laypeople. They were, nonetheless, strongly influenced by their professional style and ethos.

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1. Introduction

The European Medicines Agency approved the vaccine against the human papilloma virus (HPV vaccine) in 2006. It became available in France in November 2006 and, in March 2007, the French public health authorities (Ministry of Health) recommended it for girls only, aged 11–14 years (with catch-up to age 19). In 2015, a newer vaccine protecting against nine strains of HPV was introduced in Europe: it had not yet received approval for use in France

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at the time of this study. While cervical cancer is the fourth most common cancer in terms of incidence and mortality among women aged 15–44 in France [1], HPV vaccine coverage in this country is among the worst in Europe with an uptake rate of 23.7% for a complete course at the age of 16 (two doses for girls born in or after 2000) [2].

The contemporary crisis of trust in vaccines in France has severely impaired the uptake of the HPV vaccine. France is indeed one of the most vaccine-hesitant countries in the world [3]; one third of the population doubts the safety of at least one vaccine, and a national survey conducted in 2016 found that more than half the parents of adolescent girls had negative attitudes towards the HPV vaccine or were uncertain of its benefits [4]. This situation

results in part from mass media coverage of allegations about its safety and efficacy. Its first public criticism came in the summer of 2008 when a renowned cardiologist, Professor Claude Berraud, raised questions about its efficacy, specifically the duration of immunity, number of strains of the virus, and ecological balance of viruses, as well as its cost. He suggested that there is a risk that women might abandon regular screening and called for vigilance regarding side effects.

The year 2011 was a turning point: in July a group of doctors published an open letter to the Ministry of Health claiming that the vaccine is unsafe and inefficacious. In the following weeks, several groups of purported victims of the vaccine filed lawsuits and applied for financial compensation, alleging that the vaccine had caused various autoimmune diseases. These events were covered extensively by the mainstream news media. Furthermore, the HPV vaccine was embroiled in another important ongoing French vaccine controversy: the safety of aluminum-based adjuvants. Consequently, HPV vaccine coverage has remained very low since its marketing authorization in France, peaking in 2018 at 23.7% among 16 year-old girls, for the complete course. This coverage rate is the lowest for any of the officially recommended vaccines in France, together with seasonal influenza vaccine coverage in people younger than 65 with chronic conditions [5].

Physicians' recommendations strongly influence parents' decisions to accept the HPV vaccine for their children [6–8]. In a quantitative study among a representative panel of French GPs, we found that a substantial proportion of them were hesitant regarding this vaccine. Their unfavorable perceptions of its risk/benefit balance and doubts about vaccine utility in general were factors strongly associated with their infrequent recommendation of the HPV vaccine for children [9]. In the US, on the other hands, clinicians have been found to be generally supportive of HPV vaccination although they tend not to provide strong, consistent recommendations [10].

We conducted a qualitative survey in 2016 to study how various French physicians (general practitioners, gynecologists, and pediatricians) form their opinion about HPV vaccination. We sought to understand the decision processes that lead them to recommend (or not recommend or recommend against) this vaccine to their patients and explore the diversity of attitudes towards it. Specifically, our goal was to analyze, through the construction of a typology of physicians' behaviors towards HPV vaccination, how their social, political, and professional beliefs, values, and culture may be related to their representations of this vaccine and how interactions with patients (term used to include the parents of minor patients, that is, those with legal authority to consent to this vaccination) help to construct doctors' attitudes.

2. Method

The sampling procedure sought to collect the widest possible range of views and experiences of HPV vaccination (i.e., diversity sampling). Given the target population of HPV vaccination, three types of doctors are most likely to prescribe it: general practitioners (GPs), gynecologists, and pediatricians (who may care for patients until they have reached puberty). We made an effort to reach doctors from different geographical areas and thus interviewed doctors practicing in three regions chosen for convenience: regions of Paris, Marseille, and Annecy. First, we randomly selected doctors in a national register of medical professionals and contacted them via telephone. We described the study to them and asked for a half-hour interview. We offered financial compensation amounting to the price of 3 medical consultations. Then, to expand the sample, given that qualitative sampling is always difficult and time consuming with physicians, we applied snowballing methods

to complete a convenience sample: at the end of the interview we asked all initial interviewees to suggest members of their own networks. Asking for these recommendations at the end of the interview raises the chances of increasing the sample size, for the interviewer has had an opportunity to develop a rapport with the interviewees, who also understand the aim of the research better at its conclusion [11]. We stopped data gathering when we reached thematic saturation.

In France, approval by a research ethics committee is not required for interviews that do not pertain to the person's medical record or private life. Each interviewee received an information form presenting the objectives and procedures of the study and signed a consent form guaranteeing anonymity, in accordance with standard procedures in France. In the result section, we used fictitious first names to replace the participants' names. The first author (MB) interviewed each participant, individually, face to face, between January and March 2016. All interviews were recorded (with participants' consent) and transcribed verbatim.

The interview guide covered three main components. First, we asked the participants to talk about how they became physicians and to describe a typical working day. The aim of this question was to put them at ease, to understand their conception of the medical profession, and to place HPV vaccination against the backdrop of their day-to-day constraints. Second, we asked them whether they prescribe the HPV vaccine, where they get their information about it, and when and how they talk about it with their patients. Finally, we broached the topic of other vaccines and vaccination policy in general.

We coded the interview transcripts for a thematic analysis [12] that focused on three themes: a) doctors' diverse attitudes (and practices related) to the HPV vaccine; b) their attitudes toward the public health authorities; and c) their representations of what the physician-patient relationship should be. These codes were built both inductively and deductively from our research questions and data – by what some call flexible coding. Variations on each of these three themes were crossed to build a typology of doctors' attitudes and practices regarding HPV vaccination.

3. Results

Random selection provided information to contact 216 doctors, for 96 successful contacts and 14 interviews. The main reasons for refusal to participate were lack of time and insufficient financial compensation. Snowballing enabled us to contact and interview 14 more doctors. The sample comprised 18 male and 10 female physicians: 7 GPs, 11 gynecologists, and 10 pediatricians (Table 1). Interviews lasted 45 min on average. All participants stated that in general they favor vaccination.

3.1. HPV vaccination: favor/skeptical/hesitant

We found three types of doctors' attitudes toward HPV vaccination.

Favorable doctors: two thirds of the participants (19/28) favored HPV vaccination. They all insisted that a professional consensus exists on vaccination in general, and many asserted that one could not be simultaneously a “good” doctor and opposed to the HPV vaccine. They usually defined themselves as “pro-vaccine” and presented their attitude as the only rational and scientifically acceptable position. They stressed the severity of cervical cancer and affirmed their confidence in scientific research demonstrating this vaccine's favorable benefit-risk balance. They saw the debate about HPV vaccination as polarized between pro-vaccine doctors and “antivaxxers”. They considered any physician not in favor of a vaccine to be “anti-vaccine” and not a “real doctor”. These

Table 1
Participant characteristics (survey implemented in 2016).

	Specialty ^a	Sex ^b	Age category (years)	Practice	Town
1	GP	F	25–34	Resident in a private practice	PARIS
2	GP	F	25–34	Private practice	PARIS
3	GP	F	45–54	Private practice	MARSEILLE
4	GP (homeopathy)	F	35–44	Private practice	MARSEILLE
5	GP	M	65–74	Private practice (4 years at the child protection program)	MARSEILLE
6	GP	F	55–64	Private practice	PARIS
7	GP	F	55–64	Private practice	PARIS
8	GYN	F	65–74	Private practice	MARSEILLE
9	GYN	M	55–64	Private practice in private clinic	ANNECY
10	GYN	M	55–64	Private practice in private clinic	ANNECY
11	GYN	M	35–44	Private practice in private clinic	ANNECY
12	GYN	F	55–64	Private practice	PARIS suburb
13	GYN	F	65–74	Private practice	PARIS
14	GYN	M	35–44	Private practice in private clinic	ANNECY
15	GYN	F	35–44	Hospital	MARSEILLE
16	GYN	F	25–34	Hospital	PARIS
17	GYN	F	25–34	Hospital + replacement (locum) for private practitioners	MARSEILLE
18	GYN	M	55–64	Hospital	MARSEILLE
19	PED	F	45–54	Group private practice	MARSEILLE
20	PED	F	45–54	Group practice + hospital on-call	MARSEILLE
21	PED	M	55–64	Group practice + hospital on-call	MARSEILLE
22	PED	M	55–64	Hospital	MARSEILLE
23	PED	M	65–74	Hospital	MARSEILLE suburb
24	PED	F	25–34	Replacement for private practitioners (locum)	MARSEILLE
25	PED	M	55–64	Private practice	PARIS suburb
26	PED	F	75+	Private practice	PARIS
27	PED	M	55–64	Private group practice	ANNECY
28	PED	F	55–64	Private group practice	ANNECY

^a GP: general practitioner; GYN: gynecologist; PED: pediatrician. ^b F: female; M: male.

interviewees associated “anti-vaccine” opinions with “irrationality” and “conspiracy theories”. Relying on scientific studies, they considered that the debate is confined to the nonmedical sphere and the media. They considered the HPV vaccine as part of a global process to improve individual and collective health; its success in other countries was offered as evidence of its safety and effectiveness.

Pediatricians accounted for the largest proportion of this group, and most favored HPV vaccination. They advocated a strategy of early vaccination to avoid discussing sexuality-related aspects, and they considered that this vaccine should be administered to both girls and boys.

When you've separated this vaccination from sexual activity, it's considered a vaccine like every other vaccine, that you do as usual (Philippe, pediatrician).

Skeptics about HPV vaccination: Four physicians (3 GPs and 1 gynecologist) were opposed to HPV vaccination or very suspicious about it: we will refer to them as “skeptics”. They expressed themselves with conviction, and criticized a lack of transparency from public health authorities. Yet, their characteristics did not match the “anti-vaccine” stereotype held by the favorable group: all of them practiced allopathic medicine (one doctor sometimes also practiced complementary medicine); they said they favored vaccination in general and did not want to be associated with any “anti-vaxx” movement.

No, but I'm clearly pro-vaccination (Lorraine, GP).

Those interviewees mainly based their arguments on the uncertainties about HPV vaccine effectiveness.

I don't really know what the side effects are, or for any vaccines, I suppose ... and I don't really see the utility of [a vaccine against] the papillomavirus (Patricia, GP).

Their uncertainties and criticisms were based on what they considered rational arguments and “scientific facts”. They insisted that their attitudes differ from laypeople’s “irrational fears” and that

they are not influenced by the public controversy about this vaccine. They denounced the marketing campaign by the pharmaceutical industry, which presents the vaccine as a means to combat cervical cancer, since they considered this affirmation inaccurate, as did some favorable practitioners. In particular, they underlined the limited number of virus strains against which the HPV vaccine protects, and its insufficient effectiveness.

It doesn't protect against all the HPV viruses. Well, of course, they're the most frequent, but ... I think that the frequencies are necessarily going to change ... (Chantal, gynecologist).

It's got a different status because in terms of prevention, it's not ... I mean, it's not 100% effective since you still have to do Pap smears! So finally it's not as useful as DTP (Françoise, GP).

In addition, one of the four skeptics insisted on the lack of knowledge about the duration of immunization provided by the HPV vaccine. All four skeptics questioned the utility of the vaccine insofar as Pap smears are highly effective, less expensive, and already well known. While public health experts recommend using both methods, which are complementary, skeptics considered Pap smears to be the most feasible and important prevention method.

The skeptics did not particularly highlight the issue of safety, although public controversies and patients’ fears about the HPV vaccine had some influence on their professional behavior and attitudes, despite their efforts to distance themselves from laypeople.

There, after the accident stories, I stopped, I waited for it to be over, to see if it was really the cause, I knew that it would result in other studies, so yes I waited (Lorraine, GP).

One skeptic used a moral argument, noting that HPV is a sexually transmitted infection, and therefore presents questions of personal choice.

Hesitant physicians: Five interviewees (4 gynecologists, one GP) found it difficult to form an opinion about HPV vaccination and whether or not they should recommend it to their patients.

(Interviewer: and you give it at 11 years?) (shakes his head no), more at 15/16 years. I don't know, I don't know, I'm afraid in fact, I'm afraid that it will stunt their growth, I don't know, I'm afraid that they'll tell me, "the vaccine stopped her from growing." I don't know, I wait till they've gone through puberty... (Sébastien, GP).

Their arguments were similar to the pros and cons mentioned above but reported here without much conviction. They did not assert that they had lost faith in public health authorities or their recommendations but they felt somewhat lost and inadequately informed. Two of them (gynecologists) admitted being influenced by the public controversy about the HPV vaccine. The others felt disengaged and were not convinced of its utility. Some hesitant interviewees favored HPV vaccination with some restrictions: they opposed vaccination before puberty and considered it as part of the sexual education process, closely linked to personal life choices.

3.2. Confidence in stakeholders

Every physician's explanation of his/her opinion about HPV vaccination held implications about their views of the health and vaccination system, including the pharmaceutical industry, public health institutions, health authorities, organizations representing the medical profession, and personal peer networks. The less they trusted authorities, the more critical they were of HPV vaccination.

Pharmaceutical industry: Most of the interviewees agreed that the pharmaceutical industry pursues its own interests by convincing physicians to prescribe its products and by using sometimes aggressive marketing strategies.

So it's the pharmaceutical companies, they have a lot to do with it, I think they have enormous power, the power of money... in any case, it's money that rules the world right now... (Françoise, GP).

However, participants' attitudes toward the industry differed according to their opinions about capitalism, state regulation, and the trustworthiness of the "invisible hand" of the drug market. While some considered the pharmaceutical industry completely legitimate, others denounced the total incompatibility between mercantile logic and preserving the common good. Some practitioners had even chosen to have no relationship with pharmaceutical representatives:

I pay careful attention to what I learned [in medical school and later training] and... on the other hand I never meet with pharmaceutical sales representatives... I do my continuing education myself on this point, so I never go to conferences... (laughs) and that has always been part of my philosophy as a doctor (Françoise, GP).

Public health authorities: Many interviewees trusted the pharmaceutical industry because they saw it as controlled by the health authorities. According to 15 interviewees, public health authorities and state regulation ensures the safety and utility of HPV vaccination.

Fine, you understand that, even though medicines can be useful, they are nonetheless sold by companies that have an interest in defending them... afterwards, something the public knows less: there are surveillance authorities who check and verify the introduction of drugs... (Benoit, gynecologist).

I consider the public health institutions to be reliable (Lisa, gynecologist).

These physicians recommended HPV vaccination because it is officially recommended and therefore deserves to be trusted and followed. The other participants did not trust public health authorities, however, and their attitude towards the HPV vaccine was more often hesitant or negative. Nonetheless, some interviewees

identified different entities as "public health authorities": they distinguished between political (Ministry of Health) and scientific institutions or health agencies. They trusted recommendations of the latter because they saw them as belonging to the scientific sphere.

I have confidence in the guidelines of the public health agencies... Not the minister though! She talks about subjects that she doesn't know anything about (Philippe, pediatrician).

The fewer differences physicians perceived between public health institutions and political institutions, the more critical they were toward recommendations issued by the former:

The guidelines are awful!... you have the impression that they weren't made according to correct medical reasoning... (Chantal, gynecologist).

Peers and learned societies: Professionals who did not trust public health institutions placed their confidence in their peers and learned societies instead.

So we know the guidelines; after, our professional societies advise us, and they don't always completely agree with the guidelines... Take for example the Pap smear; the guidelines say every three years, our professional societies nonetheless say rather every two years, so I do them every two years: it's sort of a compromise. (Jacques, gynecologist).

The physicians who sought advice from competent specialists were mostly favorable to the HPV vaccine. Those with the lowest trust in public health institutions turned to alternate independent professional sources, such as the journal "Prescrire", which is considered by general practitioners in France to be an independent reference on health products, through which they can have discussions with their peers outside the official system.

3.3. Interactions with parents

We identified three different ways that physicians interact with parents about the HPV vaccine: informing and convincing them; adapting to parents' opinions; or refusing any compromise about vaccination.

A minority (10/28) of physicians tried proactively to convince parents to vaccinate their children against HPV and underscored their educational role and the importance of informed consent. Within this group, some doctors insisted that parents are the only people whose opinion is relevant in deciding whether the child should or should not be vaccinated.

Almost half the participants (13/28) reported that they adapt to parents and let them decide without trying to convince them, especially when they found it difficult to form their own opinion. Skeptical and hesitant physicians said that they would not refuse to prescribe the HPV vaccine if a parent proactively asked for it. One explained that HPV vaccination is a delicate topic, which cannot be discussed with everybody, and another reported that he sometimes feels that discussion is useless. Finally, others asserted that it is not their role to "try to convince the patient."

Health belongs to the individual and it's not for the State to say what is good or not; nor is it for me to say. Who am I to judge? (Romain, pediatrician).

Five practitioners refused any compromise about vaccination with their patients. They were convinced of the soundness of the HPV vaccine and did not want to debate it with parents. When patients express reluctance about vaccination, these doctors

consider that debating it or arguing with them about it is no longer possible. Two even found it impossible to continue to see and treat them and therefore pushed them to find another physician.

I refuse to take care of people who don't get vaccinations... I already refuse: not being vaccinated in this day and age, it's totally stupid! (Marc, pediatrician).

3.4. Final typology

Crossing these three main themes (attitudes, trust, and interaction styles) and professional style of the respondents, we identified 5 different types of physicians: dissidents, hesitants, laissez-faire, educators, and uncompromising (Table 2). These results show how the different attitudes about HPV vaccination are expressed by differences in how the physicians interact with their patients and how they frame patient decision-making.

“Dissidents” displayed a general mistrustfulness of the healthcare system and they believed that medicine should be practiced with “a sacred conception of the doctor-patient bond”. They were very mistrustful of HPV vaccine safety and/or usefulness, and they considered that its benefit-risk balance should be judged at an individual rather than at a collective global level. This group was rather homogeneous and mainly composed of women. All of them subscribed to the journal *Prescrire*. They often stated that they did not vaccinate their daughters against HPV and that they would not raise the subject of this vaccine unless patients asked for it.

“Hesitant” doctors questioned the integrity of the pharmaceutical industry and of public health institutions as well as the reliability of their recommendations. They did not question the safety of HPV vaccination, but were not convinced of its effectiveness and usefulness either. They let their patients decide by themselves without trying to influence them one way or another. Most of them were gynecologists.

“Laissez-faire” doctors interacted with their patients in a manner similar to that of the “hesitant” doctors: they let their patients decide by themselves. They did not want regulatory bodies to interfere in their professional practice because they adhered to professional values strongly favorable to patient self-determination and professional independence. On the other hand, they had nearly opposite attitudes toward vaccines in general and

HPV in particular. They were all very favorable to HPV vaccination because they found the pharmaceutical industry credible and had confidence in the learned societies they knew. At the same time, they criticized the French authorities' approach to vaccination as a “state ideology” and insisted on patients' strong responsibility to protect their children's health. Doctors from this group were notably older than the other interviewees and worked in private practice, not at hospitals.

“Educators” were the most common doctors: they expressed a generalized trust in the healthcare system and its actors. They used official recommendations as the main information source and accepted state intervention in their practices to support them when contributing to public health policy. They did not demonize pharmaceutical companies but relied on institutions to defend the general interest. They were very favorable to vaccination in general and to HPV vaccination in particular. According to them, physicians should have scientific, rational, and objective knowledge, based on the evidence of epidemiology and research. Patients should make a choice after listening to the information and the advice of doctors. These educators will listen to their patient's desires and experiences but will not believe all the negative things they report. Most of the professionals in this group were pediatricians.

The “uncompromising” were very favorable to vaccination and had a very positivistic discourse (emphasizing the importance of science). They refused to take part in any polemical debate about HPV vaccination and adopted a non-conciliatory attitude with patients, to the point of not trying to maintain their relationship with them, even, for the most radical among them, refusing sometimes to continue seeing them. This group was predominantly male, was essentially composed of hospital practitioners, and had easy access to and excellent understanding of primary scientific information.

4. Discussion

4.1. Decision-making processes: Based on perceptions more than on rationality

Our qualitative study yields insight into the decision-making processes and conception of their role in patients' decisions that lead physicians to recommend – or not recommend – the HPV

Table 2
Typology of attitudes towards HPV vaccination and behaviors towards patients, given trust in stakeholders.

N = 28	Dissident n = 4	Hesitant n = 5	Laissez-faire n = 4	Educator n = 10	Uncompromising n = 5
Specialty					
GPs	3	1	1	2	0
Gynecologists	1	4	1	3	2
Pediatricians	0	0	2	5	3
Level of confidence in:					
Pharmaceutical industry	-- ^a	–	+++	++	+
Public health institutions	---	–	---	++	+++
Professional leaders	--	+	+++	++	+++
Importance of patients' opinions	++ ^b	+++	++	+	–
Doctor's OPINION towards HPV vaccination	Mistrustful or unfavorable	Undecided/favorable without proactive advice	Favorable	Favorable	Favorable
Doctor's behavior with patients	No proactive mention of the vaccine with patients	Agreeing with patient's choice without advice – no systematic mention	Agreeing with patient's choice but systematic mention of the vaccine	Systematic mention of the vaccine, capability approach and pedagogic behaviour	Refusal of any divergence with patients

^a very low confidence (---) to very high confidence (+++).

^b very low importance (---) to very high importance (+++).

vaccine. This decision-making context involves both patients and physicians since the latter do not systematically directly endorse the recommendations of public health authorities and their risk benefit analysis. Many of the statements given by hesitant doctors were not based in science (insufficient effectiveness of the vaccine, fear that the vaccine would stop girls' growth. . .). The perception that the quadrivalent vaccine was not sufficiently effective might have been reinforced by the fact that the 9-valent vaccine did not arrive on the French market before September 2018, while the marketing authorization was delivered by the European Drug Agency in June 2015. Some physicians' perception that cervical cancer screening would be more feasible and efficient than HPV vaccination is contradicted by the non-optimal coverage of screening in France (only 59% over 2015–17).

Physicians' attitudes were found to be influenced by the credibility they attribute to and the confidence they have in the different stakeholders involved in the design of the HPV vaccination strategy, in the vaccine's production, and finally in its use. In some ways, physicians are not that different from laypeople when it comes to developing an opinion about a controversial medical topic.

4.2. Doctors are not always neutral relays of vaccine policies

Doctors must take positions, both because they have a moral responsibility toward their patients and because they have an implicit contract with health authorities: they should advise patients well and serve as effective adjuvants of public health policies [13]. However, our results go beyond the observation by Raude et al. that GPs' trust in health institutions strongly influences their perceptions of vaccine benefits and risks, which in turn affects their recommendation behavior [14]. We found that they are not always neutral relays of official recommendations. Their lack of trust in the Ministry of Health and the pharmaceutical industry fuels their doubts about the legitimacy of HPV vaccination. This result is important because mothers attach special importance to the advice they receive from their doctor and often report that this strongly contributes to their hesitancy [7,15]. Physicians' trust in the Ministry of Health has eroded during the past decades [16]. The history of repeated public health scandals in France, the growing difficulties in ensuring the sustainability of the healthcare system, and the deeply anchored values of independence of some health professionals might be significant barriers to ensuring or restoring trust in health authorities by vaccine-hesitant health professionals. An additional factor for GPs is their exclusion from the 2009 pandemic A/H1N1 vaccination campaign [17].

4.3. Physicians' trust is shaped by their professional representations and styles

Medical sociologists have shown that the relationship between doctors and public authorities is often conflictual, reflecting an antagonism that is an aspect of physicians' professional identities [18]. In France for instance, independence from the state has been a cornerstone underlying the reconfiguration of doctors' professional identities over the past century, as public authorities have increasingly played a role in healthcare financing, including by control of private physicians' fees to guarantee the population's access to health care [16]. As a consequence, trust in the healthcare system depends on doctors' adherence to some professional representations and ethos that have been found to vary according to doctors' specialties: for example, in this study, professional independence of the health authorities and/or the pharmaceutical industry, the importance of the patient-doctor relationship, defense of epidemiology as proof of reliability, membership in networks or learned societies to defend professional positions

and values. These professional values were sometimes influenced by broad political values related to capitalism and the role of the state in society.

4.4. Role of interactions with patients in doctors' uncertainties

Participants in our study who expressed their own uncertainties regarding HPV vaccination reported the extent to which they felt unable to advise their patients and how much they would prefer to avoid this role. Moreover, the less trust physicians had in health authorities, the more importance they attributed to the patient's input in decision-making. More generally, healthcare providers were rarely impervious to their patients' views.

The patient-doctor relationship involves asymmetry between the protagonists [19,20], governed by the "imposed order" that stems from the social status of the two stakeholders, a layperson seeking help from a professional in possession of knowledge and legitimacy. More recently, however, social changes have contributed to transforming this relationship "in favor of greater patient autonomy and responsibility, making them a participant in their care and involving them more in medical decision making, treatment choices, and prescriptions" [21]. As a result, the healthcare providers' attitudes are also determined in a "negotiated order" [22], and decisions that are made by interacting with patients are neither irrevocable nor predetermined.

However, this "negotiated order" must be more or less accepted by professionals and depends on the importance they accord the patients' opinion, as well as their degree of conviction about the HPV vaccine. Depending how our interviewees managed these divergent opinions, their behaviors and attitudes varied.

We can draw a parallel with the work of Géraldine Bloy [23] who built a typology of GPs' behaviors and attitudes related to managing uncertainty, according to their "awareness of guidelines" and their "consideration for the layperson's complaint". When physicians do not have strong convictions about vaccines and pay careful attention to patients' complaints, the patients can strongly influence the provider's opinion and attitude. If physicians have strong convictions and are not willing to pay attention to these complaints/opinions, they consider that their opinion is the only relevant one. They prefer avoiding patients who disagree with them.

4.5. Doctors' opinions and attitudes also strongly embedded in specialty culture

We found some remarkable differences between medical specialties suggesting that specialty role cultures also influence vaccine attitudes and behaviors. Most pediatricians belonged to the "educator" and "uncompromising" types, both in favor of HPV vaccination and vaccination in general. Given their extensive clinical experience administering vaccines to children and adolescents, they have a professional culture oriented toward prevention and vaccination [24,25]. Moreover, vaccination is a central aspect of their work. By contrast, gynecologists are rarely in contact with the target population (11–14 years) for HPV and even when they supported HPV vaccination, they did not take clear-cut positions. However, a significant number of them were hesitant, perhaps because their initial training and culture in the field of vaccination was less complete than that of pediatricians [26]. Lastly, GPs' attitudes were highly diverse, despite their strong professional culture favoring empathic relationships with patients [27]. Their vaccination culture may also depend on their own practice orientations (domains in which they choose to become somewhat more specialized, such as mental health, gynecology, or pediatrics), and the characteristics of their patient list. Independence of the pharmaceutical industry and of the health authorities was a value more

often emphasized by GPs than the other participants: dissidence or vaccine hesitancy might be a way to express this.

4.6. Strengths and limitations

Our typology presents heuristic “ideal-types” of profiles – features that are found together more often than not – rather than neatly separable chunks of reality. This means that some physicians may fit between two categories, and that all their positions regarding HPV vaccination were not discrete but rather followed a continuum of attitudes [28]. Moreover, these attitudes could vary according to their personal and professional trajectory and may depend on the types of patients they see. Some professionals told us that their opinion had changed since 2007. However, this typology remains relevant under this study and should be tested in larger samples by quantitative studies to assess the robustness of our results. To do so, our team is developing and validating a questionnaire to assess vaccine hesitancy and its determinants in various kinds of health care professionals, and vaccines. A strength of this study rests in the diversity of profiles of GPs who were interviewed: it enabled us to show the effects of specialization and of professional ideals in physicians’ vaccine hesitancy.

5. Conclusion

This article provides insight into physicians’ (GPs, pediatricians, and gynecologists) attitudes about vaccines, trust in pharmaceutical companies and public health authorities, and the way in which the former seek, more or less, to influence their patients’ decisions about vaccination against HPV. It suggests that the lower their trust in health authorities, the higher their hesitancy and the more importance they attach to their patient’s opinion. Moreover, even when doctors were convinced of the importance of HPV vaccination, they were more or less proactive, laissez-faire, or insistent with them. These attitudes depended on the extent to which doctors listened to their patients’ and on some professional values about their public health role. This may suggest that when doctors are hesitant, their recommendations about HPV vaccination are more likely to be constructed/determined during the patient-physician interaction.

Health professionals’ uncertainties about HPV vaccination efficacy and safety underline the urgent need to rethink their training in the field of vaccination in general and HPV vaccination in particular [26]. Strong efforts to focus this training on improving their scientific knowledge is necessary, especially during the medical curriculum. But our results also suggest that this will not be a sufficient condition as trust in the providers of information they will receive after their initial training is also a crucial issue [29]. In addition to information resources for physicians to give to their patients, health professionals may also need to acquire educational techniques that enable them to listen to their patients’ concerns and to deliver appropriate vaccine messages to them, especially when they are hesitant [30]. Indeed, educational strategies based on motivational interview adapted to vaccination have been found to be a promising avenue to motivate hesitant patients in accepting vaccination [31]. Their mastery requires a solid training, however, which should probably take place during initial training. This should be rigorously evaluated especially, but not only, in the field of HPV vaccination.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Authors’ contributions

MB designed the study, collected and analyzed the data, interpreted its results, lead the redaction of the manuscript. JW, PV participated in the design of the study, the interpretation of results, the redaction of the manuscript. AB, DB, PPW and VS, participated in the design of the study, the interpretation of results, and critically revised the manuscript.

All authors read and approved the final manuscript. All authors attest they meet the ICMJE criteria for authorship.

References

- [1] Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *The Lancet Global Health*. 2020;8(2):e191–203.
- [2] Santé Publique France. Données de couverture vaccinale papillomavirus humains (HPV) par groupe d’âge [Internet]. Santé Publique France; 2019 [cited 2019 Jun 5]. Available from: <https://www.santepubliquefrance.fr/determinants-de-sante/vaccination/donnees-de-couverture-vaccinale-papillomavirus-humains-hpv-par-groupe-d-age>.
- [3] Larson HJ, de Figueiredo A, Xiaohong Z, Schulz WS, Verger P, Johnston IG, et al. The State of Vaccine Confidence 2016: Global Insights Through a 67-Country Survey. *EBioMedicine*. 2016;1(12):295–301.
- [4] Rey D, Fressard L, Cortaredona S, Bocquier A, Gautier A, Peretti-Watel P, et al. Vaccine hesitancy in the French population in 2016, and its association with vaccine uptake and perceived vaccine risk–benefit balance. *Euro Surveill* [Internet]. 2018. Apr 26 [cited 2019 Oct 10];23(17). Available from: .
- [5] Verger P, Fressard L, Cortaredona S, Lévy-Bruhl D, Loulergue P, Galtier F, et al. Trends in seasonal influenza vaccine coverage of target groups in France, 2006/07 to 2015/16: Impact of recommendations and 2009 influenza A(H1N1) pandemic. *Eurosurveillance* [Internet]. 2018 Nov 29 [cited 2018 Nov 30];23(48). Available from: <https://www.eurosurveillance.org/content/10.2807/1560-7917.ES.2018.23.48.1700801>.
- [6] Holman DM, Benard V, Roland KB, Watson M, Liddon N, Stokley S. Barriers to Human Papillomavirus Vaccination Among US Adolescents. *JAMA Pediatr*. 2014;168(1):76–82.
- [7] Ward JK, Crépin L, Bauquier C, Vergelys C, Bocquier A, Verger P, et al. ‘I don’t know if I’m making the right decision’: French mothers and HPV vaccination in a context of controversy. *Health, Risk & Society*. 2017 Feb 17;19(1–2):38–57.
- [8] Gilkey MB, Calo WA, Moss JL, Shah PD, Marciniak MW, Brewer NT. Provider communication and HPV vaccination: The impact of recommendation quality. *Vaccine*. 2016;34(9):1187–92.
- [9] Collange F, Fressard L, Pulcini C, Sebbah R, Peretti-Watel P, Verger P. General practitioners’ attitudes and behaviors toward HPV vaccination: A French national survey. *Vaccine*. 2016;34(6):762–8.
- [10] Rosen BL, Shepard A, Kahn JA. US Health Care Clinicians’ Knowledge, Attitudes, and Practices Regarding Human Papillomavirus Vaccination: A Qualitative Systematic Review. *Acad Pediatr*. 2018;18(2S):S53–65.
- [11] Flick U. *The SAGE Handbook of Qualitative Data Analysis* [Internet]. London: SAGE Publications Ltd; 2014. Available from: <https://methods.sagepub.com/book/the-sage-handbook-of-qualitative-data-analysis>.
- [12] Deterding NM, Waters MC. Flexible Coding of In-depth Interviews: A Twenty-first-century Approach. *Sociological Methods & Research*. 2018 Oct 1;0049124118799377.
- [13] Wilson RJL, Vergelys C, Ward J, Peretti-Watel P, Verger P. Vaccine hesitancy among general practitioners in Southern France and their reluctant trust in the health authorities. *Int J Qual Stud Health Well-being*. 2020;15(1):1757336.
- [14] Raude J, Fressard L, Gautier A, Pulcini C, Peretti-Watel P, Verger P. Opening the ‘Vaccine Hesitancy’ black box: how trust in institutions affects French GPs’ vaccination practices. *Expert Review of Vaccines*. 2016 Jul 2;15(7):937–48.

- [15] Peretti-Watel P, Ward JK, Vergelys C, Bocquier A, Raude J, Verger P. "I Think I Made The Right Decision I Hope I'm Not Wrong". Vaccine hesitancy, commitment and trust among parents of young children. *Sociol Health Illn* 2019;41(6):1192–206.
- [16] Bloy G, Schweyer F-X. *Singuliers Généralistes. Sociologie de la médecine générale*. [Internet]. Paris: Presses de l'EHESP; 2010 [cited 2020 Mar 20]. Available from: <http://journals.openedition.org/amades/1114>.
- [17] Schwarzsinger M, Verger P, Guerville M-A, Aubry C, Rolland S, Obadia Y, et al. Positive attitudes of French general practitioners towards A/H1N1 influenza-pandemic vaccination: A missed opportunity to increase vaccination uptakes in the general public? *Vaccine* 2010;28(15):2743–8.
- [18] Bird CE, Conrad P, Fremont AM. *Handbook of Medical Sociology, Sixth Edition* [Internet]. Vanderbilt University Press; 2010 [cited 2020 Mar 23]. Available from:..
- [19] Ong LM, de Haes JC, Hoos A, Lammes FB. Doctor-patient communication: a review of the literature. *Soc Sci Med* 1995;40(7):903–18.
- [20] Emanuel EJ, Emanuel LL. Four models of the physician-patient relationship. *JAMA* 1992;267(16):2221–6.
- [21] Henry MS. Uncertainty, responsibility, and the evolution of the physician/patient relationship. *J Med Ethics* 2006;32(6):321–3.
- [22] Corbin J, Strauss A. Managing chronic illness at home: Three lines of work. *Qual Sociol* 1985;8(3):224–47.
- [23] Bloy G. L'incertitude en médecine générale : sources, formes et accommodements possibles. *Sciences sociales et santé*. 2008;26(1):67–92.
- [24] Hudson SM, Rondinelli J, Glenn BA, Preciado M, Chao C. Human papillomavirus vaccine series completion: Qualitative information from providers within an integrated healthcare organization. *Vaccine*. 2016;34(30):3515–21.
- [25] Tissot AM, Zimet GD, Rosenthal SL, Bernstein DI, Wetzel C, Kahn JA. Effective Strategies for HPV Vaccine Delivery: The Views of Pediatricians. *J Adolesc Health*. 2007;41(2):119–25.
- [26] Kernéis S, Jacquet C, Bannay A, May T, Launay O, Verger P, et al. Vaccine Education of Medical Students: A Nationwide Cross-sectional Survey. *Am J Prev Med* 2017 Sep 1;53(3):e97–e104.
- [27] Dumesnil H, Apostolidis T, Verger P. Opinions of general practitioners about psychotherapy and their relationships with mental health professionals in the management of major depression: A qualitative survey. *PLoS ONE* 2018;13(1): e0190565.
- [28] Peretti-Watel P, Larson HJ, Ward JK, Schulz WS, Verger P. Vaccine Hesitancy: Clarifying a Theoretical Framework for an Ambiguous Notion. *PLoS Curr* [Internet]. 2015. Feb 25 [cited 2019 Oct 10];7. Available from:..
- [29] Leung SOA, Akinwunmi B, Elias KM, Feldman S. Educating healthcare providers to increase Human Papillomavirus (HPV) vaccination rates: A Qualitative Systematic Review. *Vaccine X*. 2019 Dec;10(3):100037.
- [30] Randall S, Leask J, Robinson P, Danchin M, Kinnersley P, Witteman H, et al. Underpinning of the sharing knowledge about immunisation (SKAI) communication approach: A qualitative study using recorded observations. *Patient Educ Couns* 2020;103(6):1118–24.
- [31] Gagneur A, Battista M-C, Boucher FD, Tapiero B, Quach C, Wals PD, et al. Promoting vaccination in maternity wards — motivational interview technique reduces hesitancy and enhances intention to vaccinate, results from a multicentre non-controlled pre- and post-intervention RCT-nested study, Quebec, March 2014 to February 2015. *Eurosurveillance*. 2019 Sep 5;24(36):1800641.