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"We have so much information that we can get lost in it": A Mixed-Methods Study on Parents' Vaccination Information Seeking, Satisfaction with, and Trust in Medical Providers in Switzerland

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Abbreviations: Complementary and alternative medicine (CAM); Vaccine hesitancy (VH); Parent Attitudes about Childhood Vaccines (PACV).

Keywords
Vaccine Hesitancy; Information Sources; Provider; Satisfaction; Trust

What is already known on this topic:
Medical providers, personal networks and the Internet are trusted vaccination information sources and have large influences on parents' vaccination decisions.

What this study adds:
In Switzerland, where complementary and alternative medicine (CAM) is popular, little research has examined parents' vaccination decision-making process. Our findings suggest that VH parents seek out a variety of information sources and providers due to dissatisfaction with and distrust in previously obtained information. Since doctors are parents' most trusted source of vaccination information, it is important for doctors to create trusting environments where parents' vaccination questions and concerns are taken seriously and can be met with satisfaction.

Abstract

Objectives

The aim of this study was to better understand parents' information seeking behaviors, information sources, and interactions with their providers regarding childhood vaccines.

Setting

The study was part of a Swiss national research program investigating vaccine hesitancy and underimmunization.

Participants

We conducted qualitative interviews with 37 providers and 30 parents and observed 34 vaccination consultations. We then conducted quantitative surveys with 130 providers (both CAM- and biomedically oriented) and 1390 parents.

Main outcome measures

We focused on participants' vaccination information sources used in their decision-making process, as well as parents' trust in and satisfaction with these source and providers.

Results

Based on the Parent Attitudes about Childhood Vaccines (PACV) scale, we considered 889 parents as non-vaccine-hesitant (non-VH) and 501 parents as vaccine-hesitant (VH). Whereas both groups cited providers as the most trusted source of information, non-VH-parents were more likely to cite pediatricians (N=755[85%] vs N=358[71%]) and public health authorities (N=333[37%] vs. N=101[20%]) than VH-parents. VH-parents were more likely to have consulted another provider (N=196[39%] vs. N=173[19%]) than non-VH-parents, to express less satisfaction with both their primary (N=342[82%] vs. N=586[91%]) and other providers (N=82[42%] vs. N=142[82%]), and less trust in their primary (N=368[88%] vs. N=632[98%]) and other providers (N=108[55%] vs. N=146[84%]). VH-parents were less likely to be satisfied with their biomedical primary provider than non-VH-parents (100[69%] vs. 467[91%]). However, when the primary provider was CAM-oriented, there were similar

levels of satisfaction among both groups (237[89%] VH-parents vs. 118[89%] non-VH-parents). All differences were significant ($p<0.05$).

Conclusions

Pediatricians were parents' most trusted information source. VH-parents were more likely to turn to additional sources and less likely to be satisfied with their providers. (Dis)satisfaction and (dis)trust played significant roles in parents' vaccination decision-making.

Registry

The local ethics committee (Ethikkommission Nordwest- und Zentralschweiz, EKNZ; project ID number 2017– 00725) approved the study.

Strengths and weaknesses of the study

Strengths	Limitations
The mixed-methods study design brought added value to our study, as we could address qualitatively documented phenomena and then systematically analyze them on a larger scale.	The quantitative survey was not administered to a random sample.
Our recruitment strategy explicitly oversampled CAM providers and parents consulting them, which allowed us to compare the patient-provider relationship and patient-provider vaccine perspectives for parents seeing CAM vs. biomedical providers.	Our provider sample was recruited through personal contacts and snowball sampling
We consider the transdisciplinary research to be a distinct advantage [1].	

1. Introduction

The growing body of literature on vaccine hesitancy (VH) points to the multifaceted and complex nature of vaccination decision-making [2, 3]. Most parents – whether vaccine-accepting or VH – obtain their vaccine information primarily from healthcare professionals, with the most commonly cited source being pediatricians, followed by other healthcare professionals, such as midwives, nurses, and other therapists [4, 5, 6]. As healthcare providers are the main source of information for parental decision-making, issues around satisfaction

with and trust in the provider are likely to be important. Previous research has shown how trusting relationships between patients and providers are determinative in parents' vaccination decision-making, meaning that parents who trust their providers tend to trust their vaccination recommendations [7, 8, 9]. In Switzerland, *complementary and alternative medicine (CAM)* is widely used and integrated into the healthcare system [10, 11]. Particularly in primary healthcare for children, CAM is mainly provided by biomedically trained physicians with additional CAM training in the sense of integrative medicine [12]. Researchers have established associations between VH and CAM use [7, 13, 14], and even suggested that CAM providers and VH parents have a "symbiotic" relationship, meaning that "VH and CAM exist and function separately, but when combined, provide each other with 'resources' that enable them to thrive together" [13, p. 111]. Others have shown that VH individuals have lower levels of trust in biomedicine than in CAM [13, 15].

In addition to medical providers, sources of vaccination information include parents' social networks, with similar views and norms being shared within networks. Generally, parents with people in their networks who vaccinate less are also less likely to vaccinate [16, 17]. Social media and the Internet offer platforms for the dissemination of information and thus serve as popular vaccination information sources [18, 19]. Testimonies of (negative) experiences during and after vaccination or the usage of forums are believed to be particularly appealing to parents seeking vaccination information [20, 21]. In terms of vaccination information and advice seeking, the Internet, especially social media platforms, has its own complexities and dynamics that are the subject of intense study and research [22]. In the last two decades, patient-provider dynamics have partially changed from the former *doctor-provides-patient* to today's *users-provide-users* (i.e., patients no longer obtain their information only from the doctors who treat them, but doctors as well as lay people frequently disseminate information about health and illness on the Internet, which is available to all other users), with health-information seeking audiences being potentially far larger, and everyone

with Internet access being capable of disseminating information [20, 23]. This context is further complicated with negative, emotion-focused, and often untrue vaccination information being difficult to debunk with medical facts [21].

A commonly cited explanation for VH, both in scientific and public discourses, is based on the *knowledge deficit model*, which implies that VH individuals lack the necessary information to make the "rational choice", which, from public health and biomedical perspectives, would be to vaccinate [24]. Some researchers, finding support in the knowledge deficit model, have turned to considerations of *health literacy*, which "[…] entails people's knowledge, motivation and competences to access, understand, appraise, and apply health information in order to make judgements and take decisions […]" [25, p. 1473]. Proponents of this concept point out that greater health literacy generally correlates with better self-reported health [26, 27]. Other researchers have called into question the presumption that VH can be explained by the knowledge deficit and health literacy models [28] and therefore the usefulness of education-only approaches to address VH, but rather suggested to address the personal and emotional level of the parents and discuss their experiences with vaccinations. [28, 29].

In this mixed-methods study, we studied how non-VH and VH parents seek information about vaccination and what information sources they rely on. Our results show how the parental decision-making process is driven by understandings of vaccination information and by (dis)satisfaction with and (dis)trust in vaccination information sources.

2. Material and methods

2.1. Study design and population

This study is part of a national transdisciplinary investigation into vaccination decision-making in Switzerland [30]. We employed a mixed-methods approach with *sequential exploratory design*, meaning that an initial qualitative component informed the design of a

subsequent quantitative stage [31]. First, we analyzed the qualitative results by identifying key areas that seemed to be of central importance. We then focused on these when compiling the quantitative questionnaires. The detailed analysis of qualitative and quantitative results was finally done in parallel by presenting a clustering of similar statements in the qualitative sector, followed by quantitative results showing similar dynamics on a larger scale. We interviewed parents throughout German, French and Italian-speaking Switzerland. At the time of the survey, the interviewed parent was ≥18 years of age and their child was 0-11 years old. We asked parents to provide us with a copy of their children's vaccination record.

2.2. Patient and public Involvement

Given the presumably large number of people who are not to be regarded as vaccine opponents but as vaccine hesitant, we meant to employ a specific focus on the path to decision-making with all the thought processes, worries and fears contained therein, as well as the influence of external information. During our qualitative research period, various starting points emerged that were worth investigating on a larger scale (in the quantitative sector). We recruited participating parents from a network of 86 biomedical and 44 CAM providers participating in the project. Participants who indicated they wished to receive the study results will receive notifications once results are published.

2.3. Qualitative data collection and analysis

We first conducted semi-structured in-depth interviews with parents from September 2017 to February 2018 and with biomedically-only trained doctors and providers (i.e., physicians or non-physician-providers) with additional CAM training from August 2017 to September 2018. Interviews aimed to better understand parents' vaccination decision-making processes and their interactions with health care providers. An interview guide was piloted and revisited iteratively for clarity. We also conducted ethnographic observations of vaccination consultations. Qualitative interviews were audio-recorded and transcribed verbatim. Interviews allowed us to gather background information about parents and their providers and

perspectives on vaccination. Vaccination consultation observations were documented in field journals and then subsequently written into narrative accounts. Qualitative data were analyzed by AUTHOR2 and AUTHOR4. Analysis of the qualitative interviews and observations were guided by the Framework Method [32] with support of MAXQDA software.

2.4. Quantitative data collection and analysis

For the study's quantitative component, we recruited parents in participating providers' offices. We refer to these providers as the "primary" providers. We administered a questionnaire to study participants which included the *Parent Attitudes about Childhood Vaccines (PACV)* survey instrument, a validated instrument that was designed by Opel and colleagues in order to identify VH parents [33, 34, 35]. The 2011 Opel-revised 15-item PACV [34] results in a score of 0-100 points. If a parent scores ≤49 points, they are considered non-VH; if they score ≥50 points, they are considered VH. Based upon the results of a study validating a 5-item version of the PACV in Switzerland with identical scoring [36], we opted for the shorter 5-item version for our analyses. The final questionnaire included PACV items, questions gathering sociodemographic information about the parents and the target child, and additional questions informed by our qualitative research, including questions on the parent-provider relationship and vaccination information sources. Surveys were conducted by telephone from January 2019 to April 2020 [30].

A key question posed to parents was "What are your most trusted information sources on vaccination?" in which we offered a series of pre-established response options (e.g., "Internet") and prompted participants to provide additional information through open-answer responses by asking about certain types of sources (e.g., "What websites?"). The number of sources mentioned by each participant was analyzed by coding and counting the reported sources, as well as the free-text answers.

We use descriptive statistics plus Pearson's Chi-squared and Wilcoxon Rank Sum tests to test whether observed differences between non-VH and VH parent participants are significant

at the $p<0.05$ level. Quantitative data analysis was performed by AUTHOR1 and AUTHOR3 using STATA software version 12.1 (Stata corporation, College Station TX). We personally read and reviewed the information sources cited by parents and, after consultation within the team, we decided to consider each source as critical or accepting of the official vaccination recommendations.

2.5. Ethical considerations

This study was conducted in compliance with the Swiss Federal Act on Research Involving Human Beings (Human Research Act) and the Declaration of Helsinki. The local ethics committee (Ethikkommission Nordwest- und Zentralschweiz, EKNZ; project ID number 2017– 00725) approved the study. We obtained written informed consent from each participant after the nature and possible consequences of the study had been fully explained. Pseudonyms are used for participants throughout. Direct quotes were translated from the original language of utterance (German, French) into English.

3. Results

3.1. Study population

For the qualitative study component, we conducted ethnographic observations of 34 pediatric vaccination consultations. We also conducted in-depth, face-to-face interviews with 30 parents and 37 providers. Among the provider-interviewees, 20 were biomedically oriented physicians and 17 were CAM-oriented providers, of which 15 were biomedically trained physicians with additional training in CAM, and 2 were non-physician CAM providers.

For the quantitative study component, we conducted telephone interviews with 1390 parents as well as 86 biomedically- and 44 CAM-oriented primary providers. 889 (64%) parents had a PACV score of ≤49, indicating non-VH, and 501 (36%) parents had a PACV score of ≥50, indicating VH. Parent characteristics are shown in **Table 1**. VH parents were

more likely to see a CAM-oriented primary provider than non-VH parents (307 [61%] vs. 183 [21%]; p<0.001).

Table 1. Characteristics of the quantitative study population

	All parents (N=1390)		*By PACV-score*				
			Non-VH parents (N=889)		*VH parents (N=501)*		
	N (%)		*N (%)*		*N (%)*		*P value*
Female Respondent	*1232*	*(89%)*	*798*	*(90)*	*434*	*(87)*	*0.141*[1]
Relationship to child							*0.095*[1]
Mother	*1228*	*(88)*	*797*	*(90)*	*431*	*(86)*	
Father	*155*	*(11)*	*89*	*(10)*	*66*	*(13)*	
Other	*7*	*(1)*	*3*	*(0)*	*4*	*(1)*	
Interviewee Age (Mean (SD))	*37.1*	*(6.27)*	*37*	*(6.16)*	*37.2*	*(6.46)*	*0.592*[2]
Born in Switzerland	*981*	*(71)*	*608*	*(68)*	*373*	*(74)*	*0.059*[1]
Parent's highest education							*<0.001*[1]
Low[3]	*272*	*(20)*	*188*	*(21)*	*84*	*(17)*	
Medium[4]	*321*	*(23)*	*209*	*(24)*	*112*	*(22)*	
Bachelors[5]	*285*	*(21)*	*163*	*(18)*	*122*	*(24)*	
Masters	*358*	*(26)*	*226*	*(25)*	*132*	*(26)*	
Doctorate	*105*	*(8)*	*81*	*(9)*	*24*	*(5)*	
Other, missing	*49*	*(4)*	*22*	*(2)*	*27*	*(5)*	
Household income							*<0.001*[1]
< 80,000 Swiss Francs (CHF)	*319*	*(23)*	*174*	*(20)*	*145*	*(29)*	
80,000 – 120,000 CHF	*384*	*(28)*	*225*	*(25)*	*159*	*(32)*	
> 120,000 CHF	*279*	*(20)*	*195*	*(22)*	*84*	*(17)*	
Missing, declined to respond	*408*	*(29)*	*295*	*(33)*	*113*	*(23)*	
Type of primary provider							*<0.001*[1]
Biomedical	*893*	*(64)*	*705*	*(79)*	*188*	*(38)*	
CAM	*490*	*(35)*	*183*	*(21)*	*307*	*(61)*	
Missing	*7*	*(1)*	*1*	*(0)*	*6*	*(1)*	

Note. [1]Pearson's Chi-squared and [2]Wilcoxon Rank Sum tests were used for statistical analysis. [3]Secondary school not completed, no completed professional education, completed 9 years of school without further education, apprenticeship, technical school or business school; [4]College, higher professional school; [5]Bachelor at University, primary school teacher seminar.

3.1 Variety of information sources on vaccination

During our qualitative interviews and observations of vaccination consultations, parents cited a broad array of vaccination information sources as part of their decision-making process. Many VH parents engaged in what we refer to as *information shopping*, which involves comparing and weighing different information sources in an attempt to reach certainty about the right vaccination decision to make for their children. For example, Mrs. Sandoz, a 35-year-old mother of a 13-month-old unvaccinated son explained her decision not to vaccinate (Pseudonyms are used for participants):

> "I think it was a mix of discussions with people close to us and with friends. […] There is my personal feeling about the matter. There is certainly the social influence

from my husband. I'll say that the decision surely came more from me than it did from him. I think I hold the decision closer to my heart than he does. I think it was kind of a vague questioning. There were some things I read on the Internet. I joined Facebook groups where they talk about it. I read some testimonies. I think when I was pregnant, I had a discussion with the [CAM] pediatrician in order to know the true risks that we were taking if we didn't vaccinate. I was looking for the most neutral point of view possible. […] For now, it's a decision that is in favor of not vaccinating."

Other VH parents explained how having multiple sources of information reassured them that they were taking the correct course of action for their families. The following example from Mr. and Mrs. Schmied, the parents of a 6-month-old unvaccinated baby demonstrates this idea (Pseudonyms are used for participants):

Mrs. Schmied: We also talked about [vaccination] with a friend who is a doctor. He gave us – really sweet – a little PowerPoint presentation at home.

Mr. Schmied: We were there for two hours. […]

Mrs. Schmied: Really nice. He really took his time and explained every single vaccination to us again: What it is for? What it is not for? […] What side effects there can be? […] That was again very helpful [for decision-making]. […]

Mr. Schmied: Then we cancelled [the vaccination appointment] five minutes before. […]

Mrs. Schmied: Because I realized, "No, we can't really stand behind [the decision of vaccinating our child]." Then we actually cancelled [the appointment] and haven't made a new one since then.

Mr. Schmied: Yes. But at least we now know, what we…

Mrs. Schmied: What we want.

Qualitative results additionally shed light on parents, often VH parents, having consulted a multitude of sources that varied in both format and content. Parents described how each piece

of information could temporarily solidify their opinion, but also raise further doubts and uncertainties. Mrs. Sandoz explained (Pseudonyms are used for participants):

> "We have a lot of doubts around the benefits of vaccines. My husband and I are still reading about it and continue to have discussions and thinking about it in order to be comfortable. But we're not sure that the benefits are large enough, compared to what vaccines contain. […] For us, in the society we live in, we don't have the impression that the risk is sufficient enough, for now, to vaccinate our son. […] And finding the right information is difficult, which is probably linked to our information society. We have so much information that we can get lost in it. […] Up until now, everything that I've read and the discussions that I've had have reinforced our decision to not vaccinate our son."

These observations support information seeking as an important characteristic of VH parents and stand in contrast to the underlying assumptions of the knowledge deficit model that VH persons make vaccination decisions based on a lack of information. VH parents described how a multitude of information sources could be both a source of reassurance and of hesitancy in their quest for neutral information about vaccination. We therefore investigated the potential association of VH with the number and trustworthiness of parents' vaccination information sources by including the question "What are your most trusted information sources on vaccination?" in the quantitative questionnaire.

Figure 1 illustrates how the number of trusted information sources varies between non-VH and VH parents. VH parents reported using more sources on average than non-VH parents (2.98 [SD=2.02] vs. 2.70 [SD=1.83]). While small, the difference was significant (p=0.012).

[Figure 1]

3.2 Types of information sources and media

Based on our initial qualitative research, we generated a preliminary list of information source types which we then included in the quantitative questionnaire. Commonly mentioned information sources included the child's doctor and other providers, family, friends and acquaintances, official public health recommendations, print media, such as books or newspaper articles, the Internet, and social media.

In **Table 2** we list the trusted vaccination information sources cited most by parents. The child's doctor was the information source cited most (1113 [80%] parents) by both non-VH and VH parents, but non-VH parents were more likely to report the child's doctor as the most trusted source than VH parents (755 [85%] vs. 358 [71%]; p<0.001). Non-VH parents were also more likely to report public health authorities as a trusted information source than VH parents (333 [37%] vs. 101 [20%]; p<0.001), as well as information materials that are consistent with the official vaccination recommendation (74 [8%] vs. 26 [5%]; p=0.03).

In contrast, VH parents tended to mention information sources other than the child's doctor or public health authorities more than non-VH parents, including social networks (215 [43%] vs. 253 [28%]; p<0.001), other health care workers (105 [21%] vs. 119 [13%]; p<0.001) and their personal gut feelings or experiences (16 [3%] vs. 10 |1%]; p=0.006). The largest difference we identified involved information materials, such as books, online or print magazines, and websites that are critical of official vaccination recommendations (105 VH parents [21%] vs. 4 non-VH parents [0%]; p<0.001), and materials of obvious CAM nature (12 VH parents [2%] vs. 0 non-VH parents [0%]; p<0.001).

Table 2. Types of trusted vaccination information sources.

	All parents (N=1390)	*By PACV-score*		
		Non-VH parents (N=889)	*VH parents (N=501)*	
	N (%)	*N (%)*	*N (%)*	*P value*
My child's doctor	*1113 (80)*	*755 (85)*	*358 (71)*	*<0.001*
Social networks[1]	*468 (34)*	*253 (28)*	*215 (43)*	*<0.001*
Public Health Authorities	*434 (31)*	*333 (37)*	*101 (20)*	*<0.001*
Other health care workers	*224 (16)*	*119 (13)*	*105 (21)*	*<0.001*
Other physician	*195 (14)*	*111 (12)*	*84 (17)*	*0.027*
CAM	*19 (1)*	*3 (0)*	*16 (3)*	*<0.001*

Homeopathic	*12*	*(1)*	*2*	*(0)*	*10*	*(2)*	*0.001*
Midwife	*13*	*(1)*	*4*	*(0)*	*9*	*(2)*	*0.268*
Materials that are critical of public health vaccination recommendation[2]	*109*	*(8)*	*4*	*(0)*	*105*	*(21)*	*<0.001*
"Foundation for consumer protection"	*22*	*(2)*	*3*	*(0)*	*19*	*(4)*	*<0.001*
Hirte: "Impfen Pro & Contra"	*15*	*(1)*	*0*	*(0)*	*15*	*(3)*	*<0.001*
Explicitly CAM materials	*12*	*(1)*	*0*	*(0)*	*12*	*(2)*	*<0.001*
Berthoud: "Qui aime bien vaccine peu"	*9*	*(1)*	*0*	*(0)*	*9*	*(2)*	*<0.001*
Glöckler/Goebel/Michael: "Kindersprechstunde"	*6*	*(0)*	*0*	*(0)*	*6*	*(1)*	*0.001*
"www.impfo.ch"	*5*	*(0)*	*2*	*(0)*	*3*	*(1)*	*0.264*
Materials that are consistent with public health vaccination recommendation[2]	*100*	*(7)*	*74*	*(8)*	*26*	*(5)*	*0.030*
"www.swissmom.ch"	*20*	*(1)*	*16*	*(2)*	*4*	*(1)*	*0.132*
"Wir Eltern"	*8*	*(1)*	*7*	*(1)*	*1*	*(0)*	*0.164*
"Beobachter"	*6*	*(0)*	*2*	*(0)*	*4*	*(1)*	*0.117*
"Puls"	*6*	*(0)*	*4*	*(0)*	*2*	*(0)*	*0.890*
Google	*98*	*(7)*	*78*	*(9)*	*20*	*(4)*	*0.001*
Scientific literature[4]	*55*	*(4)*	*37*	*(4)*	*18*	*(4)*	*0.601*
No source, missing, don't know, don't want to disclose	*49*	*(4)*	*26*	*(3)*	*23*	*(5)*	*0.106*
Medical work experience[3]	*42*	*(3)*	*30*	*(3)*	*12*	*(2)*	*0.306*
Nurse	*8*	*(1)*	*6*	*(1)*	*2*	*(0)*	*0.514*
News	*31*	*(2)*	*22*	*(2)*	*9*	*(2)*	*0.411*
Personal experience, gut feeling	*26*	*(2)*	*10*	*(1)*	*16*	*(3)*	*0.006*
Described as neutral	*9*	*(1)*	*0*	*(0)*	*9*	*(2)*	*<0.001*

Note. [1]Family, friends, and acquaintances; [2]Print media, websites, organizations, TV programs, and films that are critical of or consistent with public health vaccination recommendations based on our detailed assessment and on consensus among research team members; [3]Medical, biological, or pharmaceutical training or work experience of the interviewee or the other parent of the target child; [4]As stated by the interviewee. Pearson's Chi-squared tests were used for statistical analysis.

In **Table 3,** we list where parents reported having obtained trusted information about vaccination. We list all information channels reported by at least 5 parents. The Internet was considered the most trustworthy medium by non-VH parents and VH parents in similar proportions (299 [34%] vs. 176 [35%]; p=0.572). However, VH parents cited print media as their most trusted medium of vaccination information more frequently than non-VH parents (237 [47%] vs. 176 [20%]; p<0.001), including books and brochures (129 [26%] vs. 63 [7%]; p<0.001). With regards to specific internet sources, non-VH parents were more likely to report Google than VH parents (78 [9%] vs. 20 [4%]; p=0.001) as a trusted medium for vaccination information. VH parents were more likely than non-VH parents to cite social media (26 [5%] vs. 21 [2%]; p=0.005), although overall few parents in either group cited this as a trusted information source.

Table 3. Types of trusted media for vaccination information

	All parents		*By PACV-score*			

	(N=1390)	Non-VH parents (N=889)	VH parents (N=501)	
	N (%)	N (%)	N (%)	P value
Internet	475 (34)	299 (34)	176 (35)	0.572
Google	98 (7)	78 (9)	20 (4)	0.001
Social media	47 (3)	21 (2)	26 (5)	0.005
Facebook	17 (1)	7 (1)	10 (2)	0.490
Print media	413 (30)	176 (20)	237 (47)	<0.001
Books and brochures	192 (14)	63 (7)	129 (26)	<0.001
Magazine and newspapers	60 (4)	42 (5)	18 (4)	0.319
TV	67 (5)	37 (4)	30 (6)	0.127
Films	13 (1)	1 (0)	12 (2)	<0.001
Conferences	9 (1)	2 (0)	7 (1)	0.150

Note. Pearson's Chi-squared tests were used for statistical analysis.

3.3 Satisfaction with and trust in the primary provider

Our results suggest that more VH parents than non-VH parents consulted providers other than the child's primary provider when making vaccination decisions. We therefore explored whether this information seeking behavior is related to issues of (dis)satisfaction with and (dis)trust in the primary provider.

Figure 2 and **Supplementary Table S1** show how VH parents were more likely to have discussed vaccination with their primary provider than non-VH parents (418 [83%] vs. 645 [73%]; p<0.001). VH parents were less likely to be satisfied with and to trust their primary provider than non-VH parents (satisfaction: 342 [82%] vs. 586 [91%]; trust: 368 [88%] vs. 632 [98%]; p<0.001 for both satisfaction and trust). When their primary provider was biomedically oriented, this difference was even more notable (satisfaction: 100 [69%] vs. 467 [91%]; trust: 120 [83%] vs. 503 [98%]; p<0.001 for both satisfaction and trust). In contrast, when the primary provider was CAM-oriented, there was no significant difference in satisfaction and trust for VH and non-VH parents (satisfaction: 237 [89%] vs. 118 [89%]; trust: 243 [91%] vs. 128 [96%]; p=0.395 and p=0.164, respectively).

To evaluate issues of (dis)satisfaction and (dis)trust, we analyzed parents' responses regarding perceived agreement between their own vaccination view and their primary provider's view. VH parents reported significantly lower agreement between their own

vaccination view and their child's doctor perceived view than non-VH parents (271 [65%] vs. 567 [88%]; p<0.001). The gap between parent and provider views was larger when the primary provider was biomedically oriented (79 [54%] VH parents vs. 449 [88%] non-VH parents; p<0.001) and smaller when the primary provider was CAM-oriented (188 [70%] VH parents vs. 117 [88%] non-VH parents; p=0.001).

[Figure 2]

3.4 Seeking multiple provider opinions on vaccination

Given the important role children's doctors play in influencing parents' vaccination decisions, we further explored a phenomenon that our initial qualitative work brought to light – parents consulting with and/or switching from one to another provider, often to one offering CAM services, in response to issues arising during vaccination consultations, a phenomenon we call "provider browsing". The following conversation with Mrs. Kugler, a 37-year-old mother of one partially vaccinated child, illustrates this behavior (Pseudonyms are used for participants):

> *Researcher*: Ok. I've already seen in the vaccination booklet, there are two or three different doctors that you consult. Do you prefer to see a biomedical provider?
>
> *Mother*: Well, we actually tend to go to the homeopath. […]. She's always a little, "I told you so," after every vaccination. But she tolerates it. It takes her two or three weeks until she gets well enough to be neutral towards us again [laughing]. Because we do vaccinate. And [the homeopath] is the one who treats [our daughter] when she's sick. […]. And if we needed a diagnosis, for example, if I wasn't sure whether it was otitis media or something like that, I used to go see [the local pediatrician]. […]. He is a classic [biomedical] Algifor-Dafalgan [commonly prescribed pain killers in Switzerland, containing ibuprofen and paracetamol, respectively] doctor.

Researcher: Ok. Purely conventional biomedical?

Mother: Yes, […]. At every diagnosis. In winter, [my daughter] was very sick again with an extremely high temperature. Again, the remedy was Algifor. The doctor added, 'We should start vaccinating soon. […]. It's a classic fever. We can easily vaccinate. It's not too bad at this age.' […] I felt we were no longer in good hands and switched to Dr. Heffelfinger [provider with additional training in anthroposophical medicine].

Qualitative analysis of provider browsing suggested that parents were seeking health care providers who were willing to listen to and understand parents' rationales around vaccination and their adherence to complementary and alternative approaches to medicine.

Table 4 reports quantitative analysis of this phenomenon showing that more VH parents than non-VH parents reported consulting with a provider other than the primary provider for vaccination questions (196 [39%] vs. 173 [19%]; p<0.001). We specifically asked questions about parents' motivations for consulting with another provider. More VH parents than non-VH parents cited seeking a second opinion or having a disagreement as the reason for consulting with another provider (87 [17%] vs. 38 [4%]; p<0.001). Logistical reasons (e.g., parents moved, or provider stopped working) were mentioned with similar frequency (43 [9%] among VH parents vs. 68 [8%] among non-VH parents; p=0.537).

Interestingly, among parents who had asked another provider about vaccination, about half as many VH parents as non-VH parents reported satisfaction with and trust in the other provider (satisfaction: 82 [42%] vs. 142 [82%]; trust: 108 [55%] vs. 146 [84%]; p<0.001 for both satisfaction and trust).

Table 4. Parents having consulted another doctor about vaccination.

	All parents (N=1390)	*By PACV-score*		
		Non-VH parents (N=889)	*VH parents (N=501)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Consulted another doctor				*<0.001*
No	*1012 (73)*	*712 (80)*	*300 (60)*	
Yes	*369 (27)*	*173 (19)*	*196 (39)*	

Missing	*9*	*(1)*	*4*	*(0)*	*5*	*(1)*	
Reason for consultation							*<0.001*
Second opinion or disagreement	*125*	*(9)*	*38*	*(4)*	*87*	*(17)*	
Moved or stopped working	*111*	*(8)*	*68*	*(8)*	*43*	*(9)*	
Other	*130*	*(9)*	*64*	*(7)*	*66*	*(13)*	
Missing	*3*	*(0)*	*3*	*(0)*	*0*	*(0)*	
Parents with a biomedical primary doctor	*Total sample (N=893)*		*By PACV-score*				
			Non-VH parents (N=705)		*VH parents (N=188)*		
	N (%)		*N (%)*		*N (%)*		*P value*
Consulted another doctor							*0.002*
No	*703*	*(79)*	*572*	*(81)*	*131*	*(70)*	
Yes	*183*	*(20)*	*129*	*(18)*	*54*	*(29)*	
Missing	*7*	*(1)*	*4*	*(1)*	*3*	*(2)*	
Reason for consultation							*0.134*
Second opinion or disagreement	*46*	*(5)*	*27*	*(4)*	*19*	*(10)*	
Moved or stopped working	*71*	*(8)*	*55*	*(8)*	*16*	*(9)*	
Other	*64*	*(7)*	*45*	*(6)*	*19*	*(10)*	
Missing	*2*	*(0)*	*2*	*(0)*	*0*	*(0)*	
Parents with a CAM primary doctor	*Total sample (N=490)*		*By PACV-score*				
			Non-VH parents (N=183)		*VH parents (N=307)*		
	N (%)		*N (%)*		*N (%)*		*P value*
Consulted another doctor							*<0.001*
No	*308*	*(63)*	*140*	*(77)*	*168*	*(55)*	
Yes	*180*	*(37)*	*43*	*(23)*	*137*	*(45)*	
Missing	*2*	*(0)*	*0*	*(0)*	*2*	*(1)*	
Reason for consultation							*0.014*
Second opinion or disagreement	*75*	*(15)*	*10*	*(5)*	*65*	*(21)*	
Moved or stopped working	*40*	*(8)*	*13*	*(7)*	*27*	*(9)*	
Other	*64*	*(13)*	*19*	*(10)*	*45*	*(15)*	
Missing	*1*	*(0)*	*1*	*(1)*	*0*	*(0)*	
All parents having consulted another doctor before	*Total sample (N=369)*		*By PACV-score*				
			Non-VH parents (N=173)		*VH parents (N=196)*		
	N (%)		*N (%)*		*N (%)*		*P value*
Satisfied[1] with other doctor	*224*	*(61)*	*142*	*(82)*	*82*	*(42)*	*<0.001*
Trust[3] other doctor	*254*	*(69)*	*146*	*(84)*	*108*	*(55)*	*<0.001*

Note. [1]Satisfied or very satisfied; [2]Somewhat or not at all satisfied; [3]Somewhat or completely. Pearson's Chi-squared tests were used for statistical analysis.

Given that VH parents report higher satisfaction and trust in CAM-oriented providers, we investigated whether provider browsing varied by type of primary provider (i.e., biomedical or CAM orientation). Among parents with biomedically oriented primary providers, more VH parents than non-VH parents engaged in provider browsing (54 [29%] vs. 129 [18%]; p=0.002). However, this difference was even starker among parents with CAM-oriented primary providers (137 [45%] of VH parents vs. 43 [23%] of non-VH parents; p<0.001).

4. Discussion

4.1. Principal findings

Our mixed-methods study has three main findings. First, our results confirm previous research showing that children's doctors are parents' most important vaccination information [4, 5, 6, 37]. Similarly, VH participants were more likely to turn to additional information sources, including their social networks, books, and other materials critical of official vaccination recommendations [5, 16, 17]. More VH parents than non-VH parents cited print media as a trusted information source. To our knowledge, this has not been reported on previously.

Second, VH parents expressed lower levels of satisfaction with and trust in their primary provider, particularly biomedically-oriented physicians. This finding is likely associated with our third main finding showing that VH parents engaged more in provider browsing than non-VH parents. Nevertheless, VH parents reported lower levels of satisfaction with and trust in these other providers. VH parents were more also likely to consult with CAM-oriented primary providers and to have higher levels of satisfaction with and trust in CAM than in biomedical providers. Interestingly, the phenomenon of VH parents having consulted with other providers about vaccination occurred more when the primary provider was CAM-oriented.

Previous research suggests that the relationship between VH and CAM use is not fully explained by VH individuals' trust in CAM services, but rather by distrust in biomedicine [15]. Accordingly, the VH parents in our sample may have been more likely to be pushed away from biomedicine than pulled toward CAM. While the behavior of information shopping and low trust in medical providers [9, 38] have been documented in previous research as characteristics of VH parents [39], VH parents' consultations with multiple providers about vaccination has, to our knowledge, not extensively been studied.

Our results suggest that VH parents' information seeking behaviors are likely an expression of dissatisfaction and distrust. We argue that individuals who are exposed to a variety of information [40], via the Internet [41, 42] or their social networks [17], are likely to harbor concerns or doubts about official vaccination recommendations. Our qualitative data suggest that these doubts may lead VH parents to seek information from additional sources, by consulting a different doctor or reading additional information materials. Reflecting previous findings [38], several parents described how persistent or novel doubts, uncertainty, or dissatisfaction surfaced when they were exposed to new vaccination information.

4.2. Strengths and weaknesses in relation to other studies

Our results allow us to question the assumptions of the knowledge deficit and health literacy models [28]. Previous research has already found a link between VH and high levels of health literacy [43], suggesting that informative/educational-only approaches are likely ineffective for addressing VH [44, 45]. Our findings suggest that the knowledge deficit and health literacy models, claiming that VH individuals are hesitant because they lack information, are insufficient to explain VH. Rather, VH participants displayed more information seeking behavior than non-VH parents.

4.3. Meaning of the study

Our results suggest potential intervention possibilities for addressing VH. An education-only approach to teaching VH parents about childhood immunizations is likely to be insufficient and perhaps even misguided. In effect, the VH participants in this study did not lack information. Rather, they showed less trust in and usage of public health vaccination recommendations, indicating that public health officials should engage in efforts to earn public trust as a legitimate source of vaccination information. Since doctors are parents' most trusted source of vaccination information, and dissatisfaction and distrust may push parents away from vaccination, it is important for doctors to create trusting environments where

parents' vaccination questions and concerns are taken seriously and can be met with satisfaction.

4.4. Unanswered questions and future research

Given that parental distrust and dissatisfaction is a major contributor to their VH, it should be investigated why VH parents come to distrust doctors.

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Transparency declaration

The manuscript is an honest, accurate, and transparent account of the study being reported; no important aspects of the study have been omitted.

Contributors

SE and MD co-drafted the manuscript. SE and KJ focused on the quantitative components and MD and AB focused on the qualitative components. SM provided valuable feedback during the writing process. BH, BW and DK gave rich insight into CAM in Switzerland. BH and BW helped establishing the network of CAM providers and gave and insight into pediatrics in Switzerland. AB was part of the gathering of qualitative data and gave valuable

feedback during the writing process. RE, JP and JH gathered qualitative data. PT was the head of the entire project. He directed and supervised all operations from start to finish. He also provided important expertise on infectious diseases and internal medicine. All authors read and approved the final manuscript.

Data sharing

Raw data supporting the findings of this study are available from the corresponding author (PT) on request.

COI disclosure statement and competing interests

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: all authors had financial support from Swiss National Science Foundation [National research program NRP74, grant 407440_167398] and supplementary postdoctoral fellowship funding from the Nora van Meeuwen-Haefliger-Foundation for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Figure legends

Figure 1. Number of trusted vaccination information sources.

Note. Distribution of the number of trusted vaccination information sources. We divided parents into non-VH and VH according to PACV score < or ≥50. The median, mean (standard deviation) of information sources was; 2, 2.80 (1.90) for the entire study population (N=1390); 2, 2.70 (1.83) for the non-VH parents (N=889), and; 3, 2.98 (2.02) for the VH parents (N=501). Wilcoxon Rank Sum test was used for statistical analysis.

Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

Note. [1]Very satisfied or satisfied; [2]Completely or somewhat trust; [3]Completely or somewhat agree; Percentages refer to the total number of non-VH and VH parent participants; Pearson's Chi-squared tests were used for statistical analysis.

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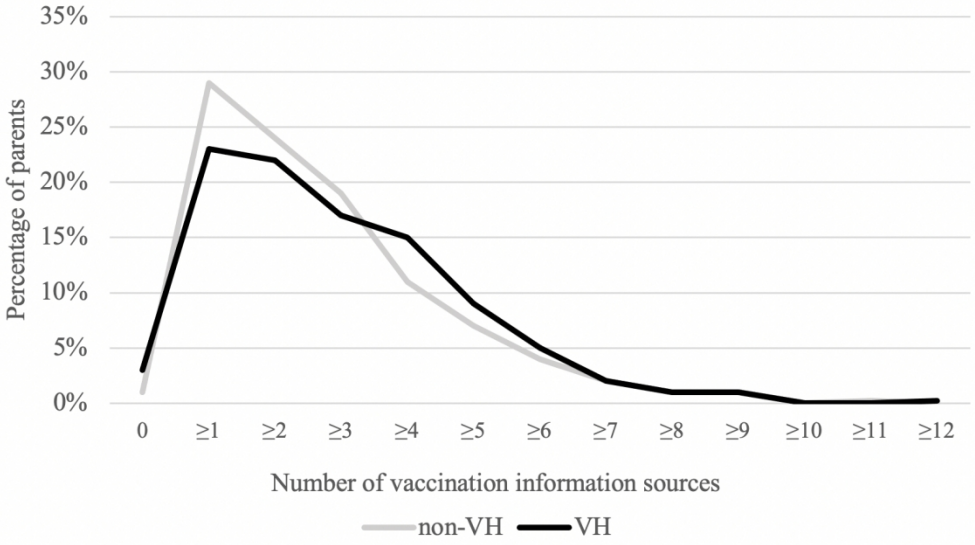
Figure 1. Number of trusted vaccination information sources.



Note. Distribution of the number of trusted vaccination information sources. We divided parents into non-VH and VH according to PACV score < or ≥50. The median, mean (standard deviation) of information sources was; 2, 2.80 (1.90) for the entire study population (N=1390); 2, 2.70 (1.83) for the non-VH parents (N=889), and; 3, 2.98 (2.02) for the VH parents (N=501). Wilcoxon Rank Sum test was used for statistical analysis.

Figure 1. Number of trusted vaccination information sources.

Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

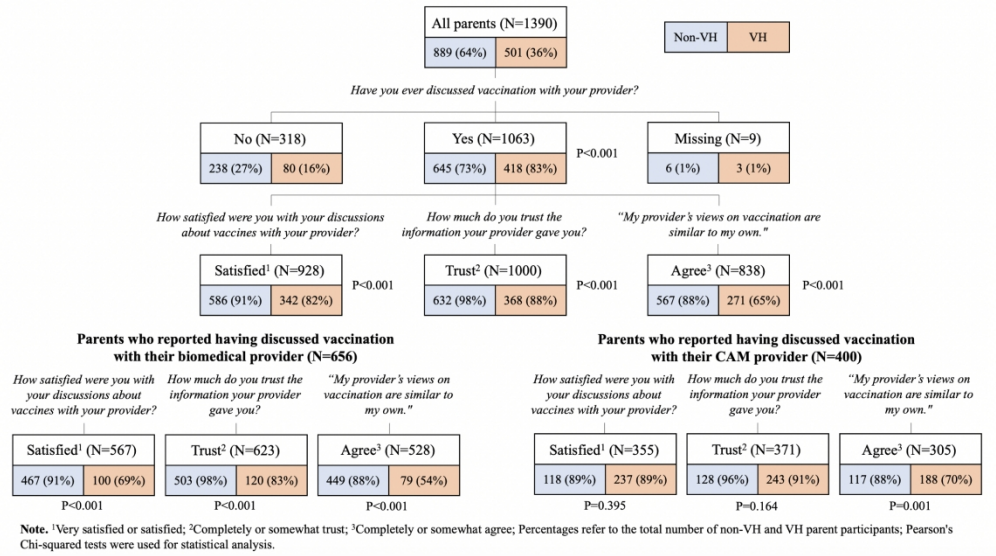


Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

Supplementary Table S1. Satisfaction with and trust in primary biomedically- and CAM-oriented providers.

	All parents (N=1390)	By PACV-score		
		Non-VH parents (N=889)	VH parents (N=501)	
	N (%)	N (%)	N (%)	P value
Type of primary provider				<0.001
Biomedical	893 (64)	705 (79)	188 (38)	
CAM	490 (35)	183 (21)	307 (61)	
Missing	7 (1)	1 (0)	6 (1)	
Discussed vaccines with primary provider				<0.001
No	318 (23)	238 (27)	80 (16)	
Yes	1063 (76)	645 (73)	418 (83)	
Missing	9 (1)	6 (1)	3 (1)	
Parents who reported having discussed vaccination with primary provider	Total sample (N=1063)	By PACV-score		
		Non-VH parents (N=645)	VH parents (N=418)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	928 (87)	586 (91)	342 (82)	<0.001
Trust provider[2]	1000 (94)	632 (98)	368 (88)	<0.001
Provider's views are similar to parents'[2]	838 (79)	567 (88)	271 (65)	<0.001
Parents who reported having discussed vaccination with biomedical primary provider	Total sample (N=656)	By PACV-score		
		Non-VH parents (N=511)	VH parents (N=145)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	567 (86)	467 (91)	100 (69)	<0.001
Trust provider[2]	623 (95)	503 (98)	120 (83)	<0.001
Provider's views are similar to parents'[2]	528 (80)	449 (88)	79 (54)	<0.001
Parents who reported having discussed vaccination with CAM primary provider	Total sample (N=400)	By PACV-score		
		Non-VH parents (N=133)	VH parents (N=267)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	355 (89)	118 (89)	237 (89)	0.395
Trust provider[2]	371 (93)	128 (96)	243 (91)	0.164
Provider's views are similar to parents'[2]	305 (76)	117 (88)	188 (70)	0.001
Parents reporting that primary providers' views are similar to their own[2]	Total sample (N=838)	By PACV-score		
		Non-VH parents (N=567)	VH parents (N=271)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	774 (92)	522 (92)	252 (93)	0.485
Trust provider[2]	820 (98)	560 (99)	260 (96)	0.004
Parents reporting that biomedical primary providers' views are similar to their own[2]	Total sample (N=528)	By PACV-score		
		Non-VH parents (N=449)	VH parents (N=79)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	479 (91)	413 (92)	66 (84)	0.081
Trust provider[2]	518 (98)	444 (99)	74 (94)	<0.001
Parents reporting that CAM primary providers' views are similar to their own[2]	Total sample (N=305)	By PACV-score		
		Non-VH parents (N=117)	VH parents (N=188)	
	N (%)	N (%)	N (%)	P value
Satisfied with provider[1]	290 (95)	108 (92)	182 (97)	0.141
Trust provider[2]	297 (97)	115 (98)	182 (97)	0.516

Note. [1]Satisfied/very satisfied; [2]Somewhat or completely; Pearson's Chi-squared tests were used for statistical analysis.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract yes (p. 1-2)	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale yes (p. 3-5)	2	Explain the scientific background and rationale for the investigation being reported
Objectives yes (p. 5)	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design yes (p. 6)	4	Present key elements of study design early in the paper
Setting yes (p. 6)	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants yes (p. 6-7)	6	Give the eligibility criteria, and the sources and methods of selection of participants
Variables yes (p. 6-8)	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement yes (p. 7-8)	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size yes (p. 8-9)	10	Explain how the study size was arrived at
Quantitative variables yes (p. 7)	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods yes (p. 7)	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants yes (p. 8-9)	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data yes (p. 8-9)	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results yes (p. 9-18)	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized

		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results **yes (p. 18-19)**	18	Summarise key results with reference to study objectives
Limitations **yes (p. 3)**	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation **yes (18-20)**	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability **yes (p. 3, 19-20)**	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding **yes (p. 20)**	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Parents' Vaccination Information Seeking, Satisfaction with, and Trust in Medical Providers in Switzerland: A Mixed-Methods Study

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Parents' Vaccination Information Seeking, Satisfaction with, and Trust in Medical Providers in Switzerland: A Mixed-Methods Study

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Word count: 4621 (without strengths and weaknesses), 4718 (with strengths and weaknesses)

Abbreviations: Complementary and alternative medicine (CAM); Vaccine hesitancy or vaccine hesitant (VH); Parent Attitudes about Childhood Vaccines (PACV).

Keywords
Vaccine Hesitancy; Information Sources; Provider; Satisfaction; Trust

What is already known on this topic:
Trust in the medical providers, who are the main source of vaccination information, is crucial for facing vaccine hesitancy (VH).

What this study adds:
In Switzerland, where complementary and alternative medicine (CAM) is popular, little research has examined parents' vaccination decision-making process. Our findings suggest that VH parents seek out a variety of information sources and providers due to dissatisfaction with and distrust in previously obtained information. Since doctors are parents' most trusted source of vaccination information, it is important for doctors to create trusting environments where parents' vaccination questions and concerns are taken seriously and can be met with satisfaction.

Abstract

Objectives

The aim of this study was to better understand parental trust in and satisfaction with information sources and medical providers regarding decision-making about childhood vaccines.

Setting

The study was part of a Swiss national research program investigating vaccine hesitancy and underimmunization.

Participants

We conducted qualitative interviews with 37 providers and 30 parents, observed 34 vaccination consultations, and then conducted quantitative surveys with 130 providers (both CAM- and biomedically oriented) and 1390 parents.

Main outcome measures

Participants' vaccination information sources used in their decision-making process, parents' trust in and satisfaction with these sources and providers.

Results

Based on the Parent Attitudes about Childhood Vaccines (PACV) scale, we considered 501 parents as vaccine-hesitant (VH) and 889 parents as non-vaccine-hesitant (non-VH). Whereas both groups mentioned providers as the most trusted source of information, VH-parents were less likely to mention pediatricians (N=358[71%] vs. N=755[85%]) and public health authorities (N=101[20%] vs. N=333[37%]) than non-VH-parents. VH-parents were more likely to have consulted another provider (N=196[39%] vs. N=173[19%]) than non-VH-parents, to express less satisfaction with both their primary (N=342[82%] vs. N=586[91%]) and other providers (N=82[42%] vs. N=142[82%]), and less trust in their primary (N=368[88%] vs. N=632[98%]) and other providers (N=108[55%] vs. N=146[84%]). VH-parents were less likely to be satisfied with their biomedical primary provider than non-VH-

parents (100[69%] vs. 467[91%]). However, when the primary provider was CAM-oriented, there were similar levels of satisfaction among both groups (237[89%] VH-parents vs. 118[89%] non-VH-parents). All differences were significant ($p<0.05$).

Conclusions

While the provider remains the main information source, VH parents turn to additional sources and providers, which is likely related to VH parents being rather dissatisfied with and distrusting in obtained information and their provider.

Registry

The local ethics committee (Ethikkommission Nordwest- und Zentralschweiz, EKNZ; project ID number 2017– 00725) approved the study.

Strengths and weaknesses of the study

Strengths	Limitations
The mixed-methods design brought added value to our study, as this allowed us to address qualitatively documented phenomena and then systematically analyze them on a larger scale.	The quantitative survey was not administered to a random sample.
Our recruitment strategy explicitly oversampled CAM providers and parents consulting them, which allowed us to compare the patient-provider relationship and patient-provider vaccine perspectives for parents seeing CAM vs. biomedical providers.	Our provider sample was recruited through personal contacts and snowball sampling
We consider the transdisciplinary research to be a distinct advantage.	

1. Introduction

The growing body of literature on vaccine hesitancy (VH) points to the multifaceted and complex nature of vaccination decision-making [1, 2]. Most parents – whether vaccine-accepting or VH – obtain their vaccine information primarily from healthcare professionals, with the most cited source being pediatricians, followed by other healthcare professionals, such as midwives, nurses, and other therapists [3, 4, 5]. As healthcare providers are the main source of information for parental decision-making, issues around satisfaction with and trust in the provider are important to understand. Previous research has shown how trusting relationships between patients and providers are determinative in parents' vaccination decision-making, meaning that parents who trust their providers tend to trust their vaccination recommendations [6, 7, 8]. In Switzerland, *complementary and alternative medicine (CAM)* is widely used and integrated into the healthcare system [9, 10]. Particularly in primary healthcare for children, CAM is mainly provided by biomedically trained physicians with additional CAM training in the sense of integrative medicine [11]. Researchers have established associations between VH and CAM use [6, 12, 13], and suggested that CAM providers and VH parents have a "symbiotic" relationship, meaning that "VH and CAM exist and function separately, but when combined, provide each other with 'resources' that enable them to thrive together" [12, p. 111]. Others have shown that VH individuals have lower levels of trust in biomedicine than in CAM [12, 14].

In addition to medical providers, sources of vaccination information include parents' social networks, with similar views and norms being shared within networks. Generally, parents with people in their networks who vaccinate less are also less likely to vaccinate [15, 16]. Social media and the Internet offer platforms for disseminating information and thus serve as popular vaccination information sources with its own complexities and dynamics [17, 18, 19]. Testimonies of (negative) experiences during and after vaccination or the usage of forums are believed to be particularly appealing to parents seeking vaccination information

[20, 21]. In the last two decades, patient-provider dynamics have partially changed from the former *doctor-provides-patient* to today's *users-provide-users* (i.e., patients no longer obtain their information only from the doctors who treat them, but doctors as well as lay people frequently disseminate information about health and illness on the Internet, which is available to all other users), with health-information seeking audiences being potentially far larger, and everyone with Internet access being capable of disseminating information [20, 22]. This context is further complicated with negative, emotion-focused, and often untrue vaccination information being difficult to debunk with medical facts [21].

Research consistently shows how trust in and satisfaction with providers who promote vaccination increases parental vaccine acceptance, while parents being misunderstood, criticized, or alienated when expressing VH in clinical interactions can have a negative impact on vaccination acceptance [8]. Ceasing to consult with a health care provider [23, 24] and, related, the phenomenon of doctor "shopping" (which we refer to as *browsing*) [25], have previously been described as important expressions of patient dissatisfaction. Some of our qualitative data analysis has particularly demonstrated how issues of trust, satisfaction, affect, and choice played determinative roles, not only in parents' vaccination decisions, but also in the types of vaccination sources and the choices of healthcare practitioners (i.e., biomedical or CAM) with whom they consult for their children's cares [24]. The nuances of CAM vaccination counselling resulting in higher trust and satisfaction most likely lie within these providers taking time for discussion, incorporating parents into decision-making, and taking parents' concerns seriously [26].

In this mixed-methods study, we examined the extent to which trust in and satisfaction with vaccination information sources, and in particular the health care provider as the main source of information, differs between VH and non-VH parents and how this affects the parental vaccination decision-making.

2. Material and methods

2.1. Study design and population

This study is part of a national transdisciplinary investigation into vaccination decision-making in Switzerland [27]. We employed a mixed-methods approach with *sequential exploratory design*, meaning that an initial qualitative component informed the design of a subsequent quantitative stage [28]. First, we analyzed the qualitative results by identifying key areas that seemed to be of central importance. We then focused on these when compiling the quantitative questionnaires. The detailed analysis of qualitative and quantitative results was finally done in parallel by presenting a clustering of similar statements in the qualitative sector, followed by quantitative results showing similar dynamics on a larger scale. We interviewed parents throughout German, French and Italian-speaking Switzerland. The French-speaking part, with approximately 23% of the Swiss population and about 19% of our parental study sample, was slightly underrepresented, and the Italian part was slightly overrepresented (8% of the Swiss population and 18% of study parents) [29, 30]. At the time of the survey, the interviewed parent was ≥18 years of age and their child was 0-11 years old. We asked parents to provide us with a copy of their children's vaccination record.

2.2. Patient and public involvement

Given the presumably large number of people who are not to be regarded as vaccine opponents but as vaccine hesitant, we meant to employ a specific focus on the path to decision-making with all the thought processes, worries and fears contained therein, as well as the influence of external information. During our qualitative research period, various starting points emerged that were worth investigating on a larger scale (in the quantitative sector). We recruited participating parents from a network of 86 biomedical and 44 CAM providers participating in the project. Participants who indicated they wished to receive the study results will receive notifications once results are published.

2.3. Qualitative data collection and analysis

We first conducted semi-structured in-depth interviews with parents from September 2017 to February 2018 and with biomedically-only trained doctors and providers (i.e., physicians or non-physician-providers) with additional CAM training from August 2017 to September 2018. Interviews aimed to better understand parents' vaccination decision-making processes and their interactions with health care providers. An interview guide was piloted and revisited iteratively for clarity. We also conducted ethnographic observations of vaccination consultations. Qualitative interviews were audio-recorded and transcribed verbatim. **Supplementary Questionnaire S1** and **Supplementary Questionnaire S2** contain the interview guides for the qualitative parental and provider interviews, respectively. Interviews allowed us to gather background information about parents and their providers and perspectives on vaccination. Vaccination consultation observations were documented in field journals and then subsequently written into narrative accounts. Qualitative data were analyzed by MD and AB. Analysis of the qualitative interviews and observations were guided by the Framework Method [31] with support of MAXQDA software.

2.4. Quantitative data collection and analysis

For the study's quantitative component, we recruited parents in waiting rooms of participating providers' offices [27]. We refer to these providers as the *primary providers*. The questionnaire, however, was administered during a telephone interview conducted after office hours from January 2019 to April 2020 [27]. The latter included the *Parent Attitudes about Childhood Vaccines (PACV)* survey score, a validated instrument that was designed by Opel and colleagues in order to identify VH parents [32, 33, 34]. The 2011 Opel-revised 15-item PACV [33] results in a score of 0-100 points. If a parent scores ≤49 points, they are considered non-VH; if they score ≥50 points, they are considered VH. Based upon the results of a study validating a 5-item version of the PACV in Switzerland with identical scoring [30], we opted for the shorter 5-item version for our analyses. The final questionnaire included

PACV items, questions gathering sociodemographic information about the parents and the target child, and additional questions informed by our previously published qualitative research investigating CAM provider approaches to vaccination consultations [26] , biomedical provider descriptions of interactions with VH parents and dilemmas faced when addressing vaccine hesitancy and refusal [35], and VH parents' navigation of information sources and consultations with CAM and biomedical providers [24]. These qualitative studies informed the design of several components of the quantitative survey, particularly including questions on the parent-provider relationship and vaccination information sources. The quantitative questionnaire is provided in **Supplementary Questionnaire S3**.

A key question posed to parents was "What are your most trusted information sources on vaccination?" to which a series of pre-established response options were made available (e.g., "Internet".) We invited participants to provide additional information through open-answer responses (e.g., "Which websites?"). The number of sources mentioned by each participant was analyzed by coding and counting the reported sources, as well as the free-text answers.

We use descriptive statistics plus Pearson's Chi-squared and Wilcoxon Rank Sum tests to test whether observed differences between non-VH and VH parent participants are significant at the $p<0.05$ level. Quantitative data analysis was performed by SE and KJ using STATA software version 12.1 (Stata corporation, College Station TX). We personally reviewed the information sources cited by parents and, after consultation within the team, we decided whether to consider each source as critical or accepting of the official vaccination recommendations.

2.5. Ethical considerations

This study was conducted in compliance with the Swiss Federal Act on Research Involving Human Beings (Human Research Act) and the Declaration of Helsinki. The local ethics committee (Ethikkommission Nordwest- und Zentralschweiz, EKNZ; project ID number 2017– 00725) approved the study. We obtained written informed consent from each

participant after the nature and possible consequences of the study had been fully explained. Pseudonyms are used for participants throughout. Direct quotes were translated from the original language of utterance (German, French) into English.

3. Results

3.1. Study population

For the qualitative study component, we conducted ethnographic observations of 34 pediatric vaccination consultations. We also conducted in-depth, face-to-face interviews with 30 parents and 37 providers. Among the provider-interviewees, 20 were biomedically oriented physicians and 17 were CAM-oriented providers, of which 15 were biomedically trained physicians with additional training in CAM, and 2 were non-physician CAM providers.

For the research program's quantitative component, (i.e., both the childhood vaccines and HPV samples [27]), we completed a full telephone interview with 1,390 parents and 130 (86 biomedically- and 44 CAM-oriented) primary providers. 889 (64%) parents had a PACV score of ≤49, indicating non-VH, and 501 (36%) parents had a PACV score of ≥50, indicating VH. Parent characteristics are shown in **Table 1**. VH parents were more likely to see a CAM-oriented primary provider than non-VH parents (307 [61%] vs. 183 [21%]; p<0.001).

Table 1. Characteristics of the quantitative study population

	All parents (N=1390)		*By PACV-score*				
			Non-VH parents (N=889)		*VH parents (N=501)*		
	N (%)		*N (%)*		*N (%)*		*P value*
Female Respondent	*1232*	*(89%)*	*798*	*(90)*	*434*	*(87)*	*0.141*[1]
Relationship to child							*0.095*[1]
Mother	*1228*	*(88)*	*797*	*(90)*	*431*	*(86)*	
Father	*155*	*(11)*	*89*	*(10)*	*66*	*(13)*	
Other	*7*	*(1)*	*3*	*(0)*	*4*	*(1)*	
Interviewee Age (Mean (SD))	*37.1*	*(6.27)*	*37*	*(6.16)*	*37.2*	*(6.46)*	*0.592*[2]
Born in Switzerland	*981*	*(71)*	*608*	*(68)*	*373*	*(74)*	*0.059*[1]
Parent's highest education							*<0.001*[1]
Low[3]	*272*	*(20)*	*188*	*(21)*	*84*	*(17)*	
Medium[4]	*321*	*(23)*	*209*	*(24)*	*112*	*(22)*	
Bachelors[5]	*285*	*(21)*	*163*	*(18)*	*122*	*(24)*	
Masters	*358*	*(26)*	*226*	*(25)*	*132*	*(26)*	
Doctorate	*105*	*(8)*	*81*	*(9)*	*24*	*(5)*	
Other, missing	*49*	*(4)*	*22*	*(2)*	*27*	*(5)*	
Household income							*<0.001*[1]
< 80,000 Swiss Francs (CHF)	*319*	*(23)*	*174*	*(20)*	*145*	*(29)*	
80,000 – 120,000 CHF	*384*	*(28)*	*225*	*(25)*	*159*	*(32)*	
> 120,000 CHF	*279*	*(20)*	*195*	*(22)*	*84*	*(17)*	
Missing, declined to respond	*408*	*(29)*	*295*	*(33)*	*113*	*(23)*	
Type of primary provider							*<0.001*[1]
Biomedical	*893*	*(64)*	*705*	*(79)*	*188*	*(38)*	
CAM	*490*	*(35)*	*183*	*(21)*	*307*	*(61)*	
Missing	*7*	*(1)*	*1*	*(0)*	*6*	*(1)*	

Note. [1]Pearson's Chi-squared and [2]Wilcoxon Rank Sum tests were used for statistical analysis. [3]Secondary school not completed, no completed professional education, completed 9 years of school without further education, apprenticeship, technical school or business school; [4]College, higher professional school; [5]Bachelor at University, primary school teacher seminar.

3.1 Variety of information sources on vaccination

During our qualitative interviews and observations of vaccination consultations, parents cited a broad array of vaccination information sources as part of their decision-making process. Many VH parents engaged in what we refer to as *information browsing*, which involves parents comparing and weighing different information sources while striving to reach certainty about the right vaccination decision to make for their children. For example, Mrs. Sandoz, a 35-year-old mother of a 13-month-old unvaccinated son explained her decision not to vaccinate:

> "I think it was a mix of discussions with people close to us and with friends. […] There is my personal feeling about the matter. There is certainly the social influence from my husband. I'll say that the decision surely came more from me than it did from him. I think I hold the decision closer to my heart than he does. I think it was kind of a

vague questioning. There were some things I read on the Internet. I joined Facebook groups where they talk about it. I read some testimonies. I think when I was pregnant, I had a discussion with the [CAM] pediatrician in order to know the true risks that we were taking if we didn't vaccinate. I was looking for the most neutral point of view possible. […] For now, it's a decision that is in favor of not vaccinating."

Other VH parents explained how having multiple sources of information reassured them that they were taking the correct course of action for their families.

Qualitative results additionally shed light on parents, often VH parents, having consulted a multitude of sources that varied in both format and content. Parents described how each piece of information could temporarily solidify their opinion, but also raise further doubts and uncertainties. Mrs. Sandoz explained:

"We have a lot of doubts around the benefits of vaccines. My husband and I are still reading about it and continue to have discussions and thinking about it in order to be comfortable. […]. We have so much information that we can get lost in it. […] Up until now, everything that I've read and the discussions that I've had have reinforced our decision to not vaccinate our son."

VH parents described how a multitude of information sources could be both a source of reassurance and of hesitancy in their quest for neutral information about vaccination. We therefore investigated the potential association of VH with the number and trustworthiness of parents' vaccination information sources by including the question "What are your most trusted information sources on vaccination?" in the quantitative questionnaire.

Figure 1 illustrates how the number of trusted information sources varied between VH and non-VH parents. VH parents reported using more sources on average than non-VH parents (2.98 [SD=2.02] vs. 2.70 [SD=1.83]). While small, the difference was significant ($p=0.012$).

[Figure 1]

3.2 Types of information sources and media

Based on our initial qualitative research, we generated a preliminary list of information source types which we then included in the quantitative questionnaire. Commonly mentioned information sources included the child's doctor and other providers, family, friends and acquaintances, official public health recommendations, print media, such as books or newspaper articles, the Internet, and social media.

In **Table 2** we list the trusted vaccination information sources cited most by parents. The child's doctor was the information source cited most (1113 [80%] parents) by both VH and non-VH parents, but VH parents were less likely to report the child's doctor as the most trusted source than non-VH parents (358 [71%] vs. 755 [85%]; p<0.001). VH parents were also less likely to report public health authorities as a trusted information source than non-VH parents (101 [20%] vs. 333 [37%]; p<0.001), as well as information materials that are consistent with the official vaccination recommendation (26 [5%] vs. 74 [8%]; p=0.03).

In contrast, VH parents tended to mention information sources other than the child's doctor or public health authorities more than non-VH parents, including social networks (215 [43%] vs. 253 [28%]; p<0.001), other health care workers (105 [21%] vs. 119 [13%]; p<0.001) and their personal gut feelings or experiences (16 [3%] vs. 10 |1%]; p=0.006). The largest difference we identified involved information materials, such as books, online or print magazines, and websites that are critical of official vaccination recommendations (105 VH parents [21%] vs. 4 non-VH parents [0%]; p<0.001), and materials of obvious CAM nature (12 VH parents [2%] vs. 0 non-VH parents [0%]; p<0.001).

Table 2. Types of trusted vaccination information sources.

	All parents (N=1390)		*By PACV-score*				
			Non-VH parents (N=889)		*VH parents (N=501)*		
	N	*(%)*	*N*	*(%)*	*N*	*(%)*	*P value*
My child's doctor	*1113*	*(80)*	*755*	*(85)*	*358*	*(71)*	*<0.001*
Social networks[1]	*468*	*(34)*	*253*	*(28)*	*215*	*(43)*	*<0.001*
Public Health Authorities	*434*	*(31)*	*333*	*(37)*	*101*	*(20)*	*<0.001*
Other health care workers	*224*	*(16)*	*119*	*(13)*	*105*	*(21)*	*<0.001*
Other physician	*195*	*(14)*	*111*	*(12)*	*84*	*(17)*	*0.027*
CAM	*19*	*(1)*	*3*	*(0)*	*16*	*(3)*	*<0.001*
Homeopathic	*12*	*(1)*	*2*	*(0)*	*10*	*(2)*	*0.001*
Midwife	*13*	*(1)*	*4*	*(0)*	*9*	*(2)*	*0.268*
Materials that are critical of public health vaccination recommendation[2]	*109*	*(8)*	*4*	*(0)*	*105*	*(21)*	*<0.001*
"Foundation for consumer protection"	*22*	*(2)*	*3*	*(0)*	*19*	*(4)*	*<0.001*
Hirte: "Impfen Pro & Contra"	*15*	*(1)*	*0*	*(0)*	*15*	*(3)*	*<0.001*
Explicitly CAM materials	*12*	*(1)*	*0*	*(0)*	*12*	*(2)*	*<0.001*
Berthoud: "Qui aime bien vaccine peu"	*9*	*(1)*	*0*	*(0)*	*9*	*(2)*	*<0.001*
Glöckler/Goebel/Michael: "Kindersprechstunde"	*6*	*(0)*	*0*	*(0)*	*6*	*(1)*	*0.001*
"www.impfo.ch"	*5*	*(0)*	*2*	*(0)*	*3*	*(1)*	*0.264*
Materials that are consistent with public health vaccination recommendation[2]	*100*	*(7)*	*74*	*(8)*	*26*	*(5)*	*0.030*
"www.swissmom.ch"	*20*	*(1)*	*16*	*(2)*	*4*	*(1)*	*0.132*
"Wir Eltern"	*8*	*(1)*	*7*	*(1)*	*1*	*(0)*	*0.164*
"Beobachter"	*6*	*(0)*	*2*	*(0)*	*4*	*(1)*	*0.117*
"Puls"	*6*	*(0)*	*4*	*(0)*	*2*	*(0)*	*0.890*
Google	*98*	*(7)*	*78*	*(9)*	*20*	*(4)*	*0.001*
Scientific literature[4]	*55*	*(4)*	*37*	*(4)*	*18*	*(4)*	*0.601*
No source, missing, don't know, don't want to disclose	*49*	*(4)*	*26*	*(3)*	*23*	*(5)*	*0.106*
Medical work experience[3]	*42*	*(3)*	*30*	*(3)*	*12*	*(2)*	*0.306*
Nurse	*8*	*(1)*	*6*	*(1)*	*2*	*(0)*	*0.514*
News	*31*	*(2)*	*22*	*(2)*	*9*	*(2)*	*0.411*
Personal experience, gut feeling	*26*	*(2)*	*10*	*(1)*	*16*	*(3)*	*0.006*
Described as neutral	*9*	*(1)*	*0*	*(0)*	*9*	*(2)*	*<0.001*

Note. [1]Family, friends, and acquaintances; [2]Print media, websites, organizations, TV programs, and films that are critical of or consistent with public health vaccination recommendations based on our detailed assessment and on consensus among research team members; [3]Medical, biological, or pharmaceutical training or work experience of the interviewee or the other parent of the target child; [4]As stated by the interviewee. Pearson's Chi-squared tests were used for statistical analysis.

In **Table 3,** we list where parents reported having obtained trusted information about vaccination. We list all information channels reported by at least 5 parents. The Internet was considered the most trustworthy medium by VH parents and non-VH parents in similar proportions (176 [35%] vs. 299 [34%]; p=0.572). However, VH parents cited print media as their most trusted medium of vaccination information more frequently than non-VH parents (237 [47%] vs. 176 [20%]; p<0.001), including books and brochures (129 [26%] vs. 63 [7%]; p<0.001). With regards to specific internet sources, VH parents were less likely to report

Google than non-VH parents (20 [4%] vs. 78 [9%]; p=0.001) as a trusted medium for vaccination information. VH parents were more likely than non-VH parents to cite social media (26 [5%] vs. 21 [2%]; p=0.005), although overall few parents in either group cited this as a trusted information source.

Table 3. Types of trusted media for vaccination information

	All parents (N=1390)	*By PACV-score*		
		Non-VH parents (N=889)	*VH parents (N=501)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Internet	*475 (34)*	*299 (34)*	*176 (35)*	*0.572*
Google	*98 (7)*	*78 (9)*	*20 (4)*	*0.001*
Social media	*47 (3)*	*21 (2)*	*26 (5)*	*0.005*
Facebook	*17 (1)*	*7 (1)*	*10 (2)*	*0.490*
Print media	*413 (30)*	*176 (20)*	*237 (47)*	*<0.001*
Books and brochures	*192 (14)*	*63 (7)*	*129 (26)*	*<0.001*
Magazine and newspapers	*60 (4)*	*42 (5)*	*18 (4)*	*0.319*
TV	*67 (5)*	*37 (4)*	*30 (6)*	*0.127*
Films	*13 (1)*	*1 (0)*	*12 (2)*	*<0.001*
Conferences	*9 (1)*	*2 (0)*	*7 (1)*	*0.150*

Note. Pearson's Chi-squared tests were used for statistical analysis.

3.3 Satisfaction with and trust in the primary provider

Our qualitative findings revealed an understudied phenomenon in Switzerland – parents switching providers for their children's care around the issue of vaccination – and suggested that this switch was often made from biomedical-oriented physicians to those trained in CAM [24]. Quantitative results suggest that more VH parents than non-VH parents consulted providers other than the child's primary provider when making vaccination decisions, as can be seen below. We therefore explored whether this information seeking behavior is related to issues of (dis)satisfaction with and (dis)trust in the primary provider.

Qualitative evidence particularly showed the saliency of the issue of trust for parents in their vaccination decision-making process. The following except from an interview with Mrs. Godet, a 29-year-old mother of a 13-month-old fully vaccinated daughter illustrates how, despite the mother's media-induced uncertainty about her vaccination decision, trust in the provider was crucial for her to follow the provider's recommendation:

> "There are a lot of so-called 'scientific' studies which have come out with consequences that vaccines might have on children's health. […]. And so it's very hard to know who to believe, actually. […]. So, we trust, anyway. Well, I trust my pediatrician. So, if she tells me that I have to vaccinate, I think that's good. Now, it's true that if you read a little bit of what's on the Internet and everything, you don't really know what to do."

Providers also discussed how they fostered trust as part of their clinical practice. Dr. Heffelfinger, an anthroposophic physician, explained how he thought his practices differed from those of a biomedically oriented pediatrician:

> "I try to take much more time and try to make something out of the time. To gain trust, to create insight to the subject. […]. To me, the free decision to vaccinate is the top priority. The decision belongs to the human being that decides for himself or herself."

Figure 2 and **Supplementary Table S1** show how VH parents were more likely to have discussed vaccination with their primary provider than non-VH parents (418 [83%] vs. 645 [73%]; $p<0.001$). VH parents were less likely to be satisfied with and to trust their primary provider than non-VH parents (satisfaction: 342 [82%] vs. 586 [91%]; trust: 368 [88%] vs. 632 [98%]; $p<0.001$ for both satisfaction and trust). When their primary provider was biomedically oriented, this difference was even more notable (satisfaction: 100 [69%] vs. 467 [91%]; trust: 120 [83%] vs. 503 [98%]; $p<0.001$ for both satisfaction and trust). In contrast, when the primary provider was CAM-oriented, there was no significant difference in satisfaction and trust for VH and non-VH parents (satisfaction: 237 [89%] vs. 118 [89%]; trust: 243 [91%] vs. 128 [96%]; $p=0.395$ and $p=0.164$, respectively).

To evaluate issues of (dis)satisfaction and (dis)trust, we analyzed parents' responses regarding perceived agreement between their own vaccination view and their primary provider's view. VH parents reported significantly lower agreement between their own vaccination view and their child's doctor perceived view than non-VH parents (271 [65%] vs.

567 [88%]; p<0.001). The gap between parent and provider views was larger when the primary provider was biomedically oriented (79 [54%] VH parents vs. 449 [88%] non-VH parents; p<0.001) and smaller when the primary provider was CAM-oriented (188 [70%] VH parents vs. 117 [88%] non-VH parents; p=0.001).

[Figure 2]

3.4 Seeking multiple provider opinions on vaccination

Given the important role children's doctors play in influencing parents' vaccination decisions, we further explored a phenomenon that our initial qualitative work brought to light – parents consulting with and/or switching from one to another provider, often to one offering CAM services, in response to issues arising during vaccination consultations [24], a phenomenon we call *provider browsing*. The following conversation with Mrs. Kugler, a 37-year-old mother of one partially vaccinated child, illustrates this behavior:

> *Researcher*: Ok. I've already seen in the vaccination booklet, there are two or three different doctors that you consult. Do you prefer to see a biomedical provider?
>
> *Mother*: Well, we actually tend to go to the homeopath. […]. She's always a little, "I told you so," after every vaccination. But she tolerates it. It takes her two or three weeks until she gets well enough to be neutral towards us again [laughing]. Because we do vaccinate. And [the homeopath] is the one who treats [our daughter] when she's sick. […]. And if we needed a diagnosis, for example, if I wasn't sure whether it was otitis media or something like that, I used to go see [the local pediatrician]. […]. He is a classic [biomedical] Algifor-Dafalgan [commonly prescribed pain killers in Switzerland, containing ibuprofen and paracetamol, respectively] doctor.
>
> *Researcher*: Ok. Purely conventional biomedical?

> *Mother*: Yes, […]. At every diagnosis. In winter, [my daughter] was very sick again with an extremely high temperature. Again, the remedy was Algifor. The doctor added, 'We should start vaccinating soon. […]. It's a classic fever. We can easily vaccinate. It's not too bad at this age.' […] I felt we were no longer in good hands and switched to Dr. Heffelfinger.

Qualitative analysis of provider browsing suggested that parents were seeking health care providers who were willing to listen to and understand parents' rationales around vaccination and their adherence to complementary and alternative approaches to medicine. Dr. Heffelfinger, an anthroposophical doctor, pointed to the practice of listening to and responding to parents' questions and concerns. He hypothesized why parents might switch to him after seeing a biomedically oriented physician,

> "That style of consultation doesn't suit them. […]. The parents don't feel like they are being taken seriously, or they have many more questions than what they were able to discuss."

When asked if parents followed this provider's vaccination recommendations, he responded affirmatively, noting that parents did not often return to their previous pediatrician,

> "People don't consult that pediatrician again because the pediatrician was vaccinating insanely. [With me], parents do almost exactly the same vaccines as they would have done with their previous pediatrician. But we talked about them."

Table 4 reports quantitative analysis of this phenomenon showing that more VH parents than non-VH parents reported consulting with a provider other than the primary provider for vaccination questions (196 [39%] vs. 173 [19%]; p<0.001). We specifically asked questions about parents' motivations for consulting with another provider. More VH parents than non-VH parents cited seeking a second opinion or having a disagreement as the reason for consulting with another provider (87 [17%] vs. 38 [4%]; p<0.001). Logistical reasons (e.g.,

parents moved, or provider stopped working) were mentioned with similar frequency (43 [9%] among VH parents vs. 68 [8%] among non-VH parents; p=0.537).

Interestingly, among parents who had asked another provider about vaccination, about half as many VH parents as non-VH parents reported satisfaction with and trust in the other provider (satisfaction: 82 [42%] vs. 142 [82%]; trust: 108 [55%] vs. 146 [84%]; p<0.001 for both satisfaction and trust).

Since VH parents report higher satisfaction and trust in CAM-oriented providers, we investigated whether provider browsing varied by type of primary provider (i.e., biomedical or CAM orientation). Among parents with biomedically oriented primary providers, more VH parents than non-VH parents engaged in provider browsing (54 [29%] vs. 129 [18%]; p=0.002). However, this difference was even starker among parents with CAM-oriented primary providers (137 [45%] of VH parents vs. 43 [23%] of non-VH parents; p<0.001).

Table 4. Parents having consulted another doctor about vaccination.

	All parents (N=1390)	By PACV-score		
		Non-VH parents (N=889)	VH parents (N=501)	
	N (%)	N (%)	N (%)	P value
Consulted another doctor				<0.001
No	1012 (73)	712 (80)	300 (60)	
Yes	369 (27)	173 (19)	196 (39)	
Missing	9 (1)	4 (0)	5 (1)	
Reason for consultation				<0.001
Second opinion or disagreement	125 (9)	38 (4)	87 (17)	
Moved or stopped working	111 (8)	68 (8)	43 (9)	
Other	130 (9)	64 (7)	66 (13)	
Missing	3 (0)	3 (0)	0 (0)	
Parents with a biomedical primary doctor	Total sample (N=893)	By PACV-score		
		Non-VH parents (N=705)	VH parents (N=188)	
	N (%)	N (%)	N (%)	P value
Consulted another doctor				0.002
No	703 (79)	572 (81)	131 (70)	
Yes	183 (20)	129 (18)	54 (29)	
Missing	7 (1)	4 (1)	3 (2)	
Reason for consultation				0.134
Second opinion or disagreement	46 (5)	27 (4)	19 (10)	
Moved or stopped working	71 (8)	55 (8)	16 (9)	
Other	64 (7)	45 (6)	19 (10)	
Missing	2 (0)	2 (0)	0 (0)	
Parents with a CAM primary doctor	Total sample (N=490)	By PACV-score		
		Non-VH parents (N=183)	VH parents (N=307)	
	N (%)	N (%)	N (%)	P value
Consulted another doctor				<0.001
No	308 (63)	140 (77)	168 (55)	
Yes	180 (37)	43 (23)	137 (45)	
Missing	2 (0)	0 (0)	2 (1)	
Reason for consultation				0.014
Second opinion or disagreement	75 (15)	10 (5)	65 (21)	
Moved or stopped working	40 (8)	13 (7)	27 (9)	
Other	64 (13)	19 (10)	45 (15)	
Missing	1 (0)	1 (1)	0 (0)	
All parents having consulted another doctor before	Total sample (N=369)	By PACV-score		
		Non-VH parents (N=173)	VH parents (N=196)	
	N (%)	N (%)	N (%)	P value
Satisfied[1] with other doctor	224 (61)	142 (82)	82 (42)	<0.001
Trust[3] other doctor	254 (69)	146 (84)	108 (55)	<0.001

Note. [1]Satisfied or very satisfied; [2]Somewhat or not at all satisfied; [3]Somewhat or completely. Pearson's Chi-squared tests were used for statistical analysis.

4. Discussion

4.1. Principal findings

Our mixed-methods study has several main findings. First, our results confirm previous research showing that children's doctors are parents' most important vaccination information [3, 4, 5, 36]. Similarly, VH participants were more likely to turn to additional information sources, including their social networks, books, and other materials critical of official vaccination recommendations [4, 15, 16]. More VH parents than non-VH parents cited print media as a trusted information source. To our knowledge, this has not been reported on previously.

Second, VH parents expressed lower levels of satisfaction with and trust in their primary provider, particularly biomedically oriented physicians. This finding is likely associated with our third main finding showing that VH parents engaged more in provider browsing than non-VH parents. Nevertheless, VH parents reported lower levels of satisfaction with and trust in these other providers. VH parents were more likely to consult with CAM-oriented primary providers and to have higher levels of satisfaction with and trust in CAM than in biomedical providers. Interestingly, the phenomenon of VH parents having consulted with other providers about vaccination occurred more when the primary provider was CAM-oriented.

Previous research suggests that the relationship between VH and CAM use is not fully explained by VH individuals' trust in CAM services, but rather by distrust in biomedicine [14]. Accordingly, we argue that the VH parents in our sample may have been more likely to be pushed away from biomedicine than pulled toward CAM, as VH parents seemed to switch providers when they were no longer satisfied with or no longer fully trusted their provider, therefore substantiating not primarily the attractiveness of the second provider, but rather a form of dissatisfaction with the initial provider. Whereas low trust in medical providers has been documented in previous research as characteristics of VH parents [8, 37, 38], VH

parents' consultations with multiple providers about vaccination has, to our knowledge, not extensively been studied.

Our results further imply that VH parents' information browsing behaviors are, similarly to provider browsing, an expression of dissatisfaction and distrust. We argue that individuals who are exposed to a variety of information [39], via the Internet [40, 41] or their social networks [16], are likely to harbor concerns or doubts about official vaccination recommendations. Our qualitative data suggest that these doubts may lead VH parents to seek information from additional sources, by consulting a different doctor or reading additional information materials. Reflecting previous findings [37], several parents described how persistent or novel doubts, uncertainty, or dissatisfaction surfaced when they were exposed to new vaccination information.

4.2. Strengths and weaknesses in relation to other studies

Building upon existing literature, our study provides evidence demonstrating how VH parents can be characterized by their lower levels of satisfaction and trust, and that this may be an important basis for a *vicious circle* of information seeking, dissatisfaction, distrust, and VH, as previous studies have shown the importance of trust when it comes to addressing VH [8, 42, 43]. Furthermore, there is a need to examine decision-making on childhood vaccinations and under-immunization among VH parents in countries where little research has been conducted [1]. It is therefore important that research provides context-specific insights on Switzerland, due particularly to its high CAM use [10] and high rates of VH [27]. The focus on Switzerland, the large-scale data on the questions of VH, and the study's mixed-methods approach speak to the novelty of this research.

That said, this is not a representative, population-based sample and it provides cross-sectional data.

Future studies could investigate how trust and satisfaction are maintained, gained, or lost over time in consultations between parents and HCPs over time.

4.3. Meaning of the study

Our results suggest potential intervention possibilities for addressing VH. Since providers remain the number one source of both VH and non-VH parents, we argue that providers can undergo vaccine consultation and communication training to engage more effectively in dialogue about vaccination with patients. Parents, especially VH parents, do not always lack facts but also may lack certainty, trust, and satisfaction toward the information they obtain as well as in their medical provider. Previous literature shows that parents showing reluctancy towards childhood vaccination are not necessarily poised to reject vaccination. Such reluctancy is rather a result of uncertainty and doubt acquired through conflicting information [26]. It is important that the provider does not hastily label or even exclude those patients, but rather views them as patients with doubts or concerns and with potential for productive dialogue. If hesitant parents' questions are not adequately addressed and concerns are not met with understanding, distrust and dissatisfaction can arise. In these instances, parents may engage in provider browsing, information browsing, and engage in behaviors that might increase their VH.

4.4. Unanswered questions and future research

Given the current sociocultural tension surrounding the Covid-19 pandemic, a thorough analysis of the underlying factors and potential intervention measures of widespread VH about the SARS-CoV-2 vaccine is needed. It will also be important for researchers to examine how issues of trust and satisfaction around Covid-19 vaccination services might be associated with routine childhood vaccinations and the influenza vaccination.

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Transparency declaration

The manuscript is an honest, accurate, and transparent account of the study being reported; no important aspects of the study have been omitted.

Contributors

SE and MD co-drafted the manuscript. SE and KJ focused on the quantitative components and MD and AB focused on the qualitative components. SM provided valuable feedback during the writing process. BH, BW and DK gave rich insight into CAM in Switzerland. BH and BW helped establishing the network of CAM providers and gave and insight into pediatrics in Switzerland. AB was part of the gathering of qualitative data and gave valuable feedback during the writing process. RE, JP and JH gathered qualitative data. PT was the head of the entire project. He directed and supervised all operations from start to finish. He also provided important expertise on infectious diseases and internal medicine. All authors read and approved the final manuscript.

Data sharing

Raw data supporting the findings of this study are available from the corresponding author (PT) on request.

Competing Interest Statement

All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: all authors had financial support from Swiss National Science Foundation [National research program NRP74, grant 407440_167398] and supplementary postdoctoral fellowship funding from the Nora van Meeuwen-Haefliger-Foundation for the submitted work; no financial relationships with any organizations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Figure legends

Figure 1. Number of trusted vaccination information sources.

Note. Distribution of the number of trusted vaccination information sources. We divided parents into non-VH and VH according to PACV score < or ≥50. The median, mean (standard deviation) of information sources was; 2, 2.80 (1.90) for the entire study population (N=1390); 2, 2.70 (1.83) for the non-VH parents (N=889), and; 3, 2.98 (2.02) for the VH parents (N=501). Wilcoxon Rank Sum test was used for statistical analysis.

Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

Note. [1]Very satisfied or satisfied; [2]Completely or somewhat trust; [3]Completely or somewhat agree; Percentages refer to the total number of non-VH and VH parent participants; Pearson's Chi-squared tests were used for statistical analysis.

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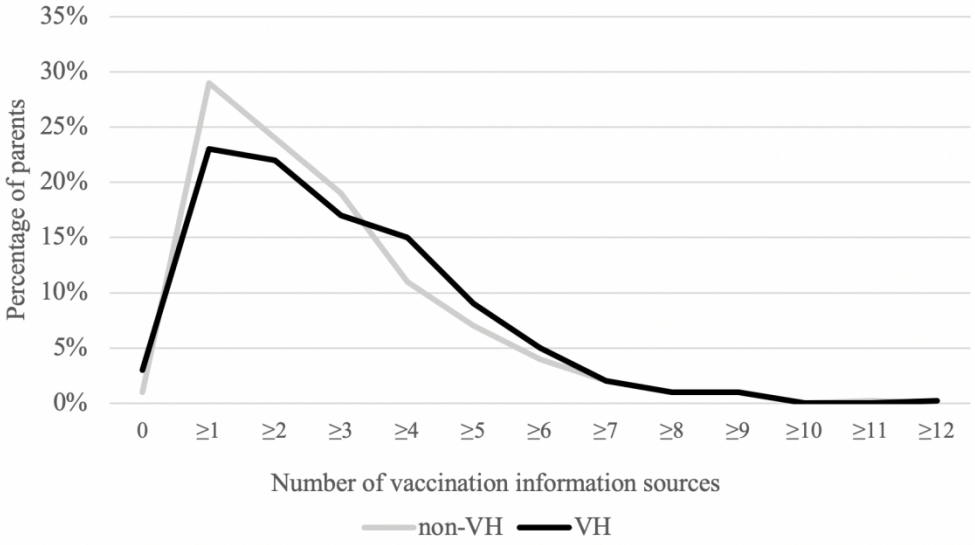
Figure 1. Number of trusted vaccination information sources.



Note. Distribution of the number of trusted vaccination information sources. We divided parents into non-VH and VH according to PACV score < or ≥50. The median, mean (standard deviation) of information sources was; 2, 2.80 (1.90) for the entire study population (N=1390); 2, 2.70 (1.83) for the non-VH parents (N=889), and; 3, 2.98 (2.02) for the VH parents (N=501). Wilcoxon Rank Sum test was used for statistical analysis.

Figure 1. Number of trusted vaccination information sources.

Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

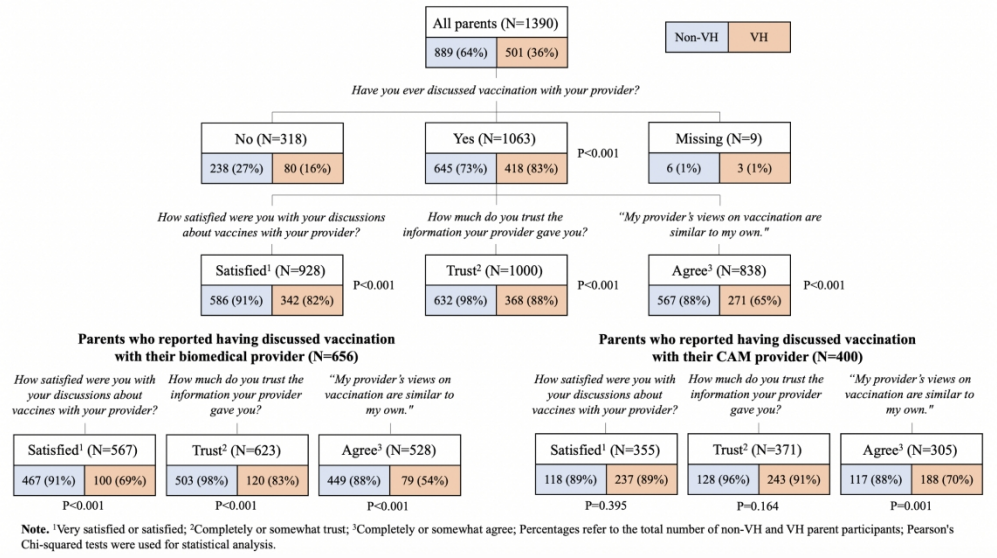


Figure 2. Parental satisfaction with and trust in the child's biomedical or CAM primary provider.

Qualitative interview guideline for parents

Background about the children and parents

1) How many children do you have? How old are they? Are they boys or girls?
2) What type of school do your children attend (probe: public, private, daycare)?
3) What is your civil status (married/divorced/widowed/single/etc.)? Is your child's/children's other parent(s) present?
4) How old are you? How old is your partner (spouse, other child's parent)?
5) Where were you born and raised? And your partner (spouse, child's other parent)? What is your nationality? And your partner's (spouse, child's other parent)?
   a. For participants not originally from Switzerland:
      i. How long have you been in Switzerland?
      ii. How long has your partner (spouse, child's other parent) been in Switzerland?
6) Where in Switzerland do you live?
7) What is the highest level of education that you have attained? What is the highest level of education that your partner (spouse, other child's parent) has attained?
   i. no completed school or professional education
   iii. mandatory school (9 years in Switzerland)
   iv. finished apprenticeship
   v. bachelors degree
   vi. higher professional education
   vii. higher technical or commercial school
   viii. university
   ix. other
8) What is your current occupation? What is your rate of occupation (i.e. 25, 50, 75, or 100%) What is your partner's (spouse, other child's parent) current occupation? What is your partner's rate of occupation (i.e. 25, 50, 75, or 100%)
9) Could you talk about the parents' roles in the family? Who works? Who takes care of the children? Who makes the children's healthcare decisions? Who made the decision regarding the children's vaccinations?
10) Do your children attend daycare? Does one parent stay home with the children while the other parent works? How do you manage childcare?

Questions about the children, their health, and their healthcare

11) What kind of health are your children in? (prompt: any chronic illnesses? birth defects? healthy?)
12) For your children's health, do you consult traditional biomedical doctors? CAM providers? Both?
13) **When you consult biomedical providers:** For what issues do you seek biomedical doctors' input for your children? Why? How often? Can you think of an example?
14) **When you consult CAM providers:** For what issues do you seek CAM providers' input for your children? Why? How often? Can you think of an example?
15) How would you describe your family's lifestyle? (Probe: What kinds of foods does your family eat (healthy/organic/avoid toxins)? What kind of physical activities do you do? Would you consider your family as making healthy choices? Why or why not?)

Questions about vaccine practices and beliefs

16) **Childhood vaccinations**: I had a look at your child's/children's vaccine certificate, and I noticed… (i.e. differences between the children, missing or delayed vaccinations, all vaccinations were administered according to the OFSP/BAG recommendations, etc.*During this part of the interview, Julia and/or Mike will have the vaccination booklet in order to look it over with the parents. We decided to consider the two youngest children and to ask if there have been any

Qualitative interview guideline for parents

major vaccination changes between the two youngest and the other children in the family. If there have been major vaccination changes, ask about this).

a. Do you think your child/children had all the recommended vaccinations?
b. What were the reasons and/or your motivations for your children to receive the vaccinations that they did receive?
c. If your child/children haven't received some of the recommended vaccinations, why not?
d. Have all your children received the same vaccinations? Why or why not? Has something changed the way that you think about vaccinations between your children? (Prompt: learned new information about vaccinations, vaccination experience with the first child, differences between children (e.g. each child's perceived immunity/potential of getting sick, particular childhood ailments, allergies, sensitivities, etc.))
e. Do you have any regrets about vaccinating or not vaccinating your child/children for childhood vaccinations? Why or why not?
f. How do you feel about childhood vaccinations? Why? Probe:
   - Are you for them? Are you against them?
   - Worldviews: Do your religious convictions influence views on vaccines? Do your political convictions influence views on vaccines?
   - Work and family set-up: How do you prevent your children from becoming sick? How do you manage when your children are sick? Can you stay home with them? Can you take them to see a doctor?
   - Can you give examples?
g. What are the benefits of childhood vaccinations? What are the risks of childhood vaccinations?
h. Do you think there are differences between different types of vaccinations? Are some more beneficial than others? If yes, which ones? Why? Are some more risky than others? If yes, which ones? Why?

17) HPV: I had a look at your child's/children's vaccine certificate and I noticed… (i.e. differences between the children, missing or delayed vaccinations, etc.)

a. Are your children aged 11 to 14 boys or girls? Did you consider the HPV vaccine for both boys and girls? Why or why not?
b. Do you think your child has received all the recommended doses of the HPV vaccine?
c. Why did they receive them or why did they not receive them?
d. Were all your children vaccinated against HPV? Why or why not? What changed your mind? Prompt:
   - boys vs. girls getting the vaccination
   - learned new information about vaccination
   - vaccination experience with the first child
   - differences between children (e.g. each child's perceived immunity/potential of getting sick, particular childhood ailments, allergies, sensitivities, etc.)
   - it is a relatively new vaccine
e. What did you consider when deciding on the HPV vaccine for your children? Probe:
   - What does the vaccine protect against?
   - How new the vaccine is?
   - Not knowing the side effects or long-term effects?
   - Did you consider the preventative aspects for sexually transmitted infections? Does receiving the vaccine encourage earlier sexual relationships? Does its ability to protect against certain STI's influence your decision? Why or why not?
f. What are the benefits of HPV vaccinations? What are the risks of HPV vaccinations?
g. Do you have regrets about vaccinating or not vaccinating your child/children against HPV? Why or why not?

Qualitative interview guideline for parents

18) Have your children ever had any side effects or complications from any vaccinations? If yes, what were they? And from what vaccinations? Did you expect these side effects or complications? Why or why not?
19) How was the actual experience of vaccinating your child/children? (prompts: stressful, child crying, painful for child, feeling helpless, agreeable/not stressful). Who vaccinated your child/children? (prompts: pediatrician, school health service, etc.)
20) What do you think about alternative vaccination schedules, which allow parents to decide at what moment the vaccination should be administered, even if this does not strictly follow BAG/OFSP guidelines?
21) Do you think vaccinations should be an individual choice for families? Why or why not? Is this how you viewed it when making your decisions? Did you consider public and community health consequences when deciding whether to vaccinate your children or not? (Probe: For example, did you consider how your child being vaccinated or not might affect other people (e.g. children infecting other children)? Why or why not?

Questions about the decision-making process regarding vaccines

22) How did you decide if you were going to vaccinate your children or not? Why?
23) With whom did you discuss vaccines for your children? (Probe: spouse/child's other parent? Parents? Friends? Family? Doctors? School doctors/nurses/medical staff? Teachers/daycare providers?) Do you trust these people and how they make healthcare decisions? Why or why not? What specifically did you discuss with these people? Did you trust what they said? Why or why not? Who was the most influential person in determining whether or not you would vaccinate your children? Why?
24) Did you look for information about childhood/HPV vaccines? If so, where did you look? (probe: Internet websites, forums, magazine articles, books, etc.)? Were you comfortable with the information that these sources provided? Why or why not? Which source was the most influential for you?
25) Did your child's school (or school health services) offer to provide vaccinations for your children? If so, which ones? What kind of information did they provide? Did you have the opportunity to discuss vaccinations with someone from the school/school health service? How was authorization requested? What do you think about this process (probe: Were you satisfied with the process? Why or why not?)?
26) Have you ever felt pressured to vaccinate or not vaccinate your children outside of a medical setting? By whom? (Probe: spouse/child's other parent? Parents? Friends? Family? Authorities? Teachers/daycare providers (perhaps may have excluded children from being allowed to come to daycare)?) How specifically did they pressure you? Did they influence your decision?

Questions about the decision-making process during the patient-provider interaction

27) When discussing the vaccination decision with your provider(s), what were your questions regarding vaccines? Were you comfortable raising these questions or concerns? How did the provider(s) react to your questions or concerns? (probe: Was the provider receptive? Were you criticized, belittled, or patronized for your questions/concerns? Were you taken seriously?) Were your questions sufficiently addressed by the medical provider(s) (**biomedical and/or CAM**)? Why or why not?
28) Did you discuss the vaccination decision for your children with your medical provider(s)? With a biomedical provider? A CAM provider? Or both?
    a. **For parents seeking vaccine advice from CAM providers, probe further:** Why did you choose to seek vaccine-related information from a CAM medical provider? Do you trust this information? Why or why not? How did the discussion go? Were your questions sufficiently addressed by the CAM provider? Why or why not?

Qualitative interview guideline for parents

b. **For parents seeking vaccine advice from biomedical providers, probe further:** Why did you choose to seek vaccine-related information from a biomedical provider? Do you trust this information? Why or why not? How did the discussion go? Were your questions sufficient addressed by the biomedical provider? Why or why not?
c. **For parents seeking vaccine advice from both, probe further**: Why did you choose to seek vaccine-related information from both CAM and biomedical providers?

29) Have you ever felt pressured to vaccinate or not vaccinate your children by any of your providers? And in other medical settings (i.e. urgent care centers)? How specifically did the provider pressure you? How did it happen in other medical settings? Did this influence your decision to vaccinate or not vaccinate your children? How so?
30) Have you ever been criticized or excluded from a practitioner's office because of your views towards vaccinations? In what circumstances? Did this influence your decision to vaccinate or not vaccinate your children?
31) About how much time did you spend discussing vaccinations with your provider(s)? Do you think the medical provider(s) (**biomedical and/or CAM**) spent enough time addressing your vaccine-related concerns? Would you have liked to spend more time discussing vaccinations with your provider? Why or why not?
32) How clearly did your medical provider(s) explain vaccinations to you? Did you understand the information provided to you? Would you have liked to receive more/other information from your medical provider(s)? If so, about what specifically?

Concluding Questions

33) In conclusion, what is the most important factor influencing your decision towards vaccinations?
34) Is there anything that you could recommend to improve upon how vaccines are currently administered in Switzerland? If so, what would you recommend?
35) Would you like to make any clarifications about anything we discussed? Would you like to add anything that we did not discuss? Do you have any questions?

Questions for providers

Introduction - Establishing background information about the provider

1) Can you talk a bit about yourself and briefly present your job title? How would you introduce yourself to other colleagues?
2) What type of provider are you (probe: pediatrician, generalist, biomedical, CAM, etc.)?
3) How long have you been practicing medicine? In what year was your final exam? How long have you been practicing in your current position?
4) Do you follow any specific approaches to medicine and medical treatment?
5) What types of patients do you see and treat?

Questions about patient-provider interactions

6) Do you recommend vaccinations to your patients? If so, which ones? Why do you recommend them?
7) If you do not recommend vaccinations to your patients, why not? Which ones do you not recommend? Why?
8) **Childhood vaccines:** Can you describe a typical vaccine consultation which involves young children's (less than 11 years old) vaccination-related decisions? Who is present? How do you inform parents/children about vaccinations? What is discussed? Who makes the decisions (probe: mother, father, child, provider decides for the parent, etc.)?
9) **HPV:** Can you describe a typical vaccine consultation, which involves adolescent patients' (between 11 and 14 years old) vaccination-related decisions for HPV? Who is present? How do you inform parents/adolescents about vaccinations? Do you broach sexuality? What is discussed (probe: sexuality, genital warts, cervical cancer, ear nose and throat cancers, anal/penis cancer)? Is there any difference when discussing HPV-vaccinations with a female or male adolescent? Who makes the decisions (probe: mother, father, adolescent, provider, school physician/authorities)?
10) In general, when it comes to vaccination-related decisions, who tends to make the decisions? (probe: mother, father, both, child/adolescent, provider, school physician/authorities)?
11) What are typical questions parents (mothers/fathers) have concerning vaccines for their children? (Probe: What kinds of questions do they have about childhood vaccinations? What kinds of questions do they have about the HPV vaccine? Anxieties/concerns?)
12) How do you discuss the consequences of vaccinating or not vaccinating children with parents? Can you give examples?
    a. How do you discuss vaccinations with parents who wish to vaccinate their children? Do you have any examples? What are the key reasons for parents that come to you to vaccinate their children?
    b. How do you discuss vaccinations with parents who are hesitant to vaccinate their children? Do you have any examples? What are the key reasons for parents that come to you not to vaccinate their children?
13) Do you try to influence parents' decisions regarding vaccination for their children? If so, how do you try to convince parents to follow your recommendations? What advice do you give? Do you have any strategies to influence parents' decisions?
14) Do parents generally follow your advice and recommendations regarding vaccination? Why or why not?
15) Have you ever excluded a patient from your practice/clinic due to his/her perspectives on vaccination? Can you provide an example? What happened during this consultation?
16) How much time do you usually have for the discussions with parents regarding vaccination? Do you feel that this amount of time is sufficient? How much time do you need? (Probe: would you like more or less time spent on the topic?)
17) Do you feel like you have been properly trained to discuss vaccinations with parents and children/adolescent? Would you like extra training? What should this extra training cover?

Questions for providers

Information about vaccination beliefs, practices, and recommendations to patients

18) How do you feel about vaccinations?
19) Where do you obtain your information regarding vaccinations (probe: colleagues, Swiss/BAG recommendations, specific approach to medicine, Internet, medical textbooks, etc.)?
20) For you, is there a difference between immunity that has been acquired "naturally" (i.e. having been infected with a disease and surviving) and immunity acquired through the use of vaccines? What is the difference for you? Is one way better than the other? Why or why not?
21) What do you think about waiting to vaccinate children when they are older,(prompt: immune systems more mature, body integrity, causing injury, vulnerability, protected by mother antibodies)?
22) How do you feel about individualized vaccine schedules?
23) Do you think vaccinations should be an individual choice for families? Why or why not? Should considerations of community/public health (i.e. herd immunity) also play a role in vaccine decisions? Why or why not? (If needed, explain herd immunity: When a critical portion of a community is immunized against a contagious disease, most members of the community are protected against that disease because there is little opportunity for an outbreak.)
24) In your opinion, are people in Switzerland vaccinated sufficiently? Should there be a specific vaccination rate? (probe: higher rates, lower rates, fine as is, etc.)
25) Do you think vaccinations can have any benefits? What kind of benefits? Where do you get the information related to benefits? Do you trust these sources? Why or why not?
26) Do you think vaccinations can have any risks? What kind of risks? Where do you get the information related to risks? Do you trust these sources? Why or why not?
27) Do you think there are differences between different types of vaccinations? Are some more beneficial than others? If yes, which ones? Are some more risky than others? If yes, which ones?
    a. **Recommended childhood vaccinations**: (Probe: recommended childhood vaccines in Switzerland: DTP-HIB-IPV; Diphtheria, Tetanus, Pertussis, Haemophilus influenzae (meningitis), Polio; MMR: mumps, measles, rubella).
    b. **Adolescent Vaccines: for HPV**: What do you consider when discussing HPV with your patients? (probe: Do you have different advice for males and females? What does the vaccine protect against? How new the vaccine is? Not knowing the side effects or long-term effects? Did you consider the preventative aspects for sexually transmitted infections? earlier onset of sexual activity, more partners, more unprotected sex because the vaccine "protects", etc. Does that influence your advice? Why or why not?)
28) Is there anything that could prompt you to change your beliefs about vaccinations for your patients?

Concluding Questions

29) To conclude, what are the most important considerations regarding vaccines?
30) Is there anything that you could recommend to improve upon how vaccines are currently administered in Switzerland? If so, what would you recommend?
31) Would you like to make any clarifications about anything we discussed? Would you like to add anything that we did not discuss? Do you have any questions?

Quantitative questionnaire

Select the questionnaire
- Childhood vaccination
- HPV parent
- HPV adolescent
- Provider

Select the language
- English
- Français
- Deutsch
- Italiano

Date of the interview
- Date

ID of interviewer
- Identifying number

ID of questionnaire
- Identifying number

ID of provider
- Identifying number

Name of provider
- Write-in response with provider's name

Name of respondent
- Write-in response with respondent's name

Name of the target child
- Write-in response with target child's/youth's name

Birthday of the target child
- Date of birth of target child/youth

Is a copy of the vaccination card available to the study team?
- Yes
- Not yet available, but participant agreed to send it during recruitment
- Card not available: do not vaccinate
- Card not available: lost vaccination card
- Card not available: child too young
- Card not available: other reason
- Participant does not want to share the card
- No answer

Consent form available
- Yes
- No

Is the relevant person available?
- Yes, target person is already on the phone and ready for interview
- Another situation...

Please describe why the person is not available and what are the next steps
- Write-in response with why the person is not available and what are the next steps

What is the sex of [child's name]?
- Boy
- Girl
- Intersex
- Doesn't want to disclose

Is Dr. [primary providers's name] [child's name]'s doctor?

- Yes
- No
- Unclear

Right person identified, interview can start

- Interview started
- Language problems
- Person refused
- Interviewee incapacitated
- Other

The interview cannot take place as not all identification or selection criteria are met. I would like to thank you very much for your time.

In order to obtain more background about you and your practices, could you please tell me if you are a licensed medical doctor in Switzerland?

- Yes
- No
- Missing

Have you undertaken any additional specialist training in any discipline of complementary and/or alternative medicine?

- Yes
- No
- Missing

Which ones?

- Anthroposophic medicine
- Traditional Chinese Medicine / Acupuncture
- Homeopathic medicine
- Phytotherapy (i.e. plant-based/herbal remedies)
- Other(s)
- No answer

Ok. Thank you. Do you provide any complementary or alternative medicines to your patients?

- No
- Yes
- Missing

Which ones?

- Anthroposophic medicine
- Traditional Chinese Medicine / Acupuncture
- Homeopathic medicine
- Phytotherapy (i.e. plant-based/herbal remedies)
- Other(s)
- No answer

Anthroposophic medicine

- No
- Yes

Traditional Chinese Medicine / Acupuncture

- No
- Yes

Homeopathic medicine
No
Yes

Phytotherapy (i.e. plant-based/herbal remedies)
No
Yes

Other(s)
No
Yes

No answer
No
Yes

You live in a household with X people. How would you describe the household you live in. Is it...

Household of a couple with 1 or more children
Household of a single parent with 1 or more children
Household of people who are not related at all
Household where some of the people are related
Household of people who are all related
Doesn't want to disclose
Doesn't know
Missing

Could you please tell me about the people who live in your home, yourself included?
First yourself [person 1], what is your age?
Age

Person 1, sex

Male
Female
Other/not disclosed
Missing

How are you related to [child's name]?
Mother
Step-mother
Mother/father's partner
Sister or half-sister
Step-sister
Grand-mother
Aunt, cousin
Other relative
Not a relative
Doesn't want to disclose
Doesn't know
Missing

How are you related to [child's name]?

Father
Step-father
Mother/father's partner
Brother or half-brother

Step-brother
Grand-father
Uncle, cousin
Other relative
Not a relative
Doesn't want to disclose
Doesn't know
Missing

Besides you and [child's name], who else lives in your household?

Indicates that another person lives in household
Indicates that NO other person lives in household
Doesn't want to say
Missing

Person 2, age
[Same as above]

Person 2, sex
[Same as above]

How is she related to [child's name]?
[Same as above]

How is he related to [child's name]?
[Same as above]

Does someone else live in your household?
[Same as above]

Person 3, age
[Same as above]

Person 3, sex
[Same as above]

How is she related to [child's name]?
[Same as above]

How is he related to [child's name]?
[Same as above]

Do you have children?

Yes
No
Doesn't want to disclose
Doesn't know
Missing

How many?
Number of children

Do you have any children who do not live at home?

Yes
No
Doesn't want to disclose
Doesn't know
Missing

How many?
Number of children

How would you describe the household you live in. Is it...

Household of couple without children

Household of a couple with 1 or more children

Household of a single parent with 1 or more children

Household of people who are not related at all

Household where some of the people are related

Household of people who are all related

doesn't want to disclose

doesn't know

missing

Have you ever delayed [child's name]'s vaccination for reasons other than illness or allergy?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

Have you ever refused [child's name]'s vaccination for reasons other than illness or allergy?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

On a scale from 0 to 10, with 0 being not sure at all and 10 being completely sure, How sure are you that following the recommended vaccine schedule is a good idea for [child's name]?

0 - 10

I will rephrase the question: On a scale from 0 to 10, with 0 being not sure at all and 10 being completely sure, how sure are you that it is a good idea to vaccinate [child's name] with the vaccines recommended by the Federal Office of Public Health?

0 - 10

Do you agree or disagree with the following statements:

It is my role as a parent to question shots.

Strongly agree

Sgree

Not sure

Disagree

Strongly disagree

Doesn't want to disclose

Missing

I believe that many of the illnesses that vaccines prevent are severe.

Strongly agree

Sgree

Not sure

Disagree

Strongly disagree

Doesn't want to disclose

Missing

It is better for [child's name] to develop immunity by getting sick than to get a vaccine.

- Strongly agree
- Sgree
- Not sure
- Disagree
- Strongly disagree
- Doesn't want to disclose
- Missing

It`s better for [child's name] to get fewer vaccines at the same time.

- Strongly agree
- Sgree
- Not sure
- Disagree
- Strongly disagree
- Doesn't want to disclose
- Missing

How concerned are you that [child's name] might have a serious side effect from a vaccine?

- Not at all concerned
- Not too concerned
- Not sure
- Somewhat concerned
- Very concerned
- Doesn't want to disclose
- Missing

How concerned are you that one of the vaccines might not be safe?

- Not at all concerned
- Not too concerned
- Not sure
- Somewhat concerned
- Very concerned
- Doesn't want to disclose
- Missing

How concerned are you that vaccines might not prevent disease?

- Not at all concerned
- Not too concerned
- Not sure
- Somewhat concerned
- Very concerned
- Doesn't want to disclose
- Missing

If you had another child today, would you want him/her to get all the recommended vaccines?

- Yes
- No
- Doesn't want to disclose

Doesn't know
Missing

Overall, how hesitant about vaccinations would you consider yourself to be?

Not at all hesitant
Not too hesitant
Not sure
Somewhat hesitant
Very hesitant
doesn't want to disclose
missing

Do you agree or disagree with the following statements:

I educate parents of children in my practice about the importance of immunizations.

Strongly agree
Sgree
Not sure
Disagree
Strongly disagree
Doesn't want to disclose
Missing

I monitor whether or not children I see are up to date on their immunizations.

Strongly agree
Sgree
Not sure
Disagree
Strongly disagree
Doesn't want to disclose
Missing

I trust the information I receive about vaccinations .

Strongly agree
Sgree
Not sure
Disagree
Strongly disagree
Doesn't want to disclose
Missing

I am able to openly discuss my concerns about vaccines with my child's doctor.

Strongly agree
Sgree
Not sure
Disagree
Strongly disagree
Doesn't want to disclose
Missing

All things considered, how much do you trust your child's doctor, on a scale from 0 to 10, with 0 being not at all and 10 being completely?

0 - 10

Have you ever discussed [child's name]'s vaccination with [provider's name]?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

How strongly does [provider's name]recommend vaccinating [child's name] with all the recommended vaccines?

Supports all recommended vaccines

Supports most recommended vaccines

Supports some recommended vaccines

Doesn't support any recommended vaccines

Doesn't want to disclose

Doesn't know

Missing

How important is following the recommended vaccination schedule for [provider's name]?

Very important

Somewhat important

Not very important

Not important at all

Doesn't want to disclose

Doesn't know

Missing

How much do you trust the information [provider's name] gave you?

Completely trust

Somewhat trust

Neither trust nor distrust

Somewhat distrust

Don't trust at all

Doesn't want to disclose

Doesn't know

Missing

How satisfied were you with your discussions about vaccines with [provider's name]?

Not at all satisfied

Somewhat satisfied

Neither satisfied nor unsatisfied

Satisfied

Very satisfied

Doesn't want to disclose

Doesn't know

Missing

Please indicate how much you agree with the following statements:

I am able to ask [provider's name] questions about vaccination.

Completely agree

Somewhat agree
Neither agree nor disagree
Somewhat disagree
Completely disagree
Doesn't want to disclose
Doesn't know
Missing

[Provider's name] takes the time needed to discuss my concerns about vaccination with me.
Completely agree
Somewhat agree
Neither agree nor disagree
Somewhat disagree
Completely disagree
Doesn't want to disclose
Doesn't know
Missing

[Provider's name] takes my concerns about vaccination seriously.
Completely agree
Somewhat agree
Neither agree nor disagree
Somewhat disagree
Completely disagree
Doesn't want to disclose
Doesn't know
Missing

[Provider's name]'s views on vaccination are similar to my own.
Completely agree
Somewhat agree
Neither agree nor disagree
Somewhat disagree
Completely disagree
Doesn't want to disclose
Doesn't know
Missing

Have you discussed vaccination for [child's name] with any other doctor?
Yes
No
Doesn't want to disclose
Doesn't know
Missing

What led you to consult another doctor?
Second opinion
Moved
Former provider stopped working

Disagreement with provider
Other:_____
Doesn't want to disclose
Doesn't know
Missing

How satisfied were you with your discussions about [child's name]'s vaccines with that doctor?
Not at all satisfied
Somewhat satisfied
Neither satisfied nor unsatisfied
Satisfied
Very satisfied
Doesn't want to disclose
Doesn't know
Missing

How much do you trust the information that doctor gave you about vaccines?
Completely trust
Somewhat trust
Neither trust nor distrust
Somewhat distrust
Don't trust at all
Doesn't want to disclose
Doesn't know
Missing

What are your most trusted information sources on vaccination?
No information/no source
Family
My child's doctor
Other doctor
Friends and acquaintances
Public health authorities
TV
Internet
Social media (such as Facebook, Instagram and Twitter)
Print media (such as books, magazines and newspapers)
Other:_____
Doesn't want to disclose
Doesn't know
Missing

Which TV programs?
Write-in response
Which websites?
Write-in response
What social media?
Write-in response
What print media?

Write-in response

What other sources?

Write-in response

Did you apply the information you received when making decisions about vaccination for your child?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

Please indicate how much you agree with the following statements:

I can always prevent my child from being infected with vaccine-preventable diseases by other means than vaccination.

Completely agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Completely disagree

Doesn't want to disclose

Doesn't know

Missing

Vaccine-preventable diseases can be easily cured in Switzerland.

Completely agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Completely disagree

Doesn't want to disclose

Doesn't know

Missing

Vaccines can cause serious long-term harm to health.

Completely agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Completely disagree

Doesn't want to disclose

Doesn't know

Missing

Vaccination is unnatural, so it is best to vaccinate as little as possible.

Completely agree

Somewhat agree

Neither agree nor disagree

Somewhat disagree

Completely disagree

Doesn't want to disclose

Doesn't know

Missing

How likely do you think it is that your child will be exposed to vaccine-preventable diseases in your home?

Very likely

Somewhat likely

Not sure

Somewhat unlikely

Very unlikely

Doesn't want to disclose

Doesn't know

Missing

How likely do you think it is that your child will be exposed to vaccine-preventable diseases in your community?

Very likely

Somewhat likely

Not sure

Somewhat unlikely

Very unlikely

Doesn't want to disclose

Doesn't know

Missing

About how many of your family members with children do you think have vaccinated their children?

Almost all

About three-quarters

About half

About a quarter

Almost none

Doesn't want to disclose

Doesn't know

Missing

About how many of your friends with children do you think have vaccinated their children?

Almost all

About three-quarters

About half

About a quarter

Almost none

Doesn't want to disclose

Doesn't know

Missing

About how many of the children in your community do you think are vaccinated?

Almost all

About three-quarters

About half

About a quarter

Almost none
Doesn't want to disclose
Doesn't know
Missing

Now I would like to ask you some questions about health more generally.

How is your child's health, in general?

Very good
Good
OK
Bad
Very bad
Doesn't want to disclose
Doesn't know
Missing

Do you agree or disagree with the following statements:

It is my responsibility as a parent to actively research health decisions for my child

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree
Doesn't want to disclose
Doesn't know
Missing

I took an active role in choosing my child's doctor.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree
Doesn't want to disclose
Doesn't know
Missing

I chose a doctor for my child who shares my views on health.

Strongly agree
Agree
Neither agree nor disagree
Disagree
Strongly disagree
Doesn't want to disclose
Doesn't know
Missing

If I disagree or am uncertain about the advice of a nurse or a doctor, I am comfortable saying so.

Strongly agree

Agree
Neither agree nor disagree
Disagree
Strongly disagree
Doesn't want to disclose
Doesn't know
Missing

How many of the recommended well-child visits from birth until now has your child completed?

All recommended visits
Some but maybe not all recommended visits
None of them
Doesn't want to disclose
Doesn't know
Missing

When [child's name] was an infant (0-2 years old), which of the following childcare options did you use? Please indicate all that apply.

I (or my partner) stayed home with him/her.
Other family cared for him/her.
A nanny cared for him/her in my home.
He/she attended a small, home-based day care.
He/she attended private day care.
He/she attended public day care.
Other
Doesn't want to disclose
Doesn't know
Missing

And how old was he/she when he/she started day care?

Age

I will now list some activities. Please indicate which of these descriptions applies to what you did when [child's name] was an infant (0-2 years old)? Please indicate all that apply

In paid work
In education (even if on vacation)
Unemployed and actively looking for a job
Unemployed, wished to work but didn't actively look for a job
Permanently sick or disabled
Retired
In community or military service
Doing housework, looking after children or other persons
Other
Doesn't want to disclose
Doesn't know
Missing

What were your total 'basic' or contracted hours each week (in your main job), excluding any paid and unpaid overtime?

Hours

How is your health in general? Is it...

- Very good
- Good
- OK
- Bad
- Very bad
- Doesn't want to disclose
- Doesn't know
- Missing

How important is health for you? Here are three options, please tell us which one is closest to your own opinion.

- I live without worrying too much about consequences for my health.
- My lifestyle is influenced by considerations about maintaining my health.
- Considerations about my health have a large impact on how I live.
- Doesn't want to disclose
- Doesn't know
- Missing

In the last 12 months, that is since [month, year], which of the following treatments have you used for your own health? Please indicate yes or no for each.

- Acupressure
- Acupuncture
- Anthroposophical medicine
- Chinese medicine
- Chiropractics
- Herbal treatment
- Homeopathy
- Hypnotherapy
- Massage therapy
- Osteopathy
- Physiotherapy
- Reflexology
- Spiritual Healing
- Other:_____
- None of these
- Don't know

The following questions have been posed to your patients who participated in this study.We would now like to pose the same questions to you.This will help us to better understand the factors that play a role when patients choose their providers.

Now I would like to ask you some questions about other topics to get a sense of your core worldview and political and religious sentiments.

Do you consider yourself as belonging to any particular religion or denomination?

- Yes
- No
- Doesn't want to disclose
- Doesn't know

Missing

Which one?

Christian:_____

Jewish:_____

Islamic:_____

Eastern religions:_____

Other non-Christian religions:____

Doesn't want to disclose

Doesn't know

Missing

Please specify which exactly:

Write-in response

Apart from special occasions such as weddings and funerals, about how often do you attend religious services nowadays?

Every day

More than once a week

Once a week

At least once a month

Only on special holy days

Less often

Never

Doesn't want to disclose

Doesn't know

Missing

Regardless of whether you belong to a particular religion, how religious would you say you are?

Not at all religious

Somewhat religious

Religious

Very religious

Doesn't want to disclose

Doesn't know

Missing

How important do you consider spiritual experiences to be in your everyday life?

Very important

Somewhat important

Not very important

Not important at all

Not sure

Doesn't want to disclose

Doesn't know

Missing

How interested would you say you are in politics? Are you…

Very interested

Quite interested

Hardly interested

Or, not at all interested?
Doesn't want to disclose
Doesn't know
Missing

Is there a particular political party that you feel closer to than all the other political parties?
Yes
No
Doesn't want to disclose
Doesn't know
Missing

Which one?
Write-in response

In politics, people sometimes talk of "left" and "right". Where would you place yourself? Would you consider yourself…
Left
Center left
Center
Center right
Right
Doesn't want to disclose
Doesn't know
Missing

How often do you participate in activites with a society, a club, a political party, a cultural association, or other groups, including relgious groups?
Almost every day
About once a week
About 1-3 times a month
A few times a year
More rarely
Never
Doesn't want to disclose
Doesn't know
Missing

We would now like to pose some questions regarding the values that generally guide people in their everyday life. The questions don't directly relate to vaccinations.

When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking?
Whether or not someone suffered emotionally. Is it not at all relevant, not very relevant, slightly elevant, somewhat relevant, very relevant or extremely relevant?
Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know

Missing

Whether or not someone was treated differently than others.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone's actions showed love for his or her country.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone's actions showed a lack of respect for authority.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone violated standards of purity and decency.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone was good at math.

Not at all relevant
Not very relevant

Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone cared for someone weak or vulnerable.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone acted unfairly.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone did something to betray his or her group.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Whether or not someone conformed to the traditions of society.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant

Doesn't want to disclose
Doesn't know
Missing

Whether or not someone did something disgusting.

Not at all relevant
Not very relevant
Slightly relevant
Somewhat relevant
Very relevant
Extremely relevant
Doesn't want to disclose
Doesn't know
Missing

Please listen to the following statements and indicate whether you strongly disagree, moderately disagree, slightly disagree, slightly agree, moderately agree or strongly agree

Compassion for those who are suffering is the most crucial virtue.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

When the government makes laws, the number one principle should be ensuring that everyone is treated fairly.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

I am proud of my country's history.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know

Missing

Respect for authority is something all children need to learn.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

People should not do things that are disgusting even if no one is harmed.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

It is better to do good than to do bad.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

One of the worst things a person could do is hurt a defenseless animal.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

Justice is the most important requirement for a society.

Strongly disagree
Moderately disagree

Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

People should be loyal to their family members even when they have done something wrong.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

Men and women should each have different roles to play in society.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

I would call some acts wrong on the grounds that they are unnatural.

Strongly disagree
Moderately disagree
Slightly disagree
Slightly agree
Moderately agree
Strongly agree
Doesn't want to disclose
Doesn't know
Missing

I just have a few more questions to finish up.

First I would like to ask some questions about you and [child's name]'s other parent's education.
What is the highest level of education you have successfully completed?

Secondary school not completed, no completed
Professional education
Completed 9 years of school, no further education
Technical scool or business school

Completed apprenticeship
College
Primary school teacher seminar
Higher professional school
Bachelor at University or applied university
Master at University or applied university
Doctorate at University or applied university
Other
Doesn't want to disclose
Doesn't know
Missing

And what about [child's name]'s father/mother? What is the highest level of education s/he has successfully completed?

Secondary school not completed, no completed Professional education
Completed 9 years of school, no further education
Technical scool or business school
Completed apprenticeship
College
Primary school teacher seminar
Higher professional school
Bachelor at University or applied university
Master at University or applied university
Doctorate at University or applied university
Other
Doesn't want to disclose
Doesn't know
Missing

Which of these descriptions apply to what you have been doing for the last seven days?

In paid work or away temporarily
In education (even if on vacation)
Unemployed and actively looking for a job
Unemployed, wishes to work but doesn't actively look for a job
Permanently sick or disabled
Retired
In community or military service
Doing housework, looking after children or other persons
Other
Doesn't want to disclose
Doesn't know
Missing

Regardless of your basic or contracted hours, how many hours per week do you normally work, including any paid or unpaid overtime?

Hours

What is your current occupation?

Write-in response

And what about [child's name]'s father/mother? Which describes his/her situation in the last seven days?

In paid work or away temporarily

In education (even if on vacation)

Unemployed and actively looking for a job

Unemployed, wishes to work but doesn't actively look for a job

Permanently sick or disabled

Retired

In community or military service

Doing housework, looking after children or other persons

Other

Doesn't want to disclose

Doesn't know

Missing

How many hours does s/he normally work, including any paid or unpaid overtime?

Hours

What is his/her current occupation?

Write-in response

In what range is your current annual household income?

<20'000

<40'000

<60'000

<80'000

<100'000

<120'000

<150'000

Min. 150'000

Refuses answer

Doesn't know

Missing

Are you a citizen of Switzerland?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

What citizenship do you hold?

Write-in response

Were you born in Switzerland?

Yes

No

Doesn't want to disclose

Doesn't know

Missing

In which country were you born?

Write-in response

What year did you first come to live in Switzerland?

Year

What languages do you speak most often at home?

Write-in response

Second language:

Write-in response

What language do you speak most often with your doctor?

Write-in response

What is your postcode?

Write-in response

Do you have comments you would like to make?

Write-in response

Supplementary Table S1. Satisfaction with and trust in primary biomedically- and CAM-oriented providers.

	All parents (N=1390)	*By PACV-score*		
		Non-VH parents (N=889)	*VH parents (N=501)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Type of primary provider				*<0.001*
Biomedical	*893 (64)*	*705 (79)*	*188 (38)*	
CAM	*490 (35)*	*183 (21)*	*307 (61)*	
Missing	*7 (1)*	*1 (0)*	*6 (1)*	
Discussed vaccines with primary provider				*<0.001*
No	*318 (23)*	*238 (27)*	*80 (16)*	
Yes	*1063 (76)*	*645 (73)*	*418 (83)*	
Missing	*9 (1)*	*6 (1)*	*3 (1)*	
Parents who reported having discussed vaccination with primary provider	*Total sample (N=1063)*	*By PACV-score*		
		Non-VH parents (N=645)	*VH parents (N=418)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*928 (87)*	*586 (91)*	*342 (82)*	*<0.001*
Trust provider[2]	*1000 (94)*	*632 (98)*	*368 (88)*	*<0.001*
Provider's views are similar to parents'[2]	*838 (79)*	*567 (88)*	*271 (65)*	*<0.001*
Parents who reported having discussed vaccination with biomedical primary provider	*Total sample (N=656)*	*By PACV-score*		
		Non-VH parents (N=511)	*VH parents (N=145)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*567 (86)*	*467 (91)*	*100 (69)*	*<0.001*
Trust provider[2]	*623 (95)*	*503 (98)*	*120 (83)*	*<0.001*
Provider's views are similar to parents'[2]	*528 (80)*	*449 (88)*	*79 (54)*	*<0.001*
Parents who reported having discussed vaccination with CAM primary provider	*Total sample (N=400)*	*By PACV-score*		
		Non-VH parents (N=133)	*VH parents (N=267)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*355 (89)*	*118 (89)*	*237 (89)*	*0.395*
Trust provider[2]	*371 (93)*	*128 (96)*	*243 (91)*	*0.164*
Provider's views are similar to parents'[2]	*305 (76)*	*117 (88)*	*188 (70)*	*0.001*
Parents reporting that primary providers' views are similar to their own[2]	*Total sample (N=838)*	*By PACV-score*		
		Non-VH parents (N=567)	*VH parents (N=271)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*774 (92)*	*522 (92)*	*252 (93)*	*0.485*
Trust provider[2]	*820 (98)*	*560 (99)*	*260 (96)*	*0.004*
Parents reporting that biomedical primary providers' views are similar to their own[2]	*Total sample (N=528)*	*By PACV-score*		
		Non-VH parents (N=449)	*VH parents (N=79)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*479 (91)*	*413 (92)*	*66 (84)*	*0.081*
Trust provider[2]	*518 (98)*	*444 (99)*	*74 (94)*	*<0.001*
Parents reporting that CAM primary providers' views are similar to their own[2]	*Total sample (N=305)*	*By PACV-score*		
		Non-VH parents (N=117)	*VH parents (N=188)*	
	N (%)	*N (%)*	*N (%)*	*P value*
Satisfied with provider[1]	*290 (95)*	*108 (92)*	*182 (97)*	*0.141*
Trust provider[2]	*297 (97)*	*115 (98)*	*182 (97)*	*0.516*

Note. [1]Satisfied/very satisfied; [2]Somewhat or completely; Pearson's Chi-squared tests were used for statistical analysis.

STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract yes (p. 1-2)	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale yes (p. 3-5)	2	Explain the scientific background and rationale for the investigation being reported
Objectives yes (p. 5)	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design yes (p. 6)	4	Present key elements of study design early in the paper
Setting yes (p. 6)	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants yes (p. 6-7)	6	Give the eligibility criteria, and the sources and methods of selection of participants
Variables yes (p. 6-8)	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement yes (p. 7-8)	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size yes (p. 8-9)	10	Explain how the study size was arrived at
Quantitative variables yes (p. 7)	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods yes (p. 7)	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants yes (p. 8-9)	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data yes (p. 8-9)	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures
Main results yes (p. 9-18)	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized

		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results **yes (p. 18-19)**	18	Summarise key results with reference to study objectives
Limitations **yes (p. 3)**	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation **yes (18-20)**	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability **yes (p. 3, 19-20)**	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding **yes (p. 20)**	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.