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“Everybody just wants to do what’s best for their child”: Understanding how pro-vaccine parents can support a culture of vaccine hesitancy

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Abstract

Background—Although a large majority of parents vaccinate their children, vaccine hesitancy has become more widespread. It is not well understood how this culture of vaccine hesitancy has emerged and how it influences parents’ decisions about vaccine schedules.

Objective—We sought to examine how attitudes and beliefs of parents who self-report as pro-vaccine are developed and contribute to immunization decisions, including delaying or spacing vaccines.

Methods—Open-ended, in-depth interviews (N=23) were conducted with upper-middle class parents with young children living in Philadelphia. Interview data were coded and key themes identified related to vaccine decision-making.

Results—Parents who sought out vaccine information were often overwhelmed by the quantity and ambiguity when interpreting that information, and, consequently, had to rely on their own instinct or judgment to make vaccine decisions. In particular, while parents in this sample did not refuse vaccines, and described themselves as pro-vaccine, they did frequently delay or space vaccines. This experience also generated sympathy for and tolerance of vaccine hesitancy in other parents. Parents also perceived minimal severe consequences for deviating from the recommended immunization schedule.

Conclusion—These findings suggest that the rise in and persistence of vaccine hesitancy and refusal are, in part, influenced by the conflicts in the information parents gather, making it difficult to interpret. Considerable deviations from the recommended vaccination schedule may manifest even within a pro-vaccine population due to this perceived ambiguity of available information and resulting tolerance for vaccine hesitancy.

Keywords

vaccine hesitancy; vaccination; parents; immunization schedule

INTRODUCTION

The 2014–2015 measles outbreak, in which 129 people from 7 states in the US were reported to have measles linked to Disneyland in California, has highlighted the resurgence of vaccine-preventable childhood diseases previously all but eliminated in the US by the implementation of the routine child immunization schedule (1,2). While nationally the coverage of measles vaccination is high (3), the resurgence of measles, with 668 cases in 2014 and 178 in 2015 as of June, points to the risk of social or spatial clusters of undervaccinated children (1,4,5). It also sheds light on rising parental vaccine hesitancy and refusal in the United States, as evidenced by increasing exemptions from mandated immunizations for school-entry and parental requests for alternative childhood immunization schedules (6–10).

Parental vaccine decision-making has been studied extensively to understand vaccine hesitancy and alternative vaccination schedules (8,11–17). Nationally, coverage for most childhood vaccines is high, indicating that most parents choose to vaccinate children (3). However, more and more concerns are being raised about the safety of the immunization schedule given controversies about the connection between vaccines and autism, the ingredients in vaccines, and the number of injections given to children (11). A 2010 survey given to a random sample of households found that while the majority of parents intended to vaccinate their children, most of them also had questions or concerns about vaccines (11). A 2009 study of health care providers found that 43% and 28% of physicians thought parents' level of concern about vaccines had greatly or moderately increased, respectively, compared to five years before (7). These doubts manifest themselves on a spectrum of vaccine decision-making that may then lead to deviance from the recommended Advisory Committee on Immunization Practices (ACIP) immunization schedule (12,18).

A number of studies have found that common reasons for forgoing or delaying vaccines include: concern about vaccine safety or efficacy; the necessity of vaccines; the perception that the child was too young; or the child being sick (14,16,19). Common parental concerns about vaccinations include child's pain or anxiety during immunization; short-term side effects of immunization; vaccine safety; immune system overload; and number of vaccines received (15). However, external factors also mediate vaccine concerns and behavior. Studies show that trust in the doctor is an important factor in parents' confidence and decision to vaccinate (12,20). Furthermore, immunization decisions are influenced by social norms and by the behavior and attitudes of peers (11,21,22).

The vast majority of parents continue to vaccinate their children according to the ACIP-recommended schedule, suggesting belief in the benefits of vaccination and trust in the advice from health care providers. However, vaccine hesitancy and questions about the instituted immunization schedule have become more common as parents continue to raise doubts and concerns about vaccines. In this context, the goal of the current study is to understand how parents make vaccination decisions, how their vaccine concerns translate into deviations from the ACIP schedule despite general acceptance of vaccines, and how they view others' decisions not to vaccinate. Elucidating these phenomena can help explain

the rise in and persistence of vaccine hesitancy and refusal that have contributed to events like the Disneyland measles outbreak.

METHODS

Participants and data collection

This qualitative study used semi-structured interviews to understand how parents make decisions about child vaccination, and the attitudes, perceptions and beliefs underlying these decisions. We used convenience sampling to recruit parents in an upper-middle class neighborhood in Philadelphia. We chose this neighborhood for three reasons: 1) the relatively high socioeconomic status meant that at least some parents would be likely to report vaccine hesitancy or refusal (16,23); 2) the neighborhood is served by a pediatrician who accommodates alternative vaccine schedule requests and with whom we had conducted clinic-based studies (24); and 3) an active neighborhood parent listserv facilitated recruitment. We did not target parents based on vaccine behavior. A total of 23 interviews were conducted by two of the authors (YB, AB) between July and September 2010, a year with a particularly large number of pertussis and mumps cases (25). 25 participants (19 mothers and 2 couples) who had at least one child aged 18 months–6 years and were living in Philadelphia were interviewed. Participants provided written consent to audio-record the interviews and provided their age, educational attainment, race-ethnicity, zip code of residence, and birth year of child(ren). Interviews lasted an average of 35 minutes. Participants were given a \$20 gift card to a local natural foods supermarket as a thank you. This study was approved by the Institutional Review Board of the University of Pennsylvania.

The goal of the interview was to elicit a narrative about parental experiences of vaccination and vaccine-related decisions. The interview guide (see Table 1) consisted of open-ended questions about their child's health and temperament; a recent health-related decision; the decision process around child vaccination, including information gathering, discussion with others, and interactions with health care providers; the actual experience of vaccination; and attitudes and perceptions about other parents' vaccine beliefs and behaviors. Interviews were audio-recorded and transcribed verbatim.

Coding and Thematic Analysis

We used a modified Grounded Theory approach to analyze interview data (26). This approach allowed the research team to ensure saturation of new parental attitudes and beliefs as they came up during the interviews (27). After the first 10 interviews were transcribed, the research team discussed emerging content codes and drafted a preliminary coding scheme. As further interviews were completed, this codebook was expanded and refined. Codes identified major content areas of the interview transcriptions, including information about the parent and child; parental decision-making; vaccine beliefs and behaviors, etc. After 23 interviews were completed, at which point thematic saturation was reached, 3 transcripts were selected at random and independently coded by two members of the research team (YB, AB) to verify coding reliability; minor changes to the codebook resulted. The research team then coded all interview data with a final codebook using NVivo 8.0

(QSR International Pty Ltd, Victoria, Australia). The first author (EW) then developed code memos which identified key themes related to the underlying study questions. Analysis of emergent themes was discussed and validated by the research team.

RESULTS

We interviewed 21 mothers and 2 mother-father pairs from Philadelphia, Pennsylvania for a total of 23 interviews (hereafter, we refer to all interview subjects as “parents”). Parent ages ranged from 32 to 46 with a median of 36; the sample was 69% non-Hispanic white, 22% Asian; and 9% Hispanic. All participants had some higher education, including 83% with a graduate degree and 17% with a college degree (see Table 2). All parents reported discussing vaccine decisions with a spouse or partner; the mothers expressed that they were primarily the parent who sought information about vaccines, had vaccine-related conversations with other parents and with health-care providers, and took their children to doctor’s appointments. No parents in the sample declined all vaccines; 2 (23%) declined some vaccines; 9 (39%) delayed some vaccines due extenuating circumstances at the time of a vaccine appointment (e.g., the child was sick) and 10 (44%) had deliberately spaced out some vaccines. Of the 14 participants who reported following the ACIP schedule, 4 had nevertheless delayed or spaced out vaccines.

Our thematic analysis revealed important potential mechanisms that illustrated how a climate of tolerance and accommodation for vaccine refusal can arise, even in a pro-vaccine population: First, parents contemplating vaccination felt frustrated by the overwhelming and conflicting information presented by various sources. Second, their decision process was informed by a palpable tension between a “scientific” and “non-scientific” approach to decision-making. These two factors, at play during the *formation* of vaccine intentions, led many parents to *implement* a delayed or spaced schedule despite self-identifying as pro-vaccine, and as adhering to the recommended schedule. Finally, these experiences during the formation and implementation of vaccine intentions generated sympathy and tolerance for vaccine hesitancy and refusal in other parents. We elaborate on these mechanisms below (see Table 3 for representative quotations).

Forming Vaccine Intentions

Responding to overwhelming and conflicting information—When describing their decision-making process around vaccination, parents reported being very well-informed, with many conducting their own research to inform their vaccination decisions. Rather than defaulting to vaccination as recommended by their pediatrician, parents made a conscious decision to vaccinate based on the available evidence.

However, parents expressed frustration at the overwhelming quantity of information available as well as perceived conflicting information from multiple sources. This led to ambiguity and uncertainty when interpreting that information. Parents cited many information sources used during their research: the scientific literature, the CDC website, books, a vaccine class, television shows, etc. Although confident about their data gathering and synthesis skills, the diversity and discrepancy across sources made it challenging (and time-consuming) to make an unequivocal decision.

Tension between “science-based” and “non-science-based” decision-making

—The “information overload” experienced by parents contributed to a tension between science-based and non-science-based judgments in parents’ description of the decision-making process. In particular, while parents knew the link between autism and vaccines had been scientifically discredited, they were still influenced by the media hype, which had generated doubts and fears in the back of their minds that were difficult to silence. Whether it was concerns about autism, thimerosal, aluminum, potential allergens, or side effects of MMR, parents felt “caught up in the insanity” (Interview 5).

A common concern that parents acknowledged was not necessarily scientific was “packing in” multiple vaccines all at once. Some associated getting vaccines with “putting...diseases into this tiny person’s body” (Interview 15). Receiving too many at once felt like “overloading” or “overwhelming” the immune system of a “little” or “tiny” baby (Interviews 1, 2, 14, 15, 22, 23). The resulting decision to stagger or space vaccines, as one interviewee noted, was not based on scientific evidence, but simply seemed like a “better idea” (Interview 21).

Another issue with incorporating science in their decision-making capacities was the uncertainty in weighing the costs and benefits of vaccines. On one hand, some parents saw these childhood infectious diseases as not severe if contracted; on the other hand, it would be “detrimental” (Interview 2) if they were to have a child who reacted severely to a vaccine, albeit this was a small chance. To one parent, it was a lose-lose situation, as she would never be able to forgive herself if her baby died of whooping cough “knowing that there’s something out there that could save them,” or if the baby developed “something preemptively that we learn later, had we never done this,” thus expressing her belief in the uncertainty of the risks of vaccines (Interview 7). In addition, another parent questioned whether it was necessary to vaccinate a young child for something he or she would be unlikely to get, like Hep B, or whether it was just “convenient to do it all in the first two or three years” (Interview 6).

Implementing Intentions

Delaying or spacing out vaccines as a response to vaccine doubts—In the face of this overwhelming uncertainty and hesitation, three main responses emerged. About a third of the parents trusted their pediatricians entirely and followed the recommended schedule. As one parent put it, “if we were going to use this particular pediatrician, what’s the point of having a relationship with them and not taking their suggestions?” (Interview 8). Another parent admitted to being nervous about “multiple shots at once,” but trust in the pediatrician overruled any other emotions affecting the decision (Interview 1). This response was consistent with articulating a belief in evidence-based reasons underlying the vaccination schedule.

A second group of parents also self-identified early in the interview as following the recommended vaccination schedule, but later reported altering the vaccine schedule due to day-of factors, like the child being sick or not wanting the child to receive too many shots at once. These parents did not perceive these deviations from the ACIP recommendation as a

“big deal” (Interview 5, 18), and report that for the most part their health care providers had no issue with accommodating the request.

A third group of parents decided to space or delay vaccines, and requested this schedule with their pediatrician up front. Parents were aware of their self-efficacy in doing so, and in fact acknowledged requesting an alteration to the schedule in order to assert that power. As one parent noted, “I wanted to know that I had control over the vaccine schedule, not [the pediatrician] or the CDC” (Interview 2). Parents requesting an altered schedule articulated specific reasons for doing so, including: not considering Hep B a necessary vaccine for a baby; avoiding multiple vaccines at once that might cause an unlikely but potential “inflammatory brain response” (Interview 6); and giving the child time to “process” the “mercury,” “aluminum,” and “other toxins” (Interviews 7, 12). Some parents noted that the reason why so many vaccinations are packed into the beginning is that “sometimes they don’t see these babies again” (Interview 11) –a category of parents they did not see themselves fall into. Regardless of how the vaccine decision was made, parents generally felt that delaying or spacing out vaccines was not at all irresponsible and even reasonable as long as the child eventually received all vaccines.

Given these doubts, parents tended to see alternative schedules as a “down-the-middle” (Interview 7) medium between not vaccinating at all versus vaccinating strictly based on authority. Delaying or spacing vaccines was a way to either balance the overload of mixed information advocating strictly for refusal or for adherence, or to act in a space in which there was a lack of “definitive” scientific information (Interview 7).

Sympathy and tolerance for vaccine hesitancy and refusal—Our interview guide prompted parents to describe their views of other parents’ vaccination decisions. We observed two distinct perspectives on whether and how reluctance to vaccinate should be accommodated or tolerated. Regarding vaccine *refusal*, some parents expressed strong disapproval of others who did not vaccinate their child, primarily for the harm it could cause others due to reduced herd immunity. Other parent felt neutral about others’ choices.

Regarding vaccine *hesitancy*, however, the large majority expressed some sympathy for or acceptance of others who desired an altered schedule. Parents felt that “everyone just wants to do what’s best for their child,” (Interviews 6, 13) and that doctors should be accommodating to those who do not wish to follow the schedule. While interviewees didn’t think hesitant parents were *right*, their own experiences of seemingly ambiguous and overwhelming vaccine information made decisions not to vaccinate understandable. Interviewees were particularly sensitive to the fact that hesitant parents might have, or know someone with, a child with autism or a developmental disorder, and that this first-hand experience could influence vaccine decisions. Furthermore, most interviewees did not distinguish between a spaced or delayed schedule and the recommended schedule, arguing that the social responsibility to vaccinate was fulfilled in either case.

DISCUSSION

Our analysis of qualitative data from interviews of parents with young children revealed that they are actively engaged in the decision-making processes around their child's health and, in this sample, strongly supported vaccination. These parents nevertheless exhibited vaccine hesitancy characterized by a conflict between "science-based" and "non-science-based" decision-making capacities, exacerbated by the uncertainty they felt when interpreting these vast, and sometimes conflicting, sources of information. This produced two phenomena: first, even strongly pro-vaccine parents often altered the recommended schedule; and second, parents sympathized with and were willing to tolerate others' decisions to pursue an alternative schedule.

As in other studies, we found that high immunization rates do not necessarily imply high confidence in vaccines (11). In our parent sample, no parents outright refused vaccines for their children except in the case of HepB. However, they expressed vaccine concerns consistent with those described in studies of vaccine-hesitant or -refusing parents, including possible adverse events and the quantity of vaccines given, both overall and at one time (11,14–16,28,29). These concerns could manifest as deviations from the recommended vaccine schedule, in part to assert control over the vaccine decision, and in part to alleviate or address lingering concerns. Deviations from the schedule could also emerge less deliberately, in response to a child illness, for example, or by a gut judgment. Still, although parents might delay vaccines, they may not identify themselves this way, for example, in a structured survey.

Our results point to the importance of the pediatric primary health care provider's response to requests for schedule deviations, particularly for in-the-moment requests. Parents in our sample confirmed findings from other studies noting the importance of trust in the pediatric provider (12,16,18). We also found that parents perceived a high degree of willingness to accommodate spaced or delayed schedules, particularly when the parent had already established vaccine acceptance. Some parents reported that pediatricians themselves had suggested delaying vaccines, for example when a child was sick, to make parents more comfortable, thus endorsing and instantiating parental concerns in an altered schedule. These important parental perceptions of their providers' response to vaccine hesitancy are consistent with provider studies, which show that while pediatricians follow the AAP schedule as the default, the majority of them are willing to spread out vaccines at least sometimes, or are comfortable with an alternative schedule if requested (7,10). This illustrates the role that individual provider attitudes and behavior may have on pursuing alternative schedules especially when trying to find a way to navigate parental hesitancy without dismissing them from the practice altogether (30–32). It may also hinge on the provider's own confidence in vaccine safety, interpretation of scientific versus non-scientific information, or flexibility towards what they view as contraindications to immunization (33,34).

The phenomena identified in our analyses help explain how a culture of vaccine hesitancy has developed and persisted over the past decade. While parents may be strongly pro-vaccine, prevalent vaccine concerns in the media and within social networks can subtly

influence the implementation of vaccine intentions leading to deviations from the ACIP-recommended schedule. We found that parents who look to the published literature to inform their decision did not perceive anything wrong about delaying vaccination, as long as they were given eventually. This perception fosters an environment of tolerance for vaccine hesitant parents, which may in turn influence parents who rely on social norms for decision-making to also delay vaccinations (35). While other studies have noted the influence of social networks on parents' vaccinations decisions (21,22,36), our results identify the important role that pro-vaccine parents can play in the creation and transmission of vaccine hesitant norms through networks.

Although the degree of the impact of vaccine delay depends on how long vaccines are spaced, a delay in one vaccine may produce a domino effect in adhering to the timing of other vaccines (37). This may in turn contribute to increased risk of disease transmission and potential for outbreaks (38,39). Furthermore, pursuing alternative schedules may make children vulnerable to acquiring vaccine-preventable diseases (40). However, more studies need to be conducted on whether this depends on the type of parent on the vaccine hesitancy spectrum, and whether the degree of this epidemiological impact is negligible for vaccines delayed by minor versus severe delays.

We note several limitations in our study. First, this was a qualitative study of a specific population of parents in Philadelphia, all of whom were potentially already interested in vaccination issues. While we don't claim that their views are representative or generalizable, the parents in the sample identified qualitative themes and proposed phenomena that may help explain how pro-vaccine parents exhibit and perpetuate vaccine hesitancy, and could highlight potential issues for future studies addressing vaccine hesitancy. In addition, we base our analyses on their perceptions and recollections of vaccine decisions and provider encounters, and were not able to verify these reports. Finally, these interview data were collected in 2010. It may be that these parents' views and attitudes may have changed with new media reports on vaccines and the various disease outbreaks since 2010, or even that a new sample of parents interviewed today would have different views. However, we felt that these experiences from several years ago were still relevant in helping to explain the evolution of cultural attitudes since Wakefield and other controversies that have generated vaccine hesitancy. To investigate how attitudes have changed given the shifting landscape of vaccines and disease outbreak, we plan a follow-up study in the same neighborhood with a new cohort of parents of young kids.

Conclusions

Parents who are pro-vaccine nevertheless exhibit vaccine hesitancy, leading them to rely on non-science-based judgments and to delay vaccinations for their children. Parents do not perceive these schedule alterations as inconsistent with pro-vaccine stance, and are in fact quite tolerant of other parents' vaccine-hesitant beliefs and decisions. The decision-making experience in the context of overwhelming and contradictory vaccine information in the media and throughout social networks may be a mechanism that generates and perpetuates a culture of vaccine hesitancy and tolerance for altered schedules, despite high rates of immunization coverage.

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Abbreviations

ACIP	Advisory Committee on Immunization Practices
MMR	Measles-Mumps-Rubella

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Table 1

Interview Guide

I.	Introduction to the interview
II.	General parental beliefs about and approaches to child health
	<ul style="list-style-type: none"> Tell me a little about your child(ren). <ul style="list-style-type: none"> ○ Any main health/medical issues with your child(ren)? Tell me a bit about the last time you made a decision about your child's health? <ul style="list-style-type: none"> ○ What was the issue? ○ Talk though how you made the decision. ○ How did you feel about the decision you made?
III.	Parental vaccine decision making
	<ul style="list-style-type: none"> Free-listing: List all of the words that come to mind when you hear the word "vaccine." Please try to give one word answers. Among the parents you know who do vaccinate their children, what reasons do they give for vaccinating? Among the parents you know who do not vaccinate their children or pursue an alternative schedule, what reasons do they give for that decision? Did you decide to vaccinate your child or children? Tell me about it. <ul style="list-style-type: none"> ○ When did you start thinking about vaccination? ○ What prompted you to start thinking about vaccination? ○ What sources of information did/do you seek out? Why did you use those sources? ○ What was important to you in making the decision? ○ Tell me about some conversations you've had with family or friends about vaccination. ○ How do your feelings about vaccination compare with those of your partner/spouse? How do your feelings about vaccination compare with those of your friends? ○ What messages about vaccination did/do you hear from the media? ○ Have you changed your mind about vaccinating since your child was born? Tell me about that. ○ What sorts of information or experiences might make you think differently about your vaccine decisions? ○ Is there anything else you'd like to mention?
IV.	Parental choice of medical provider
	<ul style="list-style-type: none"> How did you end up with your current doctor or pediatrician? <ul style="list-style-type: none"> ○ Has your child ever seen a different primary care provider regularly? How did you end up switching? ○ What was important for you in choosing a doctor? ○ How do you feel about your child's doctor as a source of information and advice about health? ○ How important is it to you that your doctor share your views on child health issues that are important to you? ○ How important is it to you that your friends go to or recommend your doctor? ○ What would you do if you had a disagreement with your doctor about an important health issue?
V.	Interview wrap up

Table 2

Parents' demographic characteristics

Age range (years)	32–46 (36 median)
Race	
White	69.6%
Asian	21.7%
Hispanic	8.7%
Highest level of education (percent) *	
Bachelor's degree	17%
Graduate degree	83%
Children's age range	0–10
Vaccination decisions	
Declined all vaccines	0.0%
Declined some vaccines	8.7%
Delayed some vaccines **	39.1%
Spaced out some vaccines **	43.5%
Reported following ACIP schedule	60.9%

* Note: All parents interviewed had a college degree or higher

** Delaying means vaccines were delayed due to “day-of,” non-deliberate factors while spacing out means vaccines were deliberately and carefully spaced out

Table 3

Representative Quotes

Forming Vaccine Intentions	
<i>Responding to overwhelming and conflicting information</i>	
Individual research and commitment to making an “informed decision”	<p>“I typically question myself: why do I think this, why do I believe this, and then find research or information about why that sort of backs up my...gives me evidence to support what I’m saying. And also sort of provides counter points of view for anything that’s opposing.” (Interview 4)</p> <p>“I did my own research: I looked at, sort of, what’s in the vaccinations they were given. I looked at the various active ingredients. I looked at, kind of, the literature, the scientific literature that’s out there that talks about various things that can go wrong.” (Interview 12)</p>
Making decisions from a rational, scientific perspective	<p>“It seems like all of their decisions, political decisions are based on fear and so it’s a hot topic for me...I don’t want to make a decision just because I’m afraid of what the outcome may be or... without doing proper research and making an informed decision I guess. That’s really important to me to make an informed decision instead of just an anecdotal or fear based decision.” (Interview 21)</p> <p>“I think in terms of deciding whether or not to vaccinate, it’s important to gather information, but to sort of, more important than getting the information, is to understand the source of the information and you know, it’s a medical decision. It’s not an emotional decision. So you need to make a decision that’s based in science and medical fact, not in, you know, what you’re feeling or what other people are feeling.” (Interview 5)</p>
Overwhelming and conflicting information; ambiguity when interpreting information	<p>“Yeah, I think people are just concerned. There’s a lot out there. There’s almost too much information... So it was hard for me to decide what I should really be doing...I just felt like I couldn’t make heads or tails of all the information I had.” (Interview 2)</p> <p>“There’s just a lot of information about there about the side effects of vaccinations and I wasn’t a crazy parent where I went and read about it all.” (Interview 9)</p> <p>“I guess until they really disprove that all and they can explain why there’s such a high rate [of autism] and what the causes are, then there will always be some kind of concern that vaccinations will be linked to autism.” (Interview 3)</p> <p>“I don’t know where to find the right answer. I feel like nobody seems to really have the answer. I don’t feel that doctors really know, because if they do, are they giving all the information? Because then why are there all these books out here that say, you know, that they do need to [re]schedule, you know, these things...or even changing some of the compounds that they use to make them. You know, I just think there’s a lot of unknowns.” (Interview 7)</p> <p>“I found myself talking about it, and thinking about it, and reading about it so much that I learned a lot about how vaccines in general get developed and how the information gets distributed and how people chose to understand, you know, what they’re hearing about it. And so, um, I mean it was interesting, like the same article that I read and five other people read could have been interpreted differently.” (Interview 5).</p> <p>“There are no easy answers at this point and there are people who put information out there, whether it be about diet or vaccines or anything else that isn’t really scientifically-based...but people are, of course, looking for answers and wanting to know what happened to their child, or why did this happen, or is there a potential answer. So I think a lot of the information is misleading, too, in that regard.” (Interview 11)</p>
<i>Tension between “science-based” and “non-science-based” decision-making</i>	
Too many vaccines at once	<p>“I just staggered, so at least I knew her immune system wasn’t getting pummeled all at the same time.” (Interview 2)</p> <p>“But you know, they say they have these vaccines, [which] cause serious diseases. So at this point I just decided she didn’t need them all at the same time. (Interview 2)</p> <p>“And then given that [my son] was right off the bat stuck with 1,000 needles, I also felt a little bad for him. So I thought, alright, let’s give him a little break on that one.” (Interview 11)</p> <p>“I just think that if there’s any little chance that your brain has this hyper-inflammatory response because you’ve given five or six vaccines, that maybe we can just spread them out a little bit more.” (Interview 6)</p>
Cost-benefit analysis and side effects	<p>“I was very unsure about most of the vaccines. But most of them I felt like, I don’t know is she going to get the whooping cough? Like how bad would it be?” (Interview 2).</p>
Gut reactions and fear	<p>“You’re programmed now to be scared of potential autism and all these other things that could affect your baby... You can take a little bit of information from one and a little from another, but I think that’s the lesson in parenting, is that you really just have to go with your gut and take what information you want” (Interview 7).</p> <p>“I didn’t really think him having multiple shots would really do anything bad to him. I think it was just we’re around some people who chose not to vaccinate because vaccines are going to cause problems. I think it’s just sort of in the back of your mind. What if he gets all of these shots and something bad happens? I think it was just a hesitation, sort of in the back. It never has changed my behavior in any such way.” (Interview 1)</p>
Implementing Intentions	
<i>Delaying or spacing out vaccines as a response to vaccine doubts</i>	
Non-science-based decisions to delay vaccines	<p>“It’s nothing scientific, I just felt like it’s a very little guy. You’re giving them, and they have to digest all of this, and especially with the MMR... They get a little bit of a fever, so I thought, alright let’s have him deal with one thing and...you know I asked them, which ones of these are tougher on the kid...so let’s do that one by itself” (Interview 11).</p> <p>“I probably would have followed an alternate schedule if it had been an option just ‘cause I think spacing them out I think, like I said before and there’s no, and this is a crazy decision I guess, there isn’t really evidence suggesting it is</p>

	more healthy or less healthy but probably, I don't know, in my mind it seems like a better idea to space them out." (Interview 21)
	<i>Sympathy and tolerance for vaccine hesitancy</i>
Perceptions of vaccine refusal	<p><i>Disapproval</i></p> <p>"I think sometimes parents just need to hear it, just need to be like, 'listen...I know you're paranoid with stuff but this is what you need to be doing.'" (Interview 10)</p> <p>"I wrote down 'crazy people' on my list because there's just some people who are so strongly opposed to vaccination and...I don't understand it." (Interview 1)</p> <p><i>Tolerance</i></p> <p>"You know I don't think they're crazy....I would consider it more, maybe passionate or strong willed...they're taking a stand that, in a minority against a majority. They don't make these decisions lightly" (Interview 21).</p> <p>"[These are] people who look at the media and maybe don't have the methods or the means to access the real literature or the real science to kind of check themselves." (Interview 6)</p> <p>"Dangers associated with vaccinating your kids are really nonexistent, but I don't blame people for thinking there's something there that isn't because there's been so much misinformation and, you know the whole campaign against the MMR vaccine associated with autism and all of that. So because, you know, in the history of vaccines, there have been isolated events where there's been something in the vaccine that has gotten some people sick. I understand as a parent that there are so many things that you have no control [over], so many bad things that can happen to your kid that you have no control over that you feel like, you know, vaccinating um, is something that you can control. But sadly some parents are making the wrong decision." (Interview 5)</p>
Perceptions of vaccine hesitancy and alternative schedules	<p>"If you're going to do your own vaccine schedule, which is fine, then you need to keep track of it." (Interview 2)</p> <p>"I think the alternate schedule's different than not vaccinating." (Interview 6)</p> <p>"I'm still kind of dwelling on what kind of people give vaccines and don't give vaccines and it's hard to stereotype or label, I think, who does and who doesn't because I think everybody has their own reasoning. And, you know, you wouldn't want to judge as to why they would or wouldn't, or label them as someone who would or wouldn't, but, I think when it comes then to affect your child...that's when it's always hairy." (Interview 7)</p> <p>"But in the end, like it makes you feel better, you're still vaccinating your kid. I mean, I think it has to do with the parent, you know, at this point, whatever makes them feel better about everything." (Interview 10)</p> <p>"It seems like [one of the arguments] for an alternative schedule, that I kind of do believe, is that it can't be very healthy to have a whole bunch of things going into your body at the same time, a whole bunch of diseases. I'm sure you know, it's been fine for [my son] and we followed a normal schedule but I can kind of understand that rationale. But I think it's much more risky to not do it." (Interview 21)</p>