

# *Framing Childhood Vaccination in the United States: Getting Past Polarization in the Public Discourse*

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Vaccination rates in some areas of the United States are decreasing. Decreases are slight but significant: the incidence of vaccine preventable disease outbreaks has risen. Vaccination is, once again, being hotly debated in public forums. In this paper, we examine current public framings of childhood vaccination to better understand how and why parents' vaccination opinions and behaviors are generally polarized into pro- and anti-vaccination camps. In California and Washington State, we found that instead of coalescing into these stark polarities, or even falling on a spectrum across a pro- and anti-vaccination divide, parents' perceptions of childhood vaccination were highly complex and better conceptualized as diverse and dynamic multidimensional assemblages. In light of this, we argue that the polarized view of vaccination is both incorrect and potentially alienating to the lay public. We suggest that providers and policymakers must begin to recognize the jagged, context-dependent, equifinal nature of how parents sort through vaccination-related information or account for their vaccination decisions in order to reverse declining vaccination rates in the United States.

**Key words:** pediatric immunization, parenting, decision making, health policy, United States

Childhood vaccination is once again a “hot topic” in the United States. Recent outbreaks of pertussis, mumps, and measles have ignited widespread public debates about vaccines including whether or not they are safe; who should get them and when; and who, if anyone, should be exempt from existing vaccination policies. A significant, yet often overlooked, aspect of these debates is that positions are generally represented as polarities: some parents and their supporters are portrayed as maintaining that partial, delayed, or complete non-vaccination is the best option for their children and that it is their right to make that choice (“anti-vaccination”); while others are portrayed as claiming that such choices are at best short-sighted and at worst abusive to both the children involved and the community at large (“pro-vaccination”).

Drawing on research from California and Washington State, we argue that this stereotype of polarity is problematic because it obscures the complex and socially situated processes of childhood vaccination, including the forces that shape parents' vaccination decisions and ultimately children's vaccination outcomes. As an alternative, using Rose's (2015) critique of social science's fetishization of central tenden-

cies as a theoretical starting point, we suggest that parents' perceptions of childhood vaccination are “jagged.” Instead of coalescing into stark pro- and anti-vaccination polarities, or even a spectrum across a pro- and anti- divide, parents' perceptions of childhood vaccination are highly complex and better conceptualized as diverse and dynamic multidimensional assemblages. Applying this anthropological perspective enables us to further examine the ramifications that emphasizing divergence into “pro” and “anti” camps within the public discourse can have, including for parents' vaccination decisions as well as interventions aimed at improving vaccination rates.

## **A Brief Background on Vaccination and the Controversies Raised by the Practice**

Although various forms of inoculation are seen in the historical records of India and China, credit for the invention of modern vaccination is generally given to Edward Jenner, an 18th century English physician who developed the first smallpox vaccine in 1796. Since that time, many more vaccines have been produced to combat a variety of diseases including diphtheria (in 1915), measles (in 1963), and rotavirus (in 1998). In the United States today, routine childhood vaccination, which begins at birth and continues through age six, prevents fourteen diseases (CDC 2016).

The premise behind vaccination is that exposure to an altered form of a pathogen imitates an infection that produces an immune response. In most (but not all) cases, the result of this process is future immunity against the pathogen for individuals receiving the vaccine. When widespread vaccination

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is present, population-level or “herd” immunity emerges. This type of protection is considered vital to vaccination programs: with it, any given individual’s chance of encountering a particular pathogen is reduced because those around them are less likely to carry it.

Despite the scientific evidence supporting vaccination’s effectiveness, including estimates that routine vaccination of each United States birth cohort prevents 20 million cases of disease and 42,000 deaths (Zhou et al. 2014), it remains a controversial practice. In truth, no vaccine is completely safe. Risks range from minor and inconvenient side effects, such as redness and soreness around injection sites, to extremely uncommon but severe events. With the measles, mumps, and rubella (MMR) vaccine, for example, one in 3,000 recipients experience a seizure, one in 30,000 experience a temporary low platelet count that can lead to a bleeding disorder until the platelet count recovers, and one in less than 1,000,000 experience a serious allergic reaction that can result in brain damage (CDC 2012).

In addition to known side effects, other—often controversial—concerns exist. Rumors have circulated in the United States suggesting that vaccination can lead to autism, multiple sclerosis, and type 1 diabetes. Although subsequent medical research has shown that such associations are unlikely (Taylor, Swerdfeger, and Eslick 2014), many individuals remain unconvinced. Other controversies surrounding vaccination include the potential for general harm caused by vaccine additives or the questioned necessity of vaccination overall.

Currently, these diverse concerns are often lumped together in the public discourse as “anti-vaccination rhetoric.” This framing obscures the variety of parental concerns and promotes the view that all anxieties about vaccination are equally “wrong” and equally “anti.”

### **Policy Discourse on Vaccination and How This Affects the Public’s Framing**

As Leach and Fairhead (2007) note, the public framing of vaccination does not exist in a vacuum. It is intimately connected to how vaccination is presented to the public by pharmaceutical companies; health care providers; scientists; and local, state, and national public health officials; as well as mailings, TV advertisements, and other outreach efforts by these individuals and groups. Along with official vaccination policies, these forces form what Leach and Fairhead refer to as the policy framing of vaccination.

In the United States, the policy framing of vaccination is strongly in favor of vaccination. This does not mean that the policy framing is homogenous; it is not (Colgrove 2006; Conis 2015), but the overall message conveyed to the public through the policy framing is that vaccination, and particularly childhood vaccination, is both important and necessary, and hence vaccinating on time and completely is the best decision parents can make.

The concept of risk is a central connector in this discourse (Leach and Fairhead 2007). In this framing, the public, and

particularly parents, are informed that vaccine preventable diseases (VPD) are risky, that vaccination is necessary to prevent VPD, and that vaccines themselves are safe. This is not to say that policy authors are unaware of complexities and nuances surrounding vaccination; but, in messaging meant for public consumption, this simple, risk-based focus tends to prevail.

In the CDC’s *Parent’s Guide to Childhood Immunizations*, for example, risks of VPD are communicated through short paragraphs describing the symptoms and complications associated with each of the fourteen VPD that the United States childhood vaccination program targets. The section on measles, for instance, states: measles virus “causes a rash all over the body, fever, runny nose, and cough. About 1 child in 10 also gets an ear infection, up to 1 in 20 gets pneumonia, 1 in 1,000 gets encephalitis. About 1 person in 1,000 who gets measles will die” (CDC 2016:3). Evidence that vaccination is necessary to prevent VPD is provided in a similar fashion. Quantitative data on the annual number of VPD cases pre-vaccine is compared to the annual number of cases of those same diseases recently. In the case of measles, for example, the *Parent’s Guide* states that there were 530,217 reported cases of measles annually pre-vaccine but just 187 in 2013 (CDC 2016), a difference, not quantified in the *Parents’ Guide*, of 530,030 cases or 99.96 percent. The purpose of this data is to build a logical argument from which parents are meant to draw the conclusion that complete, on time vaccination is the best choice they can make for their children.

Recently, some policy discourse on vaccination has also begun incorporating personal accounts of parents’ and health care providers’ experiences with VPD, including video presentations with gruesome visuals and weeping parents, ostensibly to personalize the quantitative data typically provided. One frequently cited narrative is Benjamin Franklin’s. He lived through an outbreak of smallpox and wrote in his autobiography:

In 1736, I lost one of my sons a fine boy of four years old by the smallpox. I long regretted bitterly, and I still regret that I have not given it to him by inoculation. This I mention for the sake of parents, who omit that operation on the supposition that they should never forgive themselves if a child died under it, my example showing that the regret may be the same either way, and that therefore the safer should be chosen. (Franklin 1996)

Educational materials, like those described above, influence the public framing of vaccination, which likewise affects how people understand and discuss vaccination with one another.

The policy framing of vaccination is also enforced through policies that ensure vaccination. Currently, while no federal law exists, childhood vaccination is mandated by policies in all fifty states, United States territories, and the District of Columbia. The specifics of these laws, however, including what vaccines and how many doses are required; whether the laws apply to child care, kindergarten, or another time period; what type of exceptions may be made; and how

stringently said policies are enforced, vary. All United States states, for instance, allow medical exemptions when having a vaccine would likely result in serious, adverse health effects for the person receiving it. Religious exemptions are allowed in forty-seven states (all but California, Mississippi, and West Virginia) when vaccination is contrary to the religious beliefs of parents and/or children. Furthermore, eighteen states allow philosophical exemptions (also referred to as personal belief exemptions) that provide parents the opportunity to decline vaccination for their children on the basis of personal, non-religiously based beliefs.

In addition to influencing the public framing of vaccination, these policies also have a direct impact on vaccination rates. Vaccination rates are consistently higher in areas that do not allow philosophical exemptions and/or that have difficult exemption processes and high levels of enforcement (Omer et al. 2012). Thus, while parents across the United States are able to form their own conclusions about vaccination, their abilities to actualize particular choices are constrained by where they live, what laws exist there, and how easy or difficult it is for them to circumvent existing policies.

### **A Social Science Perspective on Vaccination**

In many cases, social scientists, including anthropologists, use the issues considered in the policy literature (particularly public health and biomedical sources) as the starting point for their own analyses. A consequence of this is that the virtue of vaccination is often accepted at face value, so subsequent research tends to focus on issues raised by policy-related assumptions, such as parents' attitudes towards or barriers to obtaining vaccination. Some social science research, however, maintains a more critical distance, questioning the utility of vaccination policy, its vested interests, and even the benefits of vaccines themselves (e.g., Connel and Hunt 2010; Kaufman 2010; Reich 2014). In either approach, risk generally remains a central construct.

The formulation of risk in the social science literature, however, differs from the general policy framing of risk in a few key ways. First, there is a deeper consideration of subject-defined and perceived risk. Paramount here is the idea that individuals often interpret population-based statistics, like the data provided in the *Parent's Guide*, based on their own personal experiences, their own values or concerns, and their particular social networks including the experiences and values of those with whom they associate. This may include considering issues, like autism, that are generally dismissed in the public health and biomedical literature as not important (Kaufman 2010).

Second, the social science perspective of risk maintains that a myopic focus on the expert-lay divide obscures the reality that risk, including how lay persons and experts alike perceive it, is much more contextual than public-facing policy framing (contextually produced itself) presumes. As Poltorak and colleagues (2005:718) have shown, vaccination decisions depend “not on a singular deliberative calculus and

the information and education that informs it, but on contingent and unfolding personal and social circumstances in an evolving engagement.” In their multi-methods project, these researchers found that mothers' decisions were affected “by personal histories, by birth experiences and related feelings of control, by family health histories, by their readings of their child's health and particular strengths and vulnerabilities, by particular engagements with health services... and by friendships and conversations with others” (Poltorak et al. 2005:709). In other words, they found that vaccine decision making was a highly social process and not one that relied solely on expert opinion.

Finally, social scientists have also sought to explain how particular understandings of vaccine risk are produced in specific societies. For those writing about the Global South, the focus has generally been on how prior experiences of colonial rule in combination with the disconnections between crumbling local health systems; immediately perceived needs; and well-funded, intensive, single vaccine initiatives have fueled fears regarding the real intentions of those promoting vaccination (e.g., see Closser et al. 2016). Much of the literature regarding the Global North, however, harks back to Giddens (1990, 1991) and Beck (1992), who describe modern, industrialized societies as risk societies.

Risk production, according to Beck, has its roots in modern attempts to control accidents, violence, sicknesses, and other “dangers.” In terms of vaccination, for example, policy discourse promises security through both disease prevention and vaccine safety, but when outbreaks occur, vaccines fail, and adverse reactions happen, trust in the security promised is thrown into doubt. Of course, the issues of risk, trust, and lack of faith are not limited to vaccines; they encompass all aspects of modern life, as Boholm (2003:157) explained: “The era characterized by complete faith in social and political institutions, as well as science, is gone. Certainty has given way to uncertainty, resulting in a state of collapsing ontological security and sense of fundamental vulnerability and lack of faith.”

United States culture may be particularly risk-averse and control-oriented. As Crawford (2004) explains, living in a society where anxieties are constantly perpetuated, such as regarding emerging diseases of unidentified origin (autism) and random acts of terrorism (Chelsea bombings in New York), people want to exercise increasing levels of control in order to tame the associated risks. At the same time, autonomy is also highly valued in United States society. While autonomy is often at odds with an emphasis on surveillance and control, a compromise is struck in the form of responsible consumerism: the idea that individuals must take responsibility to make the best decisions and perform the most appropriate actions. In this setting, parents (more specifically, mothers [Reich 2014]) are simultaneously encouraged by public health and biomedical practitioners, as well as society at large, to question and make critical assessments of their available options, to be careful health-care consumers, and to hold their own—or their individual children's—best interests in mind.

Given the potentially competing risks of vaccination—specifically the risk of VPD versus the risk of vaccines—as well as parents’ desires to be risk-averse and to deploy their consumer intelligence, it is not surprising that some parents in the United States extend their critical assessments to vaccination as well. For instance, in her 2010 study regarding rumors linking autism and vaccine-borne mercury, Kaufman (2010:23, 9) showed how parents took on the informed healthcare consumer role, exercising a culturally constructed “right to choose” while coping with “the burden of responsible consumption” fostered by the “structural conditions of life in postindustrial society.” These conditions created vulnerability, stimulated doubt, and magnified feelings of responsibility (Kaufman 2010:27; see also Beck 1992; Giddens 1990, 1991).

Risk is clearly a complicated construct. Despite the policy framing’s tendency to publically portray the risks of vaccines and VPD as simple, calculable, population-level facts, the social science literature clarifies that risks entailed on either side of the equation are understood by the public in situationally, socially specific ways. And—in part because there are so many vaccines, so many VPD, and so many contexts—these “ways” are much more heterogeneous than the superficial pro- and anti- public discourse allows. Our own work suggests not only that a pro-anti divide does not exist: neither does a flat continuum between pro- and anti-poles. Instead, what we found might be best represented as three- or even four-dimensional person-centered webs of self-relevant, self-curated, context-specific (child-specific, disease-specific, vaccine-specific, peer group-specific, etc.) considerations. As detailed below, we reached this conclusion after comparing and contrasting our individual research results.

## The Present Analysis

Using data collected independently from 2009 to 2014 from three West Coast United States populations, we explored the public, or lay, framing of childhood vaccination. In doing so, we sought to illuminate the public’s framing of vaccination including how what the public knows regarding vaccination coincides with, contradicts, and complicates the policy framing of vaccination that targets them and the impact that dialogical polarization (as per Leach and Fairhead 2007) has on parents’ perspectives and actions.

The studies were designed and conducted independently, with appropriate Institutional Review Board approvals; accordingly, confidentiality and privacy were appropriately protected (pseudonyms are used to present the findings in this paper). Methods for the original projects, data for which were collected well before we knew each other, are described in detail in Brunson (2013; 2015) and Sobo (2015; 2016). The analysis here represents a synthetic qualitative, meta-analytic work: we reexamined findings from the three studies to better understand their broader implications in relation to the themes raised above.

## Research Populations and Data Sources

### Washington Sample

The Washington sample ( $n=25$ ) was assembled specifically to investigate the process of parents’ vaccination decision making. Interview data were drawn from parents living in King County, a large county in western Washington State that includes Seattle and its surrounding metropolitan area. Demographically, the population of King County is diverse in terms of incomes, levels of educations, races/ethnicities, and geographic locations—urban, suburban, and rural. Childhood vaccination rates in King County were lower than both state and national averages and were particularly low in certain areas including Vashon Island. Vaccination policies in Washington at the time of the research included religious and philosophical exemptions, and these policies were only loosely enforced.

Parents were recruited to participate in interviews if they were United States-born citizens and had at least one child who was eighteen months of age or younger. Topics covered in the interviews included the processes parents went through to make their vaccination decisions, the factors that influenced their decisions, and, when applicable, how parents’ decisions changed over time and why. All interviews were recorded and transcribed.

### California Sample 1

The first California-based study examined day-to-day home health practices in relation to education at an independent school serving 195 households in the greater San Diego area. The school served 280 ethnically diverse pre-K through twelfth grade students. Philosophical exemptions were on file for 51 percent of the school’s students—which is nearly twenty times higher than average (Shaw et al. 2014). Vaccination policies in California at the time of this study, as well as the second California study described below, also included religious and philosophical exemptions, and like in the Washington case, these exemptions were loosely enforced (since July, 2016, however, California law has changed, and religious and philosophical exemptions are no longer allowed).

Students’ primary caretakers (parents, guardians) were randomly recruited to participate in focus groups ( $n=2$ , 12 participants), formative interviews ( $n=6$ ), or cognitive interviews ( $n=18$ ). Vaccination was not queried initially; rather, parents were asked about health issues generally including children’s nutrition, screen time, outdoor play, and sleep hygiene. Nonetheless, many of the thirty-six parents in the random, representative sample spoke about vaccination in detail. Narrative data from the focus groups and interviews were recorded and transcribed.

### California Sample 2

The second California study was broader: it involved parents from the San Diego community at large. However, as the project’s focus was vaccine non-conformity, parents with higher incomes and educations were targeted for recruitment

(prior research has shown that non-conformity is much greater in that demographic; e.g., Smith, Chu, and Baker 2004).

English-speaking parents with at least one child of kindergarten age or younger were recruited first from Sobo's university's daycare center. Then, to further increase the number of non- and selective vaccinators in the sample, fliers were posted in locations that such parents were known to frequent (e.g., health food stores). A total of fifty-three parents were recruited.

Each participant completed a short interview focused on vaccine decision making using the five-minute interview method (Sobo 2009; and see Gottschalk and Gleser 1969) and several brief surveys including a survey regarding their youngest child's vaccination status. Once again, data from the interviews were recorded and transcribed.

## Analysis

Brunson analyzed the Washington data, and Sobo analyzed data from both California samples. Analyses for each study were conducted using standard ethnographically-informed content analysis techniques including open and relational coding based on iterative review and thematic model building (see Ryan and Bernard 2003; Sobo 2009). In this way, major themes and sub-themes as well as their relationships were identified. Coding was both computer assisted (Atlas.ti and Word) and done by hand on hard copies of interview transcripts.

While some investigators bringing together disparate data sets might choose to aggregate their data and then reanalyze the mass together, looking for instance at means and medians, we opted for the "analyze then aggregate" approach (Rose 2015). That is, rather than combine the data from all three studies, recode this to look for patterns, and then use those patterns to model or explain individual choices, we began with the results of our individual analyses of each of the data sets and from there interactively reflected and deliberated each other's cases to make comparisons across and between samples (including looking for negative cases). Through this iterative process, we were able to identify patterns that the aggregate-then-analyze approach would have masked.

The goal of the combined analysis presented in this paper was to identify patterns in the current public perception of vaccination in the United States and to query more specifically parents' understandings, assessments, goals, and intent in regards to vaccination, including how they did or did not replicate, reconfigure, or respond to the public-facing policy discourse. In the sections that follow, we explore how these data inform our understandings of the public perception of childhood vaccination in the United States. Participants from the various samples are identified with leading letters (WA=Washington sample; CA-1=California school sample; CA-2= California community sample) followed by study-specific pseudonyms.

## Information Assemblages

In part because we did not begin by looking for central tendencies in our data, we found parents' perceptions of childhood vaccination to be highly complex. Rather than unilinear logic maps, they are best conceptualized as diverse and dynamic information assemblages. Parents explained decisions as based upon diverse, and sometimes contradictory, perceptions of a variety of issues tracked in these assemblages, including: children's best interests; relevant risks, such as what risks are, who they apply to, and how they can vary under particular circumstances; personal agency; the legitimacy of vaccination policies; and understandings of how all of these issues can change over time.

### The Child's Best Interests

No matter the particular vaccination decision parents made, how they came to that decision, or their personal beliefs about science, the government, or pharmaceutical companies, every parent we spoke with impressed upon us the fact that they were doing what they thought best for their child. Indeed, adopting critical distance, Tiffany (CA-2) suggested that "doing what was best" was in fact the root of the current debate when selective or non-vaccination was considered and pitted against full compliance:

I think it's important for both sides not to make the other side feel like they're terrible because I do think everyone is trying to do what's best for the health of everybody, you know. I think the health profession are trying to do more for the best of everybody, and I think the parents are trying to do more what's best for their individual child, and that's probably the conflict right there.

In many cases, what parents felt was in the best interest of their children was complete, on time vaccination. Carla (WA), for example, said, "I just felt like it was a no brainer for me. The greater good I think is sort of the way I looked at it. It's not only better for [my daughter] but it's better for the community too.... I know a lot of people have wavered about [vaccination] but I just felt like I didn't even have to question it. Why wouldn't I do it for my baby?"

Parents, like Carla, who made the decision to vaccinate completely and on time did so for a variety of reasons, but in terms of risk specifically, they either trusted science, for example by accepting epidemiological risk calculations, or they trusted others' recommendations, such as those of their health care providers, which in turn were often based on authorized science. Asked why she followed her clinic's recommendation to vaccinate, Bethany (CA-2) said with a laugh, "Because—they're doctors. They're—they've gone to school and know their profession. I trust that they know what they're doing." After a notable pause, she added, laughing now, "I don't know what else to say."

When parents opted to delay or forgo certain or all vaccinations, this was also interpreted as being in the best interest

of their children. As Annette (WA) explained, “I looked at each [vaccination] with an open mind. I started researching it and found that overall, it just seemed like the best thing was not to get any of them. I haven’t regretted that decision yet. Both of my children are doing great, and I think that’s because I protected them from the vaccinations.” In regards to risk, parents like Annette opted to assess risks for themselves. In our research, we found that parents did this in three key ways: by challenging the homogeneity of the policy risk discourse, by expanding the risk discourse, and by situating risk.

### Risk is Personal

Instead of considering risk at the population level, as is often the norm with the public-facing policy framing of vaccination, parents challenged the homogeneity of the risk discourse by individualizing risk in terms of their own children. Risk determinants considered by parents included children’s ages, health histories, genetic background or ancestry, and present health status. The VPD under consideration also underwrote parents’ risk calculations. Risks associated with pertussis, for example, were not considered equivalent to risks associated with the flu. In these ways, parents recognized that risk was not a set value that could be provided by public health officials, health care providers, government officials, or others, but that risk was dependent on a variety of diverse factors that varied for each child and in regard to each vaccine—factors that could change with time and location. In this way, risk was personal and dynamic. It was not a static group-level probability as is commonly suggested by the policy framing.

Consider Shannon (WA), a thirty-seven-year-old mother with a partially-vaccinated ten-month-old boy. Shannon’s son had respiratory syncytial virus (RSV) when he was four months old. This experience was the impetus for her to stop vaccinating. Shannon explained, “Even if it doesn’t make sense because he’s perfectly healthy now, I view him as a little bit more fragile because of that experience. He was just so sick that it made me think that maybe his immune system wasn’t super strong and that we needed to be a little more cautious with him.” Being cautious, for Shannon, meant not exposing her son to potentially risky vaccines for diseases she felt he was unlikely to contract.

A consequence of individualizing risk in this way was that parents recognized different risks, and thus, their concerns varied, sometimes substantially. In some cases, there was significant overlap between how parents saw things; in others, there was none. One mother in the Washington study, for example, was only concerned about the tetanus vaccine, while another mother felt that the tetanus vaccine was the only safe vaccine available. Situations like this are, in turn, particularly frustrating to advocates of vaccination, including public health practitioners and health care providers, who tend to prefer (for reasons related to the conditions under which they labor) one-size-fits-all solutions that will simply, effectively, and efficiently address all parents’ concerns about

vaccination and convince them that vaccinating completely and on time is the only decision to make.

### VPD are Not the (Only) Risks

In addition to individualizing risk, parents expanded the risk discourse by considering multiple, competing risks including risks related to vaccines, the vaccination schedule, and the vaccination process in general. For these parents, risk was not a notion limited to the dangers of VPD, it was a ubiquitous concept that applied to all aspects of disease prevention and vaccination as well as their children’s overall health.

A few participants wondered about the effects of additives like mercury and aluminum, but—contrary to common perceptions in the public health and biomedical literature (e.g., the *Parent’s Guide*)—in all cases, these worries were vague and indexed fears over meddling with the body’s existing biochemical or microbiotic balance versus adding specific toxins. Also counter to common perceptions, few parents in our samples mentioned autism. When this was brought up, it was not as a direct worry but instead as a way of demonstrating that the respondents were reasonable people. As Michela (CA-2) explained, “We decided that the risks outweighed the benefits. And we’re not talking autism or some of the more popular, you know, non-vaccine things people think it’s for. There are a number of other issues that can come up. So we decided that, with the risk versus benefit, the risk was much greater than our benefit was.”

Rather than specific worries about reactions to mercury, or about autism, most of the parents in our studies expressed diffuse worries about what Beck (1992) characterized as “unknown unknowns.” For example, Linda (WA) explained the process of negotiating her son’s vaccinations with her husband:

We probably argued the same amount all the way through [the pregnancy]. He was mostly saying, you know, “Kids get these shots, kids do fine. We need to give him these shots because we need to protect him.” And during the pregnancy, I was saying “Yeah, but, you know, what if and what if.” And then immediately after the birth I was like, you know what if one kid, if only one kid dies from having the vaccination, but if it’s my little boy then that’s one too many. And then my husband was like, “Oh you’re overreacting, it’s not going to happen.” [And I said] “But what if it does?”

For this mother, and the other parents like her, vaccines, not diseases, were the true risks. Given the low prevalence of VPD in the United States, these parents believed that while being exposed to a VPD was perhaps a slim possibility, accepting vaccination entailed a definite exposure to a possible harm.

Likewise, parents expressed concerns about the vaccination schedule, including the timing of certain vaccines and the schedule’s specification that multiple vaccines be administered concurrently. Specifically, parents questioned the lack of research into these areas and expressed anxieties about potential unknown side effects. The fact that the policy

discourse is generally dismissive of such concerns only added to their anxiety. In the *Parents' Guide*, for example, parents' concerns about multiple vaccines given at one time is addressed by the following statement: "We may not know exactly how many germs a baby's immune system can handle at one time, but it is considerably more than they will ever get from vaccines. After all, this is the immune system's job" (CDC 2016:48). No other information is provided. Critical parents reading statements like this carefully, as parents in the United States are groomed today to do, were then left to ask, "How do we know that?"

## Risk is Socially Situated

In addition to parents' personalized perceptions of risk and expansion of the risk discourse, we found that a variety of situational factors, including how the particularities of parents' lives unfold and who ends up in their social networks, can affect their perceptions of risk and ultimately the type of vaccination decisions they make.

In relation to parents' own life experiences, we found that having firsthand knowledge of VPD, hearing about disease outbreaks locally and nationally, experiencing the vaccination process themselves, having firsthand experiences with adverse events related to vaccination, hearing about others' negative experiences with vaccination, experiencing biomedicine or other forms of medicine, and being exposed to information for and against vaccination through their children's schools and other sources all had direct impacts on parents' perceptions of vaccination as well as their vaccination decisions. These impacts, in turn, could favor complete, on time vaccination—or not. Claire (WA), for example, had decided not to vaccinate her daughter at all due to her family's prior negative experiences with pharmaceuticals: "We don't really trust anything from the pharmaceutical companies anymore. . . . My grandma, my dad and mom, they've all been seriously hurt by pharmaceuticals. The medicine they took, different types of medicine for each one, all caused side effects that caused permanent damage."

While Claire was certain she could not take the chance of the same with her daughter's health due to her past experience, Michelle's (WA) past experience, which included training in epidemiology and employment as an infectious disease specialist at a local hospital, led her to feel the opposite. Even though her daughter was born prematurely and she had concerns about her daughter's well-being, she opted for vaccination, beginning with the hepatitis B vaccine in the hospital, as she explained: "I'm pretty familiar with the FDA process for approving vaccines and vaccine safety. I am pretty comfortable that if it's an approved vaccine that it's going to be safe for her. So I said, ok, go ahead and give it to her."

A related situational factor that affected parents' perceptions was experiencing vaccination themselves. This was especially important for many parents who opted for complete, on time vaccination, as Melissa (CA-2) said of her husband and self, "We were both vaccinated as children, so it seems

like a cultural norm." Other parents, however, saw their vaccination experience as supremely minimal in comparison to the vaccination experiences of children today and did not feel this harmed them, as Joni (CA-1) explained, "Yeah, we all had chicken pox. What the heck was the problem?"

Despite the fact that the particularities of parents' lives, such as their views on pharmaceuticals and their own prior experience with vaccination, may predispose them to make particular vaccination decisions, parents do not make these decisions, or develop their perceptions of vaccination, alone. They rely on others, including family members, friends, and health care providers, for information and advice. Additionally, many parents in the United States also have the option to obtain additional information through the Internet, newspapers, magazine articles, and other similar sources—all of which can influence how parents understand and feel about vaccination.

Parents in the California school sample, for example, were influenced by their social setting. While some of their vaccine caution likely pre-dated matriculation, notable post-enrollment refusal increases provided evidence of the socially cultivated nature of vaccine refusal in this school setting. In this case, vaccine caution was nourished and intensified by an institutionalized emphasis on alternative information and by school community norms lauding vaccine refusal and masking uptake. Thus, while five in ten students had exemptions upon entering kindergarten, by seventh grade, when proof of the Tdap vaccine is due to the state, exemptions increased to seven in ten students (Sobo 2015).

## The Issue of Self-determination

Not all parents respond to their social networks, or the social pressure exerted by their network members, in the same way. Parents also vary in their confidence to interact with their social circles including, in some cases, to go against social norms both for and against vaccination. Nikki and Jamie (WA), for example, were self-assured in making the decision to not vaccinate their son at all, even though it was unpopular within their social group:

Nikki: People tell us that we shouldn't do it. But I was like, "He's our kid. So we're going to make the best decision we can for him."

Jamie: Yeah and not because of society pressure.

Beth (WA), however, lacked the self-determination to risk the social stigma of not vaccinating: "I mean it's hard when the pediatrician's really pushing it. You really feel like you're kind of being this uninformed parent and overly concerned. And I think I'm sensitive to that. . . I don't want to be a helicopter parent, worrying unnecessarily like that." While Beth originally wanted to delay her daughter's vaccinations, she ultimately had her daughter vaccinated on time. Beth personally attributed this outcome to her fear of what others, and particularly her child's health care provider, would think if she made any other decision.

Beyond issues to do with their own agency, parents also questioned the power dynamic articulated in vaccination policy, for instance in the insistence that parents accept a total vaccination package. Considering VPD separately, several of the parents we spoke with suggested that some diseases like chicken pox were not typically harmful and that other diseases such as polio were not at all common. Most disturbing to many of these parents, however, was the idea that some VPD children were vaccinated against were not actually risks for children, as Susan's (CA-2) comment about the hepatitis B vaccine illustrates: "I didn't have that STD... and we told him he can't date or have tattoos until he's at least three, so we're feeling pretty good about [declining that vaccination]."

The fact that vaccines like the hepatitis B vaccine are not only sanctioned but mandated by the United States vaccination schedule for newborns and young children even made some parents question the overall applicability of the national vaccination schedule as well as the political and economic motivations behind some of the recommendations. Frank (CA-1), for instance, argued that even the American Academy of Pediatrics was " beholden to companies," and that this was reflected in their endorsements. And Andrea (CA-2) said, "If [the doctor's] being paid by pharmaceutical companies, for doing the work, then I can't really trust his opinion—his or her opinion—on the safety of it."

### Decisions Are Not Forever

The waters are further muddied by the plasticity of parents' vaccination decisions. As explained in Sobo (2016), in the California community sample, a feeling of indeterminacy regarding the best choice was prevalent among parents with partially-vaccinated children. These parents portrayed vaccine decision making as an ongoing process whose evolution is influenced by the ever-present potential for emergent information to disrupt previously accepted hypotheses. Elizabeth (CA-2), for instance, mentioned, "I continue to search for additional information, additional sources, [trying] to cast a really wide net."

Some parents in our studies even acknowledged that their decisions had changed and/or would change over time. Brianne (WA), for instance, described this issue with her partially vaccinated son thus: "No one in [local community] is immunized for chicken pox. If an outbreak happens, I'll get him the vaccine, but for right now, I'm going to wait until he's older for that one." This sentiment was echoed by Karma (WA) who had specific concerns about overwhelming her infant son's immune system, although she wasn't opposed to vaccination generally. She stated, "I'll revisit [vaccination] with him when he gets older... his body will be bigger, his immune system will be stronger then." These findings demonstrate that the view that parents come to a point of arrival (or, "decide") in regard to vaccination can be an illusion, particularly for those who vaccinate selectively and/or on a delayed schedule.

Our participants were pro- and anti-vaccination in non-concordant, fine-grained ways across multiple dimensions of vaccination decision making. We did identify some patterns; for instance, and most concretely, varicella was, for many, the first vaccine rejected, and many only rejected or delayed a vaccine if the child in question was deemed extra-vulnerable in some way. Nonetheless, parents' vaccine-decision profiles (what they thought about particular vaccines, VPD, risks, etc.) can be characterized as what Todd Rose (2015) might call "jagged." Concordance (having all pro- or all anti-viewpoints on all dimensions) was virtually nonexistent.

Rose (2015:4) conceived the "Jaggedness Principle" after thinking about Gilbert Daniels' discovery that not one pilot out of 4,063 who were measured along ten dimensions by the United States was average in all dimensions. Indeed, less than 3.5 percent were average on any three dimensions. The implications of this for cockpit design were huge: the resulting introduction of adjustable seats and other innovations greatly reduced crashes and mishaps. But what are the implications of jaggedness for understanding pro- and anti-vaccine polarization let alone parent vaccination decisions?

Recognizing the high degree of variability in how parents view specific vaccines, VPD, and children shows the shortsightedness of simply casting members of the public as pro- or anti-vaccine, as if these were singular, oppositional dimensions. Any given parent may be both, and many combinations are possible across the many facets of vaccine decision making.

On a more abstract level, recognizing jaggedness can help advance our thinking in regard to parental positionality. It not only enriches the record of how vaccination positions are arrived at (if only temporarily) and negotiated, it also helps confirm the rules by which such positions vary.

Here, two other principles described by Rose (2015)—the context principle and the pathways principle—are relevant. These were also reflected in our findings, and the patterns they drove strengthen our contention that, beyond the lack of any wholly anti-vaccine positioning among parents generally, there is no simple pro-versus-anti continuum. We found that parents' pro- or anti- stances were context-specific versus freestanding, static, essential traits. Parents' pro- and anti- positions were, for example, peer-group dependent and affected by current events in addition to which VPD, which vaccine, and which child was under consideration. In addition, different parents came to be pro- or anti- on a given dimension along different pathways instead of along a singular normative one (in complex adaptive systems theory, this is called "equifinality"). For some, corporate greed was the key concern; for others, vaccine ingredients; for still others, the lack of any immediate VPD threat.

The jaggedness, context, and pathways principles, which warn against assuming concordance, stance essentialism, and

normative thinking, provide a theoretical handle by which to grasp the relevance of the messiness in our data. But they do not mean that other processes are not at work, the most important of which is dialogical polarization.

In dialogical polarization, oppositional thinking predominates: community discourses regarding vaccination and policy discourses are dialogically co-created through forms of social circulation in which they bounce into and off of each other, co-producing and enforcing their own divergence and distinction (Leach and Fairhead 2007). Dialogical polarization entails the same kind of oppositional thinking that underlies the one-dimensional policy framing of the vaccine issue for the public and the related tendency of the public to assume that people (perhaps themselves excluded) are either for or against vaccination—and that vaccination is a problem among some populations but not others.

This is not to deny that parental anxieties exist in a cultural and social milieu of pluralism and positional complexity. Yet, when people with divergent vaccination views try to talk with one another, such variation is flattened. Dialogical antecedents—prior communications between labeled, reified stakeholder groups, including policy authors and the potentially “anti-vaccine” lay public against which they write—have led to the currently intense polarization that characterizes the “communication environment for vaccines” (Kahan 2013). Polarization feeds on itself, further strengthening the perception of a divide. Vaccination has become, like religion and politics, a dangerous topic. The first step in diffusing the situation, and a necessary precursor to designing vaccination interventions, is rejecting the premise of pro- and anti- entirely.

## Conclusion

The present project demonstrates the value of applying anthropological method and theory to the analysis and practical solution of a contemporary social problem. Stereotypes within the public framing of vaccination in the United States, which suggest all parents with any vaccine hesitation are anti-vaccination, are both disingenuous and problematic in regards to their potentially alienating effect. Leach and Fairhead (2007:172) highlight the need for “finding ways to recognize, reinforce, and build on the positive dimensions of vaccine anxieties, and linked to this, finding ways to turn the dialogical relations between parents and policymakers into ones that draw them together rather than drive them apart.” We would extend this observation to include the dialogical relations between various segments of the public itself; these, too, must be bridged. We believe that acknowledging the fact that there are many vaccines, many VPD, and many types of children, and that by doing so with a clear understanding of the jagged, context-dependent, equifinal nature of how parents sort through vaccination-related information or account for their vaccine decisions moves us one giant step in that direction.

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