

AN ABSTRACT OF THE DISSERTATION OF

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Title: Vaccine Beliefs of Complementary and Alternative Medical (CAM) Providers in Oregon

Abstract approved:

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Health care providers, including complementary and alternative medical (CAM) practitioners, exert a significant influence on parental pediatric vaccination decisions. Use of CAM therapies is increasing in Oregon. Concomitantly, there has been a decade-long increase in parental vaccine refusal in Oregon, rising from 1 to 5 percent from 2000–2009. For example, in some Oregon schools, 70% of children are unvaccinated. I conducted hour-long interviews with 36 practitioners from five CAM modalities (i.e., acupuncture, chiropractic, homeopathy, midwifery, and naturopathy) to explore a range of associations between vaccination perceptions and vaccine recommendations to others. Data collected from the semi-structured interviews were sorted and analyzed by themes. Perceived susceptibility to and severity of either an illness or a vaccine as well as perceptions of vaccine efficacy, benefits, and risks influenced CAM provider vaccine recommendations to parents about vaccinating their children. The contextual factors of immunology beliefs, personal experience, reference group norms, and beliefs about industry and government were found to a

lesser extent to influence whether a CAM provider promoted or opposed pediatric vaccination. The results of this research suggest possible interventions aimed at improving scientific knowledge of vaccine science as well as addressing hesitancy to vaccinate. These interventions could include communicating the relative risk of vaccinations; providing training for mainstream medical providers in empathic communication with patients and avoiding a directive, fact-laden model; and developing a layered approach to vaccine education, with specific content aimed at separate populations, including health care providers, journalists, policy makers, parents, educators, and children.

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Vaccine Beliefs of
Complementary and Alternative (CAM) Providers in Oregon

by
Sandra J. Bean

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I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

Sandra J. Bean, Author

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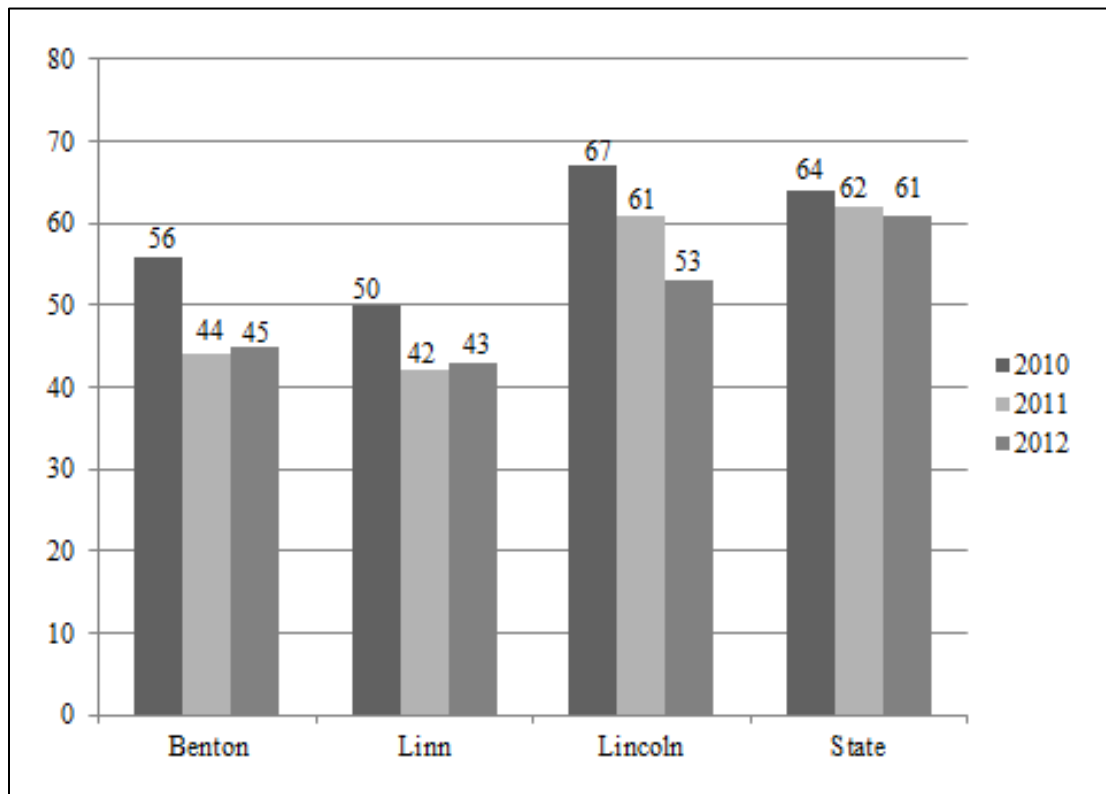
CHAPTER 1: Introduction

Overview

Vaccines are an unqualified success story, and have meant the end of suffering from many debilitating and deadly diseases (Allen, 2007; Atkinson, Wolfe, & Hamborsky, 2012; Mnookin, 2011), saving as many as 3 million lives annually, and reducing the spread of infection and the burden of disease around the world (WHO, 2011, 2013). Because of their acknowledged benefit to personal and public health, many vaccines are mandated in schools and other public settings to limit the spread of highly communicable diseases like measles, pertussis (whooping cough), and influenza (see, for example, Atkinson et al., 2012; deSante, Caplan, Shofer, & Behrman, 2010).

In spite of the overwhelming evidence of the benefits of vaccinating, a growing number of Oregon parents are increasingly choosing to avoid or delay vaccinating their children (Cieslak, 2009; Oregon Public Health Division, 2012; Robison, Groom, & Young, 2012). Enabling this burgeoning vaccine avoidance, Oregon has for many years had a relaxed religious exemption, more accurately a philosophical exemption (i.e., “any belief system”) from pediatric and other vaccines. Vaccination exemptions for Oregon kindergarteners have increased steadily since 2001 from 2 percent to a high of 5.8 percent in 2012 (Oregon Public Health Division, 2012). According to the National Immunization Survey in 2011, just 52% of all children under the age of two in Oregon had received the recommended vaccinations. Only Idaho, New York and the U.S. Virgin Islands had rates lower than Oregon (NIS, 2011). In some Oregon schools, 70% of children are unvaccinated (Charlie Fautin, health administrator with the Benton County Department of Public Health, personal communication, May 8, 2014). Pockets of low vaccination levels in the U.S., can lead to lowered immunity to vaccine-preventable disease (Atwell et al., 2013; Feikin et al., 2000; Gangarosa et al., 1998; Glanz et al., 2009; S. B. Omer et al., 2008; Wooten, Kolasa, Singleton, & Shefer, 2010).

Figure 1. *Oregon childhood immunization rates, by county*



The figure above is based on analysis from the Oregon ALERT IIS system and reported by the Oregon Health Authority (OHA). ALERT IIS is a surveillance system with 90 percent coverage. The data included mandated immunization reporting from pharmacies and public health clinics, and uses electronic health records as a key data-collection method (Mary B. Kirolo, MPH, MSW, Director, Oregon ALERT IIS, personal communication, May 22, 2014). By contrast, the CDC National Immunization Survey bases its Oregon immunization coverage estimates on a cross-sectional sample of 250 children. The OHA based its 2013 immunization summary on 5 million patient records state-wide and more than 43 million vaccination records (Little, 2013).

Outbreaks of Vaccine-Preventable Diseases (VPDs)

Outbreaks of vaccine-preventable diseases (VPDs) are shown to be geographically linked to vaccine-opposing populations (Atwell et al., 2013; Gangarosa et al., 1998; Glanz et al., 2009;

S. Omer, Richards, Ward, & Bednarczyk, 2013; S. B. Omer et al., 2008). Recent outbreaks of measles, pertussis, and varicella (chicken pox) (Atkinson et al., 2012; Atwell et al., 2013; Centers for Disease Control and Prevention, 2011; Salathé & Bonhoeffer, 2008) raise concern that more outbreaks are possible in locations where vaccine resistance persists. In the spring of 2012, an alarming pertussis epidemic (Washington State Dept. of Health, 2012) swept through Oregon's northern neighbor Washington, a state with more than twice Oregon's population. In Oregon, the number of year-to-date pertussis cases had tripled to 290 by June 2012 (Rojas-Burke, 2012).

There are a number of reasons why parents hesitate or resist vaccinating their children, leading to under-immunization (Freed, Clark, Butchart, Singer, & Davis, 2010; Mergler et al., 2013)

The Role of Health Care Providers (HCPs)

One major influence on vaccine decisions is advice from a health care provider. Parents view HCPs as their most trustworthy and reliable information sources on health and health care and in communicating risk (Baker, Wilson, Nordstrom, & Legwand, 2007; Benin, Wisler-Sher, Colson, Shapiro, & Holmboe, 2006; Fredrickson et al., 2004; Freed, Clark, Butchart, Singer, & Davis, 2011; R. Henderson, Oates, Macdonald, & Smith, 2004; Kennedy, Basket, & Sheedy, 2011; Moseley, Clark, Gebremariam, Sternthal, & Kemper, 2006; Moseley, Freed, & Goold, 2011; Opel et al., 2013; P. J. Smith, Kennedy, Wooten, Gust, & Pickering, 2006). Some mainstream health care providers fail to recommend vaccines, and even oppose some of them (Ehresmann, Mills, Loewenson, & Moore, 2000; Gust et al., 2008; R. Henderson et al., 2004; Humiston et al., 2009). Girard (2002, p. 302) reviewed vaccination programs and pertussis rates in 10 European countries, Canada, and the U.S., and concluded that lower vaccination rates were "heightened by the reluctance of family doctors to advise immunization."

Because of the rise of use of complementary and alternative medicine (CAM) (see, for example, Nguyen, Davis, Kaptchuk, & Phillips, 2011). CAM providers arguably influence vaccination rates in conversations with their patients. Oregon is home to dozens of alternative medical schools, and the State licenses naturopaths, chiropractors, midwives, and acupuncturists. Through the National College of Natural Medicine in Portland, naturopaths can also become certified as homeopaths, although the State does not license them separately.

CAM providers negatively influence vaccination decisions (Busse, Walji, & Wilson, 2011; Campbell, Busse, & Injeyan, 2000; Downey, Tyree, Huebner, & Lafferty, 2010; Halper & Berger, 1981; Lee, Saskin, McArthur, & McGeer, 2005), and may be even more influential in Oregon because of the widespread use of CAM modalities. As mentioned above, some Oregon schools have a vaccine exemption rate of 70 percent (Zheng, 2013). Do the personal and professional beliefs of CAM providers affect their beliefs about vaccines and, subsequently, what they advise to others? The purpose of this research was to seek answers to this and other questions. The significance of the availability and popularity of CAM therapies will be discussed in chapter two.

CHAPTER 2: Literature Review

This chapter examines in more detail the role of vaccines in contributing to the quality of health and well-being enjoyed by most of the developed world. It also addresses the challenges of persisting vaccine-preventable diseases (VPDs), the rise of vaccine opposition, and how this opposition can threaten the public's health. It examines the possible role of complementary and alternative medical (CAM) providers in supporting, questioning, or opposing vaccines and how their beliefs may contribute to lower pediatric vaccination rates in Oregon, and thus to infectious disease outbreaks. It contains a summary of an earlier study of Oregon health care providers (2009–2010) that characterized three basic variations in health care provider views concerning pediatric vaccination and explored the antecedents of those opinions (Bean & Catania, 2013) as providing the framework for the current research.

The Role of Vaccines

History and importance. Vaccines have a short history compared to the millennia during which humanity suffered from plagues and pestilences. Smallpox, for example, may have first appeared around 10,000 years B.C.E. (D. A. Henderson, Borio, & Grabenstein, 2008). The first evidence for smallpox prevention was variolation, which seems to date back to before the eleventh century in India (Agrawal & Tiwari, 2003). Variolation consists of engrafting tissues infected with smallpox into a healthy person to create smallpox immunity. In Britain, variolation was introduced in 1721 C.E. from a traveler who had learned of the practice in Turkey. In the American colonies in that same year, Cotton Mather introduced variolation in Massachusetts. During the American Revolution, George Washington mandated smallpox inoculation to protect American troops against infection from their largely immune English enemies, thus lowering smallpox morbidity and mortality. The safer practice of vaccination using cowpox to induce

smallpox immunity was developed in 1796. The smallpox vaccine, improved over time, radically reduced incidence of disease and death from this deadly and disfiguring disease (D. A. Henderson et al., 2008) and led in the 20th century to the complete elimination of smallpox.

At the turn of the last century, five human vaccines were in use: two viral vaccines: the variola vaccine for smallpox and a vaccine for rabies; and three bacterial vaccines: those for typhoid, cholera, and plague (S. L. Plotkin & Plotkin, 2008). In the early 20th century, additional vaccines were developed for yellow fever, diphtheria, pertussis, tetanus, and tuberculosis (i.e., the Bacille Calmette-Guérin vaccine). The first influenza vaccine (A/B vaccine) was introduced in 1942 and was administered to the U.S. combat forces in World War II. Licensed for public use in 1945, the A/B vaccine was the only flu vaccine available for decades. As new influenza strains appeared (e.g., “Asian” and “Hong Kong” strains) in the latter 20th century, scientists raced to produce new vaccines (IAC, 2013; S. Plotkin, Orenstein, & Offit, 2009). The beginnings of cell culture in the second half of the 20th century gave rise to several new vaccines, including two for polio: the live oral vaccine (OPV) and inactivated polio vaccine (IPV) as well as vaccines to prevent measles, hepatitis B, meningococcal diseases, mumps, Japanese encephalitis, *Haemophilis influenzae* type B, cholera, Lyme disease, rubella, tick-borne encephalitis, adenovirus, hepatitis A, varicella, and rotaviruses. In addition, several older vaccines were improved.

Vaccine development. Historically, vaccines have largely been developed through observation and trial and error, with very little detailed understanding of how they work (Siegrist, 2008). What is known is that vaccines activate the immune system, stimulating it to create antibodies and to cause immune cells to recognize and mount a response to a pathogen or antigen. Vaccines provoke an immune response to prevent infection from a VPD and remains robust from

a few years up to a lifetime (S. B. Omer, 2010a). Vaccines are considered by the public health community to be one of the greatest public health achievements of the 20th century, and perhaps of all time (CDC, 1999b).

Vaccines have brought about the near elimination of diseases such as diphtheria, tetanus, pertussis, measles, mumps, rubella, and the serious meningitis and pneumonia in young children caused by *H. influenzae* type B (Hib) (CDC, 1999a). Before the Hib vaccine was introduced in 1986, this pathogen was responsible for 3 million serious illnesses and as many as 386,000 deaths per year, chiefly through bacterial meningitis and pneumonia. Within six years after the Hib vaccine introduction, cases of disease dropped to 0 (Atkinson et al., 2012; World Health Organization, 2007).

Smallpox was one of the deadliest VPDs. Before the widespread smallpox vaccination of the 20th century, the case fatality rate during smallpox epidemics was 25–30 percent (Johnston, 2003). In 1967, when the now successful global eradication campaign began, smallpox still infected up to 15 million persons a year (CDC, 2007b). The global application of smallpox vaccination led to smallpox eradication through a systematic, worldwide campaign. Routine pediatric smallpox vaccination in the U.S. became unwarranted in 1972 and ended in that year (Atkinson et al., 2012). Similarly, following the success of smallpox eradication, other crippling and debilitating diseases were then considered for eradication efforts. Polio is one.

Poliomyelitis infection reached a peak in the United States in 1952, with more than 21,000 paralytic cases. Polio has no cure, but now has a safe and effective preventive vaccine. Following vaccine introduction in 1952, polio incidence declined rapidly. The last U.S. outbreak of paralytic poliomyelitis occurred in 1979, from an imported virus that appeared among clusters of Amish in several Midwest states (Expanded Program on Immunization, 1994). In 1988, polio was targeted

by the World Health Assembly (WHA) for elimination (CDC, 2009). The last imported polio case in the U.S. was reported in 1993, and the Americas were certified in that year as free from polio (Atkinson et al., 2012). Worldwide, polio has declined by 99 percent since 1985 (WHO, 2010), but its eradication remains challenging because of repeated outbreaks of circulating wild-type polio in Africa and southwest Asia (Modlin, 2010). Imported polio paralytic disease has recently re-emerged in Syria, from a Pakistani strain (Butler, 2013; Suspected polio outbreak in Syria," 2013), and wild polio virus has been found in sewage samples in some Southern Israel Bedouin communities, although there have been no reported polio infections to date in that country (Roberts, 2013). Polio remains endemic only in Nigeria, Afghanistan, and Pakistan, and , in early 2013, India was declared eradicated in India (UNICEF, 2013), following three years since the last polio case (Willyard, 2014).

The polio vaccine merits a short discussion because of confusion surrounding the vaccine's toxicity as noted in earlier research (Bean & Catania, 2013; Offit, 2005, 2011). The live attenuated, oral polio vaccine (OPV) can cause polio, but vaccine-acquired paralytic polio (VAPP) is currently non-existent in the U.S. because only the IPV—inactivated polio vaccine—is currently administered. OPV is no longer administered in the U.S. The risks associated with the polio vaccine were rare, centering on the “Cutter incident” dating back to 1955 (Offit, 2005). Two production pools of polio vaccine consisting of 120,000 doses, made and administered by Cutter Laboratories, were found to contain live polio virus, resulting in abortive polio in 40,000 vaccinated persons, 51 persons permanently paralyzed, and 5 deaths. Also during the 1950s, the five companies that produced the polio vaccine had problems in completely inactivating the virus, resulting in additional incidents of polio paralysis and death (Offit, 2005).

Vaccine-Preventable Diseases (VPDs)

Despite these stellar successes, many potentially fatal VPDs remain endemic in some regions and epidemic in others. In addition, VPDs have re-emerged around the world (Eisenstein, 2014). Measles is an example. With an R_0 of 16–17, measles is one of the most highly infectious human diseases, compared to an R_0 of 1.7–2.6 for the widely feared H1N1 influenza of 2009–2010 (S. B. Omer, 2010a). The R_0 (ar-naught) value is the assumed reproduction number for a pathogen (Fine, 1993). R_0 represents the average number of secondary infections likely to result from contact with a single infectious person in a susceptible population (Perisic & Bauch, 2009). Diseases with a higher R_0 are more likely to spread through casual contact, or other than close personal contact (see Table 1).

For example, measles infected virtually all children in the pre-vaccine era (Bremen et al., 2011; Fine, 1993), and complications from the disease can be deadly. An estimated 139,000 people died in 2010 from measles, mostly children under age five (WHO, 2012). In the first half of 2011, the U.S. experienced the highest recorded rate of measles since 1996: 198 cases, about twice the rate reported annually from 2001 to 2008 (Jaslow, 2011). Of the 198 cases, 179 (90%) were imported measles, brought into the country by residents, many of them unvaccinated, returning from international travel, having visited countries where the disease is endemic (Centers for Disease Control and Prevention, 2011; Vaccines.gov, 2012).

In 2011, the *Daily Mail* in the United Kingdom noted 26,000 measles cases reported in Europe (Bates, 2011). The U.S. Centers for Disease Control and Prevention (CDC) warned against a possible outbreak of imported measles that could follow the 2012 summer Olympics and urged Americans traveling to London for the Olympics to ensure they were current with measles vaccination (CDC, 2011a; Eccles & Keneally, 2012). In 2013, members of a church community in Texas, where many worshippers objected to vaccination, experienced an outbreak of more than

20 cases of measles, 95% of them among the unvaccinated (CDC, 2013). The church subsequently opened a vaccine clinic to stem further spread of this highly contagious, preventable disease (Associated Press, 2013).

Importance of Herd Immunity

The benefits of immunity occur at both the individual and collective levels. At the community level, this immunity is known as “herd immunity,” and, depending on the infectiousness of a disease, denotes the percentage of a population that needs to be immune for the entire population theoretically to be protected, especially those too young, too old, or too ill to be immunized (Fine, 1993; John & Samuel, 2000; Perisic & Bauch, 2009). This level of necessary protection can range from 80 percent of the population for rubella, to 95 percent for pertussis and measles (see Table 1, below).

Table 1

Estimated Herd Immunity Thresholds for Eight Vaccine-preventable Diseases

| Disease | Transmission | R ₀ | Herd immunity threshold |
|------------|------------------|----------------|-------------------------|
| Diphtheria | Saliva | 6-7 | 85% |
| Measles | Airborne | 12-18 | 83 - 94% |
| Mumps | Airborne droplet | 4-7 | 75 - 86% |
| Pertussis | Airborne droplet | 12-17 | 92 - 94% |
| Polio | Fecal-oral route | 5-7 | 80 - 86% |
| Rubella | Airborne droplet | 5-7 | 80 - 85% |
| Smallpox | Social contact | 6-7 | 83 - 85% |

R₀ is the basic reproduction number, or the average number of secondary infectious cases produced by a single index case in a completely susceptible population.

[Table modified from *Epid Rev* 1993;15: 265-302, *Am J Prev Med* 2001; 20 (4S): 88-153, *MMWR* 2000; 49 (SS-9); 27-38.]

Because schools bring together family and neighborhood subgroups that otherwise may have little interaction, infectious disease among schoolchildren can spread quickly into larger populations (Fox, Elveback, Scott, Gatewood, & Ackerman, 1971). Thus, to obtain the benefits of vaccination in a population, many states have mandated pediatric vaccinations for school attendance as the most important measure to obtain widespread public immunity and prevent epidemics. Vaccination of school children can induce immunity throughout the interlocking subpopulations of an entire town or city (P. J. Smith et al., 2006; Thompson et al., 2007). In this way, even persons for whom vaccination is disallowed for medical reasons or for whom it is simply ineffective are protected through the diminished likelihood that they will even be exposed to a VPD (May & Silverman, 2003). States with school immunization laws in 1977, when the laws first began to be implemented, had 50 percent lower incidence rates of measles, for example, than states without such laws (Orenstein & Hinman, 1999). In 1978, the second year, the results were still more dramatic—states where immunization was mandatory had more than 90 percent fewer VPD cases than states without such laws.

In the case of pertussis (whooping cough), children under the age of 12 months are the most vulnerable to this highly infectious and often fatal disease (Atkinson et al., 2012). Thus babies are best protected against infection by being surrounded (“cocooned”) by an uninfected and immune family, neighborhood, and community. Before the pertussis vaccine became available in the 1940s, more than 200,000 cases of pertussis were reported annually. Since widespread use of the vaccine began, pertussis incidence has decreased more than 80 percent compared with the pre-vaccine era (Atkinson et al., 2012). Gangarosa and colleagues (1998) reported that outbreaks of pertussis occurred periodically in places where widespread avoidance of the pertussis vaccine was present. In the spring of 2012, an alarming pertussis epidemic

occurred in Washington State. More than 2,647 cases had been reported by June 23, 2012, compared to fewer than 100 cases during the same time period in 2011 (Washington State Dept. of Health, 2012). By June 2012, the number of pertussis cases in Oregon had tripled over the previous year, to 290 (Rojas-Burke, 2012). With the nearly 6 percent parental vaccine refusal rate in Oregon, there may be a relationship between vaccine avoidance and this outbreak. For protection of a community against pertussis, fully 95% of the population should be vaccinated (S. B. Omer, 2010b)—Oregon's coverage has now slipped below 95% for kindergartners, seriously compromising herd immunity.

Erosion of Herd Immunity

The scientific literature has begun to focus on the potential harmful effects to public health of the anti-vaccine movement and vaccine exemption behavior. The greater the number of persons found to lack immunity to a disease, the greater the chances that the protection provided by herd immunity will vanish. Gangarosa and colleagues (1998) found that declines in vaccination rates attributable to the anti-vaccine movements in several countries—the United Kingdom, Japan, Sweden, Russia, Ireland, Italy, the former West Germany and Australia—resulted in pertussis incidence ten to 100 times greater than in countries with high vaccine coverage. Feikin and colleagues (2000) studied measles and pertussis cases in school-aged children in Colorado during the timeframe of 1987–1998. They found vaccine-exemptors to be 22 times more likely to acquire measles and six times more likely to acquire pertussis than vaccinated children. The frequency of exemption was associated with the incidence rate of both measles and pertussis in vaccinated children—showing that herd immunity was eroded by vaccine avoidance in a subpopulation.

Salathé and Bonhoeffer (2008) conducted a series of statistical simulations that demonstrated how a simple opinion formation process can lead to small clusters of unvaccinated persons, and this further leads to dramatic increases in disease outbreak probabilities—and these

smaller clusters negatively affect herd immunity. Omer and colleagues (2008) evaluated spatial clusters of nonmedical vaccination exemptions in Michigan and compared their geographical overlap with pertussis disease clusters. These researchers found a significant overlap of pertussis incidence with exemption clusters, suggesting that opinion clusters affect disease incidence and can work against herd immunity. And, finally, May and Silverman (2003) examined how clustering of exemptions may exacerbate the effects of the anti-vaccination movement, so that the danger of “clustering” goes beyond the groups that decline vaccination. They wrote

The fact that members of groups whose shared beliefs tend to make them open to seeking (vaccine) exemption also tend . . . to live in proximity to other members of these groups, create conditions in which a clustering of exemptions *sufficient to undermine herd immunity might occur* (May & Silverman, 2003, p. 1050) (emphasis added).

All the above examples point to the potential negative impact of vaccine avoidance or exemption on herd immunity, and thus on the health and welfare of communities. What they do not tell us is why the anti-vaccine movement continues to grow in popularity.

The Rise of Vaccine Opposition

A significant minority population has historically opposed, and still opposes, government mandates like vaccination that they believe intrude on their personal autonomy. Research shows that they also object because of perceived vaccine risks, and their low perceptions of disease severity or their own susceptibility to a VPD (Austvoll-Dahlgren & Helseth, 2010; Casiday, 2005; Highland, 2010).

Unlike curative therapies, vaccines are designed to prevent a possible future disease and not one that is already harming or sickening a person. This is one of the sources of vaccine opposition: that vaccines address the possibility of a future, unknown risk and not a present, tangible one. To persuade a well population to take the risk of introducing a toxin, however

attenuated or inactivated, into their or their children's bodies, can be daunting, as no vaccine is either completely effective or completely safe (Atkinson et al., 2012; Chen, 1999, 2005; Heininger, 2009; S. Plotkin et al., 2009). Although technological advances have ensured that modern vaccines are purer and safer than their historical antecedents, the memory of alarming vaccine side effects remains (Kwok, 2011). For example, historically some 2–3 percent of those vaccinated died of smallpox acquired from the vaccine (S. L. Plotkin & Plotkin, 2008). This serious risk led to discontinuing the smallpox vaccine following smallpox eradication. At that point, the risk of disease from the vaccine was greater than the risk of disease transmission from anyone who might be infected.

For any vaccine, the potential recipient's questions are likely to be, what is the risk that I will become infected with the disease prevented by this vaccine? What are the consequences to me if I do? The corollaries to these questions center on the risk from the vaccine itself and the consequences of that vaccine: What is the risk of disease or harm from the vaccine? What are the consequences of these risks? In general, despite the fact that much of the public perceives vaccines to be of high benefit and low risk (Stack et al., 2011), a significant minority has the opposite view (Alhakami & Slovic, 1994; B. R. Bloom, Marcuse, & Mnookin, 2014; Gaudino & Robinson, 2011; Jenkins-Smith, Silva, & Song, 2010; Salathé & Bonhoeffer, 2008). Risk perception scientists Alhakami and Slovic premised that activities or technologies judged to be high in benefit tend also to be judged low in risk. They measured this in terms of mean "distance" between the benefit and the risk. For example, radiation therapy had a low mean distance of 1.47 and smoking, a high of 5.24—that is, the risks far outweighed the benefits of smoking. For vaccines, this distance was measured at 4.37, indicating a very high risk perception versus benefit. A national study conducted in 2010 reported that 17 percent of parents believed that vaccine risks

exceed the benefits (Jenkins-Smith et al., 2010). Risk perception is likely to be the major factor in vaccine acceptance or opposition.

Recent outbreaks of measles, pertussis, and varicella (chicken pox) in the U.S. have been associated with parental avoidance of those specific vaccines for their children (Atkinson et al., 2012; Atwell et al., 2013; Centers for Disease Control and Prevention, 2011; Feikin et al., 2000; Henry, 2005; S. B. Omer et al., 2008). These outbreaks may be a harbinger of worse to come where pockets of vaccine opposition persist (e.g., the 2012 outbreaks of pertussis in the states of Oregon and Washington). The U.S. may experience additional outbreaks of VPDs similar to those reported in across Europe, attributable to vaccine objection (Martin et al., 2009). Nationally, the median coverage for pediatric vaccines in 2012–2013 was about 92 percent (B. R. Bloom et al., 2014) down from 95%.

Vaccine resistance in Oregon. Oregon is a state with a long history of opposition to vaccines. In 1911, in the face of mandated vaccination to combat recurrent outbreaks of smallpox, parents in the Portland “direct democracy movement” succeeded in shutting down local schools rather than submit to mandatory smallpox vaccination (Johnston, 2003). Oregon today has an increasing rate of pediatric vaccination avoidance (Cieslak, 2009), with 32 percent of 2-year-olds in the state not up-to-date on scheduled vaccinations. This is nearly twice the rate in Florida, the state (the District of Columbia has the lowest rate) with the lowest percentage of unvaccinated toddlers, at 18 percent (CDC, 2011b). Contemporary Oregonians have an easy way out of vaccinating their children, through exemption to vaccines. This process requires a parent simply

to check a religious exemption box on the Certificate of Immunization Status without ever having to demonstrate adherence to a religious belief with a tenet objecting to vaccines.¹

Vaccine exemptions rose steadily from 2 percent of parents in 2000 to nearly 6 percent in 2010 (Oregon Public Health Division, 2011). In Portland, Oregon, consistent delayed vaccinations increased from 3 to nearly 10 percent from 2004 – 2009; episodic delays increased from 22 to 30 percent (Robison et al., 2012). One cannot help but question why Oregonians are increasingly making the choice to not vaccinate, or to delay, when the benefits of vaccinating are so clear. According to Alhakami and Slovic (1994), the perceived risks of vaccination are seen to outweigh the perceived benefits for a significant subgroup of Oregon parents and perhaps of their health care providers (HCPs) for reasons to be explored in more detail below.

Factors in vaccine opposition. At the heart of vaccine opposition is an increase in the perceived risk of vaccination and a decline in the perceived vaccine benefits as well as the perceived risk of disease or death from the infectious diseases they prevent.

Vanishing VPDs. Because many of the most horrific preventable diseases have largely vanished (i.e., diphtheria, tetanus, *Haemophilis influenza B*, polio, smallpox, plague), parents and HCPs born after 1950 may lack any personal knowledge or experience of the devastating effects of these and other preventable diseases, and may, as a result, perceive many VPDs as presenting inconsequential or non-existent risks (Stefanoff et al., 2010). In the absence of serious VPDs like polio, diphtheria, and meningitis, it can be difficult to appreciate the benefits of the vaccines responsible for the dramatic reduction in the incidence of these diseases (Allen, 2007; Diekema, 2005; Feudtner & Marcuse, 2001; Gullion, Henry, & Gullion, 2008; Offit, 2011; Stefanoff et al.,

¹ In 2013, however, the Oregon State Legislature passed a bill requiring all parents refusing one or more vaccines must submit documentation of proof that the parents listened to an explanation of a vaccine's scientific basis and health benefits or watched an educational video (Oregon Senate, 2013).

2010). As VPDs dwindle in incidence and prevalence, the perceptions of harm from vaccines and vaccine ingredients loom larger—“you fear what you see.” There is a tendency to see vaccines and their possible side effects as serious but the diseases that they protect against are largely invisible (Slovic, 2012). This low risk perception might cause parents to delay or even avoid some or all vaccines for their children.

Vaccine risks. Many vaccine-opposing parents and some HCPs may doubt the benefits of vaccines. These doubts have centered on four major arguments.

First are concerns about vaccines themselves: vaccine safety, side effects, adverse events, vaccine ingredients (Kata, 2011; Offit, 2011); and a belief that vaccines in general interfere with the development of the immune or nervous systems (Busse, Morgan, & Campbell, 2005; Colley & Haas, 1994; Gellin, Maibach, & Marcuse, 2000; Russell, Injeyan, Verhoef, & Eliasziw, 2004; Salmon et al., 2005). These concerns about vaccine safety are growing (Barnack, Reddy, & Swain, 2010; Blume, 2006; O'Leary et al., 2013; Salmon et al., 2005). In short, it would seem that vaccines themselves have replaced the diseases they prevent as having most of the hazard characteristics leading to higher perceived risk, such as involuntariness, uncertainty, and lack of control (Chen, 2005; Slovic, 2001).

The second argument is a belief that vaccinations fail to produce immunity and may even cause the diseases they claim to prevent (Busse et al., 2005; Campbell et al., 2000; Colley & Haas, 1994; Gellin et al., 2000; Russell et al., 2004; Salmon et al., 2005).

The third argument is that infection-driven immunity—immunity from getting sick and mounting an immune response—is more permanent and less risky than vaccine-induced protection (Colley & Haas, 1994; Russell et al., 2004). This argument minimizes the much higher risk of a serious VPD.

Finally, some vaccine opponents express disbelief in vaccine-promotion information provided by traditional providers, government agencies, public health experts, and immunization safety research (Benin et al., 2006; Colley & Haas, 1994; Downey et al., 2010; Johnston, 2003; Mello, Abiola, & Colgrove, 2012; Salmon et al., 2005; K. Wilson, Mills, Boon, Tomlinson, & Ritvo, 2004). Some physicians, for example, specifically resist the human papillomavirus (HPV) vaccine as a so-called “lifestyle vaccine” because HPV is spread through sexual contact; therefore, spread of the virus is perceived as completely avoidable by means other than vaccination—especially by sexual abstinence (Humiston et al., 2009). Even mainstream medical (MM) providers who support this vaccine say that it fails to address all the possible HPV antigens, or argue that it was brought to market a little sooner “than the science would support.” (see also Mello et al., 2012).

Vaccine avoidance among mainstream medical (MM) providers. Although most mainstream medical (MM) providers enthusiastically support all vaccines, some are more conditional in their vaccine support. Providers who are parents often hold the same spectrum of beliefs as other parents, even those parents who are hesitant to vaccinate their children. For example, some physicians regard the varicella vaccine as unnecessary for mild childhood disease (Bean & Catania, 2013; Ehresmann et al., 2000). Other MM providers cite possible adverse effects from the pertussis vaccine (Girard, 2002); the combined measles, mumps, and rubella vaccine (MMR) (R. Henderson et al., 2004); combination vaccines in general (Lê, 2001; Posfay-Barbe et al., 2005); or, as mentioned above, the HPV vaccine for pre-pubescent girls (Humiston et al., 2009; Vamos, McDermott, & Daley, 2008).²

² At the time this research was undertaken, the HPV vaccine was recommended for girls, but not yet advised for boys. Comments throughout this article and in the literature cited refer only to the HPV vaccine for girls and women.

Complementary and Alternative Medicine (CAM) Providers

CAM practitioners have been found to be more likely to oppose vaccines than are mainstream medical providers (see, for example, Busse et al., 2005; Campbell et al., 2000; Downey et al., 2010). An estimated 40 percent of all U.S. adults sought treatment from CAM providers in 2007 (P. M. Barnes, Bloom, & Nahin, 2008; Nguyen et al., 2011). Oregonians are even more likely to seek CAM treatment. Using chiropractic density as a proxy for all CAM, the Oregon chiropractor-to-population ratio is 1:2544 compared to the U.S. ratio, 1:3258. In other words, 46 percent of Oregonians are likely to seek CAM treatment (Federation of Chiropractic Licensing Boards, 2012)—15% higher than the national average. Will their CAM provider advise against vaccinating? Remember that for highly infectious diseases like pertussis and measles, 95 percent of the public must be vaccinated.

I explore below the potential factors in CAM opposition to vaccines. The term “complementary and alternative” encompasses health practices that complement MM practices, or that replace them (alternative). The respective views of health among MM and CAM providers can differ significantly. “Followers of allopathic and holistic medicine do not simply see the world differently; they see different worlds” (Frohock, 1992, p. 213). For CAM providers, the body is seen as capable of fighting any disease when healthy and in “balance.” This balance is achieved through energy therapies, diet, chiropractic adjustment, meditation, and so on. Alternative practitioners believe that their therapies trigger the body’s innate healing abilities (Campbell et al., 2000; Cohen, 2003; Frohock, 1992; Josefek, 2000; Mirtz et al., 2002). By contrast, MM providers rely instead on scientific evidence, clinical observation, laboratory testing, and published research in prescribing treatments and preventive therapies. The CAM view

of health as more than freedom from disease may be a factor in attracting practitioners as well as clients to these therapies.

The National Center for Complementary and Alternative Medicine (NCCAM), a National Institutes of Health agency established in 1999, defines “conventional medicine” (also known as Western or allopathic medicine) as medicine practiced by holders of M.D. (medical doctor) and D.O. (doctor of osteopathic medicine) degrees as well as by allied health professionals, including physical therapists, psychologists, and registered nurses (NCCAM, 2011). NCCAM defines CAM as a group of diverse medical and health care systems, products, and practices not generally considered as part of conventional medicine. Berman and Straus (2003, p. 239) define CAM as consisting of clinical interventions “that are practiced because of their popularity rather than the prior demonstration of safety and efficacy required for conventional agents.”

Some proponents of alternative medicine prefer the term *complementary* in referring to unconventional therapy because it more accurately reflects the interaction between alternative and conventional medical treatment (Josefek, 2000). Alternative practitioners describe themselves as treating the body as a whole being, holistically (mind, body, and spirit), whereas they describe MM as treating a human body as “a group of isolated mechanical parts that independently require fixing” (Josefek, 2000, p. 297). Josefek describes MM and CAM as differing in their definitions of health. Conventional medicine is described by CAM providers as concerned with curing the physical body of disease and healing from the outside in, through drugs and surgery; they describe alternative medicine as healing from the inside out, and as involving a progression towards total mental, physical and emotional wellness (see also Frohock, 1992).

When the NCCAM originally developed its research strategies and priorities, it reviewed more than 800 CAM practices, including many having potential immunological effects (NCCAM,

2012). The Center divided these practices into five main domains: *natural-product based therapies* (such as naturopathy and homeopathy, which use substances found in nature to promote health); *manipulative and body-based therapies* (such as massage, chiropractic, and osteopathy); *mind–body interventions* (interventions that use various techniques designed to facilitate the capacity of the mind to affect bodily function and symptoms, including acupuncture, yoga, prayer, meditation, spirituality, and guided imagery); *energy therapies* (therapies intended to affect energy fields as well as the unconventional use of electromagnetic fields, such as moxibustion, acupressure, and acupuncture); and *alternative medical systems* such as Chinese or Ayurvedic medicine (Benjamin, Berman, Jacobs, & Starr, 1997; Berman & Straus, 2003; National Center for Complementary and Alternative Medicine, 2011; NCCAM, 2012; Wieland, Manheimer, & Berman, 2011). The NCCAM intended for each CAM modality to stand alone, with no double-classifications, even though combinations do exist; for example, MD-naturopaths, MD-chiropractors, MD-homeopaths, acupuncturist-naturopaths, or chiropractor-naturopaths.

CAM modalities encompass many hundreds of therapies (Leckridge, 2004; Redwood, Hawk, Cambron, Vinjamury, & Bedard, 2008). Wieland, Manheimer, and Berman (2011) reduced the hundreds of modalities to 51 practices for use in Cochrane reviews.³ Although CAM practices are not, as yet, embraced wholeheartedly by conventional Western medicine (Cohen, 2003; Wieland et al., 2011), the boundaries between CAM and conventional medicine are not absolute (Fearon, 2001; J. W. Henderson & Donatelle, 2004; Parkman, 2004). The popularity of CAM among the public and its increasing acceptance by the medical establishment has prompted

³ Cochrane Reviews are systematic assessments of healthcare interventions intended to help people to make informed decisions about health care, their own or someone else's. Cochrane Reviews, used more frequently outside than within the U.S., help ensure that healthcare decisions throughout the world can be informed by high quality, timely research evidence. These reviews are the main output of The Cochrane Collaboration and are contained in the *The Cochrane Database of Systematic Reviews*, published electronically by John Wiley and Sons (The Cochrane Collaboration, 2012).

medical schools to offer courses in alternative medicine as part of traditional medical education and training (Benjamin et al., 1997; Frohock, 1992; Josefek, 2000; Wieland et al., 2011; Wu, Lu, Hayes, Donovan, & Lore, 2009).

Alternative medical systems involve complete systems of theory and practice that have evolved independently of, and often prior to, the Western biomedical approach. For example, in Ayurvedic medicine, the traditional medical system of India, conditions of the mind, body, and spirit are addressed through diet, exercise, meditation, herbs, massage, yoga, and exposure to sunlight. Traditional Chinese medicine, of which acupuncture is a major component, also draws on herbs and mind-body exercises like *tai chi* and *qi gong*. CAM also includes the more-modern Western approaches that are applied in chiropractic and naturopathy (Goldrosen & Straus, 2004; Wieland et al., 2011). Of all the practices, the natural-product-based therapies and body-based therapies seem to be the most widely accepted, including naturopathy, homeopathy, acupuncture, and chiropractic (Wieland et al., 2011).

This study focused on five subgroups of CAM practitioners in Oregon, a population found to be less likely to recommend vaccines when they consult with their clients/patients (Busse et al., 2005; Campbell et al., 2000; Downey et al., 2010; Halper & Berger, 1981; Lee et al., 2005): acupuncturists, chiropractors, homeopaths, midwives, and naturopaths. Practitioners of these five selected modalities are arguably more likely than other CAM providers to include those who treat parents and/or children and who dispense advice on health care, including vaccination.

To give some idea of the scope of CAM compared to conventional practitioners in Oregon: as of 2010–2012, the state had 12,000 licensed medical doctors, 700 doctors of osteopathy, 40,000 registered nurses, and 3,900 licensed practical nurses. For the licensed CAM practitioner populations in 2010–2011, there were 1,500 chiropractors, 960 doctors of naturopathy

(including homeopaths, not counted separately), 100 acupuncturists, and 74 direct-entry midwives (Oregon Board of Chiropractic Examiners, 2011; Oregon Board of Naturopathic Medicine, 2012; Oregon Medical Board, 2011; Oregon State Board of Direct Entry Midwifery, 2011; Oregon State Board of Nursing, 2011). Not all states certify or license all five of these CAM modalities; Oregon licenses all but homeopaths.

Use of CAM modalities is rising, as noted above. The U.S. public is increasingly turning to alternative providers for health care (M. A. Davis, West, Weeks, & Sirovich, 2011; Fearon, 2001; Freedman, 2011; Goldrosen & Straus, 2004; Jones, Sciamanna, & Lehman, 2010; Josefek, 2000; Nguyen et al., 2011; Tindle, Davis, Phillips, & Eisenberg, 2005). An estimated 40 percent of all U.S. adults sought treatment from CAM providers in 2007 (P. M. Barnes et al., 2008; Nguyen et al., 2011). When the rise in CAM is added to the role played by CAM providers in opposing some or all vaccines, it is tempting to draw an association between CAM opposition and low vaccination rates, leading to potential VPD outbreaks (see, for example, Allen, 2007; Atwell et al., 2013; Busse et al., 2011; Campbell et al., 2000; Downey et al., 2010; Frank, 2002; Halper & Berger, 1981; Jones et al., 2010; Lehrke, Nuebling, Hofmann, & Stoessel, 2001; Murphy-Geiss, Rosenfeld, & Foley, 2010; Offit, 2013; Russell et al., 2004; Schmidt & Ernst, 2003; K. Wilson et al., 2004). Oregon likely has a greater-than-average use of CAM modalities, as explained above.

CAM providers have been found repeatedly to be more likely than MM providers to oppose pediatric vaccination (see, for example, Allen, 2007; Busse et al., 2005; Campbell et al., 2000; Downey et al., 2010; Offit, 2013; Rose & Ayad, 2008; Russell et al., 2004). Downey and colleagues (2010) examined pediatric vaccination experiences of more than 11,000 children ages 1 to 2 years. They found that children who visited only CAM providers were less likely to have

received the four recommended pediatric vaccines or the combination vaccines covering seven diseases. In the same study, children aged 1–17 years were “significantly more likely to be diagnosed with a VPD if they received naturopathic care” than those who saw only a MM provider (Downey et al., 2010, p. 922). Considering the increasing use of CAM, Oregon might for this reason alone have a higher number of vaccine-objectors.

Summary of Findings from Previous Research

In an earlier qualitative study by Bean and Catania (2013) Oregon health care provider (HCP) attitudes toward vaccinating were examined. The findings raised several questions I sought to address in this expanded and broadened study. In this earlier study of 15 health care providers (nurses, physicians, chiropractors, and midwives), three categories of vaccine recommendations emerged: (a) vaccine supporters: those who supported all vaccine use (20%), (b) vaccine opposers: those who broadly opposed vaccines (33%), and (c) conditional supporters: those who weighed a vaccine’s history and relevant efficacy/risk/benefit evidence in recommending some but not all vaccines or delaying scheduled vaccines (47%). Surprisingly, most study participants, MM and CAM alike, opposed or conditionally supported vaccination (80%). However, most of the conditional supporters and opposers were CAM providers (60%). In the earlier study, no CAM provider fully supported vaccines. Notably, half of the MM providers were also conditional vaccine supporters.

In the earlier study, the Health Belief Model (HBM) concepts were useful in explaining the antecedents of vaccine recommendation variants that emerged from the data. In addition, certain explanatory concepts emerged from the data that provided a broader framework for understanding differences in vaccine recommendations and opened the way for further confirmatory research. In general, the core HBM concepts (especially perceived susceptibility to and perceived severity of a disease) emerged as correlates of vaccine recommendations. However,

other health beliefs and social factors were equally important—including immunology beliefs, perceptions of government and industry, group norms, and personal experience—and not included in the HBM constructs. These are further explored in the current research.

Research Approaches Compared

An explanation of the relative strengths and weaknesses of quantitative and qualitative approaches to data collection and analysis may be useful in explaining why qualitative research methods are appropriate for this study. Very simplistically, we could say that quantitative methods are best used with large populations to record what happened to which populations and how often. Qualitative research, by contrast, by focusing on a small number of participants, is better able to tell us the beliefs of each interviewee as to *why* a phenomenon occurred and its meaning to that person. The two research approaches are complementary, or even symbiotic.

Quantitative research. Patton (2002) explains that quantitative measures are succinct, parsimonious, and easily gathered for analysis; its data are systematic, standardized, and easily presented in reports, especially in tables and graphs. Quantitative methods have provided researchers with vast amounts of information on the phenomenon of parental pediatric vaccine opposition (Dowling, 2008; Gangarosa et al., 1998; Gellin et al., 2000; Girard, 2002; Gust et al., 2006; Kennedy, Brown, & Gust, 2005; Leader, Weiner, Kelly, Hornick, & Capella, 2009; Maayan-Metzger, Kedem-Friedrich, & Kuint, 2005; S. B. Omer, Salmon, Orenstein, deHart, & Halsey, 2009; Russell et al., 2004; Salmon et al., 2005; Salmon et al., 2006; Stefanoff et al., 2010). Thanks to this research, we know that VPD outbreaks often occur in concert, or in tandem, with vaccine opposition. We also know that vaccine opposers are seldom persuaded to vaccinate by a mere statement of vaccine benefits (Benford & Snow, 2000; Feudtner & Marcuse, 2001; Kata, 2011) or by a review of the scientific literature (Gullion et al., 2008). Wilson, Mills,

Norman, and Tomlinson (2005) found that presenting scientific information on the risks of polio actually reinforced the tendency of their study participants to resist the polio vaccine.

Qualitative research. Qualitative methods aim at providing the necessary context that can reveal underlying beliefs (Patton, 2002). Results of such research are often lengthy, detailed, and variable in content; analysis is complex because responses are neither systematic nor standardized. Yet, the qualitative responses permit a researcher to understand and capture points of view without predetermining those points of view through advance selection of questionnaire categories and discrete questionnaire items.

Perhaps we can best understand and address health care provider opposition or conditional support for vaccines through an understanding of their social and professional milieus, their beliefs about illness and the workings of the human immune system, and their understanding of the real and perceived risks and values of vaccines. Gaining a better understanding of these beliefs and influences might be achieved by asking a cross-section of CAM providers to explain them. This involves asking questions and allowing time for lengthy answers (Hopfer & Clippard, 2011; Lingard, Garwood, Schryer, & Spafford, 2003; Mishler, 1991; Morse, Barrett, Mayan, Olson, & Spiers, 2002; Peterson & Langellier, 1997; Poindexter, 2002; Ragin, Nagel, & White, 2004; R. C. Smith, 2004; Wiklund-Gustin, 2010). The present research did not involve hypothesis testing, but built on concepts and models from prior work (Bean & Catania, 2013); it also explored new concepts and models. The study has a theoretical basis, drawing upon what is known about CAM providers and their beliefs about vaccines—thus the research employed a modified grounded theory approach (Tickner, Leman, & Woodcock, 2009) and it also built directly on my prior research, using the Health Belief Model.

Ulin, Robinson, and Tolley (2005) explain that many issues central to public health research and practice are embedded in cultural contexts, and that decision-making is conditioned by membership in numerous social groups and settings. Behavior has its roots in the person's social and professional milieus (Benford & Snow, 2000; Brown & Zavestoski, 2004; Emmons, 2000; Larkey & Hecht, 2010; Scambler & Kelleher, 2006).

Ulin and colleagues also note that applied behavioral research in public health “must have the capacity to uncover multiple perspectives and understand their implications for health decision making” The tried and true qualitative practices of repeated listening to audio-recorded interviews, transcribing, coding the transcripts, and re-listening were utilized—all of which comprise immersion in the data (Hopfer & Clippard, 2011; Hsieh & Shannon, 2005; Kondracki, Wellman, & Amundson, 2002; Malterud, 2001; Ragin et al., 2004). This immersion in the data elicits the meanings from the collected narratives, and can result in an elegant and informative research report (Morse, 2008).

This research expands upon earlier research (Bean, 2005, 2006, 2008, 2011; Bean & Catania, 2013), employing an interviewing technique that solicits narratives. The narrative approach relates to both interviewing a subject and analyzing the resulting text (Mishler, 1986; Riessman, 2008; Squire, 2009). As Reissmann (1993, p. 19) explains, Narrative analysis “tells not only about past actions, but how individuals understand those actions; that is, meaning.” Narrative analysis provides for examining and relating meaning at the levels of the referential meaning of what is said, the interpersonal function of speech (the relationship between the interviewer and interviewee), and the content of the text itself.

For example, experience from previous research indicates that posing direct vaccine-related questions to vaccine-opposers early in the interview process created unfortunate

antagonism between the interviewer and the interviewees, especially the CAM provider participants, who often seemed to view public health as “the enemy.” The Narrative Interview approach is designed to minimize this interview-induced bias.

Why study narratives? This research sought to describe significant, individual, personal career decision points, social and professional influences, meanings CAM providers ascribe to health maintenance, how CAM providers believe that the human immune system works—how the body fights infection and disease—and how vaccines play a role in maintaining health or cause potential harm. For this reason, the technique of narrative inquiry was chosen to elicit participants’ storied narratives on these topics. The first area of questioning addressed the participant’s choice of profession: “What was the one thing that persuaded you to become a HOMEOPATH/ACUPUNCTURIST/ MIDWIFE/ NATUROPATH/ CHIROPRACTOR?” Vaccine beliefs and practices were solicited in later probes (the full survey instrument is attached as Appendix 1).

The narrative interview method allowed each CAM provider’s story to unfold naturally, designed as more likely to uncover the experiences, training, and other influences leading to belief and practice than is traditional ethnography (Peterson & Langellier, 1997; Ragin et al., 2004). Groleau, Zelkowitz, and Cabral (2009) explain that the strength of qualitative research lies in listening to narratives in order to study how people both experience and give meaning to their health and lives within their social and cultural contexts. Storied decisional narratives enable the researcher to uncover the thinking that underlies attitudes (Hopfer & Clippard, 2011; Poindexter, 2002; Riessman, 1993; Wiklund-Gustin, 2010). They enable the researcher to understand how people think through the events they relate, thus creating a version of the past that is consistent with the person’s concept of self (Riessman, 2008). Obtaining the decisional and experiential

narratives of CAM providers was premised on the concept that stories of how providers integrate their training, personal histories, and the messages they receive from others provide a key means of understanding the assumptions they hold (Andrews, Squire, & Tamboukou, 2009; Larkey & Hecht, 2010; Riessman, 1993, 2008).

Narrative inquiry is an approach rarely used in public health, although narrative inquiry has been used for decades in disciplines such as linguistics, sociology, medicine, anthropology, and speech communications. In one study, Bingley, Thomas, Brown, Reeve, and Payne (2008) used “illness narratives” to review approaches to improve policy and practice in hospice and palliative care. In a second study, Hök, Wachtler, Falkenberg and Tishelman (2007) used narrative analysis to explore a caregiver’s account of negotiating between biomedical health care and CAM treatment for his wife’s cancer. The researchers’ recommendations aimed at assisting clinicians and researchers to improve doctor-patient communication. In a third study, Hopfer and Clippard (2011) examined the decision narratives of young women weighing the risks and benefits of the HPV vaccine to prevent future cancer. Their findings helped in crafting compelling HPV vaccine messages aimed specifically at college-aged women.

Research Significance

The current study expands the understanding of vaccine opposition and its antecedents by adding other CAM practitioners (i.e., homeopaths, naturopaths, and acupuncturists) to the earlier research that included chiropractors and midwives. I probed more deeply into CAM providers’ belief systems especially as related to disease, vaccination, and the immune system and the sources of those belief systems to elucidate the factors that led to advice concerning vaccine opposition, support, or conditional support. Specifically, this study sought to uncover antecedent

beliefs about vaccine risk and how these beliefs affect the advice concerning vaccines from several groups of CAM practitioners to their clients/patients.

Little has been reported in the literature about the types of messages CAM providers receive during their professional training and education surrounding the risks or benefits of vaccines (Busse et al., 2005; Busse et al., 2011; Campbell et al., 2000). As a result, little is known about which messages will persuade them to reflect on how they and their patrons/patients could benefit from vaccination (M. A. Davis, Smith, & Weeks, 2012; Dinas et al., 2009), and how vaccination can complement a holistic view of health and well-being (Rose & Ayad, 2008). Davis and colleagues limited their study to secondary data analysis to examine vaccination uptake among chiropractic and non-chiropractic users of CAM, but they did not report on the beliefs underlying vaccination avoidance or advice from providers. Rose and Ayad used an untested quantitative measure for gathering data about the effectiveness of a public health course offered to chiropractic students in encouraging vaccination support. The authors' intervention was only partially successful, and they admitted that chiropractic students learn from what they called "a hidden curriculum" that opposes vaccines—in other words, their fellow students, faculty, and private practitioners who serve as preceptors may oppose vaccination (Busse et al., 2005; Rose & Ayad, 2008). This anti-vaccine position then may be reinforced through anti-vaccine or vaccine-questioning continuing education course content.

Study Innovation

I focused attention on professional choices, professional and peer group norms, immunology frameworks, personal experience, "hidden curricula," beliefs about industry and government (as well as allowing for other significant contextual influences as they emerge), as keys to understanding CAM view of disease and their perceptions of vaccine risks and benefits. Doing so led to exploring what advice CAM providers give to others (especially to parents)

concerning vaccines. This research provides new information on the underlying beliefs of CAM providers who do or do not recommend vaccines. This new information can contribute to developing relevant and appropriate models to redress incorrect information and, over time, to improve vaccination rates.

CAM providers. The research population comprises representatives from naturopathy, acupuncture, chiropractic, homeopathy, and midwifery. No studies known to me to date incorporate representatives of these five CAM subpopulations into a single study to examine vaccine-related beliefs. I have assumed these five modalities to be broader and more representative of all CAM than chiropractors and midwives alone (as in the earlier study) and as likely also to represent diverse views of health. This group of CAM providers was selected as more likely than other CAM providers both to have strong views on vaccination and to encounter patients who ask for advice on vaccinating, including parents who make vaccination decisions for their children. Below I briefly examine each of these modalities and the likelihood of practitioners to support or oppose vaccination.

Naturopathy. In three separate studies, parents reported that they had chosen not to immunize their children on the advice of naturopathic practitioners (Benin et al., 2006; Busse et al., 2011; Halper & Berger, 1981). This research sought to explore beliefs of naturopaths surrounding the immune system and vaccination. Because some naturopaths are also physicians, MD-NDs might be more likely than other CAM providers to support vaccines. None were found who were willing to participate in this study, however.

Acupuncture. Acupuncture has been shown in one study to boost the immune response, for example, following influenza vaccination in adults (Yang et al., 2007). Acupuncturists may be

more likely to oppose vaccination as disturbing the body's natural energy levels. This research sought to explore acupuncturists' beliefs that may lead to vaccine opposition or support.

Chiropractic. Chiropractors often actively advise their patients against vaccinating (Campbell et al., 2000; Mnookin, 2011; Schmidt & Ernst, 2003). This research aimed to explore underlying chiropractic beliefs that negate vaccination as contributing to health, including a fuller understanding of “innate intelligence,” the vital life force within the human body mentioned by each of the five chiropractors in the earlier study, and how this relates to vaccine avoidance.

Homeopathy. Vithoulkas (2009) argues that homeopaths oppose vaccines because a vaccine is administered without regard to the uniqueness of each individual, and thus vaccination is almost the precise opposite of homeopathy. Others have found the reverse to be true—that the concept of *infinitesimals* and *similars* are analogous to how a vaccine works to stimulate the immune system (Bahia Mitchell, personal communication, November 2, 2011). This research aimed at determining more of the underlying reasons why homeopaths may support or oppose vaccines and whether some of these reasons may be amenable to change.

Midwifery. Although not included in the NCCAM listing of CAM therapies, I included midwifery in this research for four reasons: (1) first, a high proportion nationally (8%) of all births attended by midwives was recorded in 2009, and the profile of mothers using midwifery mirrored for the first time the national distribution in race/ethnicity (Declerq, 2012); (2) midwives have been found to be likely to embrace the use of CAM modalities in general (Hall, McKenna, & Griffiths, 2012); (3) no midwife in our earlier study fully supported vaccines, and (4) in Oregon, direct-entry midwifery (independent practitioners who work primarily in out-of-hospital settings⁴) is licensed as a separate medical practice, and therefore qualifies for this study as an alternative practice (Oregon Health Licensing Agency, 2012a). In addition, midwife-attended births in

⁴ Midwives Alliance of North America website <http://mana.org/definitions.html#DEM>

Oregon increased from 8.5 percent in 1990 to 16.1 percent in 2009, a relative change of 89 percent, putting Oregon in the top 10 percent of states in use of midwives for vaginal births.

Besides this, the results from the earlier study showed midwives as either opposing vaccines or as conditional vaccine supporters. This, added to the growing popularity of midwifery for childbirth in Oregon, argued for including midwives in this study.

Summary. The use of CAM providers is increasing. CAM providers are more likely than MM providers to oppose vaccines and are as likely as MM providers to engage in conversations about vaccinating. CAM providers' reluctance to vaccinate might be associated with a difference in perceived risk. This perceived risk is influenced by a different view of health and disease that may arise from training or group norms, personal experiences, and other factors. Whether CAM providers enter their professions because of their beliefs, or take on the group norms as part of their training was explored.

A careful review of the literature yielded no studies that examine how CAM providers arrive at their beliefs about the how the human biological system fights infectious diseases, including those preventable by vaccines, and how these beliefs then influence their perception of disease risk. The present research provided insights into those beliefs. I explored the influences on CAM provider career choices; and their beliefs, norms, and decision-making practices concerning vaccination. The resulting knowledge can assist in creating and implementing better communication methods for CAM providers and their clients while also acknowledging the differing worldviews of CAM and MM to a greater extent than currently occurs in public health practice (e.g., Karlberg, 2008; Wu et al., 2009). Improving communication and understanding between CAM and MM providers can enhance patient care (see, for example, Wu et al., 2009).

This study addressed this gap in the literature. These findings can serve as formative research for a larger study of CAM practitioners and their influence on vaccine uptake.

Research Aims

I conducted qualitative research among several previously unexplored CAM provider populations, including homeopathy, naturopathy, and acupuncture, as well as previously explored CAM populations: chiropractors and traditional midwives. I wanted to learn their health beliefs and the influences on those beliefs and how CAM providers assigned risk for vaccines. Focusing on these CAM provider populations provided new information and expanded on earlier findings. I used a “modified” grounded theory approach, such as that used by Tickner and colleagues (2009).

I examined the three specific aims following a classical inductive (moving from the particular to the general) approach in conducting open-ended interviews in order to—

Aim #1: Assess how and why the participant chose her/his profession and whether that choice temporally preceded or followed a vaccine-avoiding or –supporting stance.

Aim #2: Assess the understanding of CAM views on health and how these views fit the Health Belief Model (HBM) to address perceptions of whether vaccines are beneficial, efficacious, or risky, including beliefs about how the immune system functions and speculation about harm from vaccines and possible causes of harm. In addition, seek to determine whether those views are general to all vaccines and all interviewed CAM provider populations, to some vaccines and some CAM provider populations, or are specific to some vaccines and all CAM populations in the study (and vice versa).

Aim #3: Explore the factors that previous research has shown to affect vaccine support or opposition, as well as any new ones that emerge from the data, using a modified grounded

theory approach. Previously identified factors include personal beliefs about how the immune system functions; personal experience with a VPD, with a vaccine adverse effect, or with perceived benefit from a vaccine; social and professional institutional /organizational norms; beliefs about risk and protection from harm; beliefs about government and industry and how they influence each other. New factors may include community and family influences, as well as others as yet undetermined.

The research findings may or may not fit existing explanatory models. Consistent with a modified grounded theory approach, the themes that emerge from the data were compared with each other and against existing models to determine an appropriate working explanation of CAM provider beliefs and behavior.

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CHAPTER 3: Methods

Institutional Review Board

The study protocol was approved by the Oregon State University Institutional Review Board (IRB). Each participant consented to be questioned and to have her/his responses audio-recorded. (See Appendix 2 for the consent form.)

Sociodemographics

The interview population closely reflects the Oregon CAM population. This population was ethnically homogeneous—primarily Caucasian—reflecting the ethnic composition of Oregon (U.S. Census Bureau, 2011), where White persons account for 83 percent of the population, and all other ethnicities account for the remaining 17 percent.⁵ Women were well represented in the CAM provider population; all midwives, for example, were female. Participants were older than 18 years and able to speak, read, and write English. See Table 2 below for demographic details.

Recruitment

This research focused on five CAM provider modalities believed to be likely to offer advice to their patients: homeopaths (natural-product based), naturopaths (natural-product based), acupuncturists (energy-based, alternative medical system), chiropractors (body-based, manipulative), and midwives (ancient medical practice) according to the classification scheme devised by Wieland and colleagues (2011). Practitioners of these CAM modalities might be likely to treat parents and to provide their opinions about vaccines or vaccination in general. Like their patients, many participants in this study were mothers or fathers, and thus had faced in the past, or currently faced, vaccine decisions for their own children. All participants were selected because they either treated patients who are pregnant women or parents, and/or treated children.

⁵ Ethnic distribution in Oregon: White, 83%; Latino 12% (overlap with White or other), Asian, 4%, Black, 2%, two or more races, 4%, and some other race, 5% (other errors due to rounding)
http://www.census.gov/geo/www/guidestloc/st41_or.html.

The first three participants were CAM providers whose names were supplied by friends, colleagues, and professional contacts. Chain referral from these three was unproductive, so I turned to the Healthgrades website⁶ to create a database of 251 CAM practitioners located within a day's drive of Oregon State University and Corvallis (47 acupuncturists, 67 chiropractors, 23 homeopaths, 53 midwives, and 61 naturopaths). I sent invitation letters to 90 providers (sample letter, Appendix 3). Most who responded to follow-up calls did not recall receiving the letter, so I abandoned letter-writing as a means of recruitment as ineffective and time-consuming. Instead I cold-called and followed up by sending PDF letters attached to a follow-up email for as many CAM providers as agreed to consider participation ($n = 82$). It was more time-efficient and cost-effective to phone prospective interviewees (>200 cold calls). I continued recruitment until I had at least six participants for each provider population (E691, 2013), a number that would provide at least 30 participants. Francis and colleagues show that data saturation can be achieved by as few as 17 participants (Francis et al., 2010). Those who did agree to participate and two key informants ($n = 38$) then were scheduled for a one-hour-long, audio-recorded interview in their offices or homes, or some other convenient location. (One interview took place in a coffee shop and two in libraries.) I interviewed 5 naturopaths, 2 naturopath-midwives, 1 naturopath-acupuncturist, and 3 naturopath-homeopaths; 5 midwives (plus the two naturopath-midwives); 9 acupuncturists (plus one naturopath-acupuncturist); 8 chiropractors, and 3 homeopaths (plus three naturopath-homeopaths). No incentives were offered for participation in this study. I asked each participant at the end of the interview for names and contact information for other possible study

⁶ <http://www.healthgrades.com/>

Table 1

Demographic characteristics of CAM providers interviewed

| Case | Sex | Age | Ethnicity | Income | Marital | Children | OR Region | Vax Position ^a |
|----------------------------|-----|-----|-----------|------------|-------------|----------|-----------|---------------------------|
| Acupuncturist | F | 36 | Cauc | \$61-80K | M | 2 | Central | Neg |
| Acupuncturist | F | 56 | Cauc | \$121-140K | Divorced | 2 | Central | Conditional |
| Acupuncturist | F | 36 | Asian | \$100-120K | M | 0 | Central | Pos |
| Acupuncturist | F | 33 | Cauc | \$41-60K | M | 1 | Central | Neg |
| Acupuncturist | F | 41 | Cauc | \$61-80K | S | 0 | Central | Conditional |
| Acupuncturist | M | 34 | Asian | \$21-40K | M | 0 | Central | Conditional |
| Acupuncturist | M | 58 | Cauc | \$61-80K | M | 2 | Central | Neg |
| Acupuncturist | M | 52 | Cauc | \$100-120K | M | 2 | East | Pos |
| Acupuncturist | F | 40 | Medit | \$141-160 | M | 2 | East | Conditional |
| Acup/N-path ^b | F | 46 | Asian | \$80-100K | S | 0 | South | Conditional |
| Chiropractor | M | 44 | Cauc | \$100-120K | M | 3 | Central | Conditional |
| Chiropractor | M | 57 | Cauc | \$100-120K | M | 2 | Central | Conditional |
| Chiropractor | M | 55 | Cauc | \$121-140K | M | 4 | East | Pos |
| Chiropractor | M | 83 | Cauc | \$121-140K | M | 1 | East | Conditional |
| Chiropractor | M | 42 | Cauc | NR | M | 5 | East | Neg |
| Chiropractor | M | 46 | Cauc | \$41-60 | M | 2 | East | Conditional |
| Chiropractor | F | 81 | Cauc | \$40-60K | M | 0 | North | Neg |
| Chiropractor | M | 48 | Cauc | 41-60K | M | 3 | North | Pos |
| Homeopath | F | 59 | Cauc | \$21-40K | S | 1 | North | Neg |
| Homeopath | M | 56 | Cauc | \$141-160K | M | 2 | North | Neg |
| Homeopath | M | 57 | Cauc | NR | M | NR | Central | Pos |
| H-path/N-path ^b | M | 68 | Cauc | 100-120K | M | 2 | Central | Neg |
| H-path/N-path ^b | M | 41 | Cauc | \$21-40K | S | 0 | North | Neg |
| H-path/N-path ^b | M | 42 | Cauc | \$61-80 | S | 0 | South | Conditional |
| Midwife | F | 54 | Cauc | \$80-100K | M | 5 | Central | Conditional |
| Midwife | F | 38 | Cauc | \$80-100K | M | 0 | Central | Pos |
| Midwife | F | 35 | Am Indian | \$21-40 | S | 1 | East | Conditional |
| Midwife | F | 58 | Cauc | \$141-160 | M | 2 | Central | Pos |
| Midwife | F | 62 | Cauc | \$21-40 | Widow | 4 | Central | Conditional |
| M-wife/N-path ^b | F | 61 | Cauc | \$61-80K | M | 2 | East | Neg |
| M-wife/N-path ^b | F | 33 | Cauc | >\$20K | M | 0 | South | Conditional |
| Naturopath | F | 58 | Cauc | \$41-60K | Dom Partner | 2 | Central | Conditional |
| Naturopath | M | 59 | Cauc | \$21-40K | M | 1 | East | Conditional |
| Naturopath | M | 31 | Hawaiian | \$40-60K | M | 2 | North | Conditional |
| Naturopath | F | 41 | Cauc | \$21-40 | M | 0 | South | Conditional |
| Naturopath | F | 41 | Latina | \$21-40K | S | 3 | Central | Conditional |

Notes:

^aIndicates the vaccine recommendation position, whether supporting vaccines (Pos), opposed to vaccines in general (Neg), or conditional vaccine supporters.

^bDual-trained CAM provider—acupuncturist/naturopath, homeopath/naturopath, or midwife/naturopath.

participants, a process known as chain referral. Several contacts resulted, but no additional participants. One of the 38 interviewees, a physician practitioner of “integrative medicine.” was omitted from the study because he had been mistakenly identified on the Healthgrades site as a homeopath. The two key informants, a chiropractic researcher at Western States University and an immunologist at the National College of Natural Medicine, were interviewed to obtain clarification or to refute statements made by chiropractors and naturopaths in the study, respectively. They also provided peer-reviewed articles for further clarification of chiropractic and naturopathic claims and beliefs. All interviews took place between March 29 and July 16, 2013.

I had planned to revisit the data from the earlier study and include those in this study. However, this would have meant interviewing those nine CAM providers for their decision narratives. Because I was able to recruit and interview 80 percent more than the 20 participants I planned to interview, and because the resulting content themes were similar to those that emerged in the earlier study, I did not believe it would add significant new information to include those earlier research participants.

A semi-structured interview format was followed for each of the interviews (Appendix 1), and the questioning was flexible enough to explore new areas that emerged in the narrative. Questions like the following were intended to lessen any built-in suspicion and to provide an accurate reflection of provider beliefs that lead to vaccination advice to others.

- How do HOMEOPATHS/ ACUPUNCTURISTS/ MIDWIVES/ NATUROPATHS/ CHIROPRACTORS view how the human body fights off infection or disease?
- What is your personal view of this process? Is it like others in your discipline? Or different?

- What led you to this view?

All participants signed a consent form, were interviewed, and received a hand-written thank you note following their participation. I kept a careful record in a master Excel file of initial contact, follow-up calls and emails, appointments, and notes sent.

Interview Procedures

Each interview began with the professional decision topic that led participants to reflect on this key causal relationship (i.e., “Tell me about the most significant influence on your career choice”). This query was simplified in later interviews to “Tell me how you chose your profession.” The interview schedule consisted of 30 questions, additional probes, and a reminder checklist of all key themes. A fresh interview schedule (SSI) was used for each participant, and all SSIs, consent forms, and other relevant paper materials were filed in separate folders identified by the participant code and stored in a locked cabinet in my home.

The narrative approach was assisted by the SSI format to focus attention on each area of interest (see Appendix 1), so that all key topic areas could be explored. Participants were encouraged to talk about what they believed to be the most important and personally relevant factors/influences as affecting their career choices, with as few interruptions as possible from the interviewer. I strove to ensure that questions were asked in such a way that participants shaped their story in their own way, rather than adjusting it to what they might think I wished to hear (Wiklund-Gustin, 2010). Specific probes, as the narratives unfolded, elicited vaccine-specific perceptions and experiences, perceptions of VPD risk and severity, and, of course, the underlying influences of immunology beliefs; personal experience; group norms; perceptions of industry and government; and beliefs about specific vaccines and vaccine ingredients. I took care not to impose too rigid a structure on the interview so that unexpected themes could emerge naturally.

Data Collection and Analysis

Data collection procedure. Interviews were audio-recorded using a small, battery-operated Olympus® digital recorder and dual directional microphones—a mini recording studio that fit easily into a handbag. Audio data were produced as Microsoft™ Windows Media Audio (WMA) files, easily accessible on most computer systems. Interview WMA files, named by participant code, were uploaded to flash drives and mailed for transcription to a professional transcriptionist.⁷ The contractor, a professional medical transcriptionist, maintained the confidentiality of participants in the study. She then emailed the completed transcripts as Microsoft Word™ documents which I then compared, word by word, by listening to the original audio and correcting any errors and also beginning to locate themes in the data.

Data preparation. In qualitative research, transcription is not “merely a technical procedure but an interpretive practice” (Mishler, 1991, p. 259). Data analysis and coding of early interviews were undertaken simultaneously as the latter interviews were conducted, so that emerging themes could be further explored in subsequent interviews. I also reviewed all earlier transcripts as new themes emerged. As Mishler (1991) explains, close and repeated listening and transcribing leads to uncovering features and patterns not apparent on the first hearing. Arranging and rearranging the text in light of discoveries is a process of testing, clarifying, and deepening the understanding of the discourse.

Embedded stories and phrases in the narratives were the unit of analysis and all text was coded. The researcher was the primary instrument of data collection (i.e., I conducted all interviews, verified data accuracy, and analyzed the data). Therefore, immersion in the data was ensured. I listened at least twice to each interview and read each transcript at least three times: once to determine the prominent themes, a second time to gather blocks of text by theme

⁷ Theresa Dougherty, Spokane, Washington

(following the SSI question order) for further analysis, and a third and sometimes fourth or more times for clarification and to seek exemplar quotes. Sometimes a block of text fit several themes (vaccine beliefs and varicella, for example, or family influence and vaccine reactions). When necessary, I followed up by email or phone with participants for clarification of a term or phrase and engaged in a lengthy email exchange with one participant.

Data analysis. I utilized a traditional qualitative approach wherein analysis was inductive, building from data collection to generalizations and themes (see, for example, Berg, 2009; Creswell, 2007; Eaves, 2001; Patton, 2002; Strauss & Corbin, 1990; Ulin et al., 2005) as well as a more directed approach, based on Health Belief Model themes found in earlier research (Bean & Catania, 2013). Use of a modified grounded theory (MGT) approach (Creswell, 2007; Patton, 2002; Strauss & Corbin, 1990; Tickner et al., 2009) was employed for analysis of the antecedent factors. In MGT, emergent themes entail a re-examination of all the data, moving from basic description to conceptual ordering and finally to formulating a “logical, systematic, and explanatory scheme” (Patton, p. 491).

The analytic process was conducted in several phases to address the research aims. The first analytic phase consisted of hand-coding each paper transcript for relevant themes and to begin creating the research codebook⁸ through open (inductive) coding (See Codebook, Appendix 4). This analytic process entailed employing the traditional inductive approach of conceptualizing categories via tagging, labeling, and constant comparison. Tagging refers to the process of

⁸ In general, qualitative data coding entails identifying the themes contained in specific text passages or segments (Bernard, 2006). Themes may include beliefs, experiences, or opinions that the respondent was trying to communicate in response to the interviewer's questions. Different respondents may express similar themes but state their ideas in different ways, or may hold entirely different views. Text passages containing identical themes are coded the same way, and passages containing different themes receive different codes. Regardless of the software package used, there are two major steps to the qualitative data coding process: (1) segmenting text, and (2) creating and assigning codes. The text segmentation step entails division of the text into manageable segments or “chunks” of text (e.g., a paragraph or a few sentences, depending on the user's needs) (CDC, 2007a).

selecting meaningful segments of the material or “units of analysis” (Gee, 1991; Labov & Waletzky, 1997; Poindexter, 2002; Riessman, 2008) that are relevant to the purpose of the study (Baptiste, 2001). As themes emerged, I copied the relevant text into a theme (code) document (Appendix 4). Transcript analysis from each population resulted in 20–30 theme documents per discipline (138 theme documents), with many themes similar across the five disciplines (i.e., acupuncturists, 25 themes; chiropractors, 29 themes; homepaths, 27 themes; midwives, 27 themes; and naturopaths, 30 themes). All disciplines touched on all the major contextual themes of immunology beliefs, professional norms, personal experience, and perceptions of government and industry.

In the first review of the transcript data, I hand-coded all transcripts, highlighting significant portions of text, and iteratively produced thematic documents organized by the five disciplines using Microsoft Word™ word-processing software. I first coded the transcripts globally for narratives of the person’s professional choice, professional training, and the major contextual beliefs.

In the second hand-coding review, I tagged CAM views on health and perceptions of whether vaccines are beneficial, efficacious, or risky, and why this the participant believed this to be so. Criteria for coding each transcript as *vaccine-supporting* included explicit mention of intention to vaccinate, or explicit statements that a vaccination makes sense and is worthwhile. *Vaccination opposition* statements included explicit expressions of skepticism about vaccines, non-intention to vaccinate, explicit messages that the vaccine is not necessary for prevention of a VPD, or that the vaccine is harmful or useful for only certain persons unlike the informant (e.g., the poor, the unhealthy, persons traveling outside the U.S.). The position of *conditional vaccine acceptance* was reflected in statements that accepted some, but not all vaccines, or that

recommended spacing vaccines or delaying them—departing from the recommended vaccination schedule, or dosing, or both.

In tandem with the inductive grounded theory analysis, I employed a deductive approach using prior themes (Elo & Kyngäs, 2008), in other words, “modified grounded theory” (Tickner et al., 2009). This phase employed a directed content analysis approach (Hsieh & Shannon, 2005) to identify themes from earlier research (Bean & Catania, 2013), examining deductively the influences of emergent themes (listed above), but remaining alert and coding all new themes as they emerged.

I tagged and labeled all data segments—some were double- or triple-coded. Segment labels sometimes emerged from the text itself. Through this analysis, the providers’ underlying beliefs about the supposed severity of and their and their patients’/clients’ susceptibility to VPDs emerged. These underlying beliefs colored CAM providers’ beliefs about vaccine risks and benefits.

I iteratively compared transcripts to each other to identify unifying themes based on the occurrence of repeated phrases or key words. Themes were categorized into meaningful groups based on similarities in phrases across the transcripts. For each CAM modality, I used its theme documents in determining my findings.

Qualitative analytic software (NVivo®, by QSR International) was used in the previous research (Bean & Catania, 2013), but was found to be too cumbersome to use meaningfully with that small sample ($n = 15$) as well as in the present study. Specialized qualitative software is useful primarily for third-party coding (Adele Kubein, May 30, 2011, personal communication). Simple documents for each transcript and each theme created in Microsoft Word™ were used both for analysis and record-keeping.

Transferability, Reliability, Validity, Confirmability

Transferability. Can the findings be applied or transferred beyond the bounds of the project (i.e., are they replicable)? By providing thick descriptions of the procedures, recruitment methods, and most importantly, the survey instrument and the transcribed narratives of CAM providers, I ensured that the results include valuable and practical information usable by other researchers of CAM providers who seek to determine that population's vaccine support, conditional support, or opposition. Transferability was enhanced by providing the excerpts of the raw data within this dissertation, and all data relevant to the project are available upon request from the author. Claims have not been extrapolated to other provider populations; but enough information is provided to enable replication of this research.

Reliability. Coding reliability was established through my constantly comparing all transcripts to each other, and through continual rereading for the presence in earlier transcripts of newly emerged subthemes from later transcripts. The iterative process of coding also enhances reliability. Qualitative research often scores highly on validity, in part because it seeks to understand context.

Validity and confirmability. Narrative lends three types of validity to health message design: experience, relevance, and cultural validity (Miller-Day, 2008). Specifically, qualitative research design carries the responsibility to employ methods that can attest to the credibility or accuracy of the information obtained (Malterud, 2001). I first hand-coded the transcripts separately by discipline and then compared the coding across transcripts on the core variables of perceived vaccine risks and benefits. I re-examined all the transcripts, discipline by discipline, using the theoretical lens of the three positional variables of vaccine support, conditional support,

and opposition for contextual analysis (i.e., external validity). I re-examined the transcripts as well for the contextual factors, and produced theme documents for each of those factors.

These data can be confirmed through (1) the verbatim transcripts of the in-depth interviews readily available upon request, (2) the theme documents, and (3) the codebook (Appendix 4) detailing the themes from thematic data analysis. The data collection and interpretation processes were meticulously documented. A record of all contacts and resulting participants is contained in a master Microsoft Excel™ file. Moreover, the original audio data, verbatim transcripts, and documentation of subsequent coding of themes and subcategories can be readily retrieved for audit.

Dissemination Plan

The findings from this research will be submitted to a peer-reviewed journal, such as *Social Science and Medicine*, *Vaccine*, the *American Journal of Public Health*, and/or *Qualitative Health Research*. The findings will also be presented at national and regional conferences. Preliminary findings were presented at the Oregon Public Health Association Annual Meeting, October 15, 2013, and these findings will also be presented to the graduate students in public health at Oregon State University.

Future Research

I hope that the long-term implication of this research, beyond the scope of this dissertation, will be to inform and shape public policy for CAM certification programs in the state of Oregon. One long-term goal is to ensure that all licensed CAM providers in Oregon will be more thoroughly exposed to current science about the human immune system and how vaccines work naturally to prime that system. This information must be presented in persuasive and

collaborative ways that will assist providers in overcoming dangerous misinformation and will address deeply held beliefs.

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CHAPTER 4: Results

Overview

I examined all interview data with the aim of allowing themes to emerge through an intensely iterative process, examining and re-examining all interviews as new themes emerged. Three overriding pediatric vaccination recommendations (i.e., full support, opposition, and conditional support) were confirmed as well as possible antecedents and corollaries to those recommendations. Specific health beliefs, including perceived efficacy, perceived disease severity, and susceptibility to infection by a disease, as described by the Health Belief Model (HBM) (Strecher & Rosenstock, 1997), are potential antecedents of vaccine beliefs and recommendations offered to patients by providers (Zimmerman, Mieczkowski, Mainzer, Medsger, & Nowalk, 2002). The research results described below confirm the role of the HBM in explaining provider beliefs and actions, but factors beyond the HBM are antecedent to that model. The HBM is an explanatory model used to account for individual behavior and which addresses individual perceptions of threats posed by health problems (e.g. risks, susceptibility, severity), the benefits of avoiding threats, and factors influencing decisions to act or not to act (barriers, cues to actions, and self-efficacy). In addition to the HBM concepts concerning vaccines and disease (e.g., benefits, risks, disease severity), other concepts emerged from the data as antecedent to the HBM constructs—especially professional choice motivations, immunology beliefs, personal experience with a vaccine or a VPD, beliefs about a profit motive behind vaccination, and beliefs about government and industry roles in vaccination. Based on earlier research (Bean & Catania, 2013), I specifically probed for these themes in the current research.

The thematic order employed for this analysis proceeds to the dependent variables of vaccine positions from the independent variables: the proximal Health Belief Model antecedents

and influencing these variables are the more distal antecedents (i.e., descriptive narratives of their choice of profession [and professional group norms]—Research Aim #1, descriptions of health and wellness beliefs—Research Aim #2, and finally contextual beliefs—Research Aim #3). Each study population is described separately. To see the pattern of factors (IVs) leading to the outcomes of vaccine support and opposition, see Tables 3 and 4.

Complementary and Alternative Medicine (CAM) Defined

Complementary and alternative medicine (CAM) can be loosely defined as any practice with a health-promoting intent that has not yet been adopted by conventional medicine (Tippens, Marsman, & Zwickey, 2009). The National Center for Complementary and Alternative Medicine (NCCAM) of the National Institutes of Health provides a more complete explanation of CAM and its myriad relationships to mainstream medicine (NCCAM, 2013).

Population Demographics

Participants in this study ($N = 36$) lived and practiced in western (i.e., liberal) and eastern (i.e., conservative) Oregon (Oregon Elections Division, 2012), in towns with populations ranging from 2,000 (i.e., Cave Junction) to 604,000 (i.e., Portland). Ages ranged from 31 to 83 years, with a median of 46 and a mean of 47 years. Time in practice ranged from 1 to 55 years, with a median of 19 years and a mean of 16 years, so most participants were mid- or late-career professionals. By CAM modality, homeopaths were the oldest of the five populations interviewed, with a mean age of 54 years, and chiropractors had been in practice the longest, with a mean of 21 years. Acupuncturists ($n = 10$) were the youngest population, with a mean younger than the 46-year population median (mean = 42 yrs.) and had been in practice fewer than 20 years (mean = 13 yrs.).

The first population I will describe and analyze is naturopaths because their beliefs and advice to others can be found in all the other disciplines. Practitioners of all other CAM modalities in this study mentioned studying naturopathic continuing education (CE) courses, or using alternate vaccine schedules promoted and published by naturopaths. The echoes of naturopathic beliefs resonate across the CAM narratives, including those who did not receive formal naturopathic training. Naturopaths also comprised the largest population in this study ($n = 11$).

Naturopathy

Naturopathic medicine is defined by the National Institutes of Health as an alternative medical system (Wieland et al., 2011) . Naturopathy emerged as a profession in Germany in the late 1800s, about a century after homeopathy (Herman et al., 2006). The move toward naturopathy was prompted by concerns about the harsh therapeutic methods then in use including emetics, cathartics, and bloodletting. A group of German practitioners emphasized an alternative therapeutic approach using botanical medicines, homeopathy, nutritional and water therapy, psychology, and body manipulations. Contemporary naturopathy uses a similar mixture of treatment modalities, including botanical medicine (herbal supplements), diet and nutritional supplements, homeopathy, counseling, and massage. Naturopathy is based on six principles: do no harm, prevent disease, use the healing power of nature, identify and treat the underlying causes of disease, treat the whole person, and consider the doctor as teacher—emphasizing patient education and self-responsibility for health (Herman et al., 2006; Josefek, 2000; see also NIH, 2012b).

In North America, the growth of colleges offering naturopathic training peaked around 1950, with some 10 schools in operation in the U.S. alone. In Oregon, the National College for Naturopathic Medicine was renamed in 2006 as the National College of Natural Medicine (NCNM), because it offers degrees not only in naturopathy, but in Oriental medicine and integrative medicine research (NCNM, 2013). Naturopathic medical colleges are 4-year graduate programs with admission requirements similar to those of conventional medical schools (Parkman, 2004). Bastyr University in Washington State, founded in 1978, has, according to its website,⁹ played a larger role within medicine than “any other non-allopathic institution, bringing scientific legitimacy to natural medicine.” Yet, as this study shows, contemporary naturopathy is of two minds—whether to accept current scientific evidence or rely only on historical and case-based medical evidence.

Naturopathic doctors (NDs) in Oregon are licensed by the state, as they are in 12 other U.S. states. Some state statutes limit naturopaths to drugless interventions; other states, like Oregon, allow naturopaths to prescribe some medications and to administer vaccines; some states permit NDs to practice minor surgery and attend natural childbirth (Cohen, 2003; Parkman, 2004). Licensure for NDs in Oregon is covered by Oregon Revised Statute Chapter 685. This statute describes the training, scope of practice, and licensing requirements for all NDs in the state (“Oregon Revised Statutes,” 2011).

Influence on vaccine choice. In three separate studies, parents reported that they chose not to immunize their children on the advice of naturopathic practitioners (Benin et al., 2006; Busse et al., 2011; Halper & Berger, 1981).

⁹ <http://www.bastyr.edu/about/about-our-university/history-heritage>

Naturopathic study participants. The 11 naturopathic doctors (NDs) interviewed for this study consisted of six women and five men. Eight participants self-reported as Caucasian, one as Latina; one as Asian, and one participant as Hawaiian or Pacific Islander. Time in practice ranged from 20 months to 42 years, with a mean of 14 years. Five were dual practitioners—an acupuncturist ($n = 1$, 9%), midwives ($n = 2$, 18%), or homeopaths ($n = 3$, 27%). One had trained as a chiropractor before studying naturopathy ($n = 1$, 9%). Ages ranged from 31 to 68 years with a median age of 42 years (younger than the population median or mean).

Naturopathic vaccine beliefs. No naturopath in this study expressed unconditional support for vaccines (see Tables 3 and 4). All 11 NDs interviewed were vaccinated as children, and few had direct experience with an adverse event following immunization (AEFI) ($n = 2$, 18%). NDs who participated in this study expressed a narrow spectrum of vaccine positions, from conditional: delaying recommended vaccines or accepting only a few ($n = 9$, 82%); to opposing them all ($n = 2$, 18%). Of the six NDs younger than the study population age median of 42 years, one was opposed to vaccines and four were conditional vaccine supporters (36%). Among all NDs, five favored delaying all vaccines (45%). One ND (naturopathic doctor) said,

My general premise is: look at your situation and what your risk factors are. ... There are certain diseases that obviously carry more risk, such as pertussis in young infants versus maybe tetanus. ... I'm mostly of the opinion that delaying makes a lot of sense ... rather than strictly going by the generic schedule the CDC puts out. [The CDC schedule] is absolutely [grounded in] science for the population, but maybe not for the individual
(ND06, male, age 32).

Most NDs interviewed said that “vaccines have their place” ($n = 8$, 73%). Most agreed that “there are good vaccines,” specifically those for tetanus and polio ($n = 8$, 73%). Other NDs

mentioned diphtheria, measles, and the DTaP combination vaccines as beneficial. For one older ND, tetanus was the sole exception to her overall vaccine opposition. Tetanus vaccine prevents a severe, non-communicable, incurable disease (i.e., perceived severity, perceived susceptibility). “The potential consequences of the vaccine are less than the potential consequences of tetanus. . . . Tetanus [disease] is ugly,” she said. She even kept a supply of tetanus vaccine in her office for emergencies.

One ND admitted the benefit of herd immunity to community health and speculated that neurological damage rumored to be attributed to vaccines could have other causes, despite the vaccine link parents reported to him. One older ND explained her acceptance of several vaccines: “I think we need to have the DTaP, we need to have the polio . . . and measles vaccine. . . . Measles is highly contagious, so it makes sense to vaccinate for that.” She added,

You have to look at the evidence . . . look at the [vaccine] spectrum – what are you comfortable with? Do you want to do just a few vaccines, like the vaccines of the really scary things? Like polio . . . maybe mumps, measles? Or maybe [vaccinate] as the kids get older. If they don’t get [sick with measles] between the age of zero to . . . fifteen, you might want to vaccinate then for the measles, because [getting measles] could be really bad after that (ND01, female, age 58).

Again, following the naturopathic canon, no ND fully supported all recommended vaccines or the recommended vaccine schedule and another ND asserted that all vaccines “give you a false sense of security.” A third ND acknowledged his bias:

I think my view is biased by who I see, [namely] a lot of folks who’ve gone through the medical system for one reason or another and . . . weren’t satisfied with what kind of care they were getting. . . . I think I see . . . more of the people who complain of adverse

reactions, or might make a connection to their current health state with a reaction to a vaccination (ND06, male, age 31).

For most NDs interviewed, however, the choice to vaccinate should never be a one-size-fits-all option, but should vary according to the patient's particular familial circumstances. One ND said that for children "from a poor household where nutrition is minimal . . . and the hygiene's poor, and they're not getting breastfed, then by all means vaccinate," implying that when nutrition is adequate, the home is clean, and babies are breastfed, vaccination is unnecessary. One older ND believed that the non-vaccinators in the Pacific Northwest in general were raising children whose lives were better, with better diets, less exposure to television, and they were all-around healthier. Realizing her straw-man fallacy, she admitted that her practice did not represent all Pacific Northwesterners who did not vaccinate their children. "I do have a pre-selected group," she confessed. In fact, she often pre-selected her clients herself. She said she turned away parents from her practice if they planned to vaccinate their children. She said, "I can't relate to that kind of parenting." (See midwifery section below.)

Yet even the three vaccine opposers insisted that they would "never advise" against vaccinating. One ND opposer allowed that vaccines were a "tremendous boon for mankind" but questioned whether sufficient efficacy or safety studies were conducted before vaccines were approved for administration. Another ND said that vaccines "shortcut an immune reaction" leading kids to "go into a Th2 dominance" leading to more allergies, as opposed to Th1 dominance, considered to be preferable—the "humoral immunity" versus "cellular immunity" argument discussed below.

In general, all NDs interviewed said that they educated parents based on their own vaccine risk and benefit perceptions, except one ND who said that when parents ask for her opinion, she

says, “It doesn’t matter what I think. It’s . . . whether [vaccines] would be suitable for you.” She urged parents to consider their current situation before deciding on vaccination.

[I] advise parents –“Okay, you want to vaccinate. You still want to make sure your kids are as healthy as possible; you want to encourage a good immune system. And, if you want to vaccinate, please do.” Because it’s for [the parents’] mental well-being. . . . If they’re not comfortable with having their kids contracting measles, or contracting mumps, whatever, then, by all means, vaccinate. But, at the same time, you want to protect the kids . . . so all the [vaccine] side effects might be averted (ND03, female, age 41).

Many NDs supplied information to their patients in the form of photocopies of alternative vaccine schedules or lists of websites—specifically mentioned were the CDC website, vaccineconsult.com, and the National Vaccine Information Center site¹⁰, an anti-vaccine website. Two younger NDs referred parents to books—one ND recommends *The Vaccine Book* by vaccine-opposer Robert Sears and another recommends *A Parent’s Guide to Childhood Shots*, by another opposer, Mayer Eisenstein. Both books are of questionable scientific validity. Several NDs said that they told parents to “be educated” or to be “informed consumers” for their health care and to seek vaccine advice from unbiased sources, but they left parents on their own to find those unbiased sources and to educate themselves.

Perceived vaccine risks, benefits, and efficacy. This section probes how NDs perceived vaccine risks, benefits, and efficacy. Most NDs insisted they were not opposed to vaccines, but their professional experience and their “knowledge of the literature” led them to suspect that the widespread use of pediatric vaccines plays a major role in what they described as escalating rates of allergies, asthma, shingles, and even neurological disorders. Only one had experienced a severe vaccine-preventable disease, or VPD (9%). And most ($n = 7$, 64%) reported second- or third-hand

¹⁰ <http://www.nvic.org/>. This website argues against vaccinating.

AEFIs, with few directly experienced by the provider. The number of vaccines, toxic vaccine components, and the frequency of administration were issues of concern for all NDs interviewed, despite their lack of first-hand experience with a related AEFI. One ND asserted,

The number of vaccines has increased significantly. . . . I question the added value that the additional vaccines bring to the health of our children I think at some point we have to question is vaccination the only answer to keeping ourselves healthy? I certainly don't think so (ND06, male, age 31).

Specific vaccines. To better explore vaccine beliefs in the context of actual recommended vaccines, I will next focus on the perceived benefits, risks, and efficacy of the six vaccines these 11 NDs mentioned most often (i.e., vaccines against polio, pertussis, human papillomavirus, hepatitis B, varicella, and influenza).

Polio vaccine. One ND believed that most polio vaccines administered in the 1950s were contaminated, and still questions their safety or value. But in terms of perceived vaccine benefits and efficacy, most NDs ($n = 7$, 64%) accepted both polio and tetanus vaccines as necessary because the diseases they prevent were devastating and incurable. One older ND said that “for things like polio, we should be vaccinating.” A younger ND, however, insisted that homeopathy and herbs would prevent polio. She had, however, never witnessed a case of polio. Because of the concerns voiced by parents in her practice about the seriousness of the disease and the need for prevention, she reluctantly agreed that the polio vaccine might be beneficial, but only to alleviate their fears, not for any real risk of exposure.

Pertussis vaccine. One ND said that “you can get through [pertussis] if you're a vigilant parent.” One younger ND considered the vaccine itself to be dangerous. She said, “After the pertussis vaccine, there's been a higher incidence of autistic reactions,” drawing a causal

relationship from a temporal one. But most non-homeopathic NDs and one homeopathic ND ($n = 7$, 64%) agreed that pertussis vaccination was beneficial in preventing a disease that can be fatal for babies. A young ND faced the disease first-hand in his own young child, and witnessed the severity of this preventable disease. He said,

We have experience with . . . the risks of not vaccinating. Our daughter got pertussis at about 15 months. [She had] a three-month cough, and lots of restless nights (ND06, male, age 31).

Even so, he refused to vaccinate his second child. No naturopath mentioned the need to protect others from acquiring this highly infectious, preventable disease.

Human Papillomavirus (HPV) vaccine. Five NDs specifically mentioned the HPV vaccine as risky or of questionable benefit. Two NDs considered the HPV dangerous because of its reported AEFIs, but neither specified what those negative effects might be. Three NDs alluded to the HPV vaccine as possibly leading to early sexual debut or sexual promiscuity. One ND said,

Lifestyle is a big one. You can't tell people to have one partner forever. . . . Take antivirals¹¹ if you're going to be sexually active, or use protection. [A person cannot] just get the vaccine and go, "Oh, I don't have to worry about it." Well, no; you do. Because, as a healthcare provider, you say, "Yes, you can get the HPV vaccine, but it doesn't mean you can go out and be promiscuous" (ND03, female, age 41).

One ND said HPV infection could be prevented through sex education in schools. Three NDs considered the current HPV vaccines to be ineffectual and of minimal benefit because of the many HPV strains that are not covered by the vaccines. One described these unaffected strains as

¹¹ Antivirals do not eliminate or decrease HPV infection: <http://emedicine.medscape.com/article/219110-treatment>

“more virulent.” One questioned the rigor of testing before the two HPV vaccines were released to the public. She wondered,

I don't know if it's had its real due diligence since it's still now only in its fourth phase of clinical testing . . . and people are . . . having some sequelae from [the vaccine]. There [have been] a lot of neurological things, symptoms (ND08, female, age 33).

One ND considered HPV curable, and hence inconsequential.

If your immune system is healthy, HPV will not be a problem. And, you know, when it does become a problem, that's why you have screenings. And it's very easily treated (ND03, female, age 41).

Again, no ND mentioned that an HPV-infected person could infect others. Five NDs (45%) were convinced that abstinence would prevent acquisition of any HPV strain and that a healthy immune system could clear the body of any trace of HPV. “[It's a] fact that the body clears 90 percent of the [HPV] infections on its own,” said one ND. Only one younger ND considered the HPV vaccine beneficial at all, noting the advantage of having a vaccine “that actually prevents a cancer.” But even she was ambivalent, convinced that the side effects were serious and widespread.

Hepatitis B (HBV) vaccine. Eight NDs opposed the HBV vaccine (73%). Four NDs said that administering this vaccine to infants was incomprehensible to them, especially if the mother is free of the virus. One older ND summarized this position, saying, “[Babies] are not going to get Hep B from their baby behaviors, and we shouldn't be vaccinating them.” One ND who supported vaccines on a delayed schedule agreed that the vaccine was beneficial, and necessary, for adult health care providers. She advised parents in her practice to consider accepting this vaccine in children before they might become sexually active or exposed to intravenous drug use. One ND

believed that the HBV vaccine causes neurological damage in adults. The dean of research and professor of immunology at a naturopathic college said that the hepatitis B vaccine “has the most adverse events associated with it” (H. Zwickey, personal communication, June 27, 2013).

Another ND was convinced that the hepatitis B vaccine could cause neurological damage, but admitted that it was impossible to draw a direct correlation between the vaccine and this damage.

Varicella vaccine. Six of the NDs who conditionally accepted vaccines dismissed the necessity of the varicella vaccine. Varicella (chicken pox) was perceived as a benign childhood disease and the consensus was that children should get the disease itself to strengthen the immune system. They preferred “natural immunity” over acquired immunity from the vaccine. No ND in this study personally experienced anything other than a mild case of childhood varicella and, as a result, did not perceive the disease as severe. They all agreed that the vaccine may have somehow “blunted the immune system.” Many NDs believed that since the 1995 introduction of varicella vaccine, cases of shingles had increased because varicella immunity in adults was no longer naturally boosted from frequent exposure to varicella-infected children. The reasoning was that exposure to varicella-infected children boosted herpes zoster immunity in adults. Four NDs declared that the pediatric vaccine for varicella and its suppression of chicken pox had led to a “national outbreak” of shingles,¹² and at younger and younger ages. ND One said,

There’s been a lot of [shingles] recurrence [since the varicella vaccine was introduced] Was the immune response somehow blunted inadvertently? . . . Is it because their immune system is so depleted that the [herpes zoster] virus will come up and rear its head? (ND03, female, age 41).

¹² There is indeed some evidence that adult exposure to children with active chickenpox (varicella) protects against shingles (HZ). Although no evidence currently exists to support “a national outbreak” of shingles, HZ incidence rates did increase since the varicella vaccine was introduced. According to one study, during 1996–2001, HZ incidence rose from 3.2 to 4.1 per 1000 person-years (Yawn et al., 2007). This increase is not statistically significant.

The immunologist-researcher at a naturopathic college agreed with the relationship between shingles outbreaks when children are vaccinated against varicella. She said, “It turns out that having chickenpox circulate in our communities was providing a constant [shingles] immunization to people; you’d get subclinical exposure [to varicella] all the time. And now shingles is [occurring] because we don’t have that subclinical exposure anymore.” One ND held contradictory views about the vaccine, admitting that the numbers of children developing severe disease declined because of widespread vaccination, but this had to be balanced against the alleged risk of the vaccine creating a shingles epidemic “rather than getting the chickenpox first.” The only true benefit the NDs heard mentioned in varicella vaccine promotion was economic: Parents whose children were vaccinated would be less likely to be forced to stay home with a sick child, resulting in possible loss of income.

Influenza vaccine. Ten of the 11 NDs interviewed said they had never experienced influenza disease. All NDs refused the annual flu vaccine for themselves, and did not recommend it for others. One noted the poor efficacy of the annual vaccine: “It’s kind of a gamble every year when they make up the flu vaccine whether they’re going to have the right strain in the vaccine. . . . She believed that her “patients . . . get sick from the flu vaccine” rather than from influenza itself. The one ND who reported that she had acquired influenza in the past believed that the disease strengthened her immunity. Only one younger ND mentioned the benefit of influenza vaccine in case of pandemic flu, a public health benefit largely absent from most ND narratives. Another ND mentioned the danger of mercury in the flu vaccine, in the form of thimerosal,¹³ as a good reason to avoid it.

¹³ Of 30 different vaccines offered by various manufacturers, only 5 contain any thimerosal; four of those are adult influenza vaccines, out of 7 possible flu vaccines (FDA, 2013). For a listing of vaccines and their thimerosal content, see the FDA website:

<http://www.fda.gov/BiologicsBloodVaccines/SafetyAvailability/VaccineSafety/UCM096228#t1>

Vaccine safety. Four NDs interviewed mentioned vaccine safety as a perceived risk, believing that vaccine safety had never been well tested, nor was safety even a concern in conventional medicine. One ND noted that the primary problem was the “lack of accountability on the part of vaccine makers.” This theme overlaps with narratives about the pharmaceutical profit motive, discussed below.

Two NDs specifically mentioned mercury as an adjuvant in vaccines. One ND recalled that, in the 1990s, children by the age of one year were getting more mercury than the EPA allowed as safe for an annual adult exposure. Mercury was eliminated in 2001 from routinely administered pediatric vaccines, yet one ND questioned the truth of this assertion, saying, “I think they’re continuing to sneak [mercury into vaccines].”

One ND was convinced that in her childhood, growing up in a poor, rural community, she was subjected to medical experimentation, and as a result she harbored considerable resentment toward conventional medical practitioners, especially concerning vaccines. She questioned,

Was I over-vaccinated and probably experimented on as a child? Why in the world was I getting typhus vaccine and typhoid vaccine and yellow fever [vaccine]? . . . Did [these diseases] exist in [my community] or was it an experiment? (ND04, female, age 61).

Choosing naturopathy: *Treating the cause.* Most NDs interviewed ($n = 7$, 64%) held a strong belief that (1) naturopathic medicine treats the cause of a disease or disorder, whereas mainstream medicine—also called “allopathic medicine”—treats and manages only the symptoms, and that (2) naturopaths, unlike, conventional medical practitioners, are concerned about the underlying cause of a disease. Three naturopaths rejected the conventional medical

professions of their parents (27%). Two said they “always wanted to be a doctor” but decided instead to study naturopathy as more closely aligned with their worldview.

Seven NDs came to naturopathy from other practices, perhaps to obtain legitimacy for their CAM practices, but also to broaden their practice—two were midwives, three were homeopaths, one an acupuncturist, and one, trained as a chiropractor, no longer practiced chiropractic (64%). The former chiropractor explained that “By the late 1990s, [as a chiropractor], I was getting patients in [whose] medications needed to be changed and they weren’t doing well on what they were on, but I couldn’t change [their medications] because I didn’t have that license.” So, in 2005, she entered naturopathic college to become licensed to prescribe medications.

Disenchantment with mainstream medicine. NDs are not limited by the same time constraints as those imposed upon conventional MDs in an office visit. NDs agreed that they have leisurely amounts of time to spend interviewing patients in their search for causes of disease. Taking a patient’s history goes beyond filling out forms: As one ND explained, “[In naturopathic education] you get the wherewithal how to hear what people are saying and translate that into what’s happening, and then you can treat the cause.” Several NDs mentioned the limited time conventional medical doctors have available to spend with a patient ($n = 5$, 45%). A homeopathic ND said he thought it would be easier to be a conventional doctor because, “Someone comes in with a diagnosis, I match it with this drug and [that patient is] out the door; see you later.” Instead, he spends two hours during an initial intake interview with the patient getting to know the person so that the diagnosis and treatment can be targeted exactly to that particular person.

Four NDs interviewed for this study (36%) began medical training, became disenchanted, and then turned to naturopathy. One naturopath explained that conventional medicine seemed to

consist of managing medications, and that the limited time medical doctors have with their patients precludes more than this. Another naturopath said, “Most of medicine is cookbook.” A third said, “That’s not the way I wanted to do medicine.” As one ND’s naturopathic practice grew, his earlier impressions about conventional medicine were confirmed by his patients’ experiences. Another ND was disenchanted by the competitiveness he saw in medical school.

There seemed to be a high degree of competitiveness. People weren’t looking at each other, smiling at each other, talking to each other . . . it felt like [what mattered was] who was going to get the highest grade, who’s going to outdo who. And that didn’t set well with me (ND07, male, age 41).

He described his encounters with students in naturopathic college as more collegial and inclusive. This collegiality alone persuaded him to change from conventional medicine to naturopathy. Another, whose father, grandfather, and uncles were all conventional medical doctors, also questioned conventional medicine. He said,

I worked on a psychiatric unit, both while I was in school and after I was in school; I worked in halfway houses. . . . So I saw a lot of what conventional medicine had to offer, especially mental health treatment. I thought that, for some cases, it really was great. [But] for others, for that kind of chronic issue, and in a lot of chronic disease, conventional medicine doesn’t have a lot to offer (ND10, male, age 41).

One young ND who started pre-medical studies became disillusioned with conventional medicine, and found naturopathy a more natural fit. To this ND, the supposed mainstream medical premise that the body “has to be suppressed all the time to stop symptoms” did not make sense. Most NDs believed that naturopathy gets at the root of diseases—especially idiopathic

diseases—and treats their causes. A young ND who completed two years of medical school criticized the focus on disease and pathology that he witnessed in conventional medicine:

You end up with . . . somebody who is trained in disease . . . all the –ologies: neurology, nephrology, dermatology. They’re not looking at why tissue stays healthy, why the mind stays healthy [Conventional doctors] focus all their time and energy on pathogenesis. And so you end up with people that are very well versed in disease and disease management, but they haven’t studied the other side of the coin: health and wellness (ND07, male, age 41).

Naturopathy is humane. NDs explained their professional choice as more humane than conventional medicine. As one ND daughter of a conventional medical doctor explained, “I saw that drugs and surgery weren’t really helping people.” Three NDs reported their positive personal experience in healing through homeopathy or naturopathy. Another ND, suffering from common variable immunodeficiency (CVID) since her 20s, was “forced to find ways to heal [her]self.” Naturopathic treatments helped, and she decided to pursue a degree in naturopathy so that she could offer similar help to others.

NDs preferred to be called “doctor” rather than “naturopathic doctor” or “naturopath.” One ND dismissed the term “complementary” as inaccurate and asserted that her ND practice was similar to a family medical practice. She argued,

I don’t think that naturopaths are complementary care. Who exactly are we “complementary” to? . . . We are primary care physicians. . . . I use every method out there! (ND04, female, age 61).

Naturopathic training. All NDs compared their training to mainstream medical training, insisting it was just as rigorous. One ND said that the initial two years of training consisted of

“the same thing an MD would get,” plus 600 hours of clinical preceptoring. In addition, the first two years include studies of homeopathy, nutrition, botanical medicine, manipulation, and other subspecialties. Another said,

I had a teacher who used to say that we have a very broad range of knowledge, and not very deep. . . . If you ask 10 naturopaths to [recommend] therapy for something, it will be 10 different answers. . . . And they’ve all worked! (ND03, female, age 41)

One homeopathic ND was concerned about the increasing shift toward conventional medicine in naturopathic colleges. These days, he is able to prescribe nearly any medication—a plus from the standpoint of NDs being able to fill the growing need for more primary care physicians—but what it also means is that naturopathy is shifting more toward what he disliked most about mainstream medicine. He said, “The primary principle [of naturopathy] is really individualization of treatment and holism, looking at the whole person. And that is antithetical to conventional medicine.” He added, “Now we’re teaching much more of an allopathic approach, which is treat the diagnosis, not the person So we’re losing some of our naturopathic roots.”

Several NDs described a shift in their vaccine beliefs as a result of their training. Two NDs became more vaccine-accepting—one young ND noted, “Going to naturopathic school made me more allopathic than I was before.” But six (55%) became more cautious about vaccination.

Naturopathic formal education at one time required that NDs write a thesis. One vaccine-opposing ND-midwife interviewed for this study described her own thesis as establishing a link, now completely discredited, between vaccines and autism. Since 2005, the National College of Natural Medicine (NCCNM) has dropped the thesis requirement. According to the NCCNM’s research director, these were not true research theses, but “were more like book reports. . . . They

were lit reviews. Nobody was testing; nobody was doing independent research” (H. Zwickey, personal communication, June 27, 2013).

Contextual themes. Various beliefs among naturopaths were antecedent to perceptions of vaccine risks, efficacy, or benefits and related more broadly to health in general. Chief among them were (a) beliefs about the immune system; (b) personal experience, whether direct or vicarious, with a VPD or a severe vaccine reaction (AEFI); (c) reference or professional group norms and other socialization factors, typically associated with the professional training or continuing education; and (d) perceptions of industry and government and their influence on vaccine promotion (see also Tables 3 and 4).

Immunology beliefs. Naturopathic education includes a formal study of immunology, and NDs interviewed had fairly consistent, traditional descriptions of how the human immune system works to prevent or address a disease or infection. These beliefs included a shared naturopathic image of the immune system as nearly impervious to disease when healthy, but when threatened with disease, “natural is best”: the immune system works to overcome, ignore, or contain pathogens naturally to create a strong immune response.

Th1/Th2 homeostasis: Three NDs (27%) described the theory of Th1/Th2 homeostasis and used this hypothesis to explain their understanding of disease and immune response. According to this theory, T-helper-1 cells drive type 1 immunity, or “cellular immunity,” considered by NDs to be superior to Th2 (type 2), or “humoral immunity,” such as that conferred by vaccines. Type 1 immunity, resulting from a disease, is seen as preferable and permanent, whereas type 2 immunity is considered to be temporary and weak. Another ND agreed, explaining in terms of these two major processes: disease provides (1) protection from invasion through production of antibodies to fight “long-term infection” and (2) “cellular-mediated immunity, [in which] the white blood

cells find the foreign organism and don't need an antibody . . . they just engulf it and kill it." This ND explained her role,

[When] the inflammatory side of the immune system is really ramped up, [I try] to ramp that down so that, in turn, the bacterial-fighting side of the immune system can be primed and ready (ND01, female, age 58).

Natural is best. Naturopathic therapies include allowing a fever to play out—in the words of one, “I think fevers are glorious!” She also believed that a fever is able to kill cancer cells.

[A fever] kills off . . . cells in your body that are not very strong If they're not healthy, they don't survive fevers well, cancer cells being one of those. [A fever] amps (sic) up your whole immune system . . . so, you're going to be much more aggressive towards the virus with that fever (ND04, female, age 61).

All naturopaths in this study believed that diseases strengthen the immune system and are even protective. One ND went so far as to say frequent, mild diseases are necessary to protect against cancer.

Fevers, getting sick – the immune system – you know, people getting the flu once a year . . . cleans the system and it keeps people from getting cancer. . . . I have never had a cancer patient who didn't make the comment, “I have never been sick a day in my life,” or “[I] haven't been sick for 20 years” (ND09, female, age 46).

Innate intelligence. An idea of innate intelligence, or vital force, was expressed by all 11 NDs in this study. One explained how this innate intelligence works,

The body has an inherent ability to heal, so the physician's role is to try to understand what obstacles to healing are in place and to address those, rather than trying to dictate

health to the body. [The body is] designed for health. [We try to] remove what's stopping [the body] from doing what it's wanting to do already (ND06, male, age 31).

Another ND explained the role of antibiotic resistance in the weakening of the human immune system,

I'm looking at all the antibiotic resistance now. It's like evolution at its peak. You're forcing the bacteria to get better, to become stronger; to be more resilient. . . . And we are weakening ourselves because we are taking all of these antibiotics. We're killing our immune systems (ND03, female, age 41).

Several NDs expressed the belief—shared with homeopaths (see below)—that we carry all disease within us, and a healthy immune system keeps pathogens from presenting or emerging as full-blown disease ($n = 4$, 36%).

Our body is full of bacteria, fungus, you name it. . . . But we're not all running around sick. . . . We can cohabit, but we have to maintain a good environment so that [pathogens] don't take over. . . . The key is not to obliterate them and make them stronger, but to make our immune system work better (ND03, female, age 41).

Naturopathic doctors explained their role in health as teachers, as helping people to understand and assist their own immune systems. In aid of that process, they provide herbal or other supplements, or offer homeopathic remedies, acupuncture, or hydrotherapy, thus they believe they are enlisting the body's natural ability to heal and restore its natural balance. Vaccines have very little to do with this process, they said.

Personal experience. These experiences included suspected adverse events following immunization (AEFIs), vaccine-preventable diseases (VPDs), an idiopathic disease, as well as healing experiences, especially with alternative remedies.

Adverse vaccine reactions. All 11 NDs in this study mentioned AEFIs, but only four were first-hand, felt experiences. The rest of these reactions were second- or third-hand stories from others, often from self-diagnosed patients who believed they or their children were vaccine-damaged. None were clinical observations. One ND explained that her naturopathic studies taught her that AEFIs could be attributable either to the vaccine or to the adjuvants. A younger ND acknowledged that “I probably see more of the people who complain of adverse [vaccine] reactions” than those with no or minor reactions. Three NDs described the experiences reported to them. One ND said that a child she treated at age six, according to his mother, became an “angry little kid” at age two supposedly from a vaccine. Another ND interviewed mentioned a naturopath he knew of whose children reportedly died from vaccine reactions. One ND said that “[some] people who are vaccinated have gotten polio.” She added that a woman vaccinated against measles “ended up getting [measles]” from the vaccine. The same ND saw numerous cases of influenza that were attributed by her patients to their having received a flu vaccine. A third ND heard of a child who, within “a couple weeks of the shot . . . stopped making eye contact, and stopped learning words.” A younger ND said he had seen a three-week old whose 102°F fever last three weeks following vaccination. Four NDs mentioned autism as resulting from vaccines. An ND-homeopath advised a client to choose one single treatment for her child’s high fever following a vaccine, “either [to] do this naturopathically or allopathically,” he said, but not to blend the two. He explained,

Within a day or two of getting the vaccination, [the baby] was in and out of the hospital a couple times. She started developing neurological symptoms [I told her mother] “When you do the allopathic route you’re kind of putting your foot on the brake and when

you do the naturopathic route you're kind of putting your foot on the accelerator. I think you need to pick one or the other" (HMND07, male, age 41).

According to this ND, the mother chose naturopathy and her child recovered completely within 24 hours.

Disease and Healing. One younger ND attributed her own autoimmune disease to a hepatitis B shot. "Within a couple of months, my thyroid went out and I got Graves' disease," she said.¹⁴ Another naturopath said he had "anaphylactic shock to a vaccine" as a child; a third, at age 10, begged his parents not to vaccinate him, but his parents refused to listen, and he said that he suffered frequent bouts of disease throughout his childhood as a result of this vaccine. As for VPDs, two NDs interviewed had experienced mild varicella as children but no ND reported a severe, serious VPD.

Four NDs, however, said they experienced dramatic healing through herbs or homeopathy administered by others. One younger ND experienced a homeopathic cure of his plantar warts and a second young ND had "gastrointestinal issues and apprehension" that "totally stopped within a week" of receiving homeopathic remedies—an experience that persuaded him to abandon his mainstream medical education. A third young ND, diagnosed with common variable immunodeficiency (CVID), was "forced to find ways" to heal herself. The natural treatments that helped her led her to study naturopathic medicine.

Professional group norms. A practitioner of naturopathic medicine is expected to treat each patient as unique. Even though the official position of the American Association of Naturopathic Physicians (i.e., AANP, "Vaccine Position Paper") gives lip service to public health,

¹⁴ According to several studies, no increased risk of Graves disease or auto-immune thyroidosis has been demonstrated following hepatitis B vaccines, nor has any association been found between receiving the vaccine and later developing thyroid disease (Wraith et al., 2003; Yu et al., 2007).

this one-page document (1) posits that “it is well documented that some of the current childhood vaccinations have been associated with significant morbidity and are of variable efficacy and necessity,” (2) urges caution in recommending any vaccine, and (3) calls for “safer, more effective vaccinations” (AANP, 1991). All naturopaths in this study followed the protocol recommended by their profession of avoiding some vaccines and delaying all of them. One young ND said that when vaccine debates come up online on the naturopath chat site, there were “vehement discussions . . . and there’s always somebody completely anti-vaccine and always somebody completely pro-vaccine, and then the people in the middle.”

Several NDs mentioned having been influenced by a naturopathic continuing education course through which they learned the importance of delaying all vaccines and avoiding several ($n = 5$, 45%). Three NDs mentioned frequent visits to a naturopath listserv where comments reflecting the spectrum of vaccine positions influenced their point of view.

Profit motive—pharmaceutical industry. All but one of the NDs interviewed mentioned pharmaceutical company profits as driving vaccine development and marketing, and said that this profit motive led them to believe that vaccines in general were promoted more for profit than for patient benefit. One ND insisted that vaccines were profitable because of the instant, enormous market for new vaccines. “When a vaccine gets developed, you have an entire cohort or population that’s eligible for that vaccine And that means that a vaccine is a huge money maker” (ND01, female, age 58). Another ND insisted that pharmaceutical companies were paying to have their drugs approved by government agencies via honoraria for speakers, expensive trips, and other perquisites.

A younger ND agreed that a profit motive existed, but disagreed that it existed for vaccines. In her view, vaccines are usually sold at cost. “I think there is a little something to [the

pharmaceutical profit motive], but not for vaccinations. . . . That doesn't make sense to me," she said.

Suspicious of government and industry. Seven NDs in this study (64%) alluded to a too-cozy relationship between pharmaceutical companies and agencies like the U.S. Centers for Disease Control and Prevention (CDC) and the U.S. Food and Drug Administration (FDA). Two NDs specifically mentioned a “revolving door” between government agencies and pharmaceutical companies; that is, government officials are hired as executives for major pharmaceutical companies and pharmaceutical executives leave their lucrative private-sector jobs to head government agencies or branches that provide oversight for the pharmaceutical products they once promoted.

Acupuncture

Turning to another population of CAM providers: practitioners of Chinese traditional medicine and acupuncture, here is some context for this discipline. Acupuncture is classified by NCCAM as an energy therapy; Traditional Chinese Medicine (TCM) is a complete medical system. Acupuncture, as a traditional Chinese therapy, involves the use of fine needles inserted in specific points on the body to effect a specific therapeutic goal (Berman & Straus, 2003). Practitioners explain that disease is caused by a disruption in energy, or *qi* (pronounced “chee”). The *acupoints* in which needles are inserted exist along a complex infrastructure of *meridians* in the human body that carry *qi* between the body's surface and the internal organs. The thin acupuncture needles are believed to activate the body's energy (Benjamin et al., 1997; Ceniceros & Brown, 1998; Zhao, Stillman, & Rozen, 2005). A more contemporary explanation is that the needle penetration triggers the release of chemical neurotransmitters, particularly endorphins and enkephalins (Benjamin et al., 1997). A still more current analysis points out that the benefits of

acupuncture are largely due to the placebo effect (Ernst, 2006). The author writes, “The majority of [random control trials] employing new sham-acupuncture devices . . . imply that acupuncture is not associated with clinical effects beyond a powerful placebo response” (Ernst, 2006, p. 133; see also Napadow et al., 2008). Yet acupuncture, if done correctly, is non-invasive and painless, and has been shown to be effective in relieving pain, symptoms of asthma, and post-chemotherapy nausea (Ceniceros & Brown, 1998). Acupuncture in the U.S. became popular after President Nixon’s 1972 visit to China (L. Barnes, 2009; Benjamin et al., 1997). Currently, there are approximately 1,000 acupuncturists in Oregon, and 10,000 acupuncturists in the U.S., 3,000 of them physician-acupuncturists (Zhao et al., 2005). The Council of Colleges of Acupuncture and Oriental Medicine lists 59 U.S. schools on its website that provide acupuncture education, with some overlap with the Association of Accredited Naturopathic Medical Colleges.¹⁵

Acupuncturists treat adults and children, and are likely to have beliefs and experiences surrounding vaccination. I selected acupuncturists as a population to interview because of their possible influence on parents’ vaccine decision-making. I found acupuncturists to be somewhat likely to oppose vaccination as disturbing or depleting the body’s natural energy levels.

Acupuncture study participants. I interviewed 10 acupuncturists, seven women and three men; one had trained as a naturopath in order to practice acupuncture (see Tables 3 and 4). Six self-reported as Caucasian, three self-reported as Asian; one described herself as “Mediterranean.” Time in practice ranged from 3 to 24 years, with a mean of 13 years—(the same as the population practice mean). Ages ranged from 33 to 58 years with a median age of 43 years—the youngest group in this study.

Acupuncturists’ vaccine beliefs. Acupuncturists who participated in this study expressed the three vaccine positions, support ($n = 2$, 20%), conditional support ($n = 4$, 40%), and

¹⁵ <http://www.ccaom.org/>

opposition ($n = 4$, 40%). All 10 acupuncturists interviewed were vaccinated as children, with only one naturopath-acupuncturist (see above) reporting an AEFI ($n = 1$, 10%). Six of the acupuncturists in this study (60%) agreed that vaccines play an important role in preventing disease. One acupuncturist said that it was “hard to answer” whether vaccines were beneficial and another practitioner had reached “no final conclusion” on the benefit of vaccines. A third acupuncturist said,

Nobody within our family has had any significant communicable disease that’s currently addressed by a vaccine. But that probably wouldn’t be our first choice as a way to protect ourselves. There [are] these huge assaults right now on our immune systems, per se, and so that would be where we are looking first, is how have we opened the door to a weakened immune system in the first place? (AC07, male, age 58)

Advice to others. In general, acupuncturists have strong anti-vaccine opinions but say that they avoid providing vaccine advice. When pressed, acupuncturists may urge their patients to “do research” or to make “a personal choice.” Two acupuncturists did not recommend for or against vaccinating, but one of them tells clients who ask about vaccines that immunization bypasses the immune system and goes “directly into the bloodstream”—a confusing statement given that white blood cells in the bloodstream, or leukocytes, comprise a key component in the immune system. The naturopath-acupuncturist refers patients to information supplied by “a Yale researcher” in immunology at the NCNM and instructs them in the basic naturopathic tenet: not to vaccinate a child earlier than age two.

Perceived vaccine risks, benefits, and efficacy. This section probes how acupuncturists in this study perceived vaccine risks, benefits, and efficacy. Most participants insisted they were not opposed to vaccines, but perceived any vaccine administered to an infant as risky. Two

participants experienced mild cases of varicella in childhood. No acupuncturist in this study witnessed or experienced a severe instance of a VPD, so the vaccines to prevent such diseases were regarded as unnecessary. Yet two participants clearly stated that pediatric vaccines “absolutely . . . have a place” in disease prevention. One had earned a degree in chemistry and one had grown up with a physician father. The chemist-acupuncturist hedged his endorsement, saying that “maybe they’ve gone a little too far at times” and questioned the benefit of a vaccine for what he called a “self-limiting” disease like varicella.

One acupuncturist explained that “in Chinese medicine, something has to prove itself for hundreds of years before it is accepted as part of the medicine” and, because vaccines have only been around, she said, “for 200 years” (i.e., the smallpox vaccine) or even tens of years, vaccines have not been proven as beneficial or efficacious as acupuncture. In her view, the new science of vaccines cannot be trusted yet or perhaps ever. For this practitioner, vaccines pose far too great a risk to the immune system to be considered beneficial at all. She said, “We don’t know what these things are going to do in 20 years. . . . We could be wiping ourselves out!” Three acupuncturists specifically mentioned the long-discredited autism-risk belief. One acupuncturist said “I don’t know the truth about the connection [of vaccines] with autism.” Another acupuncturist said that, because the cause of autism is still unknown, “with so much murkiness on both sides, I don’t see how you can *not* be cautious about potential dangers [from vaccines].”

The naturopath (ND)-acupuncturist drew a causal link between high infant mortality rates in the U.S. and the high U.S. prevalence of vaccination. She regarded all vaccines all as risky, and said,

The incidence of infant mortality [is lower] in countries where they have [fewer] vaccines and they vaccinate later, in much lower [doses]. . . . Sweden and Japan both have

historically far [fewer] vaccines . . . it's a fact that those countries have lower infant mortality rates [than the U.S.]¹⁶ (ACND09, female, age 46).

This naturopath-acupuncturist also linked her own auto-immune disorders to the frequency with which she was vaccinated for international travel. She drew a causal relationship, saying,

I traveled to Japan constantly, and so [vaccines were] a necessity for travel, to have visas with the vaccinations. . . . I've had a ton of vaccinations. But I also have an autoimmune disease. . . . The incidence of autoimmune diseases skyrocketed in this country along with the incidence of vaccinations (ACND09, female, age 46).¹⁷

Specific vaccines. To better explore vaccine beliefs in the context of actual recommended vaccines, I will next focus on the perceived benefits, risks, and efficacy of the five vaccines (i.e., pertussis, human papillomavirus, hepatitis B, varicella, and influenza vaccines) mentioned specifically by the eight acupuncturists who in their narratives accepted all or some vaccines, or who recommended vaccine delay.

Pertussis vaccine. One acupuncturist questioned the efficacy of the pertussis vaccine, noting that, during a recent whooping cough outbreak, all of her patients who became ill with whooping cough had been vaccinated. Another insisted that “after the pertussis vaccine [was introduced], there's been a higher incidence of autistic reactions.”

Human Papillomavirus (HPV) vaccine. Six of the 10 acupuncturists (60%) mentioned the HPV vaccine in terms of benefit and risk. Only one acupuncturist supported this vaccine as demonstrating a clear benefit because of its potential to reduce cervical cancers. Another

¹⁶ Miller and Goldman assert that one cannot draw a clear conclusion between vaccines and infant mortality rates in part because vaccination cannot be isolated from other societal factors (Miller, N. Z., & Goldman, G. S. (2011). Infant mortality rates regressed against number of vaccine doses routinely given: Is there a biochemical or synergistic toxicity? *Human Experimental Toxicology*, 30(9), 1420-1428. doi: 10.1177/0960327111407644).

¹⁷ For a full review of the mechanisms involved in inducing autoimmunity, please see a review published online in 2003 in *The Lancet*, <http://image.thelancet.com/extras/02art9340web.pdf>.

acupuncturist, however, mentioned that this vaccine was highly lucrative for the manufacturer, adding that “the degree to which it can prevent HPV” was unknown and that the HPV vaccine was potentially very harmful.

One acupuncturist said, “I’m not sure that [the HPV vaccine is] something that everybody needs to have. I raised my children to think for themselves and be responsible.” He believed his own children were not at risk to become infected with the virus because he believed they were sexually abstinent. A third acupuncturist agreed, saying “I don’t know that it’s necessary,” and that she would avoid this vaccine for her own children.

Hepatitis B (HBV) vaccine. Six acupuncturists mentioned the hepatitis B vaccine; one questioned its benefit and another questioned its efficacy. Three of these practitioners received the HBV vaccine because of their fears of infections from their clients and a desire not to pass hepatitis on to others—a public health motive. The spouse of a fourth acupuncturist insisted that their daughter receive the vaccine, so she reluctantly complied, but said that given a choice, she would not accept any vaccines. She did not believe vaccines had been sufficiently studied so, she said, “my heart said ‘don’t do it.’” Even so, she had her daughter vaccinated, because, she admitted, “I couldn’t deal with it if down the line [my daughter] caught something [that] could have been prevented [by a vaccine].”

One acupuncturist agreed to the HBV vaccine to protect her children from possible infection that she could bring home from her work; two others received the vaccine prophylactically before beginning their acupuncture practices, to protect themselves and their clients. Yet another acupuncturist did not believe that the vaccine was sufficiently tested, and so she declined it. She also had watched an alarming classroom presentation in a naturopathic class

that purported to show more than 20 medical practitioners describing on camera their severe side effects, including multiple sclerosis, from the HBV vaccine.¹⁸ She said,

All [these practitioners reported] that they had the hepatitis B series and, at some point in the series—they had been healthy their whole lives—ended up with neurological disorders (ACND09, female, age 46).

At that time, she was partially vaccinated against hepatitis B and said, as noted above, this provider she declined the rest of the HBV vaccine series because she acquired an auto-immune disease. She drew a causal relationship between the HBV vaccine and her disease.

Varicella vaccine. Four of the six acupuncturists who were vaccine supporters/conditional supporters mentioned varicella; all four questioned the vaccine's benefit, and three of those believed that the major benefit was economic, to avoid "lost productivity [from] parents staying home to take care of sick kids." Another acupuncturist said his concern was that the vaccine—to him, like all vaccines—"bypassed the immune response." Yet another acupuncturist said that exposing children to varicella at "chicken pox parties" was a better way to acquire immunity.

Influenza vaccine. All but one of the 10 acupuncturists refused the influenza vaccine, and three acupuncturists insisted that the flu vaccine caused the flu.¹⁹ One acupuncturist said, "I treat people who have gotten sick from flu vaccines even though that's supposedly impossible. I see it all the time." Another acupuncturist, despite having acquired full-blown influenza, still subsequently refused the vaccine. She rationalized, "I don't know that if I had a flu shot, it would

¹⁸ Two studies showed no increased risk of onset or relapse of MS following administration of hepatitis B vaccine (Confavreux, et al., 2001; Ascherio et al., 2001). Authors of a meta-analysis (Martínez-Sernández & Figueiras, 2013) concluded that it is not possible to determine an increased risk of onset or relapse of MS or other demyelinating diseases following administration of hepatitis B vaccine.

¹⁹ For accurate information on the components and common side effects of the influenza vaccine, including how it may be possible to become infected despite being vaccinated, see the CDC flu information site: www.cdc.gov/flu/about/qa/flushot.htm.

have been any different. It could have been a different [influenza] strain.” When her doctor insisted that, as a health care provider, she needed the flu shot, she still refused. Two other practitioners insisted that Chinese herbal medicine was effective in treating the flu. One said, “I don’t really see the need for [an influenza vaccine] for myself. Of course . . . I’ve had the flu. . . . For me, it’s treated through herbs, Chinese medicine.” One believed that her “wei’ was too strong” for her ever to become ill with the flu, and said “If I got it, it’s not something that I feel is very life-threatening.” No acupuncturist mentioned the danger of transmitting influenza to others during the highly infectious, pre-symptomatic phase of the disease.

Vaccine risk from ingredients. Only two vaccine-opposing acupuncturists in this study mentioned having concerns about vaccine components. One acupuncturist said,

When I looked up the ingredients for the flu vaccine, [I found that it contained] neurotoxins and formaldehyde and crazy stuff that I know my liver is not going to be happy about. . . . And it probably wouldn’t be happy if I were six months old, or a year old, or two years old, and getting 13 [vaccines]! (AC01, female, age 36).

One of the other three vaccine-opposing acupuncturists (see Table 4) noted the “lack of science” in vaccine creation and the unknown effects of vaccine adjuvants and preservatives on the human body. He was especially concerned about peanut oil, squalene, and mercury in vaccines.²⁰ (See also Footnote 13.) He said,

²⁰ Peanut oil is absent from vaccines; it is not an ingredient. Read more from the American Academy of Allergy, Asthma, and Immunology on its website <http://www.aaaai.org/ask-the-expert/peanut-antigen-in-vaccines.aspx>. About squalene, *Wired* online quotes the U.S. Food and Drug Administration—“There is no squalene in any FDA-approved vaccine in the U.S.”: <http://www.wired.com/magazine/2009/10/squalene-not-to-worry/>. The National Network for Immunization Information, a collaboration between researchers at five universities and two hospitals, explains the role of mercury, and the difference between ethylmercury and methylmercury, often mistakenly equated, on its website: <http://www.immunizationinfo.org/science/elimination-methylmercury-and-ethylmercury-body>

One of the things I'm really curious about and I'd like to know more about, is the correlation between the use of peanut oil in vaccine formulations and these incredible levels of anaphylactic response to peanuts in the diet. I would bet dollars to donuts that there's a connection there. The use of squalene, which is a natural component of the human body, as an adjuvant: that's very troublesome to me (AC07, male, age 58).

Choosing acupuncture. For acupuncturists, unlike naturopaths, their career choice was more a turning toward acupuncture than a rejection of mainstream medicine. Three of the 10 acupuncturists interviewed were involved in mainstream medicine before choosing acupuncture, and four said that they had “wanted to be doctors.” After her pre-medical studies, one woman did not bother to apply for medical school because she believed her chances for admission were slim at the time (i.e., the 1970s). Two practitioners were massage therapists before studying acupuncture. One acupuncturist in this study said she knew massage therapy to be a “high burnout profession” and wanted a profession that provided less physical stress, as well as “more intellectual stimulation,” needs that were satisfied in her estimation by a formal study of Chinese medicine. For four acupuncturists, the pain and stress relief they experienced from treatments persuaded them to study acupuncture—a desire both to learn how it worked and to help others. One acupuncturist who studied exercise physiology had also received acupuncture treatments to alleviate stress. She said,

My primary care doctor suggested antidepressants and sleep medication and anti-anxiety medication. I was 26 years old, and I didn't want to start all that medication because of something I knew was the just the wrong [work] situation, so I did some research and I started getting acupuncture. It really helped me a lot (AC09, female, age 40).

For two participants in this study, acupuncture was simply “interesting.” For one, an acupuncturist who trained in her native China, studying acupuncture was a natural fit with her own medical worldview. In China, acupuncture is combined with a study of mainstream, or Western, medicine. She said, “Acupuncture [and] Chinese herbal medicine: that’s just part of how I grew up, and so [choosing acupuncture was] very natural for me.”

One acupuncturist was disillusioned as a pre-medical student enrolled in an honors chemistry program. He explained,

There were primarily really high-end med students, and I didn’t like most of them. I thought there was a lot of ego and a lot of competition. . . . I had questions, anyway, about whether I really wanted to be a doctor. . . . And I thought, do I want to go to school this many years and then work with [people I don’t really like] afterwards? (AC08, male age 52)

Acupuncture training. The healthgrades.com website, which includes listings for 12,000 medical doctors, at the time of this study listed more than 1,000 licensed acupuncturists in Oregon. Acupuncturists are licensed in Oregon through the Accreditation Commission for Acupuncture and Oriental Medicine (ACAOM). Formal education is graduate-level study, similar to a master’s degree, and takes place over 3 to 6 years in an accredited institution. Four of the acupuncturists interviewed studied at the Oregon College of Oriental Medicine. The Chinese participant studied acupuncture as part of a 5-year mainstream medical education program in China. Four of the remaining five participants trained at accredited schools in other states; the tenth was an acupuncturist-naturopath who trained at Oregon’s National College of Natural Medicine (NCNM). Most acupuncturists interviewed preferred to be called “traditional Chinese medicine (TCM)” providers rather than acupuncturists, because they said their practices

encompassed the full range of Chinese medicine, especially herbal medicine. Several explained that Chinese medicine is an umbrella term for acupuncture, Chinese herbal medicine, dietary and lifestyle counseling, *qi gong* exercises, *tui na* (Chinese massage), and moxibustion. Moxibustion consists of burning Chinese herbs on the skin, or more often burning a small bundle of herbs at the handle end of the acupuncture needle to warm the acupoint and promote healing.

Maintaining licensure requires 15 hours of continuing education (CE) annually. An acupuncturist with a pre-medical background said he focused on CE courses from the American Academy of Pain Management. Another acupuncturist explained that in CE courses for acupuncture, there is freedom even to focus on Western medicine. One acupuncturist said that she is “particularly interested in nutrition and diet, both oriental and Western styles of nutrition.” She searches for courses that complement and strengthen her practice, even if the courses are not formally considered Chinese medicine.

Contextual themes. As with naturopaths, various beliefs were antecedent to vaccine beliefs and related more broadly to health in general. Chief among these beliefs was (a) a shared image of the immune system as nearly impervious to disease when healthy, but when threatened with disease, it becomes imbalanced, and energy drains away. In addition to this norm, other beliefs also influenced vaccine beliefs, including (b) personal experience—most often with alternative remedies, but sometimes with observed or intuited AEFIs; (c) reference or professional group norms and other socialization factors, typically associated with professional training; and (d) perceptions of industry and government and their influence on vaccine promotion (see also Tables 3 and 4).

Immunology beliefs. Many acupuncturists ($n = 9$, 90%) mentioned *qi* and four of those acupuncturists explained *qi* as a person’s energy or life force. The three acupuncturists who

trained in mainstream medicine (MM), or whose family members practiced MM, equated *qi* with the immune system and said they were simply different terms for the same phenomenon. The acupuncturist with a degree in chemistry explained,

We're talking about the same thing, from a western medical perspective, western biology perspective. . . . *Wei qi* is the [name for the] immune system from the Chinese perspective (AC08, male, age 52).

Yet two acupuncturists' descriptions of *qi* were more varied and complex. *Qi* was viewed by some as finite, capable of being enhanced, but especially of being depleted. As one explained,

There [are] different layers of *qi* . . . there is the protective *qi*, the energy that is from our aura out to our skin. . . . We're fields of energy, essentially. . . . This aura is very real and measurable, it's an electromagnetic field that surrounds the body [and protects] against viruses and pathogenic *qi*. . . . If your *qi* is strong . . . you are going to be able to fend things off easily. It's only when the *wei qi*, or the protective *qi*, is compromised that you're going to get sick. . . . So it's not about being exposed to someone with a cold. It's about the fact that you didn't sleep well last night, that you were stressed, that you didn't eat well and therefore your *wei qi* is powered down and that's why you are getting sick. . . . [Then] there is the nutritive *qi*: the *qi* of our everyday lives, and then there's the constitutional level of *qi*, the programming level. And so by getting a virus . . . or by getting an immunization, you are injecting a latent pathogenic factor, bypassing the *wei qi* and the *ying qi* into the deepest level of *qi* that we have. [The vaccine] is basically becoming part of your programming . . . because you are introducing it into the body so it can produce antibodies. . . . In order to keep something latent or quiet requires a certain

amount of energy – it requires “financing latency.” For example, we all have cancer in our bodies all the time but our immune systems handle it (AC01, female, age 36).

Another acupuncturist explained *qi* this way:

It takes *qi* to move blood, and if our *qi* is totally deficient, then blood . . . pools. There’s a lot in Chinese medicine that talks about stagnant *qi* when energy gets stuck, and “stuck-ness” causes pain – whether it’s psychological stuck-ness and we can’t make a decision, or physical stuck-ness that can show up [for example] as tennis elbow. If our *qi* is deficient, it can’t move our blood along . . . then things get stuck (AC02, female, age 56).

The acupuncturist from China explained *qi* from a historical, pre-scientific perspective,

Loosely translated [it means] life force. So it’s not a structure of the body, it’s something flowing through the body. . . . If you have a strong *qi*, then you will be able to defend [against] illnesses. So it’s all about . . . free flow of the *qi*. Certain things can block the *qi*. There are internal pathogens and external pathogens. External pathogens refer to a cold or heat or toxins; it could be bacteria and viruses, *but this is not the language used in acupuncture because when acupuncture developed [there was no understanding of] virus or bacteria or any of those pathogens* [emphasis added]. They called [them] “toxins” (AC03, female, age 36).

She added that Chinese medicine targets the body’s internal environment, and so “[it corrects] the whole system . . . so [practitioners do] not necessarily care about which bacteria are causing this [specific] infection.” Another acupuncturist explained that everyday activities, the food humans consume, and human emotions all contribute to wellness and balance or disease-imbalance. This acupuncturist said that the three causes of disease are as follows: one, external pathogenic factors (i.e., wind or cold or heat) which correlate to bacteria, viruses, and funguses. The second consists

of miscellaneous factors including diet, nutrition, exercise or its absence, or accidents and mishaps. The third is emotional causes: “If it’s not a virus and it’s not from what you are eating,” then, “It’s your emotions.”

The fragile immune system. Four participants said that vaccines “overwhelm” an infant’s immune system. One acupuncturist worried about the complexity involved in “introducing intense vaccines into the body of young children who are vulnerable, especially at the increased rate of vaccination that we have today.” Another acupuncturist said she would prefer “not to super-load the body,” but to administer one vaccine and wait between vaccines to give a child the chance to recover between shots.

A third acupuncturist described the immune system in terms of what might be called a form of zero-sum thinking, “It’s like the sand in your hourglass; you can use it up slowly or quickly, but it when it’s gone, that’s it.” She said,

The body could probably handle that if it’s a handful [of vaccines], but seeing how many [a child is] required to have for school is *insane*. . . . Is it a good idea to be giving the body all of this to work with and especially at the same time? (AC01, female, age 36).

Personal experience. As for naturopaths, this theme relates to experience with a vaccine, a VPD, or healing. No acupuncturist interviewed mentioned healing as resulting from an acupuncture treatment.

Adverse vaccine reactions. Seven acupuncturists in this study mentioned stories of AEFIs (Tables 3 and 4); all but one was a second- or third-hand story told to them and only one acupuncturist had a direct AEFI experience. None of these AEFIs was causally established clinically or through laboratory testing, or was more than hearsay. One acupuncturist said a close friend of her sister “got Guillain-Barré a few weeks after a tetanus shot” and another, as noted

above, insisted that the hepatitis B vaccine caused her to acquire an autoimmune disease. This same acupuncturist conceded, however, that vaccine causality “is all a guess.” Another acupuncturist said that several of her patients came down with pertussis despite having been vaccinated. She did not specify whether the vaccine was administered in childhood or if the patients had received recent boosters. One acupuncturist said her son acquired full-blown measles that lasted for three days in “response to his first MMR vaccine.” Two other practitioners mentioned mild reactions—one acupuncturist said she was “run down” after receiving the hepatitis B vaccine and the daughter of another acupuncturist, she said, was very sensitive to vaccines and would be ill following each of her pediatric vaccines.

Vaccine-preventable diseases (VPDs). Only two acupuncturists reported having a VPD—both of them mild cases of childhood varicella (chicken pox). None of the other eight acupuncturists could recall having acquired any VPD, nor had anyone in their families. One vaccine-opposing acupuncturist questioned the very concept of any disease actually being vaccine-preventable. He said he never “make(s) that assumption” and had never seen it demonstrated.

Professional group norms. Several acupuncturists expressed the belief that Chinese medicine treats the whole person and that Western medicine is inferior in that it supposedly treats only symptoms. One acupuncturist said that Chinese medicine, an approach dating back millennia, was far superior to Western medicine. She said, “All of Western medicine is in its utter infancy and so we just don’t know enough yet. And so to be thinking that [Western medicine] knows everything is supremely arrogant.”²¹

²¹ An article published in 1938 the *Annals of Internal Medicine*, is instructive in understanding a view of modern medicine. It states, “The history of medicine is a history of the dynamic power of the relationship between doctor and patient” and that “the placebo has always been the norm of medical practice” (Houston, 1938) (p. 1418).

Another acupuncturist said that her vaccine position was influenced by her training, adding that if a vaccine is given when the “immune system is not strong enough to react properly, it just creates a mess.” She explained that with a vaccine, the body fails to recognize “what is self and other” and starts to attack the wrong cells. She was also convinced that “our immune systems are getting weaker.” Another acupuncturist agreed that her thinking moved away from vaccinating as a result of her training. She said,

I had an awareness of thinking differently about the body and the immune system before I went to school, but [acupuncture training] definitely strengthened my opinions about vaccines . . . understanding how the body develops and how the immune system develops, and what the vaccines are doing to the immune system. What they’re asking of it, how they’re affecting it (ACND09, female, age 46).

One practitioner felt pressured by the acupuncture community to avoid vaccinating. She said,

The majority of people that I trained with were against vaccinations. . . . Most providers really feel so strongly about how bad vaccinations are, and I just don’t feel that way.

When I’m around [peers] who are well-read and well-informed on all of the theories on the negative side of [vaccinating], it makes me feel almost guilty, like I’m maybe not well-read enough . . . or I’m too Western, or I’m just going with the flow too much with my kids. . . . The people trying to convince [me], those were all my classmates in San Francisco; they were my teachers! (AC09, female, age 40).

Profit motive—Pharmaceutical industry. Six participants mentioned the profit motive of pharmaceutical companies as negatively affecting medicine. Three acupuncturists, including one strong vaccine supporter, specifically mentioned evidence that medical research is funded by

pharmaceutical companies, alluding to unethical practices and even corruption in promoting vaccines and medicines. One acupuncturist said,

I think there's a lot of lobbying pressure and a lot of money that goes into swaying things in a particular direction. I think sometimes things that come out as hardcore studies that are cited as evidence . . . you need to look further into who funded the study and how the study was done, and who it was being used by. Oftentimes it's being used by the same people that funded it. . . . I think there's a lot of pressure and I think a lot of politicians have their pockets really padded by certain interests. Big Pharma is a huge, huge, huge [influence] in terms of what goes on (AC05, female, age 41).

Government and industry. Most acupuncturists ($n = 7$) mentioned government profiting from drug sales, or government research being funded primarily by pharmaceutical companies, or other questionable relationships. One acupuncturist in this study said that government agencies were coercing hospital workers into vaccination against their will. He said,

I am aware of the concept of herd immunity, and I think that that's really valid. But, it's used as a . . . pressure tactic, like you're failing the human race if you don't get on the bus [and get vaccinated] (AC06, male, age 34).

Another acupuncturist expressed the belief that any risk of a VPD outbreak was exaggerated. She said, "I understand that from a public health standpoint there is this [attitude of] 'Everyone must do this or the whole strategy will fail!'"

Four acupuncturists described the influence of the pharmaceutical industry on government policy in general and one participant speculated that U.S. medical policy was used to weaken citizens in other countries. She said,

It really makes me nauseous sitting here, to actually know that the majority of those diseases are in these countries that we're also blowing [up, in wars]. How many billions of dollars a day are we investing there? If you can weaken the people, if you can weaken your enemy, it gives you another upper hand, doesn't it? That's just gross (AC02, female, age 56).

Chiropractic

According to the National Center for Complementary and Alternative Medicine (NCCAM), chiropractic is classified as manipulative and body-based therapy. Chiropractors, like naturopaths and acupuncturists, emphasize the body's self-healing powers (Frohock, 1992) and references to spinal manipulation can be traced back to ancient Greece (Meeker & Haldeman, 2002). Founded by Daniel David Palmer in 1895, chiropractic medicine derives its name from Greek for "done by hand" (hand *cheiro*, and *practos* doing by) and involves manipulation of the spine (Campbell et al., 2000; Josefek, 2000). David Palmer reportedly cured a hearing loss by use of spinal manipulation. Campbell, Busse, and Injeyan (2000, p. 1) write that "this single, possibly apocryphal, observation provided the practical basis for Palmer's future concept of chiropractic." Palmer adhered to *vitalism*, a doctrine that ascribes the functioning of a living organism to a vital principle distinct from physico-chemical and other known and accepted forces. Eventually, this concept became integrated within the basic tenets of chiropractic practice. Palmer concluded by 1902 that all disease (or dis-ease, as he termed it) was primarily neurological and he asserted that 95 percent of all diseases resulted from misaligned vertebrae pinching spinal nerve roots, or from lesions of the nervous system which he called *subluxations* (Busse et al., 2005). It followed that a healthy body required a properly aligned backbone, and so Palmer developed a novel method of

spinal adjustment to correct misaligned vertebrae. By using spinal manipulation therapy to remove subluxations, Palmer believed he was influencing a life force within the body which he named “innate intelligence.” Contemporary chiropractors recommend regular spinal adjustment for optimal health (see also NIH, 2012a). Chiropractic is used by millions of Americans each year for pain relief and to relieve symptoms caused by spinal biomechanical dysfunction (Mirtz et al., 2002).

Chiropractic vaccine opposition. A vocal minority of chiropractors opposes vaccines (Colley & Haas, 1994; Hawk & Dusio, 1995). In one study, 90 percent of the 171 chiropractors who responded to a questionnaire reported that they advised their patients against vaccination (Colley & Haas, 1994). In a 2010 study of 11,144 children, those children who were treated by chiropractors were significantly less likely to have met the recommended schedule for vaccination against measles/mumps/rubella, varicella, or *H. influenza* type B than those children who visited traditional medical providers (Downey et al., 2010).

Chiropractic participants. Eight doctors of chiropractic (DCs), seven men and one woman, were interviewed for this study. All self-identified as Caucasian. Time in practice ranged from 9 to 55 years, with a median of 19 years and a mean of 21 years—the population with the longest average time in practice in this study. Ages ranged from 42 to 83 years with a median age of 52 years, one of the oldest populations in this study.

Chiropractic vaccine beliefs. Six of the eight DCs in this study (75%) were vaccinated as children. The two unvaccinated DCs, who were also vaccine-opposing, were age >80 years, and had been children in the 1930s, when few vaccines were widely available. The chiropractors who participated in this study were vaccine opposers ($n = 2$), conditional supporters ($n = 4$), or full

supporters ($n = 2$). More DCs were likely to accept one or more vaccines than to oppose them all ($n = 6$, 75%). (See also Tables 3 and 4).

Chiropractors interviewed held strong views on vaccines, ranging from one extreme—“Other than clean water, [vaccines] are the greatest advance in health and human history”—to the belief that vaccines sicken children for the rest of their lives. But half were somewhere in the middle ($n = 4$, 50%), agreeing on the proven benefit of some vaccines (i.e., polio, diphtheria, measles, and tetanus).

The two vaccine-opposing DCs attributed autism and sickness to vaccines. One insisted that the pertussis vaccine is the “root cause of autism.” One DC opposed any vaccine administered to an infant, claiming that the blood-brain barrier “does not exist in infants, and that’s when most of the . . . vaccinations are being given to children, right fresh out of the womb.” She cited “research that I’ve been hearing about” asserting that the undeveloped infantile blood-brain barrier allows vaccines to go through and, then produces “some very unfortunate results.”²² The BBB information came from a continuing education course from a source she praised for its high quality. But another DC conceded that vaccines were necessary in an age of international travel: “[Today] we are in a world where we are so mobile . . . we have zones of one disease and you’re traveling over and you’re introducing it somewhere else. These [diseases] are wandering all over the place.” He also believed that vaccination programs were not a part of public health, instead restricting public health to improvements in sanitation and hygiene. Public health “has been probably more [important] than the vaccinations themselves. We learn what good practices

²² For a full discussion of the blood-brain barrier (BBB) fallacy and vaccines, please see the discussion section. The BBB is mature around the age of 4 months, and much evidence exists to support that it is already well developed in utero.

are, how to keep . . . barriers between each other, how to clean up and deal with things, not let things get away,” he said.

In general, all DCs interviewed said that they encouraged parents to educate themselves about vaccines. The 83-year-old DC described the cautionary vaccine advice he dispenses:

I try to give them the pros and cons and let them make their own decision. Every patient I talk to where they know of a case of autism has turned them off on vaccinations for small children. They see the results. . . . I tell patients, young mothers, “When it comes to vaccinations don’t give that child any bolus vaccinations until they are at least two or three years old. Single vaccinations once a month, let their body recuperate, then get another one.”. . . [I tell them,] “Talk to the mothers of autistic children and see what they tell you about vaccinations” and it *turned a lot of them around* (emphasis added) (CH14, male, age 83).

This DC, despite his insistence that he advises parents to make their own vaccine decisions, tips the scale against vaccines by insisting on the discredited link between vaccines and autism to dissuade parents from vaccinating.

Another DC said he tells parents “Don’t listen to your MD. He will not ever give you accurate information on the possible side effects of vaccines.” He refers them to anti-vaccine literature, for example. He expanded on his theme,

Particularly if it’s parents, I say, “Listen, I’m not anti-vaccine”—and I truly believe I am not anti-vaccine—“but I believe you should be intelligent and educated about the vaccines that you have. So this is what I would recommend to you, as a parent: I would recommend that you read up on these vaccines. I can loan you a book, I can give you the web page [for

the National Vaccine Information Center], or I could do both” (CH15, male, age 42). (See also Footnote 10.)

Perceived vaccine risks, benefits, and efficacy. This section probes how DCs perceived vaccine risks, benefits, and efficacy. Most chiropractors insisted they were not opposed to vaccines, but their professional experience, CE courses, and their reading led them to suspect that the widespread use of pediatric vaccines negatively affects children’s health. Vaccines were perceived as risky if their benefits were regarded as low, as in avoiding live vaccines but accepting inactivated ones; one DC believed all vaccines were too risky to administer to children; another DC drew a direct correlation between pediatric vaccines and lifelong disease, including autism.

Specific vaccines. Most DCs interviewed had broad views on vaccines but were less likely, for example, than NDs, to focus on specific vaccines. Chiropractors most often mentioned the five vaccines discussed below.

Polio vaccine. Four DCs (50%) specifically noted the benefits of the polio vaccine. One vaccine-supportive DC said he treated patients with permanent nerve damage from childhood paralytic polio. He said, “As long as the polio virus is out there in the world, absolutely, kids should be vaccinated against it.” Two otherwise vaccine-opposing DCs accepted the need for both tetanus and polio vaccines because of the proven benefits in preventing disease and their efficacy in targeting the correct pathogen.

A DC who conditionally accepted vaccines also insisted on the inactivated/intravenous polio vaccine (IPV) for his daughter after hearing what he called “horror stories about vaccines” (i.e., the live, attenuated, oral polio vaccine, or OPV) in his chiropractic education. One DC who accepted all vaccines nonetheless had reservations about the OPV, the only polio vaccine

available when his children were young. He insisted that his children receive the IPV. He had read “that all of the cases of polio in the United States after 1980 were caused by [the OPV].”²³ Even though his pediatrician assured him that the OPV “was fine,” a few years later, the American Academy of Pediatrics stopped recommending the live vaccine and recommended instead the safer, but less protective IPV. In the U.S. today only the IPV is administered; polio was declared eradicated in the U.S. in 1979 and so vaccine efficacy is less an issue than when polio was present and endemic.

Human Papillomavirus (HPV) vaccine. Only one of the vaccine-supportive DCs strongly favored the HPV vaccine; the other vaccine supporter said he would accept the vaccine if HPV were not sexually transmitted. He added that to ensure that his children received the HPV vaccine would essentially be to “give up and say, well, they are going to [have sex] anyway.” He said when his children turned 18, “If they want to pay for it, they can go get it. But I’m not going to do it on my watch, because I’m not going to be permissive in that way.” Three vaccine-conditional DCs mentioned a “controversy” about the vaccine, and objected to the vaccine on the grounds that “certain behaviors” are central to infection. One of them disagreed that exposure to HPV was as widespread as he had heard.

The concept [is] that your child or you are going to be exposed to this bacterial or viral agent at some point, no matter what, because of people’s behavior. And because of people’s behavior, we’re just going to say everybody needs to get [vaccinated]. I think that that kind of blanket generalization is poor (CH11, male, age 44).

DCs did not discuss the HPV vaccine’s benefits in preventing cancer, genital warts, or human suffering; they mentioned only the vaccine’s perceived risk of promoting early sexual

²³ According to the CDC, from 1980–1999, there were 162 confirmed cases of paralytic polio cases—154 (8 were imported polio) were vaccine-associated paralytic polio (VAPP) caused by the live OPV.

debut or even promiscuity. The perception of susceptibility to HPV was low for DCs. The one DC who supported this vaccine said simply that it was “a good idea.”

Hepatitis B (HBV) vaccine. One vaccine-supportive DC agreed with vaccinating against hepatitis because of the vaccine’s benefits and the severity and persistence of the disease. He did consider hepatitis both serious and preventable by a vaccine. Another DC, however, described this vaccine as the source of “a big financial reward” because it is mandated: “everybody gets [that vaccine].” He mentioned nothing about the contagiousness or the serious effects and sequelae of the disease hepatitis B.

Influenza vaccine. Five DCs interviewed (63%) described risks from the flu vaccine serious enough to preclude accepting this vaccine. One otherwise vaccine-supporting DC avoided the flu shot. A death in his family attributed to the seasonal flu vaccine dissuaded him from ever vaccinating himself or his family against seasonal influenza. Two DCs expressed the belief that chiropractic adjustment, along with adequate nutrition, sleep, and exercise, should be enough to avoid influenza infection. One called flu vaccine “the most worthless vaccine on the planet” and described it as containing toxic levels of aluminum, a substance it does not, in fact, contain.

Aluminum is a carrier molecule . . . and, oddly enough, we know that there’s no safe amount of aluminum in the human body. And we know that aluminum in the human body causes tangles in the brain and . . . we see tangles in the brain of Alzheimer’s patients (CH15, male age 42).

Only one DC agreed to the H1N1 vaccine. He also provided it to his staff and his family to ensure protection from this serious disease.

Varicella vaccine. One DC said that “When we get a disease we’re vaccinating ourselves” and said he preferred chicken pox parties of his childhood to provide varicella immunity. He

said, “You’d . . . invite all the other kids over and they all get chickenpox when they’re real little so they didn’t have to have it [when they were] older.” A vaccine-opposing DC blamed the varicella vaccine for an epidemic of Type 1 diabetes. He said,

Now we have tens of thousands of kids in the United States that have Type 1 diabetes, that have no diabetes in the family. And three or four weeks after their chickenpox vaccination, they’re full-blown diabetic. I have two little girls in my practice here; no diabetes anywhere in the family they can find, and [now] they’re full-blown diabetics (CH15, male, age 42).

He agreed that children should be encouraged to be exposed to varicella when young, that this would protect against severe varicella in adolescence. He also noted that the vaccine’s efficacy wears off sooner than reported. He said,

We’re finding out that vaccine that they told us was a one-time shot wears off by the time you’re a young adult. And we know the mortality rate amongst adults for chickenpox is about 10 percent, so we’re going to have all these 18-year-olds going out into the world who aren’t thinking about getting a booster for vaccinations, because that’s the last thing 18-year-olds are thinking about. . . . So then we’re going to let 10 percent of them die? . . . as opposed to probably just getting the chickenpox once for life? That seems like a much smarter move to me [than getting vaccinated] (CH15, male, age 42).

Yet, one DC had experienced a severe case of chicken pox when he was 19, and said “It was nasty!” He considered the vaccine to be “sort of innocuous” and “an easier way out. You just go ahead and introduce [the pathogen]; the person develops some resistance, and off you go.” He added that vaccines are necessary in an age of international travel:

[Today] we are in a world where we are so mobile . . . we have zones of one disease and you're traveling over and you're introducing it somewhere else. These [diseases] are wandering all over the place (CH12, male, age 57).

Choosing chiropractic. Four of the DCs interviewed (50%) benefited in their youth from the healing touch of chiropractic, and all witnessed dramatic pain relief or the disappearance of a disease or disorder solely from chiropractic treatment. One DC, who began training as a physical therapist, experienced so dramatic a recovery following a chiropractic adjustment for back pain that he turned to chiropractic as a profession. Other DCs interviewed variously reported successful chiropractic treatments for their own adolescent sports injuries, back pain, childhood ear infections, and springtime allergies.

Chiropractic is humane and pragmatic. Chiropractors described their discipline as more humane than conventional medicine, as well as being pragmatic in using whatever modality produced relief. One DC said that the “natural healing” of chiropractic was a motivation for his career choice. Another DC was drawn to chiropractic to help people. She said, “I know that sounds very trite [but] that’s the way I feel about it. Our patients are our friends. They’re not numbers on a chart. . . . They are our friends, and that’s the way we treat them.” A third chiropractor described conventional medicine as “rather callous and brutal.” Although a fourth DC outlined a more pragmatic view: “Whatever makes the person get better, so be it; let’s use it.” He said,

I’m not one of those individuals who is anti-medicine all the time, because there are places for surgery. There are places for antibiotics. There are places for other medicines, as needed by the individual. I disagree with the abuse of them; handing out antibiotics to

anybody and everybody that has an ear infection is an abuse, and I'm against that (CH18, male, age 48).

Chiropractic training. Chiropractic is currently licensed in all 50 states (Parkman, 2004) and the Council on Chiropractic Education lists 17 accredited institutions on its website.²⁴ Oregon has an accredited chiropractic educational institution, the University of Western States (UWS), located in Portland. Chiropractic education is a 4-year, post-baccalaureate, program, followed by clinical hours and an annual 20-hour CE requirement. Meeker and Haldeman (2002, p. 2) describe contemporary chiropractic education and practice as “at the crossroads of alternative and mainstream medicine,” and as having improved its educational and licensing systems in recent years. As the profession has evolved, it has also moved away from the original theory; chiropractors now routinely suggest exercise and improved nutrition, and provide advice about weight loss, smoking cessation, and relaxation techniques (Meeker & Haldeman, 2002).

Most doctors of chiropractic (DCs) in this study ($n = 6$, 75%) trained in Portland, Oregon, at the University of Western States (UWS), as it has been known since 2009. Younger DCs in this study agreed that their profession is now more scientific than it was in the early 20th century. As one DC explained, “[Chiropractors have] every bit as much science, if not more, than the typical MD.” One DC, in practice 9 years, the least number of years for this cohort, explained his training:

[Chiropractic] fit with my world view, but the training was different from what I was expecting. I thought I was just going to learn to crack backs. But the training was . . . very medically oriented. In other words, we studied a lot of pathology. According to the school [UWS], we have an extremely similar program to the medical doctors' in the first two years, in terms of medical sciences. And it was more about learning when not to treat,

²⁴ <http://www.cce-usa.org/>

than when to treat. . . . And then, in the latter two years, they started reintroducing the notion of when to treat, and it was really more as a secondary consideration. . . . I see the education as very evidence-based and that's something chiropractic, as a profession, has been lagging in in the past, but now . . . [it] has been catching up (CH16, male, age 46).

Continuing education. DCs described their formal education as supporting pediatric vaccination but that CE courses, lectures, and seminars included content that questioned or opposed vaccines, including the CE course mentioned above that contained misinformation on the blood-brain barrier. One DC explained that his UWS instructors “taught that vaccines are completely legitimate and helpful. It was afterwards that I started reading about . . . the relationship between [vaccines and] autism. . . .” Another DC cited the anti-vaccine National Vaccine Information Center website (see Footnote 10) as a good source of information. A third DC learned in a web-based CE course that the blood-brain barrier in infants is undeveloped, and therefore it “allows these vaccines to go through and, thus, it affects what’s going on in their brain. . . .” (see Footnote 22.) Another DC said,

Last year, at [a] continuing education conference organized by the state, one of the speakers was a mother of a child who she feels was affected by a vaccine. And she actually [said], “I’m not here to change your mind about vaccines. I’m here to open your mind or make you aware [that] your choices to have your child vaccinated may be taken away. Your risks may not be being presented to you.” Her point was . . . that parents [should] be educated on the risks and allowed to make [vaccination] decisions for themselves (CH16, male, age 46).

But for one DC, chiropractic CE courses were “just really lousy” and he said he preferred conventional medical CE courses, especially ones that related to musculoskeletal diagnosis and

treatment. This same chiropractor, who worked as an exercise physiologist before his DC training, characterized chiropractic as “in this sort of strange medical subspecialty [in which] we treat musculoskeletal conditions conservatively” and that also includes DCs who belong to “the holistic alternative therapy bunch that thinks that you can do it all with lining up the spine . . . or with spinal manipulation and botanical and herbal and nutritional therapies.”

To summarize the effect of chiropractic training and education on vaccine positions: Formal chiropractic education supports vaccination as valuable in disease prevention and an important part of public medicine. Over time, however, the influence of formal education recedes as chiropractors are exposed in their CE courses, seminars, and in conversations with their peers to anti-vaccine beliefs and practices and thus become less likely to endorse vaccination.

Contextual themes. Among DCs in this study, various beliefs were antecedent to vaccine beliefs and related more broadly to health in general. Chief among them was (a) immunology beliefs, (b) personal experience with an AEFI or a VPD, (c) professional group norms, and (d) perceptions of industry and government and their influence on vaccine promotion (see also Tables 3 and 4).

Immunology beliefs. DCs in this study explained the importance of maintaining a healthy body to maintain a strong immune system. A healthy person is less susceptible to any illness, and regular chiropractic adjustments are part of maintaining that health. Another DC said chiropractic treatment works to disrupt “a cycle of conversation between a visceral problem and a somatic problem,” meaning that problems that appear in the spine (soma) can send signals to organs that then cause problems in those organs (viscera). Conversely, “you can talk back to the viscera through the soma,” he said. Chiropractic adjustment is important for enhancing the immune system. One DC said,

Basically, chiropractic believes that if you maintain a healthy body you have a healthy immune system. That doesn't mean that you won't catch pathogenic bacteria or other diseases, such as cancer, but people who have a good immune system are less likely to have diseases that attack them (CH14, male, age 83).

Natural is best. As for other CAM modalities, chiropractic adjustments were seen as a natural way of enhancing immunity, despite that chiropractic adjustments are not known to occur in nature. One DC referred to the importance of “host vitality” or “host resistance” in warding off disease and said, “Nothing beats naturally acquired immunity versus artificially acquired through vaccinations.” Another DC said,

When your spine is in alignment, there are nerve energies in the blood circulation. . . .

And, if they're impinged in any way, that will interfere with the process of the body and, thus, the immune system. All I do is put the bones back into place and let the body adapt . . . and do what it's supposed to do (CH17, female, age 81).

Two DCs mentioned the centrality of the nervous system to this host vitality: the nervous system and white blood cells are keys to how the immune system fights disease and they said there are “nerve energies in . . . blood circulation.”

Genetics and good health practice. Two DCs did not mention spinal adjustments, but instead mentioned the importance of genetics to the strength of a person's immune system, as well as good health practices and access to clean air and water. One DC said that often chiropractic is not enough. He said,

There are a lot of chiropractors that believe that the human body can heal itself if we get out of the way and let it happen. . . . I believe that that's correct to a certain degree, but there are certain things that, if the body is haywire, it's just not going to fix. Then you

have to go to other means . . . to assist the body in healing. [For example], if somebody has an infection and I'm adjusting them, by all means: if that infection can be helped with some antibiotics, I am absolutely going to refer them to get some antibiotics. There are patients [who] were in so much pain that . . . what I was doing was not providing enough relief fast enough so I referred them to a medical doctor, or the ER, in order to get some pain meds (CH18, male, age 48).

The DC who was a former exercise physiologist said that his education did not include “spinal adjustments being able to correct . . . viral problems or bacterial problems, or make your immune system work any better. . . . There's no evidence that [they do].”

Personal experience. Chiropractors interviewed for this study had no direct adverse experience with a vaccine, but described AEFIs described to them by family members or their patients. One had experienced a severe VPD, influenza, an experience that provided the impetus for his annual flu vaccine.

Adverse vaccine reaction. Only one DC reported a severe AEFI in his family: His paternal grandmother was hospitalized from what was believed to be a reaction to an influenza vaccine. As a result of this familial experience, he now avoids the flu vaccine despite his acceptance of vaccines on principle.

Autism and vaccines. Five DCs (63%) mentioned AEFIs reported to them by others: one DC mentioned “dozens of patients whose family members” had adverse reactions, including a death, and another DC said a patient's son reportedly “became autistic within days” of receiving a combination vaccine. Four DCs mentioned autism in concert with vaccines (50%), and one DC said,

Since becoming a chiropractor, [I've become] more aware of public health issues, including . . . the controversy around [vaccines]. . . . I've read [that autism has been] blamed on the actual cellular components that are introduced into the body, whether it be vaccine virus or bacteria. I've read [that] it's the medium in which those [vaccines] are introduced. Most lately, I've read that it's sometimes the combination, the DPT vaccine, diphtheria and pertussis—when delivered in one punch, so to speak (CH16, male, age 46).

An older DC conflated his distrust of pharmaceutical companies with his belief that vaccines have caused the current rise in autism:

The trend now, thanks to drug companies and vaccine manufacturers, [is to] shoot the kid as soon as they're breathing with all kinds of vaccines and then you have sick kids the rest of their lives. . . . Autism [20 years ago] was one in 1500 [children], now it's one in 150 (CH14, male, age 83).

A third DC correlated low autism incidence with low vaccination rates, saying, "I can look in Amish communities and [see that] they have very, very low rates of autism, and very low, low rates of vaccination." A fourth DC acknowledged that, in his formal chiropractic education, "[The instructors] taught that vaccines are completely legitimate and helpful. It was afterwards that I started reading about . . . the relationship between [vaccines and] autism."

Vaccine-preventable disease. Only one of the chiropractic participants in this study reported experiencing a severe VPD; that is, he became so ill with influenza that he was determined ever after (i.e., a cue to action) to receive the annual seasonal flu vaccine. Other older DCs reported mild cases of childhood rubella, pertussis, measles, and mumps in the days before vaccines were widely available to prevent these diseases, but they generally considered the

diseases themselves as helpful in boosting the immune system. One DC described several bouts of childhood disease as giving her a strong immune system, insisting,

[I had] minor measles, three-day measles. . . . I've had whooping cough, which nobody recognized at the time that I had it. I've had chickenpox, and I have had mumps on one side. As far as I'm concerned, [these diseases] prepared me—my immune system—to fight these things off (CH17, female, age 81).

Professional group norms. Formal chiropractic education in Oregon encourages evidence-based practice and is increasingly in line with mainstream medicine. Yet, most chiropractors interviewed for this study were strongly influenced by peers who oppose vaccines and by CE course content that questioned vaccines or emphasized vaccine risks over benefits ($n = 5$, 63%). These chiropractors became more vaccine-opposing over time. In addition, since 2008, the Oregon Board of Chiropractic Examiners ceased vetting CE course content, so the content and scientific soundness of these courses vary widely. One DC credited his active vaccine opposition to information he received from such CE courses after his formal training. One chiropractor explained how his peers influenced his reluctance to accept vaccines: “In the company I keep, [that is to say] professional company . . . there are plenty of individuals that are extremely active in fighting the concept of vaccination/ immunization.” Another DC expressed his confusion toward supporting or opposing vaccination:

I'm not sure that [my views on vaccinating have] changed much from when I was in school, because in [chiropractic] school there were some people that said, “Don't ever get your kids vaccinated because it interferes with the normal ability of the body to heal from those infections. And, if you get adjusted on a regular basis, then you won't get sick because you're making the body work properly, the nerves are working properly and

everything is great.” I don’t see that. It doesn’t make sense to me; it’s not logical to me. . . . Then there are other [chiropractors who] say, “Get every single vaccine that you can get because it will help no matter what.” Well, I don’t know. There are reports [of children having] reactions from some of the preservatives that are in the vaccines, and very much to their detriment. So I’m kind of leery about some of the stuff that’s in the vaccines (CH18, male, age 48).

One DC distanced himself from his vaccine-opposing professional peers, refusing to take chiropractic CE courses and focusing instead on what he learned about vaccine benefits and public health in his formal chiropractic training. He also preferred mainstream medical continuing education courses over chiropractic CE courses.

Profit motive—pharmaceutical industry. Six DCs (75%) interviewed noted pharmaceutical profits as driving vaccine production and marketing. A seventh blamed the Food and Drug Administration for delays in bringing a drug or vaccine to market. One DC argued the opposite—that the FDA rushes drugs through the approval process to enable companies gain market share. He insisted,

There really haven’t been the long-term studies, [or studies of] long-term effects. [Pharmaceutical companies] didn’t wait for them. They get [a drug] approved too quickly and put a lot of pressure on people. Got it out there, and then when it made some money . . . take it off [the market] later. That’s a very callous approach. Or [they] look the other way, “Nah, that’s not going to hurt them. You know, just get it out there.” Or [they say], “Look at how much good it’s going to do, so therefore we’re not going to take the extra step to clean this thing up.” There’s financial incentive to get [vaccines] into the public really fast, beyond safety concerns (CH12, male, age 57).

He specifically noted alleged huge financial rewards from the hepatitis vaccine, because of “muscle[ing] it through to make it absolutely mandatory.”

Most DCs were suspicious of pharmaceutical companies, one saying that many “medical approaches in general . . . follow a money trail.” One DC said,

There is a lot of influence by money, politics, and the pharmaceutical industry that plays into the prescribing habits and the suggestions that medical providers give to their patients. . . . Decisions are being made that aren’t completely based on science and objective data (CH11, male, age 42).

Government and industry. Six DCs (75%) mentioned concerns about undue influence by the pharmaceutical industry in setting health policy. Four DCs specifically mentioned government coercion; one DC said “There is some strong-arming by public agencies to get your children vaccinated.” Another DC distrusted government at all levels, and believed the future to be dire. He said, “I think there will be an attempt to force my children to be vaccinated before they’re grown. And I think if I don’t comply, that [the government] will come and try to take my children [from me] through Child Protective Services.” Another compared the federal government to the Spanish Inquisition, “I get . . . worried when government, are they stepping on individual rights? . . . You don’t want medical science to be playing the role the church did 600 (sic) years ago: persecuting people for not believing in what they purport [to be true].” Another DC mentioned the recurring “revolving door” theme,

[Is there a] revolving door? Like everyone that works for Big Pharma used to work for the FDA? . . . You do a favor for them in the FDA, couple years down the road, [they say] “Come work for us and we’ll make sure you’re getting six figures. We’ll make it right for you.” We’ve seen case after case of former FDA workers that approved drugs that,

apparently, were bad for us; all of a sudden [they] have a job with Big Pharma (CH15, male, age 42).

Homeopathy

The National Center for Complementary and Alternative Medicine defines homeopathy as an alternative medical system as well as a natural-product-based system (Berman & Straus, 2003; see also NIH, 2013). The discipline was founded in the late 1700s at a time when traditional medicine was brutal and described as “heroic,” often involving venectomy, a practice of slitting a vein and draining blood from a patient, supposedly to release toxins (Frohock, 1992). This procedure could end in suffering or death; hence the “heroic” designation. In one documented example, George Washington, suffering from a cough, was treated with venectomy three times on December 14, 1799, and died after having two quarts of blood withdrawn (Offit, 2013). By contrast, the new practice of homeopathy (a modality that emerged from 1790 to 1805) was conservative—the opposite of heroic. Its founder, German physician Samuel Hahnemann (who also coined the terms “homeopathy” and “allopathy”), conducted a series of controlled experiments, called “provings” (Jonas, Kaptchuk, & Linde, 2003) which led to the two guiding principles of homeopathy—*similia* and the law of *infinitesimals* (Benjamin et al., 1997; Linde et al., 1997). The law of *similars*, or “like cures like” (first suggested by Hippocrates), was refined by Hahnemann into these two principles (Benjamin et al., 1997).

Homeopaths interviewed for this study were quick to note that Hahnemann’s principle of *similars* also underlies the theory and development of vaccines. According to homeopathy, a *similium*, a substance capable of causing the symptoms of a disease experienced by the patient, induces the body to heal, analogous to the way a vaccine induces an immune reaction and

prevents or greatly lessens future disease. For example, red onion, which causes watery eyes, runny nose, and sneezing, is a homeopathic medicine (*allium cepa*) purported to be effective in treating allergies.

The law of infinitesimals, or *potentization*, involves serially diluting an active agent (such as *allium cepa*), hundreds or even thousands of times until the final product has no measurable amount of the original substance left—in other words, attenuation to zero (Benjamin et al., 1997; Jonas et al., 2003; Milgrom, 2009). Then the mixture must be shaken for a prescribed amount of time. Dilution without the prescribed mixing or shaking is believed to negate the tincture's effect. “If mixed properly, the vibrational energy of the tincture would still be present even when it is in such small amounts that no molecules of the tincture can be discerned in laboratory tests” (Frohock, 1992, p. 58). The energy released supposedly creates the therapeutic effects. Yet the NCCAM and the British National Health Service have both found homeopathic remedies to be effective only in activating the placebo effect (NCCAM, 2013; NIH, 2013; Shaw, 2010).

Research results are mixed as to the efficacy of homeopathy (Linde et al., 1997; Mathie, 2003). Homeopathy is a controversial therapy due to the biologic implausibility of any effect from highly diluted medicines (Jonas et al., 2003; NIH, 2013; Rise, Langvik, & Steinsbekk, 2012). In addition, homeopathy has been deemed unethical by the National Health Service in Britain (Shaw, 2010).

Homeopathy and vaccines. Concerning vaccines, Vithoulkas (2009) in *The Science of Homeopathy* wrote that “vaccination has a profoundly disturbing effect on the health of an individual” (p. 110). The author also argues that the concept of vaccination is almost the precise opposite of homeopathy, not because of its lack of efficacy or benefit, but because vaccines are administered without regard to the uniqueness of each individual. So it is not surprising that many

homeopathic practitioners oppose vaccines as a one-size-fits-all preventive measure (Frank, 2002; Schmidt & Ernst, 2003).

Although the existing homeopathic literature has begun to investigate theories and processes as they affect clinical practice, the impact of homeopaths' values, beliefs, and interests on their reasoning and decision-making behaviors has not been explored, nor has the extent to which these influences are consciously understood or acknowledged (Levy, Ajjawi, & Roberts, 2010).

Homeopathic study participants. Five male and one female homeopath participated in this study, all self-identified as Caucasian. Their time in practice ranged from 11 to 42 years. Homeopaths are not licensed to practice in Oregon, but they can be certified by the Council for Homeopathic Certification (CHC, 2013), which lists 11 certified practitioners in Oregon (the names of two of the six homeopaths interviewed for this study appear on that list). All homeopaths I interviewed were dual practitioners because of the need for a credential. Half were trained as naturopaths ($n = 3$), and only one of those NDs had obtained certification in homeopathy, but were permitted to practice homeopathy under their naturopathic license. Of the remaining three, one was a certified as a nurse practitioner and as a homeopath, another was a medical doctor, and the sixth was a licensed massage therapist. Ages ranged from 41 to 68 years with a median age of 56 years and mean of 54—the oldest group of participants in this study.

Homeopathic vaccine beliefs. All six homeopaths interviewed were vaccinated as children, and only one reported what he believed to be a lasting AEFI. The homeopaths interviewed expressed a range of vaccine positions, from accepting vaccines on principle ($n = 1$, 17%), to conditional acceptance, as described above, ($n = 2$, 33%); to vaccine opposition ($n = 3$, 50%). (See also Tables 3 and 4.) Three homeopaths opposed all vaccines and three agreed that

vaccines do play a positive role in disease prevention. One naturopath (ND)-homeopath explained that the originator of homeopathy, Samuel Hahnemann, conceptualized not only the theoretical bases for vaccine (“like cures like”) but asserted that homeopathic preparations were “the germinal work in modern Western medicine” leading to modern vaccines. Despite this belief, he preferred Hahnemann’s 200-year-old serial dilutions, or *nosodes*, to any contemporary FDA-tested vaccine.

One vaccine-conditional homeopath administered only “homeopathic vaccines.” Yet the MD-homeopath argued the implausibility of homeopathic “vaccines” because homeopathic preparations cannot provoke an antibody response, nor does research show that antibodies can be created from a homeopathic dilution. He said,

I believe that vaccines have a role in preventing illness. . . . Do I have homeopathic vaccines? My answer is “no.” I have prevention and treatment, but homeopathics haven’t been shown—there’s no data available—[that they] actually stimulate the immune system like a vaccination does. I just want to be real clear about that (HM01, male, age 57).

The nurse-practitioner homeopath agreed. He said, “No, [I don’t administer homeopathic vaccines]. . . . I don’t believe that that’s the way homeopathy really works.”

A vaccine-opposing homeopath said that homeopathy works exactly as a vaccine does, but with a far lower dose, and therefore wondered why a person would chose a vaccine over a homeopathic preventative that would be equally efficacious and cause no damage. Yet another homeopath said that he was not sure that the viruses and bacteria identified as causal were the actual correct disease pathogens, and so a vaccine would be unlikely to be effective. A fifth homeopath claimed to have witnessed “hundreds of kids . . . [many of them] autistic kids . . .

[whose] parents [said], ‘My child was doing well until they (sic) were vaccinated, and then they just started staring off into space and not responding, and they lost their language.’”

An ND-homeopath recommended vaccines for those patients “not willing to do the work.” For children in his practice, he said,

[I] make up these oral vials and I say, “Okay, here’s diphtheria, and here’s pertussis, and here’s tetanus, and here’s measles. You give your baby one a week for three weeks of this one; one a week for three weeks of this one; and here’s these six. You . . . do it every two years until they’re ten [years old]. . . . And I tell them this is not a legal vaccine. . . . I can’t sign this off for you (HMND02, male, age 68).

Another ND-homeopath questioned the ever-increasing number of vaccines:

When does it stop—at a hundred vaccinations? At two hundred vaccinations? There always seems to be one more being added, and one more being added. From the research that I’ve seen . . . the mortality of most of the childhood diseases—whooping cough, and rubella, and mumps . . . had already decreased by 70, 80, 90 percent by the time the vaccines were introduced (HMND07, male, age 41).²⁵

As was true for other CAM practitioners, the most common advice to parents was “they should educate themselves.” But, as reported by most CAM practitioners interviewed, homeopaths largely left parents primarily on their own to do this. One homeopath reproduces an alternative vaccination schedule he received from a naturopathic CE course taken years ago and he recommends a website renowned for its vaccine-delaying advice (see Footnote 10). For those parents who object to all vaccines, he administers homeopathic vaccines, or “nosodes.” The MD-homeopath said that he found “fairly reliable” information on vaccines in alternative markets and

²⁵ In one example, according to the CDC (<http://www.cdc.gov/vaccines/vpd-vac/measles/faqs-dis-vac-risks.htm>), in the decade before measles vaccination began, some 3 to 4 million persons were infected each year, of whom 400 to 500 died, 48,000 were hospitalized and another 1,000 developed chronic disability from measles encephalitis.

health food stores, the Internet, and articles on vaccines in *Mothering Magazine*. But even so, he was the most vaccine-supportive homeopath, and, because of his personal experience with severe disease, he strongly advised parents to vaccinate their children against both pertussis and tetanus. He was also adamant that homeopathic vaccines do not exist.

Perceived vaccine risks, benefits, and efficacy. This section probes how homeopaths in this study perceived vaccine risks, benefits, and efficacy. Most homeopaths were willing to accept those vaccines for which the disease prevented was perceived as particularly severe and the homeopath had direct experience of the preventable disease, such as pertussis, and whenever the risk from complications of infection was considered greater than for adverse reactions from the vaccine. The medical doctor-naturopath and an ND-homeopath >46 years both recommended vaccination against both tetanus and polio. The number of vaccines, especially in combination; the presence of toxic vaccine components; and the frequency of vaccine administration were issues of concern for all homeopaths interviewed. The same younger ND-homeopath who supported polio and tetanus vaccines, insisted vaccines could do more harm than good:

I think vaccines are held . . . [as] a holy grail of healing and health and I don't think . . . that vaccines are really the best thing for every individual. I think sometimes [vaccinating] can be more damaging than it is beneficial (HMND10, male, age 41).

This homeopath also speculated that a link might exist between measles-mumps-rubella and diphtheria-tetanus-pertussis vaccinations with Pediatric Autoimmune Neuropsychiatric Disorders Associated with Streptococcal infections (PANDAS).²⁶ He asked, “Are any of these viruses [from vaccines] being harbored in the system and reacted to [so] that, in a sustained way, that’s creating damage and inflammation in the body?”

²⁶ In the Vaccine Adverse Event Reporting System (VAERS) data for all 131,000 AEFIs reported in 2012, only one event mentioned PANDAS, and that was as a pre-existing condition. The 20-year-old male with PANDAS had apparently received no vaccines, as no vaccine is included in the VAERS record.

Specific vaccines. To better explore vaccine beliefs in the context of actual recommended vaccines, I will next focus on the perceived benefits, risks, and efficacy of the five vaccines these six homeopaths specifically mentioned (i.e., polio, pertussis, HPV, varicella, and influenza vaccines). Most homeopaths were indifferent, however, to specific vaccines.

Polio vaccine. Although he supported the polio vaccine, the MD-homeopath was certain that polio mortality and morbidity was declining long before the vaccine was introduced. He said, Around 1910, 1900 to 1910, as living conditions changed and indoor plumbing came along, better nutrition came along, you could see [polio] incidence fall off. . . . And then that bottomed out at its new level around 1970. . . . You see the polio vaccine introduced . . . then you have to think, did [the vaccine] really do anything to change the incidence of polio? (HM, male, age 57)

Another homeopath speculated that “a homeopathic preparation of [the polio virus] would help people with [polio] to avoid having those post-polio episodes,” but did not indicate that such a preparation actually exists.

Pertussis vaccine. The same MD-homeopath who questioned the real benefit of the polio vaccine was, however, fully supportive of the pertussis vaccine and regarded it as beneficial to prevent a serious disease. He had the direct experience of witnessing active, serious pertussis in young children and appreciated the severity and potential lethality of the disease.

I encourage my patients to really think about vaccines. . . . I encourage them to think twice about it, especially pertussis around here, because we have more than average pertussis [disease] in the area (HM01, male, age 57).

An older ND-homeopath was reluctantly revaccinated against pertussis at the insistence of his son before he would be allowed any contact with his newborn grandson. Another ND-homeopath saw

this vaccine as more risky than beneficial, saying that the combination diphtheria-tetanus-pertussis vaccine caused “a lot of reactions.” He did not specify what those reactions were.

Human Papillomavirus (HPV) vaccine. One participant echoed the same early sexual debut/promiscuity theme that emerged in other CAM interviews. He said that the HPV vaccine is “probably a good thing . . . if someone, a young person, is likely to be having sex with multiple partners.” Another homeopath did not believe the vaccine’s efficacy was fully established, and said that that demonstration of efficacy could take “another 30 years.” Therefore, he questioned the benefit of the HPV vaccine.

Varicella vaccine. Few homeopaths regarded the varicella vaccine as beneficial. The ND-homeopaths agreed with other naturopaths who believed that widespread administration of the varicella vaccine has eliminated natural boosting in adults from their continued exposure to childhood varicella, and that this process has led to increased HZ in adults. (See also Footnote 12.) The homeopaths in this study agreed that natural immunity from the disease is preferable to vaccine-acquired immunity to varicella. One younger homeopath said,

I think with shingles (sic), I think it’s healthier for a child to contract chickenpox naturally, and I think allow the body to do what it does. Vaccines are a rather unnatural way of introducing infectious disease to the body, especially when you’re introducing multiple infections at one time. That’s not the way nature has ever done it (HMND10, male, age 42).

Influenza vaccine. One homeopath perceived this vaccine as beneficial primarily for at-risk populations, and added that the severity of influenza is not a concern. He said he was “not too worried about influenza because there’s good [homeopathic] prevention and treatment for it, in

most cases.” No homeopath mentioned concern that an infected person could pass influenza to others.

Another homeopath insisted that the vaccine itself caused disease, which she described as: A cold, or . . . diarrhea really bad . . . kind of colicky or some kind of a real mucous-y thing. . . . With adults, usually it’s like one of those 24-hour one- or two-day virus kind of things. . . . With children, it will last for like a week or two weeks. . . . Well, they just got this immunization; don’t you think that maybe they might be connected? (HM02, female, age 59).

Like most Americans, this homeopath equated gastroenteritis, the so-called “24-hour-flu,” with influenza, an entirely different disease. Yet another homeopath believed that the vaccine risks outweighed any vaccine benefit and told a second-hand story about reported kidney failure following influenza vaccination. He said,

[A doctor] noticed that . . . a certain subset of patients that had kidney failure were getting vaccinated with . . . the influenza vaccination within six months of their kidney failure (HMND07, male, age 41).

Vaccine safety. One homeopath who agreed that “there is a place” for vaccines, said they needed to “be cleaned up.” He also questioned whether any efficacy or safety studies were ever done on children’s vaccines. The three homeopaths who accepted some vaccines, or agreed to delay them all, were concerned about additives and preservatives in vaccines. Four homeopaths specifically mentioned mercury as a vaccine additive. One insisted that flu vaccines contain mercury in the form of thimerosal, despite thimerosal having been removed from pediatric vaccines in 2001 (see also Footnote 13). Another homeopath was convinced that pharmaceutical companies were still using mercury in vaccines despite evidence to the contrary and said that this

“that represents a plague on our children.” One homeopath mentioned Ethylenediaminetetraacetic acid (EDTA) as an additive and said that it was unconscionable to add such a substance to a vaccine.²⁷ Another homeopath insisted that homeopathic remedies were preferable as they are entirely free of any additives and preservatives. An ND-homeopathic refused to administer any injections. “I don’t give anything that could potentially cause harm,” he said. He particularly cautioned against combination vaccines.

Choosing homeopathy. Homeopaths (HMs) in this study provided lengthy, emotive healing narratives to explain their choice to study and master homeopathy. For three homeopaths, these experiences were important antecedents to their formal study of this CAM discipline; for the remaining three, their homeopathic healing experiences confirmed their prior choice.

During the homeopathic medical doctor’s pre-medical studies, he learned that two naturopaths were teaching evening classes on homeopathy at a local community college. He said, “My curious mind found [the classes and I] decided to sit in . . . just to see. . . . [then] I decided to get treated; again, just to see.” He said his exploration was in line with his scientific education, which encouraged experimenting and testing results. He explained,

Things happen under homeopathic treatment that are expected and [yet] are very difficult to explain from a conventional science standpoint. I had one of those things happen to me, so I had to either attend to my experience or convince myself that it hadn’t happened. [There are] a few things homeopathics look for when they treat patients, because if they see some of these things . . . they know they’re on the right track. . . . One of those things is for something you had before to reappear for, sometimes, just a day or two. . . . We call

²⁷ Yet, a naturopath and another homeopath praised the use of EDTA for chelation therapy, supposedly used to remove heavy metals, like mercury, from a patient, or for preventing high blood pressure, or even replacing cardiac bypass surgery. Mainstream medicine considers chelation a “questionable therapy.”

that “return of old symptoms.” And so I got treated and I had a wart pop up on my foot that I’d had when I was a kid . . . but that had been gone for 15 years. . . . [The wart reappeared] for about three or four days, and then faded away again. That was interesting enough because it was in exactly the same spot as it was when I was younger. . . . That was the hook (HM01, male, age 57).

The nurse practitioner was persuaded to study homeopathy after witnessing his infant son dramatically recover twice from otitis media (middle ear infection) following homeopathic treatments. The first time his son fell ill, he tried several antibiotics, but his son’s infection worsened and his fever kept climbing. Then, “somebody recommended I bring him to a homeopath,” he said. He thought “it all seemed very woo-woo and totally crazy,” but he had exhausted his options and decided to try it. He explained,

I was even more skeptical when [the homeopath] said that I should give my son these little sugar pellets that contained belladonna, which is deadly nightshade. I said . . . “You want me to poison my son now that he’s sick?” [The homeopath] said not to worry, it was very dilute. It wouldn’t actually be toxic . . . because it was just the energy of [belladonna], not the substance. . . . [Then], within hours, the fever came down and the distress level came down. By the next day, [my son] was acting and eating and drinking perfectly normally . . . and his eardrums were normal. After many years . . . and [having treated] thousands of ear infections with antibiotics, I rarely saw eardrums go back to normal that quickly (HM03, male, age 56).

This homeopath at first dismissed this event as a simple coincidence and reasoned that his son would have improved on his own. But then, a few months later the child developed a second ear infection, and so the father tried a second homeopathic dilution, and a second immediate recovery

followed.²⁸ “At that point . . . I couldn’t just ignore it,” he said, so he started reading about homeopathy, and eventually undertook a formal three-year study toward homeopathic certification. He said,

The first books I read didn’t reassure me. It seemed cockamamie, crazy. But I was intrigued enough, through my experience, to purchase some remedies and to learn a little bit enough to gingerly try treating some patients in my clinic settings when the patients would agree. . . . I didn’t really know what I was doing, so a lot of the time it didn’t work, but, some of the times, rather remarkable things happened (HM03, male, age 56).

An informally trained homeopath claimed to have cured her own cervical cancer through twice daily applications of a clay poultice “recommended by a shaman.” She said she has been cancer-free since that 1985 treatment. Another homeopath received a homeopathic remedy for gastrointestinal problems and anxiety, was healed, and decided to abandon traditional medicine to focus solely on homeopathy. He explained,

My gastrointestinal issues totally stopped within a week and my mood really, really improved. I thought, “Something this gentle can have a profound healing effect; I want to study it and learn it” (ND10, male, age 41).

Disenchantment with conventional medicine. The three ND-homeopaths all began studies of conventional medicine, but subsequently rejected medical training reasoning that it was too simplistic, mechanistic, and also corrupted by money. One practitioner dismissed mainstream medicine, saying, “Most of medicine is cookbook.” Another ND-homeopath rejected the competitiveness of medical school and found naturopathy more welcoming. In addition, while studying naturopathy, he had a compelling personal experience of healing with homeopathy that turned him toward this CAM discipline. He said,

²⁸ This dramatic healing, even twice, may represent a simple regression artifact.

I had plantar warts . . . since I was 18. I tried salicylic acid. I tried different alternative therapies like putting garlic on [them] and essential oils. . . . Nothing worked. . . . My brother also had [plantar warts]. He went to a podiatrist, spent \$800, and had to clean bloody, painful wounds for three weeks in order for him to heal up. . . . I went to see a naturopath [who] looked at [the warts], asked me a couple questions, gave me a \$5 tube of a homeopathic remedy. Within a week the [warts] were gone. . . . I had been trying to get rid of [them] for eight years, and they were gone within a week for \$5. And it was painless! (HMND07, male, age 41)

The third ND-homeopath described his concerns about conventional medicine treating symptoms rather than getting to the root of the problem. He said,

Conventional medicine shines with acute disease, with acute trauma, broken bones, meningitis—these types of things. But, for more chronic conditions, just addressing symptoms doesn't get to the root of it, and usually makes things worse (HMND10, male, age 42).

Homeopathic training. Training in homeopathy is generally offered in schools of naturopathy, including the National College of Natural Medicine (NCNM), where the three naturopath-homeopaths in this study trained, and where two of them graduated as naturopathic doctors, thus permitted to practice homeopathy. Three homeopaths had received a “diplomate in homeopathy” from other institutions. The licensed massage therapist took homeopathy classes at NCNM, and then hung out her shingle adding homeopathy to her massage therapy practice.

All the homeopaths interviewed emphasized the individual nature of homeopathic treatment, as “treat[ing] the person, not the diagnosis,” and, like chiropractors, used the term “disease” to explain disease. One naturopath-homeopath described his training:

[Homeopathy] is not something you can dabble in. . . . You really need to study it. . . . [To do otherwise is] like a naturopath studying open-heart surgery for a week and deciding that they're going to do an open heart [or] bypass surgery. It just doesn't work like that (ND10, male, age 41).

The physician-homeopath described his informal apprenticeship with a master homeopath that lasted nearly a decade. This homeopathic mentor shared his office space. Even with this first-hand mentoring, the MD regarded his homeopathic training as insufficient, and said that the added rigor of conventional medicine was essential to his practice. He said,

Good homeopaths, and especially MD-homeopaths . . . understand that what conventional science says about the human body needs to be taken into consideration when we're treating folks homeopathically. That is, we don't just make people feel better, but we have to see their laboratory values getting better, their imaging studies getting better. . . . Otherwise, we're only doing half of what we should be doing. So [MD-homeopaths] have that good training (HM01, male, age 57).

The nurse-practitioner homeopath said,

For homeopathy to be truly effective, the choice of remedy prescribed has to be very accurate, so, as compared, say, with conventional medicine where, once one decides . . . that the problem is infectious, then there's not a whole lot of thought that goes into which antibiotic to prescribe, usually. . . . In academic medicine one ideally sends a sample, a blood culture or a urine culture . . . and one is very careful about choosing [a treatment]. But in everyday common [medical] practice, once one decides it's a kind of infection, one chooses a broad spectrum antibiotic, whatever the latest sample [is] that a drug [company representative] has left, or whatever is one's habitual choice. . . . [Whereas] in

homeopathy . . . it's very important to make very fine distinctions between whether one remedy is indicated versus another, and there's a real art to it, as well as a science. It takes a lot of training and . . . practice to get it right. If one prescribes the wrong remedy, the results will be very underwhelming, and . . . we like to see curative results (HM03, male, age 56).

Old is better. A theme shared by homeopaths and acupuncturists is that the older the discipline, the better it must be, because it has been tried and tested for centuries or even millennia.

I will call myself a classically trained homeopath. That is, I was trained to do homeopathy the way the original authors (sic) were doing homeopathy, the way they left their written instructions for us. But also the method handed down from doctor to doctor, from generation to generation (HM01, male, age 57).

Contextual themes. As for other CAM populations, various beliefs were antecedent to homeopathic vaccine beliefs and related more broadly to health in general. Chief among them was (a) a shared homeopathic image of most disease as inherent in human beings. They view the human body as carrying pathogens—bacteria, fungi, viruses—within it all the time, and of course this is true. These pathogens remain dormant unless the immune system becomes compromised, thus allowing pathogens to flourish and disease to emerge. Other beliefs were also influential, including (b) personal experience—most often an experience with an illness and dramatic healing through homeopathy, as described above in the personal choice narratives; (c) reference or professional group norms and other socialization factors, typically associated with professional training or continuing education; and (d) perceptions of industry and government and their influence on vaccine promotion (see also Tables 3 and 4).

Immunology beliefs. According to homeopathy, the goal is to bring a disease to the surface, not to fight it. As noted above, homeopaths hold to the belief that human beings are host to myriad pathogens that remain dormant unless the immune system is compromised. Then the pathogens can flourish and disease will emerge.

“We need to express disease.” Use of military analogies and metaphors so common in medical parlance illustrate the vastly different worldviews of conventional medical practitioners and homeopaths. In the words of one of the two medically trained homeopaths in this study:

The question itself [of how the body “fights disease”] uses language that is part of the conventional medical model, which is [that] disease is something that comes from outside of one that one has to fight. . . . Disease isn’t something from outside of ourselves; it’s something that we express. Dis-ease, if we think about the word, dis-ease is “not at ease.” And we are either at ease, or we are not at ease. It’s an aspect of our inner self. [The] homeopathic point of view is not that germs aren’t important, or that germs aren’t associated with disease, but that what’s at least as important as a contagion is host condition, host resistance. . . . When we are in balance, when there’s homeostasis, then our flora—the bacteria on our skin, the bacteria in our gut, the bacteria in our nasal passages and our bronchi—will all work harmoniously together to maintain this homeostasis. When we are experiencing some kind of stress or we’re under some kind of adverse condition . . . then we create conditions within ourselves . . . that encourage the invasion or the overgrowth of some kind of bacteria or virus or spirochete—something—that will allow us to produce symptoms that express that inner state. Then if we become exposed to, say, pertussis, we’ll likely get pertussis. . . . The bacteria will oblige; they will fill in. And certainly, if we’re in that kind of condition and we don’t come into contact with one of

those bacteria, then we'll probably be precluded from getting that specific disease. So I believe in germs, and I believe in their power to wreak havoc and kill, but I don't believe that it's just the germs. I think there's some interaction between what's going on within the human species and within the soul of an individual, and what's going on in their perception of their experience and whether or not they will become sick with that particular pathogen. And that, if we stand in the way of a particular pathogen because of our . . . defend-attack mode, then, if an individual is still needing to express disease, it will find some other way, one that might potentially be more chronic (HM03, male, age 56)

One homeopath explained the continuous, latent presence of disease somewhat more colorfully, insisting that people all carry within them the pathogens for tuberculosis and hepatitis, for example, and that every breath contains molecules that are thousands of years old, all striving to live on.

Personal experience. Only the physician-homeopath said he had witnessed a severe VPD—pertussis—observed in two seriously ill infants. Another homeopath reported having varicella as a child, but no others had ever experienced or witnessed a severe VPD.

Adverse vaccine reactions. All homeopaths interviewed were vaccinated as children and one additionally received numerous travel-related vaccinations while in his 20s with no adverse effects. The stepson of one homeopath, after receiving the measles-mumps-rubella (MMR) vaccine, broke out in a rash that she attributed to “a ‘miasm’ that was the underlying cause [of the rash]” and she said that the immunization “brought it out.” A younger ND-homeopath reported having treated “many . . . vaccine-damaged children” in his practice. Another ND-homeopath said that he vehemently objected to a shot when he was a child of 10 or 11 years old. The entire experience was so traumatic for him that he was chronically ill for years, he said. He attributed his

frequent bouts of strep throat over the next several years to the trauma of this early vaccination ordeal.

Disease and healing. The homeopaths interviewed reported numerous instances of healing through homeopathic remedies. Because of this healing, they were increasingly persuaded of the efficacy of homeopathy. With a mean of 20 years in practice, they had years of homeopathic successes to buttress these efficacy and benefit perceptions for homeopathy. Yet the MD-homeopath balanced his knowledge of homeopathy with his conventional medical knowledge, and sometimes it was the conventional medical treatment that prevailed. He witnessed, for example, two serious cases of pertussis, a VPD, and saw that the babies were sicker than what homeopathy could offer to heal them. He said,

I've had babies in here . . . with pertussis; they would cough and stop breathing and go blue. . . . They come in to me from some of the naturopaths in town, and to the naturopaths from some of the midwives in town, because everybody could see that these babies were sicker than their parents . . . were willing to deal with. . . . Those [two] babies both wound up at Doernbecher [Children's Hospital in Portland], because my advice to those parents was to get over to the ER right now. . . . So there's a line, we all have to know where that is, no matter what we do. Conventionalist family doctors, we have to know that, too. . . . The kernel that I took from my family medicine training was to know where your limit is, so that you know when to ask for help (HM01, male age 57).

That same homeopath, in practice for 23 years, offered homeopathy to help cancer patients tolerate their conventional cancer treatments, but he never recommended homeopathy as a replacement for that mainstream medical treatment. He said,

I have a fair number of cancer patients who I treat in parallel with their conventional treatments, who seem to do a lot better with their treatments and tolerate their [cancer] treatments a lot better, and who seem to have a longer life expectancy than the conventionalists are telling them (HM01, male, age 57).

A younger naturopath-homeopath provided a list of journal articles and editorials designed to demonstrate the rigor of homeopathic efficacy studies and the clear benefits of homeopathy over placebo. The majority ($n = 72$, or 59%) of the articles were published in the *Journal of Complementary & Alternative Medicine*, and the rest appeared in various homeopathy journals ($n = 18$, 15%) or other journals of alternative or complementary treatments ($n = 33$, 26%).

Professional group norms. Similar to naturopaths, homeopaths are expected to treat each person as unique and to tailor every therapeutic recommendation to the person's specific life experiences, family background, state of mind, earlier diseases, as well as current symptoms. One homeopath summarized the approach: "Prescribing homeopathy is based on the totality of symptoms, but that totality should represent the individual. So, 10 people with asthma are going to have 10 very different presentations" and therefore, 10 different remedies. This individual norm is also articulated by various homeopathic associations, such as the American Institute of Homeopathy, a trade organization (AIH, 2009); the North American Society of Homeopaths (NASH, 2013); and the National Center for Homeopathy. This focus on the individual means that rigorous scientific study is not possible, because, by its nature, homeopathic treatment for each person is necessarily different. Gold standard triple-blind efficacy studies across populations receiving the same treatment, an alternate treatment, and placebo, are thus ruled out by definition.

Profit motive—pharmaceutical industry. Five of the six homeopathic practitioners had firm opinions of how profit drives U.S. health care. Homeopathy, with its generally very

inexpensive treatments, was considered preferable for pragmatic reasons of cost as well as its alleged efficacy in treating disease. It was also described as the more morally sound choice. One ND-homeopath said that “medical education . . . is largely paid for by pharmaceutical corporations. . . . I [cannot] see how the truth would be free to emerge with vested interests.” Another homeopath expressed his reservations about the real motives of pharmaceutical companies:

Pharmaceutical companies . . . have one legal obligation. It’s not to cure disease. It’s not to heal patients. Their one legal obligation as a corporation is to make money. . . . [One study I read noted that] marketing and advertising departments of pharmaceutical companies have basically infiltrated medical schools, [peer-reviewed] journals, and pretty much every other facet of the medical profession. . . . I just don’t think that the medical profession is immune to the pressures of profit (HMND07, male, age 41).

Government and industry. The “revolving door” between government and the private sector emerged in homeopaths’ narratives as they had in naturopathic and chiropractor narratives. One ND-homeopath said he had a hard time understanding why a CEO or someone on the board of a large company, and making very good money, “would go to a government job and take a pay cut,” insinuating that government employees receive kickbacks from the private sector. Another ND-homeopath distrusted all medical scientific research. He said,

It gets me kind of rankled when conventional medicine talks about “evidence-based medicine,” because it’s really economic-driven medicine. . . . I think the truth gets lost. . . . And so I really don’t have a lot of trust or faith in the pharmaceutical [industry] when they talk about double-blind placebo [tests]. . . . What’s really the truth there, [with] such incredible financial interests at stake? (HMND10, male age 42)

Two homeopaths specifically mentioned pressure and even coercion from schools and government agencies to have children vaccinated. One said, “I don’t think there’s a place for fear in the practice of medicine.”

Midwifery

Finally, turning to the fifth population of CAM providers included in this study, I will examine midwives’ vaccine beliefs and the antecedents to those beliefs. I included midwives and a doula in the study because of the influence of midwives and doulas on young parents, their role in parent support and education, and their potential influence on vaccine decisions. A doula, or labor coach, educates, advises, counsels, and supports parents before, during, and after the birthing process, but does not assist in the birthing process. A midwife actually assists in childbirth—or “catches babies.” Similar to the above four populations, I examined all interview data with the aim of allowing themes to emerge through an intensely iterative process, examining and re-examining all interviews as new themes emerged. Before explaining my findings, let me provide some context for the discipline of midwifery.

According to the NCCAM, midwifery is not truly complementary or alternative, but is an ancient natural procedure for assisting women in childbirth. Evolutionary biologist Wenda Trevathan (1993) speculates that midwifery arose millions of years ago when women sought assistance in giving birth. Anxiety, uncertainty, and pain were the likely stimuli that led women to seek help rather than endure childbirth alone. This birthing assistance might have reduced mortality to such an extent that the behavior was incorporated into social practice across cultures and continents (Trevathan, 1993).

Throughout the early 20th century, many physicians resisted both midwifery and modern hygienic methods. The tardy adoption of even general cleanliness and hand washing led to deplorable outcomes in some areas of medicine (Bogdan, 1988). As physicians replaced midwives in birthing practices, epidemics of puerperal fever occurred simply because physicians refused to take seriously the basic antiseptic methods that were common among midwives. Forceps used to aid childbirth were particularly deadly instruments of bacterial contamination.

Contemporary midwifery began to increase in popularity until, by the 1970s, the home-birthing movement in the U.S. was fully developed, or, more accurately, experienced a resurgence (Murphy-Geiss et al., 2010). Contemporary women are drawn to midwifery because of a deep belief that childbirth is a natural process that should not be “medicalized” or take place in a hospital, except in life-threatening situations (Murphy-Geiss et al., 2010; Schön & Silvén, 2007; Vincent, 2003).

I have included midwifery in this research for four reasons. (1) A high proportion of all U.S. births are attended by midwives (8%); 11 percent of all vaginal births are midwife-attended. In addition, in 2009, for the first time, the profile of mothers in the U.S. who used midwifery mirrored the national distribution in race/ethnicity (Declerq, 2012). In Oregon, midwife-attended births increased from 9 percent in 1990 to 16 percent in 2009 (Declerq, 2012), a relative change of 89 percent, putting Oregon in the top 10 percent of states in use of midwives for vaginal births. (2) Midwives have been found to be more likely than mainstream medical providers to embrace the use of CAM modalities in general (Hall et al., 2012). (3) In Oregon, direct-entry midwives (i.e., independent practitioners who work primarily in out-of-hospital settings²⁹) are licensed separately, and therefore qualify as CAM practitioners (Oregon Health Licensing Agency,

²⁹ Midwives Alliance of North America website <http://mana.org/definitions.html#DEM>

2012b). Finally, (4) no midwife in an earlier study was found to fully support vaccines (Bean & Catania, 2013).

Midwives, especially direct-entry midwives (DEMs), are likely to advocate “natural parenting” (Schön & Silvén, 2007), and may discourage the mothers they assist and advise from vaccinating their children (Bean & Catania, 2013). Yet, midwifery can also be combined with nursing (i.e., certified nurse midwives, CNMs) and thus serve as part of MM practices (NCCAM, 2012). The Midwifery Education Accreditation Council lists two accredited programs and seven accredited institutions in the U.S. on its website.³⁰ CNMs are more likely to support vaccination than DEMs or certified professional midwives (CPMs), but CNMs still lean toward CAM health modalities.

Midwifery study participants. Seven midwives—two of them also naturopaths—agreed to participate in this study (all of them women). Six self-reported as Caucasian and one as Native American. Time in practice ranged from 1 year to 37 years, with a median of 19 years. Their ages ranged from 35 to 62 years (average age 49—falling in the middle of the five populations interviewed). Two were CNMs, two were naturopath (ND)-midwives (CPMs), one was a doula; one was a DEM, and one was a CPM trained in a naturopathic college not an ND. The CNMs did not practice or attend home deliveries; CPMs and the DEM performed or attended home births. Ages ranged from 33 to 62 years, with a median age of 54 and a mean of 49 years.

Midwife vaccine beliefs. All seven practitioners interviewed were vaccinated as children, with two of the four older providers reporting AEFIs (29%). One of those adverse events was common pain at the injection site, and was unusual primarily for its severity. Midwives and the doula who participated in this study expressed a range of vaccine positions, from full support ($n = 2$, 27%); to conditional: delaying recommended vaccines or accepting only a few vaccines

³⁰ <http://www.meacschools.org/>

($n = 4$, 57%); to opposing them all ($n = 1$, 14%). (See also Tables 3 and 4.) Only one midwife, who was also a naturopath, opposed vaccines, and she was passionate in her opposition. Of the three younger midwives, one fully supported vaccines and two were conditional supporters. Only the two mainstream-medical CNMs fully supported vaccines. Four practitioners in this population—the direct-entry midwife, the certified professional midwife, one of the two ND-midwives, and the doula—all conditionally supported vaccination.

Three practitioners believed that no infant should be **subjected** to vaccinations because of their belief that a child's immune system is not fully developed until age two—the naturopathic canon. One ND-midwife did not believe that an “extremely immature immune system [would] develop any kind of titer from [a] vaccine” and so infant vaccinations were unlikely to be efficacious. One MM midwife expressed concern for the risk of mercury in vaccines (although mercury has been absent from pediatric vaccines since 2001). She said, “Mercury does cross the blood-brain barrier in pregnant women, [crosses] the placenta [to] babies, and I think that's something women should really think about when they're pregnant, when they're getting the vaccine.” (See also Footnote 21.)

The midwives and the doula acknowledged that vaccines were beneficial in preventing disease. One of the two CNMs had lived in a developing country and, having witnessed the suffering caused by numerous VPDs, found her belief in the benefits of vaccinating to be reinforced. Two midwives specifically mentioned the importance of herd immunity, particularly to protect those who cannot be immunized, for example, against pertussis—i.e., babies too young to be vaccinated. A younger ND-midwife said she felt compelled to persuade parents who were vaccine-resistant to accept vaccines.

Several midwives described a shift in their vaccine beliefs as a result of their training. A CNM said that even though she supported vaccines before her nursing education, that as a result of that training she even more strongly advocated vaccinating. One CPM became less vaccine-supportive as a result of her naturopathic training and regretted an earlier decision to vaccinate her daughter against varicella, which she considered to be a harmless childhood disease. Following her naturopathic midwife training, this CPM's attitudes toward vaccines changed from accepting all vaccines on face value to questioning them all and supporting a delayed or modified schedule. Despite that the vaccine-opposing ND-midwife insisted that she “never recommend(s) not vaccinating,” she nonetheless declined to accept as clients a birthing couple planned to fully vaccinate their baby.

In general, all midwives and the doula in this study said that they educated parents based on their own vaccine risk and benefit perceptions. They also encouraged parents to “do their own research.” The DEM provides a list of resources for parents’ research, but she does not “feel like [she knows] what’s best for each family.” Several midwives and the doula, who works in a hospital, provide a list of pediatricians whom they believe will respect parents’ decisions and not “treat [parents] like children” in their vaccine discussions—in other words, these providers will agree to spreading out or delaying vaccines. The two ND-midwives recommend that parents educate themselves but mentioned no resources for how parents might accomplish that. One CNM said she referred parents to the CDC website and encouraged her clients to accept vaccines, providing arguments from her own experience as well as from her medical training. She said that she cautioned against using the Internet because it is known to be a risky source for accurate information. This midwife keeps a book in her waiting room that contains compelling narratives

of the dangers of VPDs³¹ and she refers parents to the CDC and Mayo Clinic websites for information about vaccines and the diseases they prevent.

In summary, the two mainstream medical providers used credentialed sources of information, whereas the CAM midwives were more likely to encourage parents to talk with their pediatricians about vaccines, but also to “educate themselves” or “do their own research” (i.e., talk to other parents or surf the Internet for information).

Perceived vaccine risks, benefits, and efficacy. This section probes how midwives perceived vaccine risks, benefits, and efficacy. The number of vaccines, toxic vaccine components, and the frequency of administration were issues of concern for several of the midwives interviewed. For the majority of midwives, vaccines were beneficial and effective; but several questioned benefits or efficacy of some vaccines. One ND-midwife experienced “anaphylactic shock to a vaccine” at age 10 and said that her young son had a “6-month reaction” to a tetanus vaccination. For a few vaccines, the risks outweighed the benefits; for others the reverse was true.

Specific vaccines. To better explore vaccine beliefs in the context of actual recommended vaccines, I will next focus on the perceived benefits, risks, and efficacy of the six vaccines the midwives in this study specifically mentioned (i.e., polio, pertussis, HPV, hepatitis B, varicella, and influenza vaccines).

Polio vaccine. The vaccine-opposing midwife grew up in a home with a vaccine-opposing mother who refused to participate in what the mother called “the polio experiment.” This ND-midwife believed that the polio vaccine was contaminated with “viruses that are shown

³¹ Cunningham, R. M., Bloom, J. A., & Baker, C. J. (2009). *Vaccine-preventable disease: The forgotten story*. Houston, TX: Texas Children's Hospital.

to cause cancer,”³² One midwife dismissed infection with polio as low-risk in the United States, and so preferred to delay or completely avoid the polio vaccine. One conditional vaccine supporter acknowledged that the vaccine had successfully eliminated polio in the U.S. For four midwives (57%), the benefits of vaccinating against polio outweighed the small risk of an AEFI. One CNM believed that it was particularly important to receive the polio vaccine because of the severity of the disease it prevents.

Pertussis vaccine. At the time this research was conducted, Oregon and neighboring Washington State were in the midst of an alarming outbreak of pertussis. One midwife said that some of her clients had pertussis run through their families and said that “if they had known how hard it would be, they would have vaccinated.” Other families in her practice, however, said pertussis “wasn’t that big a deal” and made decisions not to vaccinate based on Internet research. Instead they planned to treat pertussis with, for example, herbs or massive doses of vitamin C. One midwife, however, said that the severity and prevalence of pertussis were motivators for families in her practice to accept the pertussis vaccine to protect their families, especially to protect newborns who cannot be vaccinated until age two months (Atkinson et al., 2012, Appendix A, p. 3). Midwives interviewed did not mention any risks for this vaccine, but did describe parental objections. Parents did not believe the disease to be severe, even though they knew they and their families could be susceptible to this highly contagious disease.

³² This unsubstantiated claim may refer to 2003 testimony by Barbara Loe Fisher, creator of the anti-vaccine Vaccine Information Center, before the Subcommittee on Human Rights and Wellness, U.S. House Government Reform Committee, U.S. House of Representatives, September 10, 2003 (Fisher, 2003). It may also refer to the SV40 virus that may have contaminated polio vaccines in the 1950s. Monkey tissue has been absent from vaccines since 1963 (CHOP, 2013).

The benefits and efficacy of the pertussis vaccine were noted by most midwives (57%). Pertussis has an R_0 similar to measles, 12–17³³ and can be fatal to very young infants (see Table 1). One midwife said,

I don't like scare tactics but I think, hopefully, we've taught people through [the recent pertussis epidemic] that vaccines aren't evil. . . . Babies dying is never a good thing, but . . . that news, hopefully, is changing some minds [about the pertussis vaccine] (MW13, age 38).

Human Papillomavirus (HPV) vaccine. This vaccine's benefit was mentioned by three midwives (43%), but its risks overrode the benefits for the other four. Two CPMs and the DEM believed its efficacy was yet to be demonstrated, questioning whether the HPV vaccine had undergone “due diligence” for efficacy, whether it actually demonstrated long-term protection, or that it targeted the correct cancer-linked pathogens. One midwife mentioned severe AEFIs from the HPV vaccine as a potential reason to avoid it (i.e., high risk), yet acknowledged that a vaccine that actually prevents a cancer was of clear public benefit. One CNM praised the vaccine but said she was not “sold yet” that it should be administered to 10-year-olds. A younger ND-midwife mentioned unspecified “alarming sequelae” from the HPV vaccine that she learned about in a documentary film³⁴ screened in her town. This vicarious experience negated her otherwise enthusiastic support for this vaccine.

Hepatitis B (HBV) vaccine. Three midwives questioned the timing of the HBV vaccine. One said that she tells parents that their newborn is not at risk for acquiring hepatitis B. Two midwives questioned whether vaccines so early in an infant's life are healthy or that the infant's

³³ The R_0 is a measure of the average number of persons an infected person will infect in a totally naïve population. Pertussis could actually have a higher R_0 because this illness is believed to be highly under-identified. Polio, by contrast, has an R_0 of 5-7, and influenza, 1.7- 2.6. (See Table 1.)

³⁴ This film was probably “One More Girl,” a documentary film that purports to show a number of severe adverse effects, including death, resulting after administration of Gardasil, the HPV vaccine produced by Merck & Co., Inc.

immune system could even react appropriately. One said, “You’re onslaughting (sic) a . . . brand-new baby’s immune system with all these things at one time.” However, one midwife noted that when parents object to this vaccine, they are “making that decision for that child for the rest of their (sic) life” and she urges them to reconsider. The HBV vaccine was viewed only by the two CNMs (29%) as highly beneficial and efficacious in preventing hepatitis and liver cancer and they agreed that infants should receive this vaccine. The major risk of the HBV vaccine for these MM participants was that administering it to newborns could be unlikely to stimulate an immune response.

Varicella vaccine. The varicella vaccine was the most contested, as it was for the other populations in this study. The disease was considered benign and infection with the disease in childhood was seen as preferable for ensuring lifelong immunity. This population seemed unaware that the herpes zoster (HZ) virus remains latent in the body and can cause herpes zoster (shingles) in adulthood. Four midwives said chicken pox did not warrant any sort of prevention and advocated contracting varicella as a better way to acquire immune protection. The midwife who regretted having her daughter vaccinated against varicella said she wished she had “just thrown her into a chickenpox party” so she would have acquired lifelong immunity. The two ND-midwives, like the naturopaths, believed that widespread varicella was causing a heightened risk of herpes zoster (shingles) (see Footnote 12.)

Influenza vaccine. Risks of disease from the vaccine were perceived more strongly, in general, than the vaccine’s benefits, and many midwives did not consider themselves as possible hosts of the infection. The vaccine objector and conditional supporting midwives seemed to be unaware that they could become ill and pass influenza to others, including vulnerable pregnant women and newborns. One midwife supported the flu vaccine, but recommended that her patients

receive a double dose of the inactivated pediatric version “to avoid getting mercury.”³⁵ One CPM reported that her business partner and her partner’s children fell ill with “one thing after another” following the flu vaccine, a vaccine she declines to receive, despite her frequent contact with vulnerable pregnant women. Two midwives believed the flu vaccine was unnecessary or even harmful, with more attendant risks than benefits. One said she witnessed severe influenza, but had never been infected; she attributed her immunity to never having received a flu vaccine. She mistakenly believed that those who were vaccinated were more likely to be infected and become ill than were persons who avoided the vaccine. One young ND-midwife was of two minds about the vaccine—praising the vaccine for averting widespread infection, and possible pandemic flu, but avoiding it for herself.

By contrast, a vaccine-supporting CNM related the family story of her father-in-law’s influenza while in infancy. His parents wanted the infected baby (i.e., her future father-in-law) to be quarantined to protect his six siblings from contracting this serious disease. The family physician located a lactating mother whose child died from the flu, and that mother cared for and breastfed the sick baby. “There was no vaccine and people were dying left and right,” the midwife said, but because of this unique quarantine for the infant, no one else in that family fell ill.

Vaccine safety. Three midwives in this study voiced concerns about adjuvants in vaccines: the tiny amounts of vaccine preservatives that prevent contamination and the added substances to vaccines that boost the immune response. One noted that “now that the mercury is out of” vaccines, attention has turned to aluminum. Another midwife believed that mercury persists in vaccines, despite its near-total absence since 2001. One participant noted that **people** all accept

³⁵ Pregnant women receive the inactivated, not the live vaccine. Only the live vaccine contains <25 micrograms of the preservative thimerosal, which is 50% mercury by weight. By way of contrast, a 6-oz can of light tuna contains 84 micrograms of mercury (NRDC, 2005)

some forms of risk without giving them a thought; risk is always around us, she said, including every time a person drives a car, but driving is a risk people are willing to take. She said, “I’m impressed with people—what they will put in their bodies—and yet they will argue about vaccines!” She said,

We . . . know there’s something called herd immunity. If everybody in the group has been vaccinated, then you’re not as likely to get [a VPD] if you haven’t been vaccinated.

However, there’s not a guarantee. And, as far as the vaccine goes, there is risk with vaccines, but there are pretty significant risks with not getting the vaccine (MW15, age 58).

Choosing midwifery. A CPM and the DEM reported negative experiences with the hospital births of their own children, and were determined to help other women avoid similar encounters; a CPM and a CNM witnessed midwife-assisted births and this positive experience led them to embrace midwifery as a profession; the second CNM entered midwifery after a decades-long career as a delivery room nurse. One CNM had also earned a master of public health degree. The doula’s post-partum depression and social isolation following the birth of her own twins convinced her of the need for stronger social support for birth as essential to a woman’s health and well-being, and so she trained as a doula. All six midwives were passionate about their choice to “catch babies.” The doula explained that, whereas nurses and doctors perform the clinical role, families need social support surrounding birth. “It’s a long-standing tradition that women formed a circle of support” for a woman giving birth, she said. “What you need is somebody who is knowledgeable and experienced to help if there’s a problem,” she added. That person, she explained, is a midwife or doula, who supports both mothers and fathers. She said,

We’ve disturbed birth so much from its normal path that evolved over a long time that people don’t even recognize it anymore for what it truly is, or should be . . . but we’re

moving back to that through knowledge and skill and research. And doulas are a part of that, because . . . [we] provide that psychosocial support [that] makes a woman feel safer. . . . The research has found just tremendous benefits [from doulas] for the mother and babies, not only in their health outcomes, but in their relationships, their interactions, their bonding . . . and the quality of the parenting (Doula12, age 62).

Unnatural birth. Midwifery offers a “foundational trust and belief in the body’s systems” to maintain health and function and to give birth. One midwife described her hospital-based obstetrical birth as a bizarre experience of being “strapped to a bed with machines”—an odd way in her view to participate in one of life’s most natural events. Another midwife said that women are fully capable of giving birth without doctors, and have done so successfully since birthing babies began. She added that giving birth while lying flat is unnatural to women; most natural births take place with the woman seated, squatting, or sometimes even standing. The supine position is seen as more beneficial for obstetricians in a hospital setting than it is for the birthing mother. One CNM agreed that hospital-based births could be a daunting experience, but with a midwife present at the birth, the birth experience was likely to be both safer and more compassionate—the best of both worlds—mainstream medicine and midwifery. In addition, CNMs provide access to mainstream medical interventions when called for, such as when a baby presents as a breech birth or with shoulder dystonia.³⁶

Midwifery training. Training ranged from several years of informal apprenticeship with an experienced midwife (i.e., the DEM), to formal apprenticeship (i.e., one CPM), to formal training in naturopathic-midwifery (ND) for the two ND-midwives, formal certification for the doula, and professional master’s degree-level medical nursing education for the two CNMs. One

³⁶ A shoulder dystocia occurs when the fetus’ shoulder impacts against the mother’s pelvic bones, preventing vaginal birth (Baxley & Gobbo, 2004).

CNM described her approach as a blend of alternative and mainstream medicine, but “very entrenched in [mainstream] medicine.”

Contextual themes. Various beliefs among midwives and the doula were antecedent to vaccine beliefs described above and related more broadly to health in general. As for the previous practitioners, chief among these themes were (a) immunology beliefs, (b) personal experience—whether with a VPD, a suspected AEFI, an idiopathic disease, or with alternative remedies; (c) reference or professional group norms and other socialization factors, typically associated with professional training or continuing education; and (d) perceptions of industry and government and their influence on vaccine promotion. Profit motive for vaccines was largely absent from the midwife and doula narratives (see also Tables 3 and 4).

Immunology beliefs. Naturopathic midwives endorsed the naturopathic canon, i.e., the importance of homeostasis, the concept of the human body’s innate intelligence, the belief that mild diseases strengthen the immune system, and the admonition to question all vaccines. The DEM believed that doctors had “lost some of the knowledge that they used to have about supporting health” and now tended to simply treat symptoms. “The health of the body’s system as a whole has been ignored,” she said. This midwife maintained that a healthy diet was important, but refused to be persuaded to “go overboard.” She said she refused to advise pregnant women to take a “lot of medicinal herbs just because they’re pregnant.”

Many midwives in this study mentioned the negative impact of physical or emotional stress on the immune system ($n = 4$) and the importance of reducing stress for overall health as well as for a successful delivery.

Personal experience. Personal experience for midwives seemed to predict vaccine support or opposition, and that experience was often actually vicarious, as reported by family members and friends.

Adverse vaccine reactions. Three midwives interviewed for this study experienced mild AEFIs: fever or soreness at the injection site. The vaccine-opposing ND-midwife said, “It’s hard to find anybody who doesn’t know somebody that’s had a bad reaction to a vaccine,” specifically post-vaccine hearing loss and autism in stories reported second- or third-hand.

Vaccine-preventable diseases. Many midwives interviewed witnessed or experienced what they described as mild cases of measles, rubella, mumps, or varicella. Only one midwife in this study reported direct experience with severe pertussis in very young children. No others described first-hand experience or observation of a severe VPD. All acknowledged the role of at least one vaccine—usually smallpox, polio, and tetanus—for preventing diseases that were perceived as serious and thus warranting the prevention provided by vaccines.

Professional group norms. The midwives in this study agreed that birth and childbearing were normal bodily functions, and that the mother should be trusted as capable of giving birth. Their attitudes varied from CNMs who embraced mainstream medicine (i.e., babies should be born in a hospital, where support is available), to the ND-midwife who supported only home births. The doula said that there was no single point of view on vaccines in the profession, but said that she focused on the fundamental areas of agreement—namely, that women were capable of giving birth with minimal assistance or medical intervention.

The older ND-midwife said that her vaccine-opposing position put her at odds with the midwives in her community, most of whom favored an alternate vaccine schedule (i.e.,

conditional vaccine supporters). But the younger ND-midwife saw her role as promoting vaccines for children. She explained,

Sometimes, families who are thinking they weren't going to get any vaccines can be [persuaded] when they realize what the real facts are . . . [They] may decide to take some vaccines when they weren't going to do any (MW08, female, age 33).³⁷

A CNM with a master's degree in public health said that her midwife training strengthened her support of vaccines. Both of the CNMs were part of the mainstream medical community, and both advocated vaccinating children. The doula emphasized the benefit of breastfeeding as conferring all the necessary immunity to an infant. She explained that midwifery is oriented toward preventing adverse events, but she also recognized that midwives may need help, such as “more highly skilled clinical care providers, including [physicians and surgeons]—whatever is required for the healthiest outcome.” The DEM acknowledged that many midwives oppose vaccines. They “were taught certain things [about vaccinating] and . . . [hold] onto [those beliefs] even in the face of evidence that says it's not true.” The three CPMs, including the two naturopath (ND)-midwives, adhered to the naturopath canon—i.e., some vaccines are dangerous and unnecessary and no child should be vaccinated before age two.

Family influence. Four of the seven midwives (57%) described family influences on their vaccine positions—both supportive and opposing. One departed from her family's mainstream medical tradition, becoming an ND-midwife. She listed pharmacists and nurses in her family, but said that although that was “where [she] came from originally,” she disagreed with the “Western traditional model” that “offers a pill for any sickness” A tension between her own CAM and MM beliefs emerged in her remarks about certain vaccines; for example, she praised the HPV vaccine

³⁷ A recent study of pediatricians in Washington State confirmed that providers who presume parents will accept vaccines in their health supervision visits are more likely to experience parental acceptance than those providers who seek agreement to vaccines (Opel et al., 2013).

for its ability to ward off cancers but believed as well the horror stories of its adverse effects. This provider held opposing beliefs—she relied on peer-reviewed journal articles for medical information, including vaccine information, but she also uncritically believed anecdotal horror stories about AEFIs.

Profit motive—pharmaceutical industry. The doula said that despite the ethical questions surrounding profit in health care, especially for pharmaceutical companies, this was not a compelling enough reason to dismiss vaccines. “That is not using critical thinking,” she said. Two midwives said discussions with patients of pharmaceutical profit motives for vaccines were unproductive given the time available for patient consultations. Only the vaccine-opposing naturopath-midwife saw nefarious intent in vaccine promotion. She said that financial interests were motives for vaccine and drug marketing, and also that honoraria and research funding from pharmaceutical interests create serious conflicts of interest for physicians.

Government and industry. The same vaccine-opposing ND-midwife saw collusion between government and industry in vaccine promotion. She raised a straw-man fallacy, asking, “Is there anybody in the CDC [vaccine oversight offices] that isn’t getting money from vaccine-producing companies? . . . In the 1990s there was a congressional investigation about the funding of research for vaccines and who were the policy decision makers and how much money were they making—because not a lot of companies make vaccines. It’s a very huge amount of money split amongst a very few, really. How much money goes into vaccines this year? About six billion [dollars]? . . . We, as taxpayers, pay for a great deal of that. It’s a pretty sweet deal! (MWND04, age 61)”

She also said she was “always interested in who’s paying for the research,” because she “discovered some huge, disgusting holes” in how research was conducted. Two other midwives

mentioned the conspiracy/collusion beliefs that were reported to them by their patients/clients. One midwife told of how she tried to negotiate a middle ground with parents, being “respectful of their views without . . . buying into [their] paranoia” and distrust of government motives. A CNM said that several of her patients even refused the phenylketonuria (PKU)³⁸ test for their newborns, insisting that the government is using these tests to gather DNA without the public’s consent.

Summary

In terms of practice modality, it is clear that no naturopath unconditionally supported vaccines. Naturopaths either supported a few vaccines ($n = 4$), favored a delayed schedule for all of them ($n = 5$), or opposed them all ($n = 2$).

Summary tables. Tables 3, 4, and 5 were developed using a modified version of magnitude coding (Saldaña, 2013) and summarize the results described in this chapter, but lists each provider only once, by the person’s chosen practice modality. The dichotomous ratings (e.g., Hi/Lo, Pos/Neg) help to crystalize subtle differences. Tables 3 and 4 show differences in vaccine position at the individual level. It is interesting to note that despite positive attitudes toward vaccines, even vaccine supporters regarded the government and pharmaceutical industry negatively ($n = 9$, 64%), a phenomenon that might be attributable to the current widespread popular distrust of both government agencies and industry. Because it was present across the vaccine positions, negative assessments of government and industry had no bearing on vaccine beliefs and recommendations; in other words, such distrust did not dissuade the vaccine supporters from their support positions.

³⁸ The PKU test is conducted to determine whether a baby has a needed enzyme that changes phenylalanine into another enzyme, tyrosine. Without this enzyme, phenylalanine can build up in the infant’s blood and cause brain damage, seizures, and intellectual disabilities. According to WebMD, the damage can begin in the first weeks of life, hence the need for the test in newborns (WebMD, 2013).

Table 3

Vaccine Supporters (Pos) and Opposers (Neg) and Factors That Influence Their Vaccine Recommendations

| Case | Dependent Variable Vax Rec ^b | Independent Variables (IVs) | | | | | | | | | | |
|----------------------------|--|-----------------------------|----------------------|-----------------------|-------------------|----|---------------------|-------------------------|--------------------|------|--------------------|-----|
| | | Proximal IVs | | | | | Distal IVs | | | | | |
| | | Disease (VPD) ^c | | Vaccine | | | Immune ^k | Experience ^j | Norms ⁱ | Gov | Pharm ^l | |
| | Suscept ^d | Severity ^e | Benefit ^f | Efficacy ^g | Risk ^h | | | | | | | |
| Acupuncturist | Pos | Hi | Hi | Hi | Hi | Lo | Mix | Vax | | Pro | Pos | Neg |
| Acupuncturist | Pos | Hi | Hi | Hi | Hi | Lo | Trad | | | Anti | Neg | Neg |
| Chiropractor | Pos | Hi | Hi | Hi | Hi | Lo | Trad | | VPD | Anti | Neg | Neg |
| Chiropractor | Pos | Hi | Hi | Hi | Hi | Hi | Trad | | VPD | Anti | Neg | Neg |
| Homeopath | Pos | Hi | Hi | Hi | Hi | Lo | Mix | | VPD | Pro | Neg | Pos |
| Midwife | Pos | Hi | Hi | Hi | Hi | Lo | Trad | | VPD | Pro | Pos | Pos |
| Midwife | Pos | Hi | Hi | Hi | Hi | Lo | Trad | Vax | VPD | Pro | | Neg |
| Acupuncturist | Neg | Lo | Lo | Lo | Lo | Hi | Non | Vax | | Anti | Neg | Neg |
| Acupuncturist | Neg | Hi | Hi | Lo | Lo | Lo | Non | | | Anti | Neg | Neg |
| Acupuncturist | Neg | Lo | Hi | Hi | Lo | Hi | Non | Vax | | Anti | | |
| Acupuncturist | Neg | Lo | Hi | Lo | Lo | Hi | Non | Vax | | Anti | Pos | Pos |
| Chiropractor | Neg | Lo | Lo | Lo | Lo | Hi | Non | Vax | | Anti | Neg | Neg |
| Chiropractor | Neg | Lo | Lo | Lo | Lo | Hi | Non | | | Anti | Neg | Neg |
| Homeopath | Neg | Hi | Hi | Lo | Lo | Hi | Non | Vax | | Anti | Neg | Neg |
| Homeopath | Neg | Hi | Hi | Lo | Lo | Hi | Non | | | Anti | Neg | |
| H-path/N-path ^a | Neg | Hi | Hi | Lo | Lo | Hi | Non | Vax | | Anti | Neg | Neg |
| M-wife/N-path ^a | Neg | Lo | Lo | Lo | Lo | Hi | Non | Vax | | Pro | Neg | Neg |

Notes:

^aDual-trained CAM provider—homeopath/naturopath or midwife/naturopath.

^bIndicates the vaccine recommendation position, whether supporting vaccines (Pos), or opposed to vaccines in general (Neg).

^cVaccine-preventable disease (VPD).

^dSusceptibility to vaccine-preventable diseases (VPDs); whether respondent/participant (R) perceives his/her susceptibility to VPDs generally as high (Hi) or low (Lo).

^eWhether R perceives most VPDs as very severe (Hi) or not severe (Lo).

^fWhether R perceives vaccines in general as beneficial (Hi) or not beneficial (Lo).

^gWhether R perceives vaccines in general as highly efficacious (Hi) or low in efficacy (Lo).

^hWhether R perceives vaccines in general as low risk for adverse effects or illness (Lo) or very risky, likely to result in adverse effects, illness, or death (Hi).

ⁱIndicates the immunology beliefs of R, whether traditional, or adhering to Western medical beliefs and practices (Trad); non-traditional or adhering to alternative beliefs about how the immune system works (Non); or a mixture of the two (Mix).

^jWhether R has had a direct negative experience with a vaccine directly or vicariously (Vax), as reported by family members, patients, colleagues, friends, or a negative experience with a vaccine-preventable disease (VPD). Empty fields represent missing or noncommittal responses.

^kWhether R's professional norms in general are supportive of vaccines (Pro), favor delaying all vaccines (Delay), or oppose vaccines (Anti).

^lIndicates beliefs about government agencies and the pharmaceutical industry, whether generally positive (Pos) or generally negative (Neg). Empty fields represent missing or noncommittal responses.

See also Appendix 5 for expanded explanations and exemplar quotes from the interview data.

Table 4

Conditional Vaccine Supporters and Factors That Influence Their Vaccine Recommendations

| Case | Independent Variables (IVs) | | | | | | | | | |
|----------------------------|-----------------------------|----------------------|-----------------------|-------------------|----|---------------------|-------------------------|--------------------|-----|--------------------|
| | Proximal IVs | | | | | Distal IVs | | | | |
| | Disease (VPD) ^b | | Vaccine | | | Immune ^a | Experience ⁱ | Norms ^j | Gov | Pharm ^k |
| Suscept ^c | Severity ^d | Benefit ^e | Efficacy ^f | Risk ^g | | | | | | |
| Acupuncturist | Hi | Hi | Hi | Hi | Lo | Non | Vax | Anti | | |
| Acupuncturist | Hi | Hi | Hi | Lo | Hi | Non | VPD | Anti | Neg | Neg |
| Acupuncturist | Hi | Hi | Hi | Hi | Lo | Trad | Vax | Anti | | Neg |
| Acup/N-path ^a | Hi | Lo | Hi | Hi | Hi | Non | Vax | Anti | | |
| Chiropractor | Hi | Hi | Hi | Mix | Hi | Non | VPD | Anti | Neg | Neg |
| Chiropractor | Hi | Hi | Hi | Lo | Hi | Trad | Vax | Anti | Neg | Neg |
| Chiropractor | Hi | Hi | Hi | Hi | Hi | Non | Vax | Anti | Neg | Neg |
| Chiropractor | Hi | Hi | Lo | Lo | Hi | Trad | Vax | Anti | Neg | Neg |
| H-path/N-path ^a | Hi | Hi | Lo | Lo | Hi | Non | Vax | Delay | Neg | Neg |
| H-path/N-path ^a | Hi | Hi | Lo | Lo | Hi | Non | Vax | Anti | Neg | Neg |
| Midwife | Hi | Hi | Hi | Hi | Lo | Trad | VPD | Delay | | Neg |
| Midwife | Hi | Hi | Hi | Hi | Hi | Non | VPD | Anti | Neg | |
| Midwife | Hi | Hi | Hi | Hi | Hi | Mix | VPD | Pro | Neg | |
| M-wife/N-path ^a | Hi | Hi | Hi | Lo | Hi | Trad | | Anti | | |
| Naturopath | Hi | Hi | Hi | Hi | Hi | Trad | | Delay | Neg | Neg |
| Naturopath | Hi | Hi | Hi | Lo | Hi | Non | Vax | Anti | | |
| Naturopath | Hi | Hi | Hi | Lo | Hi | Trad | VPD | Delay | | Neg |
| Naturopath | Hi | Hi | Hi | Lo | Hi | Non | Vax | Delay | Pos | Pos |
| Naturopath | Hi | Hi | Hi | Hi | Lo | Trad | Vax | Delay | Pos | Pos |

Notes:

^aDual-trained CAM provider—acupuncturist/naturopath, homeopath/naturopath, or midwife/naturopath

^bVaccine-preventable disease (VPD)

^cSusceptibility to vaccine-preventable diseases (VPDs); whether respondent/participant (R) perceives his/her susceptibility to VPDs generally as high (Hi) or low (Lo).

^dWhether R perceives most VPDs as very severe (Hi) or not severe (Lo).

^eWhether R perceives vaccines in general as beneficial (Hi) or not beneficial (Lo).

^fWhether R perceives vaccines in general as highly efficacious (Hi) or low in efficacy (Lo).

^gWhether R perceives vaccines in general as low risk for adverse effects or illness (Lo) or very risky, likely to result in adverse effects, illness, or death (Hi).

^hIndicates the immunology beliefs of R, whether traditional, or adhering to Western medical beliefs and practices (Trad); non-traditional or adhering to alternative beliefs about how the immune system works (Non); or a mixture of the two (Mix).

ⁱWhether R has had a direct negative experience with a vaccine directly or vicariously (Vax), as reported by family members, patients, colleagues, friends, or negative experience with a vaccine-preventable disease (VPD). Empty fields represent missing or noncommittal responses.

^jWhether R's professional norms in general are supportive of vaccines (Pro), favor delaying all vaccines (Delay), or oppose vaccines (Anti).

^kIndicates beliefs about government agencies and the pharmaceutical industry, whether generally positive (Pos) or generally negative (Neg). Empty fields represent missing or noncommittal responses.

See also Appendix 5 for expanded explanations and exemplar quotes from the interview data.

At first, I thought to examine specific vaccine recommendations across this group—especially the polio vaccine, recommended by nearly all the conditionals, and the flu vaccine, avoided or dismissed as unimportant by conditional supporters and opposers alike. Even so, no distinct vaccine-specific pattern emerged between provider categories. One clear pattern that did emerge for the conditional vaccine supporters is that all 19 of these providers considered VPDs as serious and themselves as susceptible. Then, did it follow that conditional vaccine supporters regard the benefits and efficacy of vaccines as high and the risks of vaccinating as low, as should naturally follow high perceptions of disease risk and susceptibility? A more nuanced pattern emerges (see Table 5, below). Most conditional supporters ($n = 16$, 84%) considered vaccines as both beneficial and high in risk ($n = 15$, 79%). In fact, 12 of the conditional supporters (63%) regarded vaccines as both beneficial and risky. These providers might be weighing each vaccine

Table 5
Differential IV Ratings Between Vaccine Supporters, Opposers, and Conditional Vaccine Supporters
(All numbers are percentages)

| IVs | Supporters ($n = 7$) | Opposers ($n = 10$) | <i>Differential</i> ^a | Conditional ($n = 19$) |
|--|---------------------------|--------------------------|----------------------------------|-----------------------------|
| VPDs | | | | |
| Low perceived susceptibility | 0 | 60 | 60 | 0 |
| Low perceived severity | 0 | 40 | 40 | 5 |
| Vaccines | | | | |
| Low perceived benefit | 0 | 90 | 90 | 16 |
| Low perceived efficacy | 0 | 100 | 100 | 53 |
| High perceived risk | 14 | 90 | 76 | 79 |
| Non-traditional immune beliefs | 0 | 90 | 90 | 58 |
| Negative vaccine experience | 29 | 70 | 41 | 59 |
| Negative experience with a VPD | 71 | 0 | 71 | 32 |
| Anti-vaccine professional norms | 43 | 90 | 47 | 63 |
| Negative views of government | 47 | 70 | 27 | 53 |
| Negative views of pharmaceutical companies | 71 | 70 | 1 | 58 |

Notes:

^aThe *differential* indicates the difference between supporters and opposers. Scale of proportional significance: 80–100%, large; 50–79%, medium; 30–49%, small; 0–29%, trivial.

according to its relative benefit or risk. Or, they may simply balance opposing beliefs about vaccines in general—believing that yes, vaccines prevent disease, and yes, they are also fraught with risk. For a comparison of the three groups in terms of the 11 variables in this study, see Table 5, above.

Differences between vaccine positional groups. Table 5 shows contrasts between groups, using percentages for ease in comparison. Large proportional differences between groups—defined as a difference of 80 to 100%—are present for some of the factors, including perceptions of vaccine benefit, efficacy, and, to a lesser extent, vaccine risk perceptions. The distal variables (defined on Tables 3 and 4) generally show small to negligible proportional differences between the groups (0–49% difference) groups, as would be expected if indeed their effects on vaccine recommendations are more indirect, shaping opinions, but not representing the primary beliefs behind the recommendations. Two exceptions where a larger proportional difference is evident between the extreme groups are for immune beliefs (where the difference is large, 90%) and negative experience with a VPD (with a moderate difference, 71%).

In contrasting the conditional group with the supporters and opposers, the middle-ground position of the conditional group can be seen. Conditionals are somewhat similar to supporters in terms of perceived susceptibility to, and severity of, vaccine-preventable diseases, as well as perceptions of vaccine benefits. Yet, on perceptions of vaccine risk, they hold positions closer to the opposing group. Proportionally speaking, they are midway between opposers and supporters on most of the variables—vaccine efficacy perceptions, immune beliefs, negative experiences with VPDs, and professional norms. Moreover, as a group, they are less likely to hold conspiracy beliefs as compared to the opposers, and they are somewhat similar to the vaccine supporters.

CHAPTER 5: Discussion and Conclusions

Significance

The results presented here add to the literature by elucidating CAM providers' vaccine beliefs and recommendations and the significant factors that influence those beliefs (see Tables 3 and 4). Our goal is to assist the public health community in understanding the factors influencing CAM providers with the overriding goal of stemming the trend toward parental reluctance to vaccinate and to see an improvement in pediatric vaccination rates in Oregon. A hopeful sign is that a surprising majority (72%) of complementary and alternative medical (CAM) participants interviewed for this study expressed their willingness to accept at least one vaccine or even all of them, if delayed until after age two. Only 28 percent of participants opposed vaccines, and just a few of them were uncompromising in their opposition. Most of the CAM providers who accepted vaccines had direct experience with a severe preventable disease (VPD) like pertussis, tetanus, influenza, or polio (see Table 1). Younger providers (<46 years old), born after smallpox had been eradicated and polio had vanished from the Western hemisphere, and in an age of widespread vaccination against numerous diseases, had never witnessed a severe VPD. Because of lack of experience with VPDs, they may have underestimated their susceptibility to and the severity of these diseases. These results are similar to findings from the earlier study (Bean & Catania, 2013).

The current research was designed to determine CAM provider attitudes toward vaccination, but also to uncover various other antecedents to their belief systems. A larger study, for example a cross-sectional study of a larger CAM population, through a survey administered to up to 200 CAM providers (or about 5% of the CAM providers in Oregon) might further

elucidate clear relationships between the distal and proximal IVs and their influence on CAM providers' vaccine recommendations.

Professional Choice

CAM practices have existed since antiquity (Institute of Medicine, 2005). Indeed, one observer has postulated that the history of medicine (until modern times) has been the history of complementary and alternative medicine (Shapiro & Shapiro, 1997).

Some CAM providers came to a formal study of their discipline through a desire to heal coupled with a personal rejection of mainstream medicine (MM). Most providers interviewed expressed a desire to be of direct service to others. They attributed their professional choices to their positive experiences of healing and pain relief through CAM practices such as acupuncture, homeopathy, naturopathy, or chiropractic, or a better birthing experience through midwifery, when mainstream medicine failed to help or even impeded their healing. They were also drawn to CAM disciplines because of the perceived warmer relationships between patient and provider and the greater level of empathy they experienced in CAM client-provider interactions than in MM encounters. The relationship between provider and patient has been and remains an important predictor of positive outcomes—of healing.

Those CAM providers who had studied the physical sciences before beginning their CAM studies were likely to continue to hold to mainstream medical beliefs and to support most vaccines as necessary to prevent serious disease (Tables 3 and 4: those holding traditional views of the immune system and embracing pro-vaccine norms). Non-traditional immune beliefs were proportionally strongest among opposers and medium among conditional supporters (Table 5). But even science-based CAM providers veered somewhat from the MM path of vaccine support. This deviation may have resulted in part from exposure to vaccine-opposing professional norms and vaccine-questioning CE course content. Other CAM providers maintained their original

science-based beliefs and chose traditional medical CE courses, but then found themselves over time at odds with their professional peers because of their scientific training and orientation and their resistance to powerful CAM norms. For some, this created a sense of isolation from their peers, but others relished the thought of themselves as iconoclasts.

Vaccine beliefs followed professional education. CAM providers came to their profession with preconceived notions about how mainstream medicine approaches health and healing, but providers in this study did not choose their CAM modality because of pre-existing vaccine beliefs. In fact, formal training for a particular CAM profession often supported vaccines, however cautiously (i.e., naturopathic and chiropractic education). For example, all of the naturopaths in this study, including those with a physical science background, had come to accept without question the 1991 naturopathic protocol for vaccines. The American Association of Naturopathic Physicians (1) states that some of the current childhood vaccinations “have been associated with significant morbidity and are of variable efficacy and necessity,” (2) urges caution in recommending any vaccine, and (3) calls for “safer, more effective vaccinations” (AANP, 1991). Most CAM practitioners became more cautious about all vaccines following their CAM studies, and even more cautious after CE courses. They were thus less likely over time to recommend vaccines to their patients/clients or to accept them for themselves or their families than they were before their formal and informal training.

CAM continuing education reinforces vaccine hesitancy. Continuing education (CE) course content aimed at CAM providers represents a challenge to vaccine acceptance. For many CAM providers, vaccine cautiousness increased with experience and age and appeared to begin with CE exposure. The CE courses CAM providers described often included content that warned about the dangers of vaccinating; this seemed to be especially true for naturopathic and

chiropractic CE courses, despite the fact that the formal training for these disciplines is more vaccine-promoting than that for homeopaths or acupuncturists, for example. CAM provider beliefs in the superiority of natural immunity from disease were strengthened as they became more deeply involved in their disciplines and more exposed to CE courses that reinforced those beliefs. Although the course content taught in accredited institutions must be approved by those institutions and often reflects current scientific knowledge, fee-based CE courses are generally not required to pass even the most cursory scientific review. Each CAM licensing board for the five modalities examined for this research requires between 15 and 20 hours of additional study each year for a provider to maintain licensure. In fulfilling this requirement, CAM providers are able to choose CE courses based on their interests and not necessarily on the scientific rigor of the course. Providers interviewed were increasingly likely over time to select courses that exposed them to anti-vaccine messages. Fresh, current information (or misinformation) from CE courses also supplanted information learned years or decades earlier in accredited degree or certification programs. Thus their continued professional training and reference norms tended to reinforce an anti-vaccine stance.

Health Belief Model (HBM)

The HBM is an explanatory model that addresses individual perceptions of threats posed by health problems (susceptibility, severity), the benefits of avoiding threats, and factors influencing decisions to act, or not to act (barriers, cues to action, and self-efficacy); the model is employed to account for individual behavior and was developed to examine such behavior (e.g., limiting tobacco consumption, accepting breast cancer screening). Core HBM concepts of perceived susceptibility to and perceived severity of a disease emerged as correlates (independent variables) of vaccine recommendations of CAM providers and their advice to

others on pediatric vaccination (the dependent variable). Antecedent to beliefs about whether to vaccinate were perceptions of susceptibility to, and severity of, either a VPD or an adverse event following an immunization (AEFI) plus perceptions of vaccine benefits, efficacy, and risks. Other health beliefs and social factors which are not included in the HBM, however, were important, including immunology beliefs, personal experience, group norms, and perceptions of government and industry, discussed below. (See Tables 3 and 4.)

Broad support was evident for recommending pediatric vaccines (vaccine supporters and some conditional supporters) when vaccines were seen as very beneficial, highly efficacious, and as having few or minor risks. Based on this assessment, the vaccines CAM providers in this study usually accepted included polio, pertussis, and tetanus vaccines. Thus, conditional supporters' and vaccine supporters' recommendations followed HBM predictions. Low perceived efficacy was proportionally a large predictor of opposition to vaccines, followed by low perceived benefit and high perceived vaccine risk (Table 5).

Some practitioners generally mistrusted new vaccines or, more precisely, they mistrusted the evidence supporting the use of new vaccines, and saw them as of low benefit (i.e., the varicella vaccine) or of questionable efficacy (i.e., the human papillomavirus and influenza vaccines). But in some cases, vaccine rejection was based on beliefs beyond the core HBM beliefs. Some vaccine-opposing CAM providers conceptualized all vaccines as harmful. For example, some acupuncturists believed all vaccines were likely to deplete rather than boost the immune system.

Only seven participants acknowledged the strong benefit of vaccines in promoting community—or herd—immunity for serious diseases, and preventing disease in vulnerable populations, i.e, those too young, too old, or too ill to be vaccinated. Several participants failed

even to grasp the concept of herd immunity. Homeopaths, some naturopaths, and some chiropractors described all disease as latent in the human body. According to this view, a person does not “catch” a communicable disease—the disease is instead activated (expressed) when the immune system is compromised. Protecting a community did not figure in the risk and benefit narratives of these providers. Likewise, the concept of contagion was lost on many CAM providers. They seemed largely unaware that their supposed easily overcome case of flu or pertussis could in the active state spread to others, especially to vulnerable populations, such as infants too young to receive the pertussis vaccine. They also seemed unaware that an infected person can shed an infectious pathogen before any disease symptoms appear. Only those providers who had a background in the physical sciences or pre-medical studies seemed to grasp the fact that a disease could actually spread from self to others.

The CAM providers who substantially opposed vaccines did so in part because the public health benefit of a community immune to the disease was not their major focus. The CAM focus is on individual health. One might argue that CAM providers affirm the American exceptionalist tradition—the individual is paramount—to the detriment of civic responsibility and duty to the community.

Health Belief Model: Vaccine recommendations. Low or high perceived susceptibility to a vaccine-preventable disease (VPD) or of the severity of a given VPD affected to a moderate extent (40–60%) whether a CAM provider promoted or opposed pediatric vaccination recommendations (see Table 5). According to the model, a vaccine will be accepted or avoided based on perceptions of benefit, efficacy and risk: *Benefit*—does it prevent a disease? *Efficacy*—is it effective in preventing that disease? And *low risk*—is the vaccine safe and free of serious

side effects? (*High risk*—the vaccine is unsafe and its side effects are worse than its supposed benefits.)

Vaccine benefit, efficacy, and risk perceptions. Turning now to some of the specific vaccines mentioned in CAM narratives, these will be examined in terms of vaccine efficacy, benefits, and the perceived vaccine or disease risks.

Polio vaccine. Polio is still out in the world. It is endemic in Afghanistan, Pakistan, and Nigeria, and, in the fall of 2013, there was a possible polio outbreak among children in Syria ("Suspected polio outbreak in Syria," 2013). Even more recently, reports of wild polio circulating in Israel have raised concerns of further polio spread (Butler, 2013; Roberts, 2013). The benefits of the polio vaccine were noted far more often in CAM narratives than were any dangers. The vaccine was viewed as effective and its benefits far outweighed any risk from the vaccine. For the CAM providers in this study, the inactivated polio vaccine, unlike the oral, live polio vaccine, was especially considered beneficial, efficacious, and low in risk. The presence, mentioned in the Results above, of a monkey virus in the polio vaccine merits a word of explanation. A suspected carcinogen, simian virus 40 (SV40), was present in monkey kidney cells used to grow the polio vaccine. Using these cells ceased in 1963—50 years ago. In addition, epidemiologic studies do not show an increased risk of cancers in those who received polio vaccine between 1955 and 1963, and there is evidence of SV40 in many cancer patients who were born after SV40 was no longer a contaminant of the polio vaccine (CHOP, 2013).

Tetanus vaccine. CAM providers overall generally accepted the tetanus vaccine as not only beneficial, efficacious, and low risk, but necessary to prevent an incurable, preventable disease. Vaccine-opposing chiropractors and the opposing naturopath-midwife agreed that the

disease is severe, populations are susceptible, and natural remedies unlikely, so they accepted this particular vaccine as necessary.

Pertussis vaccine. CAM providers who came to their practices from a physical science background, or those who had directly witnessed the disease in an infant, fully supported the pertussis vaccine and were adamant in recommending it ($n = 5$, 14%). Yet the CAM population in this study was divided in its perceptions of benefit, efficacy, or risk for the pertussis vaccine. When the disease was considered of high risk and severity, such as during an outbreak, the vaccine to prevent it was regarded as highly efficacious and beneficial. Some CAM providers, especially those who lacked direct experience with pertussis, believed that the vaccine was high in risk and was related to serious adverse effects, including autism. Autism was originally blamed on the measles vaccine (Wakefield et al., 1998) and this association has since repeatedly been discredited (Deer, 2011; Godlee, Smith, & Marcovitch; Harris, 2010; Institute of Medicine, 2004). No association has similarly been found between autism and any other vaccines or vaccine ingredient (DeStefano, 2007; DeStefano, Price, & Weintraub, 2013; Doja & Roberts, 2006; Gerber & Offit, 2009; Institute of Medicine, 2004; Offit, 2008a, 2008b). If providers considered pertussis as a disease to be one “you can get through if you’re a vigilant parent,” they saw the pertussis vaccine as low in benefit and too risky to recommend.

Human papillomavirus (HPV) vaccine. Most providers in this study regarded the HPV vaccine as low in benefit and efficacy, and very risky. As HPV is a relatively recent addition to the vaccine portfolio, its benefits are still not widely understood or accepted. CAM providers questioned or opposed the HPV vaccine primarily because they believed that this vaccine leads to early sexual debut and promiscuity, fears that are unsupported by the literature. For example, in a study of 1,400 girls, HPV vaccination was not associated with increased sexual activity

(Bednarczyk, Davis, Ault, Orenstein, & Omer, 2012). Another study of more than 1,000 adolescent females showed no association between HPV vaccination and risky sexual behavior (Liddon, Leichliter, & Markowitch, 2012). In addition, the assertion that sex education and abstinence will largely prevent HPV is unrealistic. The abstinence-as-protection argument overlooks the near inevitability of sexual activity in the human life cycle, and thus potential exposure to an HPV. In addition, sexual activity in adolescents has been increasing over the past three decades, with most adolescents becoming sexually active, on average, by age 15 (AAP, 1999). By age 17, more than half of U.S. adolescents surveyed in one study reported sexual experience (Cavazos-Rehg et al., 2009). Monogamy and marriage can put a person at risk for an HPV infection. Eventually the majority of young men and women will choose a sexual partner, marry, and have children, not necessarily in that order, and the HPV status of one's partner is likely to be unknown. In addition, the argument that an HPV infection can be quickly cleared misses the point of transmissibility. Yes, sometimes the body will clear an HPV infection on its own, but by the time the infection is cleared, a person could easily have infected others, who might not realize they are infected, or be unable themselves to "clear HPV."

Importantly, the protective nature of the HPV vaccine has already shown positive results in its first few years of use. Researchers examined HPV prevalence from 2003 to 2010 and found a decrease in vaccine-type prevalence by more than half (from 12% to 5%) among women aged 14 to 19 (Markowitz et al., 2013), a strong argument supporting the efficacy as well as the benefit of the HPV vaccine.

Hepatitis B (HBV) vaccine. In the absence of demonstrable benefits, perceptions of a vaccine are driven by real or imagined risk beliefs. Nowhere is this more apparent than in the case of the HBV vaccine. CAM providers in this study simply saw few benefits from the vaccine

and so their narratives were dominated by discussions of risk. Naturopaths believed HBV to be the riskiest of all the vaccines, in that it is (1) administered at birth, considered too early for an infant to mount an appropriate immune response; and (2) reportedly results in more incidents of serious neurological effects than other vaccines, including among adults. Yet evidence for neurological damage from the HBV vaccine has been inconclusive to date (Stübgen, 2012; Yu et al., 2007); authors of a review of 13 studies establishing a relationship criticized many of the studies as methodologically unsound (Martínez-Sernández & Figueiras, 2013). Another research team examined data from the Nurses Health Studies I and II (121,700 and 116,671 participants, respectively) to determine a relationship between receiving the HBV and later developing multiple sclerosis. They reported “no association between hepatitis B vaccination and the development of multiple sclerosis” (Ascherio et al., 2001).

A study in Taiwan showed a marked reduction in childhood liver cancer following the 1984 introduction of hepatitis B vaccination (Chang et al., 1997) and researchers in another study concluded that “it should be emphasized that the contribution of vaccines to individual and global health outweighs by any measure the risk of most neurological adverse events” (Agmon-Levin, Kivity, Szyper-Kravitz, & Shoenfeld, 2009, p. 1199). A research team from France and Canada concluded that the HBV vaccine’s protection against hepatitis B and liver cancer more than offsets the minimal risk of disease from the vaccine (Hernán, Jick, Olek, & Jick, 2004). Yet the benefits of HBV vaccine were not acknowledged by, or perhaps were unknown to, many of the CAM providers in this study.

Varicella vaccine. No CAM provider interviewed for this study fully endorsed the varicella (chicken pox) vaccine as beneficial, despite the significant decline in varicella morbidity and mortality since its introduction and widespread acceptance. The only benefit

mentioned was economic (i.e., avoiding sick days or days away from work to nurse a sick child). Efficacy was not mentioned. The only risk mentioned was that the vaccine might enhance herpes zoster (HZ) infection. It has been noted by several researchers that shingles incidence has increased since the childhood varicella vaccination was introduced (Brisson, Gay, Edmunds, & Andrews, 2002; Patel, Gabremariam, & Davis, 2008; Yih et al., 2005). The Brisson study was predictive rather than descriptive however, in that the researchers used mathematical modeling to predict infection rates. A fourth study found the relationship between vaccination and increased rates of HZ inconclusive (Yawn et al., 2007). The “shingles-outbreak” argument is present on anti-vaccine websites, most notably Mercola.com.³⁹ The Mercola site raises alarms that the varicella vaccine has the potential to spur a shingles epidemic, “bolting” the site asserts, “straight at the U.S.” The perception of a shingles epidemic may also be fueled by media reports and by an aggressive shingles vaccine marketing campaign creating the impression that HZ is more prevalent than it may be. Notably, since the introduction of the varicella vaccine in 1995, the U.S. has seen a reduction of 85 percent in cases of pediatric varicella, a drop of 88 percent in hospitalizations and a decline of 82 percent in number of varicella deaths in persons aged 0 to 49 years (Roush, Murphy, & The Vaccine Preventable Disease Table Working Group, 2007). Another study asserted that vaccine strains of varicella are less likely than the varicella disease to reactivate to cause shingles (Welsby, 2006). Eventually, the varicella vaccine will protect against shingles as more and more children are vaccinated and they grow into adulthood without latent herpes zoster.

Influenza vaccine. Most CAM providers in this study considered the annual influenza vaccine neither beneficial nor efficacious. It is true that the annual flu vaccine is a best-guess for

³⁹ <http://articles.mercola.com/sites/articles/archive/2010/11/02/chicken-pox-vaccine-creates-shingles-epidemic.aspx>

targeting the pending influenza pathogen and researchers often do miss the specific circulating influenza pathogen for a given season. One researcher agreed with the vaccine-opposers in this study that the seasonal influenza vaccine was of minimal efficacy and has resulted in numerous side effects (Doshi, 2013).

Yet researchers in another study noted the benefits of the seasonal flu vaccine in reducing morbidity and mortality, reducing hospitalizations and admissions to long-term care facilities, and reducing complications associated with chronic disease, including congestive heart failure (Gusmano & Michel, 2009). In addition, the CDC claims that from 3,000 to 36,000 deaths each year in the U.S. can be attributed to seasonal influenza and its complications (CDC, 2011c). The CDC estimated the vaccine's efficacy at 57 percent following the 2012 influenza season, and said that the risk of hospitalization was reduced by more than 50 percent across all vaccinated age groups (Jackson et al., 2013). For the 2013–2014 flu strain, the vaccine is likely to be much more effective, as the circulating influenza strain during that season was influenza type A, subtype H1N1, a strain now present in all seasonal flu vaccines. In summary, nearly all CAM providers considered the influenza vaccine as unnecessary. Only the CAM provider who had direct experience with influenza disease accepted the flu vaccine.

This theme of perceived disease severity is expanded upon under “personal experience,” below, under Contextual Variables.

Vaccine risk and safety—Heuristics. The CAM provider judgments about vaccine risks are open to several reflexive heuristic processes; that is, the use of simple cognitive shortcuts to solve complex problems (J. C. Smith, Appleton, & MacDonald, 2013). In the case of vaccine risk and benefit judgments, these include a coincidence heuristic, logic fallacies, omission bias, compression, and over-confidence. Once such heuristics are entrenched, addressing them with

facts alone becomes almost impossible—or “belief persistence” (Anderson, Lepper, & Ross, 1980; Nyhan & Reifler, 2010), and may even result in a backfire effect, increasing misperceptions and reducing vaccination intention (Nyhan, Reifler, Richey, & Freed, 2014). CAM providers are susceptible to the same heuristics as the public. Below are the common heuristics that emerged from the CAM provider narratives in this study.

Coincidence. The *coincidence* heuristic is a logical fallacy (J. C. Smith et al., 2013). For example, because I received a flu vaccine, so the reasoning goes, I then caught the flu. Linking perceived diseases (i.e., autism, autoimmune disorders, influenza) to vaccination commits a logic fallacy: *post hoc ergo propter hoc*—i.e., “after this, therefore because of this,” confusing temporal association with causation.

Omission bias. This bias is the tendency to favor errors of omission over errors of commission (Meszaros et al., 1996; Tabbarah et al., 2005): i.e., inaction is less harmful than action: So, not vaccinating is safer than vaccinating.

Compression. The *compression* heuristic consists of overestimating rare risks, (e.g., vaccine reactions), and underestimating common risks (Ball, Evans, & Bostrom, 1998); for example, the belief that anaphylactic shock is more likely from an influenza vaccine injection than is serious disease from catching the flu. One demonstration of how the compression heuristic works appears in a study by Ritov and Baron. These researchers examined attitudes toward a hypothetical vaccine that prevented disease and its complications, but occasionally caused death. Twenty-three percent of respondents refused to tolerate even a tiny risk of death from the vaccine, and would avoid this vaccine despite its preventive benefits (Ritov & Baron, 1990).

Over-confidence. The *over-confidence* heuristic refers to a person placing great faith in his or her own judgments or behaviors. The present study repeatedly revealed the belief that a salubrious lifestyle—eating well, exercising, avoiding stress, and practicing strict personal hygiene—will protect one against VPDs like influenza, thereby negating the need for annual immunization (J. C. Smith et al., 2013). CAM providers believe they can defeat any illness because of their good health.

These heuristics were all present in the CAM narratives collected for this research. Some of them (i.e., coincidence, omission, and compression) were also present in the official naturopathic vaccination canon (AANP, 1991), i.e., the risk of an adverse vaccine reaction appears larger than the risk of the vaccine-preventable disease.

Belief persistence. This is a widely studied psychological phenomenon concerning the tenacity of beliefs. People naturally seek to make sense of salient events or relationships among events, and create or accept short-cut explanations that then become nearly impossible to change (Anderson et al., 1980). In fact, one current study showed that a current vaccine promotion effort resulted in an increase in vaccine misperceptions and heightened resistance to vaccination (Nyhan et al., 2014).

Vaccine testing. Another belief among CAMs is that vaccine safety has never been well tested; many CAM providers believed that vaccine safety is entirely absent from conventional medicine. This perception is incorrect. Numerous scientific studies and commentaries report on vaccine safety; government agencies and university vaccine research centers all work continuously on improving vaccine safety. A literature search on the term “vaccine safety” using an academic search engine (Academic Search Premier) produced a listing of 1,805 articles published in scholarly journals since 2000, many of them describing safety testing and results

specific to a given vaccine. Vaccine safety is a critical part of medical treatments offered to the public. For example, in one study, researchers writing in the *American Journal of Epidemiology* described the extensive safety testing of a combination diphtheria-tetanus-pertussis/inactivated polio virus/haemophilis influenza Type B (DTaP-IPV-Hib) vaccine administered to more than 149,000 children ages 1–2 years (Nelson et al., 2013). In another study, researchers in Spain examined the safety of the 2009 H1N1 vaccine (Zuccotti et al., 2011). In a third, a researcher in Atlanta, Georgia, USA, reviewed the workings and critical components of the Vaccine Safety Datalink, an active vaccine monitoring system (R. L. Davis, 2013).

Mercury. CAM providers interviewed mentioned mercury at toxic levels as a danger in some vaccines. These providers continue to be concerned about the mercury (i.e., ethylmercury) in thimerosal (50% of thimerosal is mercury by weight), although this preservative was removed from pediatric vaccines in 2001 (Atkinson et al., 2012; Geier & Geier, 2006) and is present only in a few other vaccines (FDA, 2013). In addition, **scientists now** know that it is methylmercury that bioaccumulates; ethylmercury does not. Methylmercury is present in high levels in the environment in the United States and other developed countries, and is found in fish, seafood, and dental amalgam fillings. Most environmental mercury comes from coal-fired power plants. Yet CAM providers most often attribute the mercury danger to vaccines, not to the near-ubiquitous environmental presence of mercury. In addition, CAM providers are generally confused about mercury toxicity. The human body handles ethylmercury (the mercury in thimerosal) very differently from how it handles methylmercury—the form of mercury found in fish (such as in a can of tuna) or accidentally ingested from industrial accidents. Ethylmercury is eliminated from the body much faster than methylmercury (8.6 versus 21.5 days); the two substances, often conflated in the CAM narratives, are not the same (FDA, 2013; NNII, 2010).

Summary. Mistrust of a vaccine’s efficacy/risk data undermines perceived vaccine benefits or disease severity concerns. In sum, the core HBM concepts emerged as correlates of vaccine recommendations, but were incomplete. In the following section, I propose a broader framework to explain health and vaccine beliefs.

Contextual Themes

Immunology beliefs. Beliefs concerning human immunology are highly relevant to perceived health benefits of vaccines and underlie an understanding of how vaccines work and vaccines’ value, or lack thereof, in preventing the spread of infectious disease. Immunological beliefs provide explanatory power over and above the HBM concepts of benefit, efficacy, and risk, described above. These beliefs were proportionally very different between opposers and supporters (Table 5) and might account to a large extent for vaccine opposition or support.

“Natural is best.” The CAM providers interviewed shared a *natural-artificial* heuristic: a consistent belief that acquiring a disease, and thus developing immunity, was far superior to immunity from a vaccine. This ancient belief in the benefits of disease pre-dates modern medicine by thousands of years (Barry, 2004). The belief that “natural is best” was more important to CAM provider decisions to vaccinate or not than were the risks of getting a disease itself. Most CAM providers in this study shared a belief that the human body, when it is healthy, is capable of fighting off, or suppressing, any disease. From this perspective, the view is not that people might die from a disease, but that those who become ill are already unhealthy. Thus, when one is healthy, then the body’s immune system can do its job; in terms of acupuncture, its *qi* is strong. Naturopaths and chiropractors administered their healing arts prophylactically, to avoid disease through herbs, diet, or, for chiropractors, regular chiropractic adjustments to keep the spine in alignment and thus prevent disease—despite that fact that such adjustments can

occasionally be harmful (Hufnagel, Hammers, & Leonhard, 1999). Similarly, acupuncturists provided dietary advice and administered Chinese herbal medicines meant to enhance a person's underlying *qi*. Potential harm from CAM treatments or herbs was never mentioned (for examples of harm, see Offit, 2013).

Beliefs about a natural versus artificial means of building an immune system hold a position of importance that guides decision making more strongly than do other related beliefs, such as perceived risks of disease. Thus, the public health benefits of vaccine-related individual and herd immunity were rarely acknowledged. Only the public health-educated providers (i.e., several midwives and one acupuncturist) acknowledged the importance of herd immunity to prevent infection in vulnerable populations.

Humoral and acquired immunity. Three naturopaths said that Th1 (T-helper cell type 1) immunity is preferable to the “acquired immunity” of Th2 (i.e., immunity conferred by vaccination): again, the “natural is best” theme. At least one study refutes the widely accepted hypothesis of the two T-helper cells differing in cytokine secretion patterns and other functions. Kidd (2003, p. 223) writes that, although Th1 and Th2 cells seem to have been “virtually anointed with the responsibility for coordinating the immune system, critical investigators are finding discrepancies in the hypothesis” (see, for example, Dent, 2002; Singh, Mehrotra, & Agarwal, 1999). These researchers have noted that there can be as many patterns of immune response as there are immune cells, and Kidd enumerated some of the factors that influence a Th1 or Th2 response, including the dose and nature of the antigen, the direct cell-to-cell interaction with antigen-producing cells, the diversity and intensity of those interactions, and the cytokine receptors available on the cell (2003).

Zero-sum thinking. The belief that the immune system consists of measurable and irreplaceable levels of a substance called *qi* dominated the narratives of several acupuncturists. One described this substance as “a heavy, dense substance” that can be depleted “like sand in the hourglass,” and “when it’s gone, it’s gone.” This belief runs counter to scientific knowledge about the constantly replenishing nature of the immune system. According to a report on vaccines published by the National Institute of Allergy and Infectious Diseases,

The immune system contains billions of circulating B and T cells capable of responding to millions of different antigens at once. Because the body constantly replenishes these cells, a healthy immune system cannot be “used up” or weakened by a vaccine (NIAID, 2008, p. 32).

Fragile immune system. Immunology beliefs also play a role in the timing of pediatric vaccine administration. Many CAM providers believed that the immune system of a child is too fragile to handle the physiological challenge produced by vaccines, particularly multiple vaccines; one certified professional midwife insisted that vaccine administration to infants presents an “onslaught” to the child. Naturopaths maintained that no child under the age of two should receive any vaccines. This thought process ignores evidence supporting the robust nature of the infant’s immune system at birth (see, for example, Angelone et al., 2006) as well as the need to vaccinate very young children against early childhood diseases, including rotavirus, flu, measles, and pertussis. The rotavirus vaccine is administered only to children under the age of 2—by naturopathic reasoning, no child needs to be protected against possible rotavirus outbreaks in day care centers.

One researcher has theorized that an infant can safely receive thousands of vaccines at one time (NIAID, 2008), far higher than the 10 vaccines in 25 doses recommended before age 2 years (Atkinson et al., 2012).

The blood-brain barrier. Although mentioned by only three CAM providers (8%), the theme that vaccines pass through the infant's immature blood-brain barrier and cause irreparable harm merits a note because it appears to be a vaccine-opposition theme gaining traction on the Internet. This belief represents not only false information but a misunderstanding of human biology. Research shows that the infant's blood-brain barrier is effective in the embryo and fully developed at birth (Ek, Dziegielewska, Habgood, & Saunders, 2012; Fernández-López et al., 2012; Saunders, Habgood, & Dziegielawska, 1999). As Smith and colleagues explain, this type of belief represents *anchoring* and *availability* heuristics. The anchoring heuristic starts from a set belief, in this case, belief in the "fragile immune system," and then the person judges the probability of a future event/secondary belief from past events or beliefs. Convinced (i.e., anchored) that babies are assaulted by too many vaccines, it is an easy step to the availability heuristic—something easily imagined and therefore judged as likely to occur. Babies are immature; they are assaulted by too many vaccines, so therefore the mechanism for harm is theoretically this proposed permeable, immature blood-brain barrier.

Personal experience. Personal experience with a vaccine or a VPD (Table 5) impacts to a moderate degree what people consider important in future vaccine decision making. Individual experiences can be conceived of as case studies that provide the person with important decision-making tools. Medicine, as for other areas of health care, has a long history of valuing the case study as a source of guidance, and as providing evidence that can even supersede recommendations from respected research entities and government agencies (Williams, 2005).

The consequences of vaccine experiences aligned somewhat with perceived vaccine risk for many of the CAM providers, and were illustrated with personally salient stories of vaccine-acquired disease as directly experienced by providers or as reported to them and that enhanced and reinforced already deeply held beliefs (i.e., belief persistence). The effects of these histories on vaccine evaluations often served to accentuate perceptions of disease severity or vaccine side-effect severity. These important stories, however, were often second- or third-hand stories as told to providers by patients or other practitioners. It is worth noting that second- or third-hand reports constitute hearsay, and are never admissible, for example, as evidence in a court of law; no other profession considers rumor as proof to act upon. Like legal and other professionals, the public health community's advice and recommendations must be based on observable facts and measurable effects—sound evidence, not hearsay.

The ease with which the CAM providers recalled these stories, and the weight the stories assumed in their evaluative frameworks, suggests underlying emotional connections to these narratives, and suggests the creation of reflexive heuristics in decision-making. Such emotion-laden case studies become incorporated into evaluative frameworks in a manner that overemphasizes their factual value. As Slovic and Peters explain, “People judge a risk not only by what they think about it, but also by how they feel about it” (2006, p. 323). They called this phenomenon the *affect heuristic*.

Yet, for those providers who witnessed or directly experienced a severe VPD (i.e., influenza and pertussis), the vaccines that prevent the disease were important in providing immunity against a potentially fatal disease. Their disease experiences persuaded them of the benefits of vaccinating.

Reference group norms. Reference group norms (Askelson et al., 2010) are important antecedents of human behavior and provide a contextual framework for health-related beliefs. In this study, group norms exerted proportionally more influence on the vaccine opposers than on the supporters or conditional supporters (Table 4).

Professional group norms. Medical professionals are socialized to a set of professional and scientific beliefs through formal education by experts in their field, clinical training, participation in professional societies and conferences, by reading professional literature, and through CE courses. They are also influenced informally by their peers.. These normative professional expectations are regularly reinforced and exert a sustained impact on decision making.

Family norms. Family norms also were persuasive behavior modifiers among CAM providers. One CAM provider avoided the flu vaccine because of a grandmother's serious AEFI attributed to the vaccine. For several CAM providers, their family norm was to avoid vaccines, and so providers avoided them also. But many providers described how their decisions to become homeopaths, naturopaths, or acupuncturists contradicted powerful mainstream medical family norms, and they described how the strong influence of the MM norms affected their vaccination practices, but not necessarily their beliefs. For example, a CAM provider might acquiesce to vaccines for the sake of family unity, as did one homeopath whose son insisted he receive a pertussis vaccine before meeting his new grandson, and as one acupuncturist reluctantly agreed to vaccinate her newborn because of her husband's belief in the need for protective vaccination for their child. These providers did not, however, alter their own beliefs that not vaccinating was to be preferred.

Perceptions of government and industry. Beliefs concerning the pharmaceutical industry as not acting in the public interest sometimes played a role in the evaluative frameworks

of CAM providers in this study, but were largely irrelevant to their vaccination choices. It was typical for providers in this study, whether supportive, opposing, or conditionally supportive, to view the pharmaceutical industry as being strongly motivated by profits over and above health and safety (Tables 3–5). This is not inconsequential, although perceptions of profit motive did not dissuade supporters from their vaccine support. Historically, the entire medical profession was both questionable in scientific rigor and as motivated by profit until widespread reforms were instituted following the Flexner Report in 1911 (Cooke, Irby, Sullivan, & Ludmerer, 2006). Until that time, most American medical schools were fee-based, with students paying professors directly for their instruction and often being admitted to medical school without even a high school diploma. Only when the profit motive was removed, and medical schools were publicly funded, or supported by foundations and universities, did medicine become a respected profession in the United States (Barry, 2004).

In addition, more recently, failures to bring medication safety information to the public in a timely way, as happened for example with Vioxx™, have eroded the public's confidence in drugs and the entire pharmaceutical industry (Faunce, Townsend, & McEwan, 2010). The Vioxx™ experience only intensifies the belief that vaccine problems are also being covered up. This is heuristics at work, augmenting doubt in vaccines.

Vaccine perceptions might also be influenced by the U.S. market-based system of allowing direct marketing of medications to the public. Indeed, the United States is one of only two developed countries in which direct marketing of pharmaceutical products to consumers is permitted (Frisch, 2011). The belief is not simply that pharmaceutical companies make excessive profits, but additionally, that the profit motive underlies public health policy/regulations, that

public policy officials are often hired by pharmaceutical companies, and that pharmaceutical executives are appointed to powerful policy-making government agencies.

Intervention Strategies

The public health community faces challenges in elevating the vaccine discourse with CAM providers so that these providers might recognize the benefits of vaccines to the health of a community, at best, or at least to their own client populations, and to overcome negative vaccine beliefs. But the effort will not start from zero—remember that 72 percent of CAM providers interviewed for this study accept one or more vaccines—this is encouraging. Behavior change interventions can be tailored to the “fence-sitters” who accept one or more vaccines or who question the vaccine schedule (Leask, 2011).

The interventions described below are drawn from this research and from the existing literature.

Work for policy change. The question of how to overcome vaccine objections has no easy answer and was not a part of this study, although the data in this study do offer some insights. Many of these recommendations apply equally to traditional medical and to CAM providers.

Evaluate and improve CAM professional education. Evaluate professional and technical educational content for CAM provider licensing, as well as all CE courses offered to all CAM modalities, to ensure that they contain and disseminate accurate and current scientific content. Mandate the dissemination of accurate scientific information on vaccines and VPDs for all health care licensing programs.

Continually monitor web content. Health-oriented websites and those purporting to present “unbiased” information on vaccines, or “both sides of the vaccine controversy” can be

subject by CAM licensing agencies to evaluation by a set of standard criteria, such as that proposed by Kim and colleagues (Kim, Eng, Deering, & Maxfield, 1999) and others (Bean, 2011). Web content is constantly shifting, and most commercial sites are not reviewed for accuracy or currency. Websites must continually be monitored for errors. Once errors are found, the public health community needs to counter the inaccuracies and misinformation and provide alternative sources for accurate information.

Develop emotional narratives about VPDs. My research shows that CAM providers have a tenuous at best, and non-existent at worst, emotional connection to the human costs of the diseases that vaccines prevent. Lacking personal experience with vaccine-preventable diseases, the health care provider community (and the public) requires education beyond facts and lists of statistics (Kata, 2011; J. C. Smith et al., 2013). Vaccine recommendations could be presented in novel ways to stanch the erosion of public confidence and could employ simple language and use current communications media, including social media, in new, easily understood promotion efforts aimed at CAM providers and especially messages that avoid dense recitations of facts or scary images of sick children.

Personal experience is a powerful motivator. Enthusiastic CAM vaccine supporters had direct experiences with VPDs—they witnessed pertussis, or had a neighbor with polio in the 1950s, or lived in a country where preventable meningitis was endemic, or had suffered a bout of severe influenza. Finding ways to achieve an emotional connection to vaccine-preventable diseases through credible and authentic voices—spokespersons from within various CAM disciplines—may be useful. In one example, parents are being recruited in Washington State as peer-educators in a move to lower that state’s high vaccine exemption rate (Eisenstein, 2014). Another example is an inexpensive booklet created by Texas Children’s Hospital that contains

20 emotional stories and photos about 12 vaccine-preventable diseases (Cunningham, Bloom, & Baker, 2010).

Create and publicize vaccine courses for all Oregon public health educational programs. In nearly every gathering of public health graduate students at OSU, the voices of vaccine-objectors or casual vaccine-avoiders are heard as well as the vaccine-opposing themes elucidated in this study. This ignorance of vaccine science and vaccine benefits should give every public health researcher, instructor, administrator, and professor reason for concern. No vaccine course appears to be offered in any public health program in the state of Oregon. At Oregon State University, vaccinology is touched upon in courses in microbiology and pharmaceutical science, but is absent as a separate offering in public health. Public health students reflect the same misinformation, fear, and scientific ignorance confirmed in this and earlier research (see Chapter 1 of this dissertation). Public health students must be educated to be first-line vaccine advocates; how alarming that they are often hesitant to recommend vaccines, or that they even oppose some of them.

Interventions aimed at the public. Although not a part of this research, which examined only CAM providers' beliefs and the proximal and distal factors influencing those beliefs, below are some interventions aimed at the public, following the multifactorial outline provided by Smith and colleagues (2013). Parents are the ones who will ultimately make health care decisions for their children, and interventions should address parents and their concerns (Leask et al., 2012).

Positive messages. Campaigns like the “Hug me—I’m vaccinated” campaign might be successful in improving vaccination rates, if not in changing attitudes. In a report about the campaign, the creators noted that the “most effective anti-vaccination arguments are those that

induce fear in parents by naming frightening ingredients and by greatly exaggerating the risks of vaccinations. The best pro-vaccination arguments were those that focused on a good-parenting message, such as suggesting that not immunizing your child is equivalent to putting them in a car without a car seat” (JREF, 2013, p. 2).

Communicate relative risk. Concrete comparisons of relative risk from daily life can aid in reducing vaccine risk perceptions (R. Wilson, 1979). The public health community can address mercury concerns by emphasizing the environmental sources of mercury when mercury/thimerosal bubbles up as a fear. Risk-comparison messages could be included, such as that a can of tuna contains approximately 84 micrograms (NRDC, 2005) of mercury (methylmercury) and the one-time annual dose of live, attenuated influenza vaccine (LAIV) contains 25 micrograms of mercury (ethylmercury) (Verstraeten et al., 2003)—Is it possible that a person consumes more than one can of tuna a year? Public health workers and traditional medical providers must find an opening to explain in simple terms that mercury is present in the air, and that when it is found in human tissue, its major source is industry and coal-fired plants, not vaccines, and that the ethylmercury in a vaccine clears the body nearly three times faster than the more toxic methylmercury found in fish and in the very air we breathe.

But even so, these measures may be ineffective or perhaps even counterproductive, in light of the belief persistence paradigm (Nyhan & Reifler, 2010; Nyhan et al., 2014).

Communication techniques. One theme that appeared throughout the CAM providers’ narratives was the impersonal nature of mainstream medicine and their experience with dismissive or even dictatorial MM providers. Changing the nature of the discourse requires training and dedication, but models do exist, including providing training for clinicians in empathic communication (Dwamena et al., 2012) and motivational interviewing (Brobeck,

Bergh, Odenchrants, & Hildingh, 2011). MI is an open-ended method of provider-patient interaction that focuses on asking questions, listening, and seeking agreement rather than on directive communication. A study by researchers in Australia includes recommendations for matching communication strategies to vaccine-hesitant or –avoidant positions, provides helpful strategies for addressing vaccination concerns, and lists communication techniques that build rapport and trust (Leask et al., 2012). Leask wrote, “Governments and health organizations must move beyond deficit models of communication that assume the public to be passively awaiting their information fill” (2011, p. 445).

Use familiar language. In addition, of course, public health should learn, and especially respect, the language of CAM modalities. Many CAM strategies and components parallel those of mainstream medicine. For example, the concept of vaccine itself is analogous to the homeopathic concept of *similars* and *infinitesimals*. In one instance, faced with a group of homeopathic mothers adamantly opposed to vaccinating their children in a country where polio was epidemic, a physician explained the polio vaccine to the mothers in terms of the infinitesimal and harmless amounts of a very dilute pathogen that then stimulates an immune response that, later, when the primed immune system is confronted with the actual disease, it defeats the disease. Using the language of homeopathy, she persuaded all the mothers to accept the polio vaccine for their children (Bahia Mitchell, personal communication, November 2, 2011). This type of creative communication takes research, patience, compassion, and tenacity. The public health community needs these qualities.

Oregon’s educational initiative. According to the Portland statewide newspaper, the *Oregonian*, some schools have vaccine opt-out rates of 70 percent or more (Zheng, 2013), compromising herd immunity and threatening VPD outbreaks, and theoretically including the

2012–2013 pertussis outbreak in Oregon. As of March 1, 2014, the State of Oregon mandates education for parents who decline vaccines for their children (Foden-Vencil, 2014). The legislation (i.e., Senate Bill 132) requires parents who object to any vaccine to obtain the signature of a doctor or other health care practitioner certifying that the parents received immunization education or, alternatively, they must provide a certificate confirming they watched an approved online educational video. Oregon legislators were persuaded to approve S.B. 132 because Oregon leads the nation in kindergartners whose parents have exempted them from vaccination requirements. So now parents have help in “educating themselves” about vaccines, but, as noted earlier, vaccine opposers are unlikely to be persuaded by any of the arguments presented in the video. The vaccine video⁴⁰ (which takes from 15 minutes to 2 hours to view—depending on how many and which vaccines a person wishes to omit) may largely serve to create a nuisance effect, annoying fence-sitting parents into vaccinating rather than spend the time online, and further alienating entrenched vaccine opposers.

Develop a multi-faceted approach to vaccine education. Smith and colleagues have proposed several behavior-change interventions to improve vaccination acceptance, comprising a multi-faceted approach that addresses vaccine information deficits and misinformation on the part of health care providers, journalists, policy makers, parents, educators, and even children as current and future advocates for vaccination (J. C. Smith et al., 2013). Their suggestions to enhance vaccine confidence include these: (1) exploit stories to benefit vaccines in communication and social media; (2) develop broad awareness of the rigorous vaccine safety system; (3) ensure that clear and succinct language is used in all vaccine communications, both

⁴⁰ The Oregon educational modules can be viewed online:
<http://public.health.oregon.gov/PreventionWellness/VaccinesImmunization/GettingImmunized/Modules/vaccineeducation.htm>

public and academic; (4) encourage open and transparent decision making for vaccine approval, programs, and policy; (5) employ strategies to reduce vaccine-related pain; (6) enhance vaccinology education for all health care providers, especially physicians, nurses (and CAM providers); (7) educate children proactively on the need for, benefits, and safety of vaccines; and (8) develop vaccinology education materials for reporters. Educating children in Oregon about vaccines would be a good beginning.

Implications for Further Research

A larger study of CAM providers might accurately measure the causal pathways alluded to in this study. For example, does early scientific training result in CAM providers who are more likely to accept or even endorse vaccination? What factors will move conditional supporters into the unconditionally supportive population? What factors might move an opposer toward accepting vaccines on principle? It would be useful to compare CAM providers in states like Oregon with low pediatric vaccination completion rates, such as Idaho (with 42% coverage) or Vermont (54%), as well as with CAM providers in a state with high pediatric completion rates, such as Massachusetts (68% coverage), Kentucky (69%), or Florida (69%). A series of cross-sectional surveys could be designed based on this formative research to ascertain CAM providers' sources of vaccine information and influence on parents of vaccinated ($n = 100$) and unvaccinated ($n = 100$) school-aged children. A nationwide survey could be designed to characterize, compare, and contrast vaccine-related knowledge, attitudes, and practices among pediatricians and family physicians (MDs and DOs), integrative medical doctors, doctors of chiropractic (DCs), doctors of naturopathic medicine (NDs), acupuncturists, homeopaths, and other CAM providers. It would be ideal to recruit 200 pediatricians/family physicians, 200 integrative medicine doctors, 200 doctors of chiropractic, 200 licensed naturopathic doctors, and 200 other CAM providers (total $n = 1,000$). But at this point, given the downward trajectory of

vaccination rates in Oregon, it might be preferable at this point to test an intervention designed to improve pediatric vaccination rates in Oregon. This current work would support the development of interventions to modify the vaccine perceptions of CAM providers, especially those who conditionally support vaccines.

Study Limitations

As for any qualitative study, the number of participants is always a limitation; nonetheless, I sought to approach saturation in the range of variations in provider vaccine recommendations by including providers representing midwives and four CAM modalities. These modalities reflect the largest communities of CAM providers in Oregon. Of course, more participants from each category of CAM provider would have strengthened the design. Another possible limitation is that the predetermined theoretical model of the HBM and the contextual factors that emerged in earlier research, explored in the semi-structured interview instrument, might have constrained the range of antecedents that emerged from data analysis. Leaving the survey open-ended was designed to minimize this.

Summary tables are also subject to several limitations. They represent modified versions of magnitude coding. Table 5, in particular, is limited by the small numbers measured and the arbitrary choice of ranges for large, moderate, small and minimal differences.

As with all studies based on opportunistic samples, these findings might not be generalizable, particularly with regard to the actual prevalence of any particular theme in a broader population of CAM providers. In addition, the usual sources of bias are possible, including interviewer bias, participant recall bias, and high internal validity bias. The latter compromises external validity; that is, the ease of generalizing the results (Pannucci & Wilkins, 2010). Despite these limitations, the current work successfully opens a window on the diversity

and similarity of CAM vaccine beliefs, and on a narrow array of antecedents and a set of reflexive heuristics that might contribute to the formation of those views.

Conclusions

The results of this study provide clear evidence that observed variations in CAM vaccine positions are related to a complex and interrelated set of beliefs, life experiences, emotions, and norms. To change their views toward accepting current vaccine recommendations, vaccine opposers will need to modify key core beliefs about human immunology. To promote a modification of these beliefs will entail revisions of current CAM provider training and continuing education programs as well as more transparency in vaccine marketing and communication messages. As with all such messages, these marketing messages should be targeted to a specific audience; in this case, to CAM providers.

Evaluative frameworks. This research shows that evaluative frameworks regarding vaccines are not solely evidence-based, but rest on sets of related beliefs and reflexive heuristics that extend into broader areas of life (e.g., pre-scientific constructs as well as social movements and philosophies concerning ideas of what is healthy for the individual and society). Such broad belief structures, with cognitive “roots” in many different belief systems, are potentially difficult to modify through education, because such a change would require modifying multiple assumptions and beliefs about the world rather than a single underlying one. But try we must. This research also shows that CAM providers do support those vaccines they perceive to be beneficial, efficacious, and low risk. What persuades a CAM provider to vaccinate is very often their direct, personal experience with a VPD. The public health community should improve the understanding of the benefits of avoiding VPD infection, and focus primarily on vaccine benefits. One analogous example is the success of the medical community in 2012 in Philomath,

Oregon, in countering anti-fluoride arguments in their community. Their fluoridation campaign emphasized only the benefits of fluoridation, and featured images and messages of strong, healthy teeth in children. They avoided any allusion to any of the anti-fluoride arguments and refused to enter into pointless arguments. The campaign was successful and fluoride was re-introduced in 2012 to the community's water supply.

False equivalence. This discussion is incomplete without addressing the false equivalence paradigm by which CAM providers may equate scientific evidence collected, tested and retested, often over years or decades, with anecdotes, anti-vaccine web content, rumors, and opinions (Leask, 2011). Most (67%) CAM providers in this study connected the arguments for and against vaccinating as carrying equal weight and having equivalent scientific bases. The scientific literature, however, is clear in supporting the benefits of vaccinating (see, for example, Allen, 2007; André, 2003; D. E. Bloom, Canning, & Weston, 2005; Calloway, 2012; Offit, 2011; Offit & Jew, 2003; Salmon, Moulton, & Halsey, 2004). Many practitioners who provide advice on vaccinating to the parents in their practices often refer them to well-known anti-vaccine websites, (i.e., the National Vaccine Information Center and Mercola.com) which purport to present “both sides” of the “vaccine controversy,” or they provide parents with an unapproved vaccine schedule. Many CAM providers simply tell confused parents to “educate themselves,” encouraging them to surf the Internet for information on vaccines. The content and design of websites with anti-vaccination content promote and reinforce existing beliefs that vaccines are harmful (Bean, 2011; Davies, Chapman, & Leask, 2002; Kata, 2011; Pias-Peleteiro, Bordoy, & Martínón-Torres, 2013). Thus, the advice to parents to “do their own research” can result in more deeply entrenched beliefs in vaccine risks over any understanding of vaccine benefits.

Frequently the “research” is the result of a Google™ search, because Google™ is the most widely used search engine by the general public, with billions of hits weekly (Experian, 2013). But Google™ uses an algorithm to predict what a person looking for information wants to see. If a person has ever accessed sites that disagree with the value of vaccinating, then anti-vaccine sites will be among the top URLs in any fresh Google™ search (Pias-Peleiteiro et al., 2013). Specifically, a search for vaccine information that leads to an anti-vaccine site triggers the search engine to return to previous websites in the next search for vaccine information. The results from a web search then reinforce automatic mental associations between immunization and risks as highlighted on these anti-vaccine websites, providing more fuel for the argument that there is a “debate” between vaccine risks and benefits, and that the debate is equally weighted.

The powerful effect of viewing anti-vaccine websites was demonstrated in a German study, which showed that viewing anti-vaccine websites for only 5–10 min had a significant negative effect on the viewer’s vaccine perceptions and decisions to immunize (Betsch, Renkewitz, Betsch, & Ulshöfer, 2010).

Personal Remarks

The public health community is as guilty of false dichotomies as are any of the CAM providers I interviewed. Public health sees itself as on the side of the angels, and congratulates itself for its objectivity, its belief in social equity, and its correctness. I learned from the providers in my study how mainstream medical providers marginalize CAM modalities. Was I arrogant in my interviews? Was I inadvertently patronizing? I dismissed as “anecdotal,” and hence unpersuasive, information one of the homeopaths in my study provided. He replied in an email,

I have seen/heard the use of the label “anecdotal” used over and over by individuals in the medical profession when presented with information that challenges their belief system. However, when I attend grand rounds at local hospitals or pediatric/dermatology/or any other “-ology” conferences, and individual clinical cases are presented, nary a word is mentioned about anecdote. Rather, these individual case presentations are called “clinical pearls” and seen as a source of practical clinical information that may be applied by the attending docs in their practices. . . . I take issue with the hypocrisy and the double standard which I have witnessed repeatedly over the years by these individuals. . . . [And] I think people conflate skepticism with critical thinking. In my opinion, skepticism is antithetical to science in that it closes the mind off to all possibilities before a thorough investigation has been completed (inherent bias), whereas critical thinking allows an open mind when presented with any hypothesis or idea while retaining reason and logic (HMND07, male, age 41).

Is it possible for public health and CAM to converse as equals, seated at the same side of the table? The public, health care providers, and the public health community all, after all, want the same thing—healthy children, healthy communities, and a collaborative and inclusive medical community, united in promoting health and well-being.

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Appendix 1: Semi-structured Interview Guide

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Appendix 1

5523 Dissertation Research: Semi-structured Interview Guide for Complementary and Alternative (CAM) Health Care Providers Ver. 3 02.13

ADD INFORMATION: ID CODE _____ [DATE AND LOCATION] _____

1. Completed consent form _____

Read statement of research purpose:

I am conducting this research to gain a better understanding of why providers differ in their support of childhood immunization. Understanding the various factors that influence immunization recommendations can help the public health community change or amend current vaccine policy and practices. Your insights and experience are important to this process.

So, let's begin. OK? Let me ask a few questions about you:

Birth date _____ Sex M F

Academic/professional degree (please list all) _____

Race:

American Indian or Alaska Native _____ Asian _____

Black or African-American _____

Native Hawaiian or other Pacific Islander _____ White _____

Other _____

Ethnicity: Hispanic or Latino _____

Marital status _____

Number of children in the family _____

Household income –circle one under \$20K \$21K–40K 41–60K 61–80K 80–100K
100–120K 121–140K 141–160K 161–180K 181–200K

1

Note: Revise each SSI to reflect the interviewee's profession and location. Print and use that version.

1. What is your profession? _____
2. Job title (if different) _____
3. Number of clients/patients in your practice? _____
4. How long have you been practicing XXX?
5. What was the one thing that persuaded you to become a XXX?
6. Tell me about your professional preparation? Where? How long?
7. What about other continuing education or additional specialized training? FOCUS IN CE?
8. Did you participate in **residency or work with another experienced practitioner** when you first started your professional career? Did your professional training include education about the human immune system?

Please describe this training. How did you feel about it? Did it fit your worldview, resonate with you?
9. In your view, how does the body fight or prevent disease?

2

THEME GUIDE: KEEP THIS PAGE BEFORE YOU AT ALL TIMES—PAY ATTENTION TO THE CHECKLIST AS THE INTERVIEWEE NARRATES.

Influences

Milestones

Mentors

Doubts

HBM checklist:

Perceived VPD risk

Perceived VPD severity

Vaccine efficacy

Vaccine risk

Vaccine safety

Contextual:

Personal experience

Group norms

Immunology beliefs

Government-industry (conspiracy, collusion)

Print this page separately

Views of vaccine changed since professional education?

3

10. How do XXXS **IN GENERAL** view how the human body fights off infection or illness?
11. What is your personal view of how the body does this? Is it like other XXXs? Or different?
12. IF APPLICABLE: How do your professional peers react to your different opinion from theirs?
Probe: **“What do you know about the response among your professional peers to any departure of yours from the profession’s stated viewpoint on vaccines?”**
13. Do vaccines have a role in preventing illness? (IF yes, how?)
14. **Did your vaccines belief come before or after your professional education? How have your views changed since your professional education?**
15. **Do some of your perspectives** about vaccination come from your earlier training as a XXX?
16. Were you vaccinated as a child? Y N Don’t know

IF yes, What, if anything, do you remember about getting vaccinated?

Probe as needed to elaborate on negative/positive experiences.

Probe for elaboration on how training influenced these ideas and feelings.

17. What one thing has most **influenced your CURRENT THINKING** on childhood vaccinations?
18. **IF OPP**—What would persuade you that vaccines have a role in health? Diff views of diff vaccines—HPV, Flu, Varicella, Shingles, MMR, DTap, Rotavirus, Hep B?

Probe as needed for sources: other HCPs, Internet/websites, discussion w/friends, family, publications such as periodicals, books? (family experience Qs 29–33 are below)

19. What do **other professionals** in your field feel and think about vaccinating children?

*If person answers **supporting vaccination**, follow up with question below.*

20. What does your family think about vaccinating children? How do you agree with them?
How do you differ from them?

Probe as needed.

21. Have any of your patients'/clients' children had **negative health reactions** to being vaccinated—allergic reactions/illnesses?

Probe to elicit details as relevant.

22. How about you [*IF Respondents reports having a family also ask: "or your family"*]: have you or any of your family had negative health reactions to being vaccinated—such as allergic reactions/illnesses?

If yes, please tell me about **one of those experiences**.

Probe as needed—R or R's family's negative reactions.

23. What is your major source of information about vaccines? What is the best source of information about vaccines? How often do you check this source?

5

- a. Which information sources on vaccines do you believe to be the most reliable?
- b. What sources of information do your friends and colleagues tell you they use for vaccine information? Which sources on vaccines do your friends/colleagues tell you are most reliable?

24. *If not answered above:* Thinking about your feelings on and ideas about childhood vaccination, what **person or experience** has contributed the most to these ideas?

25. If a vaccine opposer—**question whether R accepts treatment for bacterial infections.** [Or only “natural is best” therapy? N.B.: Drug therapy is used for bacterial infections, but is ineffective against viruses. For viruses, there is a **preventive therapy—vaccines.**]

26. What have you heard or do you know about Oregon State’s official policy and regulations on childhood vaccination? [*Probe as needed to get as much as they know.*] What do you think about these policies/regulations?

PROBE for religious reasons.

27. Some vaccine information websites mention that the government is forcing vaccines on the general public. Have parents in your practice mentioned this as a concern? **[IF YES]** How would you respond to this?
28. Some vaccine information websites mention the profit motive of pharmaceutical companies. Have parents in your practice mentioned this as a concern? **[IF YES]** What would your response be?
29. I’d like to ask you about your personal health practices—When you seek medical care, is it allopathic, homeopathic, osteopathic, chiropractic, herbal medicine, acupuncture?

6

Not comprehensive list; these are examples of many possible choices.

IF children: you mentioned earlier that you have children. These last few questions are about your children.

30. Are your own children vaccinated? IF YES: Are there vaccines they do not have?

Probe: if not, why not?

31. Do your own children have a regular medical doctor?

- a. *If yes*—Do you **trust this** person on matters of immunization?
- b. Tell me **one thing that happened** to make you trust/distrust this person on imz?

Probe as needed: How does that doctor feel about vaccines? What kinds of things happened to make you trust/not trust this person?

- c. **If no to 26a.** What do you do when your child is ill?

Probe as needed.

Wrap-up questions:

1. Do you have any additional thoughts?
2. Is there anything I have missed, or that you would like to share?

END OF SURVEY

7

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Appendix 2: Consent Form

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CONSENT FORM

Project Title: Vaccine Beliefs of Complementary and Alternative Medical (CAM) Providers in Oregon
Principal Investigator: Joseph A. Catania, Ph.D.
Student Researcher: Sandra J. Bean, MPH
Version Date: January 6, 2013

1. WHAT IS THE PURPOSE OF THIS FORM?

This form contains information you will need to help you decide whether to be in this study or not. Please read the form carefully and ask the study team member(s) questions about anything that is not clear.

2. WHY IS THIS STUDY BEING DONE?

The purpose of this study is to better understand CAM professional choices, professional training and other influences on beliefs, especially beliefs about how the body fights disease and overcomes infection. This work is being conducted by Sandra Bean for the completion of her dissertation.

Up to 60 participants may be invited to take part in this study.

3. WHY AM I BEING INVITED TO TAKE PART IN THIS STUDY?

You are being invited to take part in this study because you are a complementary and alternative medical provider in the state of Oregon.

4. WHAT WILL HAPPEN IF I TAKE PART IN THIS RESEARCH STUDY?

The study activities include a 45-minute to one-hour audio recorded interview. The study aims include seeking to understand professional choices; professional norms; beliefs about how the immune system functions; experience with an infectious (vaccine-preventable) disease; negative or positive experiences with a vaccine; views on health; and how these views and beliefs address perceptions of whether vaccines are beneficial, efficacious, or risky. These will be assessed using an open-ended survey instrument that Ms. Bean will administer in a face-to-face meeting in a quiet place. You will be audio-taped. You are free to skip any questions that you would prefer not to answer.

_____ I agree to be audio recorded.

Initials

_____ I do not agree to be audio-recorded.

Initials



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Relevance: Few studies has been undertaken to date elucidating CAM practitioners’ general and specific views on vaccination. This is a relatively new area of research.

Because it is not possible for us to know what studies may be a part of our future work, we ask that you give permission now for us to use your personal information without being contacted about each future study. Future use of your information will be limited to studies about CAM providers’ and immunology and vaccination beliefs and attitudes. If you agree now to future use of your personal information, but decide in the future that you would like to have your personal information removed from research database, please contact Joseph A. Catania, Ph.D., Professor, College of Public Health and Human Sciences, at Joseph.catania@oregonstate.edu, or phone Dr. Catania at 541-737-3828. The data will be retained for a minimum of three years following completion of the study.

_____ You may store my information, audio, and transcript for use in future studies.

Initials

_____ You may not store my information, audio, and transcript for use in future studies.

Initials

Future contact: We may contact you in the future for another similar study. You may ask us to stop contacting you at any time.

Study Results: The study results will be shared with you once the dissertation has been approved by Ms. Bean’s graduate degree committee.

5. WHAT ARE THE RISKS AND POSSIBLE DISCOMFORTS OF THIS STUDY?

The possible risks and/or discomforts associated with your being in the study include possible discomfort, embarrassment, fatigue, or inconvenience. You can elect to stop the interview at any time and continue at a later date.

Breach of Confidentiality: There is a risk that we could accidentally disclose information that identifies you. Every effort will be made to protect your identity; no identifying information will be included in the transcripts or the final thesis.

email: The security and confidentiality of information sent by email cannot be guaranteed. Information sent by email can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses.

Internet: The security and confidentiality of information collected from you online cannot be guaranteed. Information collected online can be intercepted, corrupted, lost, destroyed, arrive late or incomplete, or contain viruses.



College of Public Health and Human Sciences
 Oregon State University, School of Social and Behavioral Health Sciences, 401 Waldo Hall, Corvallis, Oregon 97331-6406
 Phone 541-737-2686 | Fax 541-737-4001 | health.oregonstate.edu

6. WHAT ARE THE BENEFITS OF THIS STUDY?

This study was not designed to benefit you directly.

7. WILL I BE PAID FOR BEING IN THIS STUDY?

You will not be paid for being in this research study.

8. WHO WILL SEE THE INFORMATION I GIVE?

The information you provide during this research study will be kept confidential to the extent permitted by law. Research records will be stored securely and only researchers will have access to the records. Federal regulatory agencies and the Oregon State University Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you.

If the results of this project are published your identity will not be made public. Audio recordings will be accessed only by Sandra Bean and Dr. Catania, the research team. All audio data and transcripts will be kept under lock and key by Principal Investigator Dr. Catania on campus for a minimum of three years after completion of this study. All data will be de-identified against possible inadvertent disclosure of individually identifiable information.

To help ensure confidentiality, coding for the transcripts will be by a number and letter: H01 will indicate homeopath number 1, and so on—it is important to keep track of which alternative therapy the transcript represents, because the researcher will be comparing within and across the five CAM practices (homeopathy, naturopathy, acupuncture, midwifery, and chiropractic).

Contact information for the participants will be kept under lock and key and de-linked from the data. Only the Principal Investigator will have access to this information. Links between the code number and direct identifiers will be destroyed after the study has been completed.

9. WHAT OTHER CHOICES DO I HAVE IF I DO NOT TAKE PART IN THIS STUDY?

Participation in this study is voluntary. If you decide to participate, you are free to withdraw at any time without penalty. You will not be treated differently if you decide to stop taking part in the study. If you choose to withdraw from this project before it ends, the researchers may keep information collected about you and this information may be included in study reports.

10. WHO DO I CONTACT IF I HAVE QUESTIONS?

If you have any questions about this research project, please contact: Joseph A. Catania, Ph.D., Professor, College of Public Health and Human Sciences, Dr. Catania at 541-737-3828 or by email to Joseph.catania@oregonstate.edu



If you have questions about your rights or welfare as a participant, please contact the Oregon State University Institutional Review Board (IRB) Office, at (541) 737-8008 or by email at IRB@oregonstate.edu

12. WHAT DOES MY SIGNATURE ON THIS CONSENT FORM MEAN?

Your signature indicates that this study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a copy of this form.

Participant's Name (printed): _____

(Signature of Participant) (Date)

(Signature of Person Obtaining Consent) (Date)

Appendix 3: Recruitment Letter

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Appendix 3



College of Public Health and Human Sciences
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 Phone 541-737-2686 | Fax 541-737-4001 | health.oregonstate.edu

March 26, 2013

Name
 Address1
 Address2

Dear NAME,

I am writing to request your participation in research concerning your profession and your beliefs about how the human body overcomes or fights off infectious disease. My study is entitled "Vaccine Beliefs of Complementary and Alternative Medical (CAM) Providers in Oregon.

Would you be willing to participate in a 45-60-minute interview, to be conducted under private circumstances in your office or an alternate location of your choosing? I will be conducting the interview face-to-face and will analyze the results to gain insight into health professionals' recommendations to parents concerning health care and disease prevention for their children, including the role of vaccines. In this interview, I will be asking for an account of the influences on your choice of profession, your views of how the human body fights or prevents disease. I will ask about your personal experiences with infectious diseases, about your professional practice, your sources of health information, and the role of your social and professional networks in reinforcing your beliefs and values and in your disseminating information to others, especially concerning pediatric vaccination. The potential benefits to you are your contribution to the discourse and increased knowledge about your discipline within the public health community. Benefits to society include the broadened understanding in the public health community of the factors in your discipline that influence immunization recommendations. This knowledge can help the public health community change or amend current vaccine policy and practices.

I will use the findings from this research work to aid in fulfilling requirements for the Ph.D. in public health from Oregon State University's College of Public Health and Human Sciences. Principal Investigator for this dissertation research is Joseph A. Catania, PhD, Professor, College of Public Health and Human Sciences, Oregon State University.

You will be contacted in the near future to learn whether you are willing to participate. You may also email me at beans@onid.orst.edu or call me at 541-753-0602 or cell: 404-281-7185. At that time, we can arrange for an interview time and place.

Thank you for considering participation in this study, and I will be happy to answer any questions you may have. You may contact me, as noted above, or contact Dr. Catania at 541-737-3828.

Sincerely,

A handwritten signature in blue ink, appearing to read "Sandra Bean".

Sandra Bean, MPH,
 Doctoral Candidate
 Oregon State University, Department of
 Public Health,
 403 Waldo Hall
 Corvallis OR 97331-6406

Principal Investigator:
 Joseph A. Catania, Ph.D., Professor
 College of Public Health and Human Sciences
Joseph.catania@oregonstate.edu

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Appendix 4: Codebook

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Appendix 4: Codebook

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|------------------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| Vaccine position | Statements of support, conditional support, or opposition to vaccines/vaccination . | ✓ | ✓ | ✓ | ✓ | ✓ |
| Vaccine-preventable diseases | Statements about having acquired a perceived or actual vaccine-preventable disease as well as per-ceptions of disease severity and/or susceptibility to acquiring it. These statements can refer to the participant's family, patients in their practices, or second-hand reports | ✓ | ✓ | ✓ | ✓ | ✓ |

¹ A check mark (✓) indicates presence of this theme in narratives for the specific discipline.

² Only themes with at least two responses were included.

³ Indicates total number of themes for the discipline.

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|---------------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| | and rumors. | | | | | |
| Vaccine beliefs: efficacy | Statements regarding the ability of vaccines to prevent the disease(s). Also includes statements regarding the ability of the vaccine to affect (a) an individual's risk of getting the disease, (b) transmission of the disease from one person to another and (c) disease spread at the population level. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Vaccine beliefs: benefits | Statements regarding (a) prevention of suffering in individuals or groups, (b) reduction in the risk of secondary consequences of illness, as well as death, for individuals and for groups; (c) the | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|------------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| | economic benefits of disease prevention by vaccines for the individual and society. | | | | | |
| Vaccine beliefs: risks | Statements regarding (a) harm to the health of individuals or group/society (immune system harm, cancer, illnesses or disorders, causes what it is supposed to prevent), (b) death. Includes harm from a vaccine, vaccine ingredients, vaccine schedule and timing. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Vaccine safety | Statements relating to vaccine safety, testing, accountability, etc. | ✓ | | ✓ | ✓ | |
| Advice to others | Statements describing vaccine or immunization information provided to | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|--------------------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| Vaccine additives, ingredients | patients/parents. The participant's own expressed attitudes and/or perceptions of the attitudes of others (other practitioners, parents) about additives, adjuvants, or other ingredients in vaccines. | ✓ | | ✓ | ✓ | ✓ |
| Professional choice | Statements that describe how the provider reached a decision to choose a specific CAM profession, often including contrast statements for mainstream medicine. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Training | Statements that describe education, internships, professional training, and continuing education courses related to the | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|--|--|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| | discipline. | | | | | |
| Healing | Statements about personal experiences of healing, especially through alternative modalities. | ✓ | | ✓ | ✓ | |
| Contrast with mainstream,/Western/ conventional medicine | Statements that indicate the CAM modality differs from (i.e., is superior to) mainstream medicine. | ✓ | ✓ | ✓ | ✓ | |
| Information sources | Statements about information sources a participant accesses and considers reliable. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Norms | Statements about beliefs shared in the professional community and how the participant agrees with or disagrees with these beliefs. | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|-----------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| Personal experience | | | | | | |
| Vaccinated as a child | Statements that describe any memories the participant has of his/her vaccination as a child, and/or participants' accounts of their children's vaccination experience. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Family influence | Statements about the participant's own natal family experience with vaccines or with vaccine avoidance. This includes family member reactions to vaccines, or reactions, especially to the participant's vaccination hesitancy. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Immunology beliefs | Statements that describe how the human body and its systems and organs | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|------------------------------|--|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| Vaccine reactions | prevent or overcome infection or disease. Statements that describe any adverse vaccine reactions experienced, witnessed, described second-hand to a participant, or described as theoretically possible by a participant. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Government and industry | Statements that describe governmental agencies, mainstream medical providers, and/or pharmaceutical companies as influencing vaccine production, marketing, and/or policy. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Perceptions of public health | Statements relating to public health and how its aims contrast or | ✓ | ✓ | ✓ | | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|--------------------|---|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| | align with CAM. Includes statements about herd immunity. | | | | | |
| Profit motive | Statements ascribing profit motives to individuals, government agencies, the medical community, or pharmaceutical companies or any combination. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Conspiracy beliefs | Statements that indicate distrust or nefarious motives of the government, medical community, or pharmaceutical companies or any combination of the three. | ✓ | ✓ | | | ✓ |
| Coercion/gov'ment | Statements that indicate that government agencies force vaccines on the | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|---------------------|--|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| | public. | | | | | |
| | Comments about specific vaccines | | | | | |
| Polio vaccine | Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. | ✓ | | ✓ | ✓ | ✓ |
| Pertussis vaccine | Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. | ✓ | ✓ | ✓ | ✓ | ✓ |
| HPV vaccine | Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. | ✓ | ✓ | ✓ | ✓ | ✓ |
| Hepatitis B vaccine | Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. | ✓ | ✓ | ✓ | | ✓ |
| Varicella vaccine | Statements relating to | ✓ | ✓ | ✓ | ✓ | ✓ |

| Theme ² | Description | Complementary and Alternative Medical Discipline ¹ | | | | |
|--------------------|--|---|----------------------------|-----------------------------|---------------------------|--------------------------|
| | | Naturopathy ³ (30 themes) | Acupuncture (25 themes) | Chiropractic (29 themes) | Homeopathy (27 themes) | Midwifery (27 themes) |
| Influenza vaccine | illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. Includes H1N1. | ✓ | | ✓ | ✓ | ✓ |
| Tetanus vaccine | Statements relating to illness susceptibility and severity as well vaccine efficacy, benefit, and/or risk. | ✓ | ✓ | ✓ | ✓ | ✓ |

Appendix 5: Further Explanation of the Variables

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Appendix 5

Appendix to Tables 3 and 4—Further Explanation of the Variables

| Variable | Definition | Exemplar Quotes |
|---|--|--|
| Dependent Variable: | | |
| VAX REC (Vaccine recommendation position) | <p>Statements of support, opposition to, or conditional support for vaccines/vaccination.</p> <p>Table 3 shows the extremes of support ($n = 7$) and opposition ($n = 10$). Table 4 shows the conditional supporters ($n = 19$)</p> | <p><i>Support:</i> “I do support vaccines in general.”</p> <p><i>Oppose:</i> “Shoot the kid as soon as they’re breathing with all kinds of vaccines and then you have sick kids the rest of their life.”</p> <p><i>Conditional:</i> “I don’t know if certain vaccines are more necessary or less necessary than others.”</p> |
| Independent Variables—Proximal | | |
| DISEASE | | |
| Susceptibility to (Suscept) | Statements concerning perceived susceptibility to vaccine-preventable diseases (VPDs) in general. | |
| High (Hi) | Statements indicating respondent/participant (R) believes self/others to be susceptible to one or more VPDs. | “Oh, absolutely take [vaccinations]! I gave [the MMR and DTap] to my kids; I had my kids vaccinated for those. Because . . . if the kids get [those diseases], they’re going to die, or have some other serious problem.” |
| Low (Lo) | Statements indicating R believes self and others are not | “You see kids that are coming from a poor household where nutrition is minimal . . . and the hygiene’s poor, |

| Variable | Definition | Exemplar Quotes |
|---------------------------|---|--|
| Severity of (Severity) | susceptible to one or more VPDs. | and they're not getting breastfed, then by all means vaccinate. But if it's a household where nutrition is pretty good, they're nursing, there's good hygiene . . . the mom's in a good state of health or is willing to get there, then the babies are more protected, even if they're not vaccinated." |
| High (Hi) | Statements concerning perceived severity of VPDs in general. | "Vaccinations . . . have been important, obviously, in improving public health, in diminishing some very nasty diseases . . . like polio, for sure." |
| Low (Lo) | Statements indicating that R believes one or more VPDs are serious. | "Chickenpox happens to be . . . something that doesn't kill people and actually strengthens our immune system." |
| VACCINE | | |
| High Benefit (Hi Benefit) | Perceptions that vaccines in general are beneficial. | "I really strongly encourage every parent to get their kids at least a tetanus series once they get up and start walking, because from my perspective—better safe than sorry in that regard." |
| High (Hi)) | Statements indicating that R believes one or more vaccines are very beneficial. | "We don't know . . . the long-term impact of [the HPV vaccine]." . . . [The vaccine] may be a really damaging type of thing." |
| Low (Lo) | Statements indicating that R believes one or more vaccines are not beneficial. | |

| Variable | Definition | Exemplar Quotes |
|-----------------------------|--|---|
| High Efficacy (Hi Efficacy) | Perceptions that vaccines in general are efficacious—they address the targeted pathogen and do so effectively. | |
| High (Hi) | Statements indicating that R believes one or more vaccines are very efficacious. | “HPV vaccine is one of the first vaccines that . . . prevents 75% of cervical, vaginal, vulvar cancers, because it prevents infection with HPV 16 and 18 [the two strains that cause the majority of those cancers].” |
| Low (Lo) | Statements indicating that R believes one or more vaccines are low in efficacy. | “It’s kind of a gamble every year when they make up the flu vaccine whether they’re going to have the right strain in the vaccine. . . .” |
| Low Risk (Lo Risk) | Perceptions of the risk of adverse effects or illness from vaccines as low when weighted against the benefits of vaccinating. | |
| Yes (Y) | Statements indicating that R believes one or more vaccines to be low in risk for adverse effects or illness. | “Tetanus [vaccine] seems safe.” |
| No (N) | Statements indicating that R believes that one or more vaccines are too risky or likely to result in illness or adverse effects to be administered safely. | “. . . her husband had died from a reaction to the swine flu vaccination.” “She doesn’t take the flu vaccine either . . . it has aluminum as a carrier molecule in it and . . . we know that there’s no safe amount of aluminum in the human body. And we know that aluminum in the human body causes tangles in the brain and . . . we see tangles in the |

| Variable | Definition | Exemplar Quotes |
|-------------------------------------|---|---|
| brain of Alzheimer’s patients.” | | |
| Independent Variables—Distal | | |
| NORMS | | |
| Pro-vaccine (Provax) | Statements about norms within R’s circle of colleagues or in the profession as a whole. | “Most all [midwives I know] have vaccinated their kids.” |
| Anti-vaccine (Antivax) | Statements indicating that R’s professional norms do not favor vaccines. | “I would say the majority of people that I trained with were against vaccinations, because they feel that it can have a negative effect on the [body]; that it’s unnecessary, and it’s actually good for our body to fight pathogens we’re exposed to.” |
| Delay (Delay) | Statements indicating that R’s professional norms favor delaying all pediatric vaccines (Table 4 only). | “[Naturopathic CE course instructors] advocate a delayed [vaccine] schedule. . . . I’m also in favor of a delayed schedule.” |
| EXPERIENCE | | |
| Neg Immuz | Statements about experiences with a VPD or a vaccine, or both. Statements indicating R’s direct or vicarious adverse event or illness following immunization (AEFI). | “I had [a] hepatitis B vaccine and, within a couple of months, my thyroid went out and I got Graves’ disease.” |
| IMMUNE (Immunology Beliefs) | Statements concerning R’s beliefs about how the human | |

| Variable | Definition | Exemplar Quotes |
|---|---|--|
| Traditional (mainstream medical beliefs about the immune system). | immune system works to prevent disease. | “Well, first of all, your body – you come across an infection and your body mounts an immune response by identifying the infection and sending in and developing antibodies towards this infection. And . . . identifying what’s going wrong and helping you to fight it.” |
| Non (Nontraditional or alternative beliefs about the immune system). | Statements indicating that R embraces alternative beliefs about the immune system. | “You [...] get your genetic cards dealt to you at birth. That sort of prenatal essence is a substance called <i>jing</i> , source <i>qi</i> . It’s like the sand in your hour glass: you can use it up slowly or quickly but it when it’s gone that’s it.” |
| Mix (A mixture of MM and alternative beliefs about the immune system) | Statements indicating that R holds both traditional mainstream medical and alternative beliefs about the human immune system. | “Good homeopaths, and especially MD/homeopaths – or homeopaths . . . who understand that what conventional science says about the human body needs to be taken into consideration when we’re treating folks homeopathically. That is, we don’t just make people feel better, but we have to see their laboratory values getting better, their imaging studies getting better and all the rest. Otherwise, we’re only doing half of what we should be doing.” |
| GOV/INDUSTRY (government or industry, or both) | Statements about government agencies or the pharmaceutical industry, or both. | “Like everyone that works for Big Pharma used to work for the FDA? . . . You do a favor for them in the FDA, couple years down the road come work for us and we’ll make sure you’re getting six figures.” |

| Variable | Definition | Exemplar Quotes |
|--|---|--|
| Government agencies or programs (Govt) | Statements that reflect R's beliefs about government. | |
| Positive (Pos) | Statements indicating that R supports government program or efforts in general. | “I think that the government’s trying to do their job with public health.” |
| Negative (Neg) | Statements indicating that R opposes or distrusts government programs or efforts in general. | “The vaccine makers cannot be sued for liability of these products. ... [That] smacks of unequal protection under the law.” “I would be of the opinion that there is some strong-arming by public agencies to have your children vaccinated.” |
| Pharmaceutical companies (Pharm) | Statements that reflect R's beliefs about commercial vaccine producers. | |
| Positive (Pos) | Statements indicating that R supports pharmaceutical industry vaccine programs and promotion efforts. | “When you look at the amount of money and time that is required to bring a drug from the first conception to the market, it’s what – 15 years now? Or longer? And it costs billions of dollars? So, in order for a company to go through all of that research and time and regulation and only have a time period of five years, from which they can benefit from the patent and recover all of that cost of development, of course it’s going to be expensive.” |

| Variable | Definition | Exemplar Quotes |
|----------------|---|---|
| Negative (Neg) | Statements indicating that R does not support, or is suspicious of, pharmaceutical industry vaccine programs and promotion efforts. | “Medicine and drugs are huge business.” “And there’s plentiful evidence, you know, that the pharmaceutical industry has strong influences in government policies. . . .” |
