A REVIEW OF THE EVIDENCE SURROUNDING INTERVENTIONS FOR VACCINE HESITANCY IN PRIMARY CARE

by

Christine Sarter Huel

R.N. (Diploma), Lethbridge College, 2003
B.N., Athabasca University, 2010

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ABSTRACT

In the past five years, the rate of children in British Columbia who have been fully immunized by the age of two has ranged between 65% to 71%. This statistic remains far below the coverage rate required to ensure herd immunity and to suppress communicable diseases. Correspondingly, outbreaks of pertussis and measles in the province are occurring with alarming frequency. Caregivers who are philosophically or conscientiously opposed to routine infant and childhood immunizations have been blamed for the re-emergence of these diseases, and for the low coverage rate of vaccination both provincially and federally. Among this group of caregivers for children are those who are *vaccine-hesitant* those who are uncertain about vaccine safety and have yet to decide if they will immunize their child. Evidence shows that primary care providers, like family nurse practitioners, continue to be considered as a key source of immunization information for these philosophically opposed caregivers, regardless of whether or not they proceed to vaccinate their children. The goal of this project is to present the results of an integrative literature review that addresses the question "What interventions can primary care nurse practitioners employ in communicating immunization safety to increase vaccine uptake in hesitant caregivers?" A Medline literature search produced 10 research articles for analysis. The Fuzzy-Trace Theory was employed to provide the theoretical framework for this paper and to inform the rationale applied to the findings identified by the review literature. Major findings emphasize the necessity for research that evaluates interventions aimed at increasing vaccine uptake in hesitant caregivers, the importance of child-centered communication using narrative and storytelling to explain vaccine risk and benefits, and the need for more education with respect to vaccination during pregnancy.

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CHAPTER 1

Introduction

Immunization programs are considered to be one of the most successful public health initiatives put forward by modern medicine. These programs provide a safe, cost-effective measure to prevent disease and premature death (Public Health Agency of Canada, 2013a). Yet, in recent times, Western countries with strong public health initiatives have seen outbreaks of vaccine-preventable diseases in pediatric populations whose caregivers oppose immunization ("Vaccine safety," 2009). Philosophical or conscientious opposition to routine infant and childhood immunization includes those individuals who believe (or suspect) some or all of the following propositions: that vaccines are ineffective and harmful to the immune system; that adverse effects from vaccines are under-reported; that vaccine-preventable diseases are not harmful; that supporters of vaccination are motivated by profit and therefore will overlook the dangers of vaccination; and that compulsory childhood vaccine schedules are a violation of civil liberties (Fredrickson et al., 2004; Lyren & Leonard, 2006; Nield, 2008).

The degree to which these propositions influence caregivers who subscribe to some or all of these beliefs will show up in the population in three broad groups. Caregivers who are philosophically opposed to immunizations can be grouped on the basis of *vaccine rejecting* individuals who oppose all routine childhood vaccines, *vaccine resistant* individuals who selectively choose certain vaccines for their children, and/or request alternative timing schedules for vaccine administration, and individuals who are *vaccine-hesitant*, as yet uncertain about vaccines and undecided as to whether their child will be immunized (Hagood & Herlihy, 2013; Public Health Agency of Canada, 2013a). Essentially, caregivers who are philosophically opposed to vaccination are thought to have weighed the perceived benefits and risks of vaccinating their children and to have made a conscious decision to abstain based on their belief that they are protecting their child's health.

The extent to which caregivers who are philosophically opposed to vaccination will have a negative impact on the rate of immunization for an entire population —by increasing the risk for communicable disease outbreaks –is a significant concern for public health professionals worldwide (Luyten, Desmet, Dorgali, Hens, & Beutels, 2013). According to a recent UNICEF report looking at child well-being in wealthy countries (Adamson, 2013), the Canadian average for full vaccination at two years of age is 84%, 11% short of the worldwide average of 95% for developed countries. The report also notes that full vaccination rates for Canadian children at two years of age have declined over the past 10 years, and it postulates that rumours and misinformation with respect to the safety of vaccines could further affect vaccine uptake. This is supported by a 2011 pan-Canadian survey which notes that 50% of parents surveyed were concerned that new vaccines are not as safe as older vaccines, and that 33% of the parents surveyed felt that children currently receive too many vaccinations (Ekos Research Associates Inc., 2011).

In British Columbia the rate of vaccination is even lower than the national average, proposing a bleak outlook for future disease control. Following a study that took place between 2006 and 2007, the BC Immunization Subcommittee reported that only 69% of two-year-old children were fully covered—a rate that was deemed to be inadequate (British Columbia Centre for Disease Control (BCCDC), 2009). The Subcommittee set a target increase of 5% per year with a view to achieving a long-term coverage rate of 95% (which was thought could be achieved by 2015).

A vaccine coverage rate of 90% is considered optimal for maintaining herd immunity on the basis of a reduction in the circulation of pathogens within a largely vaccinated population, and the consequent suppression of communicable disease outbreaks (Fine, Eames, & Heymann, 2011). A follow-up report (BCCDC, 2014) pointed out that there are presently health service delivery areas within British Columbia with vaccine coverage rates as low as 57%. The most recent ImmunizeBC progress report (BCCDC, 2014) states that only 68% of children province-wide are up to date on their vaccinations by the time they reach the age of two, a decrease of 1% from the earlier report cited above which initially prompted the Subcommittee to set targets for increasing vaccine uptake in two-year-old children.

The nationwide decline in infant and childhood immunization uptake has had a significant impact on herd immunity rates. Outbreaks of vaccine-preventable communicable disease, previously a rare occurrence, are now occurring at regular intervals. In 2010 and 2014, outbreaks of measles in British Columbia challenged public health leaders to contain the spread of measles and to advocate measles vaccination to unimmunized populations (BCCDC, 2013; Maki & Barton, 2014). Similarly, pertussis outbreaks in the province in 2012 and 2013 have signaled a return of epidemic rates reminiscent of the late 1990s and early 2000s (BCCDC, 2013). According to the media, the loss of public confidence in immunization is to blame for the recent outbreaks (Pearce, 2013; Woodward, 2014). These recent events highlight the challenge of increasing vaccination rates in children in order to thwart the further spread of vaccine-preventable diseases. In the event that immunization rates continue to decline—and incidence of disease outbreaks increases—the risk of hospitalization and death will needlessly persist for society's most vulnerable groups, infants and the elderly (Kennedy, Pruitt, Smith, & Garrell, 2011).

To reiterate, philosophical opposition to vaccination poses a significant challenge to healthcare professionals as vaccine-preventable communicable diseases, not widely experienced for decades, re-emerge in unvaccinated populations (Public Health Agency of Canada, 2006). Numerous research studies indicate that primary care providers (PCPs), in particular, play an important role in the decisions that caregivers are likely to make (McMurray et al., 2004; Omer, Salmon, Orenstein, deHart, & Halsey, 2009). While much of this research focuses on the role of family physicians as PCPs, it does not address the extent to which other PCPs, such as nurse practitioners or midwives, influence this decision-making process. Studies generally find that, even where parents are philosophically opposed to immunizations, regardless of whether or not they decline vaccinations for their children, they still identify their family practitioner or PCP as their primary source for information about vaccines (Omer, Salmon, Orenstein, deHart, & Halsey, 2009; Salmon et al., 2005). Studies have also indicated that the extent to which the primary care provider is both knowledgeable and comfortable with the topic of immunization appears to increase vaccine uptake in vaccine-hesitant caregivers (Petousis-Harris, Goodyear-Smith, Turner, & Soe, 2004). This finding indicates that PCPs must be well-versed in ways of approaching this topic given the level of influence they exert on the decision-making processes of caregivers and parents.

Current recommendations for healthcare providers working with philosophically opposed families place great emphasis on provider/patient relationships and emphasize that healthcare providers are in a good position to put forward evidence-based, counter-arguments to anti-vaccine claims (Healy & Pickering, 2011; Levi, 2007; Smith, Kennedy, Wooten, Gust & Pickering, 2006). Research findings (and opinion pieces) published in academic journals highlight the importance of establishing trust and mutual respect between the healthcare practitioner and their patients, arguing that this is a key factor in the likelihood of increasing vaccine uptake in philosophically opposed caregivers. However, it seems that these recommendations tend to focus on abstract relational qualities that will vary among healthcare providers and their patients:

perceptions of the characteristics of a trustful relationship between practitioner and patient can differ between practitioners and between patients (Healy & Pickering, 2011; Levi, 2007).

The research literature also provides recommendations for ways in which to address vaccine hesitancy, proposing that anti-vaccine arguments can be countered with evidence-based information provided by way of an open communication style in the course of counselling (Healy & Pickering, 2011; Levi, 2007; Smith et al., 2006; "Vaccine safety," 2009). However, there is no evidence that providing good medical information about the safety of vaccines will increase patient understanding or improve immunization uptake (McMurray et al., 2004). On the whole, research findings in the literature do not outline specific strategies or interventions that healthcare providers might employ to convey the safety of vaccination to hesitant caregivers; despite the fact that such interventions could offer a clearer direction on how to increase immunization uptake.

The purpose of this project is to present an integrative literature review to address the question of "What interventions can primary care nurse practitioners employ in communicating immunization safety in order to increase vaccine uptake in hesitant caregivers?" This project will contribute to moving the focus away from the relational aspects of primary care by identifying the research that has been shown to be helpful in conveying the message to caregivers that vaccinating children is not only safe but is also a preventive health measure.

At the same time, the purpose of this review is not to diminish or negate the value of positive, trust-imbued patient/provider relationships when it comes to influencing decisions about vaccination. Instead, this review proposes that, while the existence of a trustful relationship between patient and healthcare provider plays an important role in communicating the safety and importance of vaccines, more is needed for this to be effective or influential when it comes to increasing vaccine uptake. Literature that looks only at the positive aspects of trustful patient relationships as a means to improve vaccine-uptake leaves little to go on for healthcare providers who already have good clinical relationships yet still struggle to increase vaccine uptake.

The findings of this review are examined using the fuzzy-trace theory, as outlined by Brainerd and Reyna (2001). This theoretical framework is employed here to provide a means to examine why strategies for increasing vaccine uptake in hesitant caregivers may or may not be successful, and why current approaches to vaccine hesitancy have not been successful (Kempe et al., 2011).

It is not the purpose of this review to focus on caregivers who vehemently reject vaccination. Research indicates that this group is the least likely to be open to further discussion, or to be influenced by educational initiatives given their irrational belief systems (Hagood & Herlihy, 2013). Instead, the focus of this review is on evidence-based strategies that nurse practitioners and other PCPs working with caregivers might employ with those who are vaccine-hesitant, on the basis that this group is considered more likely to take into account and act on information put forward by healthcare providers (Hagood & Herlihy, 2013).

This paper will first present the background to the research question, followed by an explanation of the fuzzy-trace theory, and then a description of the method used to select the data. This will be followed by a presentation of the findings from the literature analysis, a discussion of the findings, and finally, recommendations for practice, research, and education. The chief purpose of this review is to make available a body of evidence-based knowledge about vaccine hesitancy as it is encountered in primary care—especially to family nurse practitioners who are in a significant position to incorporate this knowledge into their practice. The following background to this topic considers a brief history of philosophical opposition and the anti-vaccine movement, and will situate the issue of opposition to vaccination within the context of the practice of family nurse practitioners in Canada.

Background

History of Vaccine Opposition

Since the inception of British-organized vaccination campaigns in the early 1800s, opposition to immunizations has persisted even as advances to vaccines were made (Saint-Victor & Omer, 2013). Interestingly, many of the concerns voiced by various anti-vaccine interest groups have remained unchanged over time, and the arguments against vaccination have simply shifted their focus from one vaccine to another. Saint-Victor and Omer (2013), in their consideration of the pattern of vaccine refusal, note that, over the past two centuries, vaccine dissidents tend to insist that their first-hand experience of injurious vaccination provides a sufficient basis for their opposition. In the past, as in the present, those opposed to vaccination appear to give more weight to personal narratives and hearsay accounts, and less weight to research—even research that considers the potential adverse effects of vaccines and gives some support to the position of those opposed to vaccination.

Similarly those opposed to vaccination are also more likely to endorse the viability of alternative medicine as a means by which immunization can be effected. The persistence of this pattern of opposition over time would seem to indicate that vaccine opposition is a cyclical phenomenon within a population, and is not a new issue in healthcare today. Understanding this trend could help predict when these viewpoints will eventually fall out of favor.

Historically, predictable trends in anti-vaccination sentiments have been shown to proliferate during the time in which disease incidence is at its lowest. Saint-Victor and

Omer (2013) note that "the period of time during which disease prevalence remains low enough to escape public notice corresponds to a spike of vaccine refusal as vaccine-preventable diseases fall out of public notice, and post-vaccine adverse effects gain more attention" (p. 2). They also point out that, historically, the anti-vaccine movement becomes less popular and loses momentum when populations experience a renewed susceptibility to vaccine-preventable disease and outbreaks or epidemics result. By contrast, and unlike this historical trend, recent evidence indicates that, despite widespread outbreaks in 2012 of pertussis in Washington State—a geographical area with low vaccine uptake due to vaccine refusal —there was no increase in vaccine uptake once the epidemic subsided (Wolf, Opel, DeHart, Warren, & Rowhani-Rahbar, 2014). These findings suggest that there are characteristics particular to modern-day philosophical opposition that act to reinforce the convictions of caregivers despite the occurrence of epidemics of vaccine-preventable communicable disease within their communities. This divergence from the historical trend described above signals a need for innovative approaches to overcoming vaccine hesitancy, especially given the resilient convictions of those opposed to vaccination in the face of evidence to the contrary.

Modern Day Philosophical Opposition

The most recent wave of anti-vaccine sentiments has been largely attributed to a controversial study published in *The Lancet* in 1998, which suggested a link between autism and the MMR vaccine for measles, mumps, and rubella (Gerber & Offit, 2009). Autism is an idiopathic condition that has become more prevalent over the past 40 years, and linking the MMR vaccine to the increase in the occurrence of autism not only caused tremendous public outrage (Mnookin, 2012), but MMR vaccine uptake in developed countries fell significantly as caregivers perceived a risk of triggering autism in their children (Larson, Cooper, Eskola, Katz, & Ratzan, 2011). In the aftermath of this controversial study, numerous research initiatives worldwide attempted to replicate the results—with no success (Immunization Action Coalition, 2008).

Anti-vaccine advocates have also linked autism to thimerosal, a mercury-derived vaccine preservative. This claim is connected to a 1999 United States Food and Drug Administration recommendation to remove thimerosal from infant vaccines as a purely precautionary measure (Centers for Disease Control, 2014). Anti-vaccine advocates linked the reported increase in the rate of autism with the increase in the number of vaccines in the childhood vaccination schedule, and concluded that the government action to remove thimerosal from immunizations proved that the preservative was responsible for the development of autism (Mnookin, 2012). The intensity of these allegations subsequently led other governments to request that vaccine manufacturers voluntarily remove this ingredient from vaccines for infants and children. Since the removal of thimerosal from American infant and children's vaccines in 1999, numerous subsequent studies have failed to find any causal link between thimerosal and autism (BCCDC, 2013). Thimerosal was removed from vaccines in Canada in 2001, even as the diagnosis of autism continues to increase (British Columbia, ImmunizeBC, 2013; Larson, Cooper, Eskola, Katz, & Ratzan, 2011).

A worrisome trend in anti-vaccine advocate's claims about immunization safety is the ever-changing nature of the argument against vaccination, which gives the sense of a moving target. As each new claim concerning the safety of vaccination is reported by the media, healthcare providers are continually challenged to respond to arguments against vaccination, and the demand for research to demonstrate that vaccines are indeed safe increases. Research required to counter the opposition to vaccination does not come without a cost, particularly when unsubstantiated arguments against vaccination continue to proliferate, and when those who are vaccine-opposed are unwilling to acknowledge that these arguments are ever-changing (Gerber & Offit, 2009).

Factors Contributing to Modern-Day Public Mistrust of Vaccines

Socio-Cultural Changes

Although there are similarities between historical and current philosophical opposition to immunization, a number of sources propose that current socio-cultural influences contribute to the present phenomenon of increased opposition (Dubé et al., 2013). Jolley and Douglas (2014) investigated the potential impact of anti-vaccine conspiracy beliefs similar to those linking vaccines to autism. They found that exposure to anti-vaccine conspiracy theories appears to trigger undue suspicion about vaccine safety, and increases feelings of powerlessness and disillusionment, while at the same time decreasing trust in authorities, which in turn introduces a reluctance to vaccinate. They also linked this phenomenon to an ever-growing "culture of conspiracism" where a mistrust of science and a dislike of medical "officialdom" trickles down to influence the decisions caregivers make about the health of their children.

Postmodernism

Alternatively, a number of studies propose that present-day philosophical opposition to childhood vaccination is due less to a "culture of conspiracism" and more a by-product of the postmodern medical paradigm. The argument is that, in a postmodern society, as power shifts from providers to patients, the legitimacy of science is put into question and expertise is redefined (Larson et al., 2011; Kata, 2012). In this context, patients are characterized as "consumers" of healthcare who, with their seemingly limitless access to online sources of information, are less inclined to rely on the "experts" who previously helped them navigate their treatment choices (Kata, 2012). Patients today are encouraged to be well-informed and are increasingly empowered to contribute to decisions relating to their health; there is a growing emphasis on making decisions together with their healthcare providers. The current trend for healthcare delivery now appears to give equal weight to the personal values and preferences of the patients as it does to evidence-based medicine.

In this context, the postmodern concept of "relativism" describes a departure of belief in objective facts in favour of multiple meanings and ways of knowing (Kata, 2012). This shift towards multiple meanings can also be accompanied by disillusionment and generalized suspicion of scientific evidence and expertise. What once was a top-down, expert-to-consumer transfer of information with respect to the importance of vaccination has shifted towards a non-hierarchical, dialogue-based pattern of horizontal communication (Larson et al., 2011). The anti-vaccination movement has benefited from this societal paradigm shift, allowing it not only to strengthen and legitimize its claims, but to also place the various claims to alternative or anecdotal evidence on par with (or having more weight than) scientific evidence. Caregivers who subscribe to anti-vaccination propositions are a good illustration of this shift —in their readiness to consider themselves experts in their children's care, and to take responsibility for conducting their own research, often by way of the Internet, in order to make what they consider to be informed choice about the risks and benefits of vaccination.

Media

To further intensify the issue of self-appointed expertise, caregivers are subject to inundation by constant media input on questions of vaccine safety and effectiveness. Kata (2012) notes that, with the transition to "Web 2.0," and the emergence of user-generated Internet content, sources such as blogs, video-uploading, and social media sites have come to dominate how parents share and access health information. Anti-vaccination groups have made great use of the interactive nature of this iteration of the Web, allowing social media to thrive and provide an effective means by which individuals can interact with a group that shares their beliefs and anecdotal evidence with respect to vaccine safety.

Davies, Chapman, and Leask (2002), in their examination of the extent and character of anti-vaccination sites accessible on the Internet, found that 43% of the websites that came up when searching for "vaccination" and "immunization" conveyed views that were philosophically opposed to vaccines. Often the information produced by anti-vaccine websites is extravagant and highly rhetorical, designed to appeal to those with already well-formed views, as well as being designed to develop a rapport with parents seeking vaccine-related information —often by way of video uploads (Davies, Chapman, & Leask, 2002; Healy & Pickering, 2011). It is difficult for caregivers to ignore the power of the emotionally driven messages on anti-vaccine websites, sites which often foreground a parent's struggle with a vaccine-injured child.

It is also interesting to note that anti-vaccine websites often have official-sounding names that purport to be authoritative, such as the National Vaccine Information Center, the Vaccine Risk Awareness Network, and the Vaccine Information Network. Caregivers using the Internet in hopes of finding a balanced presentation with respect to the risks and benefits of vaccines are made vulnerable because these sites prey on assumptions that seemingly authoritative sources will present an unbiased representation of the facts around immunizations. On entering these sites, readers are bombarded with fear-based messages reporting adverse effects and images of vaccine-injured children. The emotionality of these websites, and the way the information is delivered, is persuasive to say the least. Studies have found that only five to ten minutes spent on a website of this nature is sufficient, not only to alter perceptions but also to effect a decrease in the acceptance of vaccines where a previous pro-vaccine stance may have existed (Betsch, Renkewitz, Betsch, & Ulshöfer, 2010). Vaccine-hesitant caregivers are particularly susceptible to such websites as they attempt make an informed decision to immunize their children. The combination of pseudo-officialdom with emotional, fear-based messages is difficult to ignore when a caregiver has their child's best interests in mind.

Experiential Knowledge

In the light of seemingly limitless and contradictory sources of vaccine information, it is believed that many healthcare professionals have underestimated the persuasive nature of Internet anti-vaccine messages *and* disregarded the power of parents' experiences with illnesses in their children (McMurray et al., 2004). Research shows that, when communicating with caregivers with respect to the benefits of vaccinating their children, healthcare professionals tend to emphasize research that indicates a reduction in the incidence of disease in highly vaccinated populations (Healy & Pickering, 2010). This observation is significant when considering that today's caregivers may never have experienced or witnessed a vaccine-preventable illness, but they are likely to know of, or have a child of their own, diagnosed with a disorder that has been implicated in the anti-vaccine discourse, such as an autism spectrum disorder, juvenile autoimmune disease, attention deficit disorder, or an atopic disorder. Anti-vaccine websites have linked all of these illnesses to routine infant and child vaccinations (National Vaccine Information Center, 2014; Vaccine Information Network, 2014).

Research indicates that first-hand experience with children with autistic disorders plays an influential role in parental decisions not to vaccinate their child (McMurray et al., 2004). Current recommendations with respect to communication strategies for encouraging vaccination do not, for the most part, acknowledge the influential role that experiential knowledge plays in the decision-making processes of caregivers. Nor do these recommendations take into consideration the extent to which parents are challenged by the vast amount of contradictory information they feel obliged to sift through and appraise in order to make the best healthcare decisions on behalf of their children.

Current Vaccine Hesitancy Strategies

Interestingly, according to Fredrickson et al. (2004), a significant contributing factor to vaccine hesitancy is the educational model to which healthcare providers adhere when addressing the topic of immunization with their patients. A number of sources note that much of the educational material developed to advise healthcare providers as to how to address the vaccination concerns of patients has its basis in a "cognitive deficit" model (Blendell & Fehr, 2012; Fredrickson et al., 2004; Healy & Pickering, 2011; Kempe et al., 2011; Kennedy et al., 2011; McMurray et al., 2004). The cognitive deficit model assumes that patients simply lack the medical facts needed to make informed decisions about vaccines, and that the provision of medical information will, in itself, be sufficient to quell vaccine concerns. At present the educational resources developed for healthcare providers by the British Columbia Centre for Disease Control (Immunization Communication ASK Tool) and the Public Health Agency of Canada (Canadian Immunization Guide) to address vaccine hesitancy place great emphasis on countering anti-vaccine arguments with evidence-based information that purports vaccine safety (BCCDC, 2013; Public Health Agency of Canada, 2013a). Kempe et al. (2011) argue that this traditional approach to patient education has hampered the efforts of primary care providers to address vaccine hesitancy or refusal. Research coming out of the behavioural science field proposes that, to effectively address vaccine hesitancy, healthcare professionals must take into account the reality that caregiver decision-making is influenced by the wider socio-cultural context, not simply information from a single (medical) source. (Dubé et al., 2013).

When comparing current vaccine communication strategies to the theoretical framework used for this review, it became evident that the fuzzy-trace theory could provide rationale as to why this approach has been unsuccessful (Brainerd & Reyna, 2001). The fuzzy trace theory provides a way of looking at the vaccine decision-making process based on how information is imparted, either through *gist* or *verbatim* representations (Reyna, 2012). Verbatim representations make up the evidence-based information healthcare providers share with their patients regarding vaccinations. Healthcare providers may concentrate their efforts on reporting the facts regarding vaccination to caregivers, along the lines of the cognitive deficit model, rather than being concerned with actually imparting meaning along with the information. This may explain, to some extent, why the cognitive deficit model is not appropriate for the complex decision-making process that caregivers are confronted with when attempting to provide the best care for their children. Further explanation of the fuzzy-trace theory is provided later in this review, along with a discussion of the way it can be applied to the findings revealed by the literature.

As noted above, a certain mistrust of official scientific information is characteristic of postmodern societies (Larson et al., 2011). Much of the information about vaccine safety currently provided to healthcare professionals is distributed by government agencies and medical societies, sources that likely fall under the rubric of “officialdom,” and could therefore be suspect in the perception of vaccine-hesitant caregivers. By using information provided from official sources, such as Health Canada, the Canadian Paediatric Society, or the Centers for Disease Control, healthcare providers are not taking into account research that indicates caregivers who are likely to be hesitant or refuse vaccination are also likely to mistrust such authorities (Larson et al., 2011; Salmon et al., 2005). Providers who endorse these official sources to their patients in the course of addressing vaccine hesitation may find that the content of what they are trying to say fails to engage vaccine-hesitant caregivers, given the lack of trust this population is reported to have in formal authorities of this nature.

Vaccine Opposition: Multiple Determinants

Given the multiple factors that appear to influence vaccine hesitancy at this time, it is worth setting out these factors here as a way of illustrating the complexity that healthcare providers and social scientists are faced with when it comes to reestablishing a better rate of vaccination. Dubé et al. (2013) propose a conceptual model for understanding vaccine hesitancy that well conveys the complexity of this issue and takes into account the many factors that currently influence the decision-making processes of caregivers. The authors explain that "this model was adapted from a schema summary of discussions held during a workshop on the cultural and religious roots of vaccine hesitancy in Canada" (p. 1763). The workshop was part of a conference at the University of Sherbrooke that addressed vaccine hesitation and included experts from social sciences, humanities, public health, and biomedical sciences. The authors argue that vaccine hesitancy is actually a result of broader societal influences that includes historical, political and socio-cultural contexts (Dubé et al., 2013).

The workshop participants determined that a complex array of both external and internal influences govern the individual choice of whether or not to vaccinate. A schema summary was developed out of these discussions (Laberge et al., 2011) and was later developed as a conceptual model that depicts the wide range of influences to which caregivers are subject to, and situates them on a spectrum that ranges from refusal to acceptance. Appendix B, Figure 1 presents the model that came out of the schema developed in the workshop. This model has implications for PCPs because it indicates that vaccine hesitancy cannot be attributed to a simple lack of information, or to an oversupply of bad information. It places the issue of vaccine hesitancy within the wider socio-cultural context and maps a whole range influences external to the patient-provider relationship. This depiction of the reality that caregivers are subject to has the potential to shape the way in which healthcare professionals address vaccine-hesitant patients, especially given that current recommendations for informing caregivers place greater emphasis on the importance of the patient/provider relationships. Consideration of historical, political, and socio-cultural factors will undoubtedly help healthcare providers better understand that their patients are motivated by a broad range of external factors, and do not simply act on the basis of trust.

Canadian Vaccine Requirements

Walkinshaw (2011) notes that in Canada, three provinces have legislated vaccination policies that apply to children preparing to enroll in school: Ontario and New Brunswick require immunizations against diphtheria, tetanus, polio, measles, mumps, and rubella and, in Manitoba, proof of a measles vaccination is required before children commence kindergarten. Despite this mandated requirement, all three provinces also have legislation that includes an exemption clause. According to Walkinshaw, this allows caregivers to request that their child be exempted from the vaccination requirement on medical, religious, or conscience grounds. At present, no other province in Canada requires proof of up-to-date immunizations before entering school (Gilmour, Harrison, Asadi, Cohen, & Vohra, 2011). This state of affairs in Canadian schools means that there is no way of knowing how many children in any given school population are lacking recommended immunizations.

Smith, Chu, and Barker (2004) examined the socio-cultural attributes of both under-vaccinated and unvaccinated children between the ages of 19 and 35 months in hopes of predicting trends in the US. They found that under-vaccinated children—who typically have some, but not all vaccinations up to date—belong to a racial minority, have a mother with a low educational status, and belong to a household living below the poverty line. On the other hand, they found that unvaccinated children had caregivers who were vaccine opposed; they tended to be Caucasian, have a mother with a college education, live in a household with a combined income exceeding $75,000, and reside in an urban setting.

Research that examines the issue of under-vaccination tends to focus on the issue of removing of barriers to healthcare access, and advocates strategies to remind caregivers that vaccinations are due as a way to increase vaccine uptake. Given that most provinces in Canada do not require proof of immunization prior to school enrollment, it is difficult to ascertain the level of risk that children in a school population face when unvaccinated and under-vaccinated children are largely unaccounted for. This is an important consideration when medically-exempt children—who are unable to receive vaccines due to illness or allergies—plan to attend a school where the rate of vaccination in the population is undetermined. Caregivers of these children, unable to risk vaccination, are faced with having to mitigate the risk of exposure to communicable diseases in the absence of knowing the rate of vaccination in the school population.

Philosophical Opposition and Primary Care

Philosophical opposition to vaccination presents both a challenge and an opportunity for PCPs. Once an issue related only to those working within the public health sector, the issue of vaccination has more recently moved into the sphere of primary care. This is in response to the twin nature of vaccination as both a public health program and an individual preventive intervention. Today, both primary care givers and public health care agencies have a decided interest in the widespread delivery of vaccinations. There is strong evidence to indicate that PCPs play an influential role in the decision-making processes to which caregivers' embark on during vaccination decision-making, even where the primary care provider is not providing the vaccine (Mergler et al., 2013; Smith et al., 2006; Freed, Clark, Butchart, Singer, & Davis, 2011; Salmon et al., 2005; Omer et al., 2009). The presence of an established relationship seems to make it more likely that primary care providers will be approached for vaccine-related information. While attending incidental appointments with a primary care provider, the opportunity to discuss whether or not a child is up-to-date on their immunizations is always available.

In spite of the evidence implicating the role of the primary health care provider in the delivery of vaccine-related information, much of the relevant educational information developed in Canada is designed to address all health care providers. However, it may be that PCPs are not as aware of these resources and/or do not refer to them as frequently as other healthcare providers, such as public health nurses do (BCCDC, 2013; Public Health Agency of Canada, 2013a).

In British Columbia, most infants and children receive their vaccinations at public health clinics by way of scheduled appointments with a public health nurse (Provincial Health Services Authority, 2012). The potential for caregivers to develop a relationship with employees at public health units depends on the community, its population, the roles of the staff employed there, the structure of the clinic, and how long the family has resided in the area. Given that most children in the province receive their immunizations at public health clinics it is interesting to note that the official educational material promoting the importance of vaccination is targeted for healthcare providers in a setting where hesitation or refusal may be less likely to occur (BCCDC, 2013; Public Health Agency of Canada, 2013a).

It is also important to acknowledge that vaccine-hesitant caregivers can easily avoid appointments at public health clinics and thereby thwart potential discussions about vaccination, or escape entirely from any pressure to immunize in the course of their appointment. The choice to not book an appointment with a public health agency is simple compared to the prospect of staying off the radar by circumventing primary care when it comes to children.

This is not to say that resources have been misdirected in training public health professionals to appropriately address the concerns of vaccine-hesitant parents. Rather, within the structure of the current health system, PCPs are well-placed to deliver educational content; they have both the opportunity and the influence to work with vaccine-hesitant caregivers despite their lesser role in the actual administration of vaccines.

In order to come to an understanding of the link between vaccine hesitancy and primary care providers, both retrospective and prospective considerations must be taken into account. Retrospectively PCPs, specifically family physicians, have been criticized for their authoritarian stance, a behaviour that is seen as a contributing factor to the vehemence of the anti-vaccine movement. Suk (2010) argues that the derogatory and condescending rhetoric that characterizes the medical literature that examines vaccine-opposed parents—along with the historical legacy of paternalistic behaviour on the part of the medical community—could be a factor in the increased opposition to vaccinations. He points out that long-term benefits are to be had if we address this and move to build partnerships with parents as individuals rather than treating them as part of a group that exists in opposition to medical authority when it comes to vaccination. Prospectively, primary care is moving towards fostering partnerships between providers and patients when it comes to making decisions with respect to their healthcare—a shift that could well improve the balance of this relationship.

Alternatively, if the current issue has little to do with the nature of the relationship between the primary care provider and the patient, and the seeming impasse has more to do with a fundamental difference of opinion with respect to vaccinations, where neither party is willing to concede, what is the next step? In primary care, non-adherence to provider advice is commonplace. Patients are for the most part free to make their own decisions—either contrary to or compliant with the recommendations of their primary care provider—and seemingly without the controversy and emotionality attached to decisions about vaccinations. According to Cassidy (2007), what separates vaccine hesitancy from other behaviours around non-compliance is the differences in how providers and caregivers appraise risk factors related to certain decisions. Cassidy looks at these "contested notions of risk" (p. 1059) in the light of the MMR controversy (noted above). She finds that caregivers are faced with assessing the potentially competing risks of vaccinating versus having their children contract a vaccine-preventable disease, requiring them to make a judgment about risk on behalf of their child.

In contrast, for example, if a PCP discusses the risks and benefits of a vegan diet with a caregiver considering this option for their child, both the patient and the provider understand that the discussion concerns only the child's best health interests. Even if the PCP points out the inherent risks of a vegan diet for a growing child, there is usually room for both parties to work together to determine which vegan food products are most appropriate. In these situations, the PCP is generally able to accommodate the caregiver's beliefs *and* ensure the continued health of the child.

What differentiates risk/benefit discussions about vaccination is absence of room for disagreement between both parties and the extent to which the discussion tends to be polarized. At one side, hesitant caregivers are likely to argue that there is evidence to suggest that the risks of adverse effects from vaccines are greater than the benefits of protection from the diseases, should they occur. They may also suspect that their PCP does not set the highest priority on the child’s best interests if they suspect that the PCPs knowledge of the risks is limited, or comes from dubious sources such as pharmaceutical companies or government public health agencies. At the other side, PCPs are likely to take the position that exclusion of all or any of the vaccinations in the routine childhood schedule will place both the child and the community at risk for contracting a communicable disease; they may also add that the arguments of anti-vaccine advocates are not supported by science. The lack of a common ground between the two when it comes to the topic of vaccination presents an unstable platform on which to build any kind of meaningful risk/ benefit communication, let alone to propose that the benefits outweigh the risks.

A further complication in the delivery of primary care, when it comes to non-compliance with vaccination, is the dominant role caregivers play as healthcare decision-makers for their dependent children. PCPs may have a certain level of comfort around non-compliance when the perceived risks apply only to the patients themselves. However, when risks are seen as being imposed on dependent children or on vulnerable members of the wider community, as with vaccine hesitancy, PCPs report having felt a sense of frustration and anger with caregivers during the consultation process (Lyren & Leonard, 2006). According to some sources, when this happens, the primary care provider might even choose to dismiss the family from the practice when it seems that trust in their professional recommendations has been threatened (Gilmour et al., 2011; Lyren & Leonard, 2006). PCPs in Canada are, however, encouraged to use their influence, despite their frustration or worry on behalf of their young patients, to work with vaccine-hesitant caregivers on the basis of evidence that shows that their professional advice carries some weight (MacDonald & Finlay, 2013). Even in the face of vehement vaccine refusal, the idea is that this kind of working relationship leaves open the possibility of future opportunities for meaningful discussion, and demonstrates to caregivers that patient-provider relationships can be built on respect and kindness despite a difference of opinion about immunizations.

Philosophical Opposition and Nurse Practitioner Practice

An integral part of exploring this research question is to highlight its connection to nurse practitioner (NP) practice, and to differentiate it from the realm of public health nursing. The link between the vaccine hesitation and the role of PCPs has been established here. And, given federal and provincial statistics that indicate low levels of infant and childhood vaccine uptake, NPs as PCPs will inevitably have to address the issue of vaccine hesitancy in the course of their practice.

In British Columbia there is also a well-established link between NP practice and the process of vaccination. Despite the greater role of public health in the administration of vaccinations, NPs are still enlisted to provide immunizations in the province, particularly in rural and remote clinics (College of Registered Nurses of British Columbia (CRNBC), 2011b; British Columbia, ImmunizeBC, 2013). Here, vaccination appointments provide opportunities for vaccine-hesitant caregivers to discuss these concerns with their primary care provider.

There is some evidence to indicate that the busy office schedules of primary care physicians and pediatricians impose a barrier to those wanting to discuss their reservations around vaccination (Kempe et al., 2011). Sangster-Gormley (2012), in a survey of NP practice patterns in British Columbia reports that the mean number of patients seen per day by an NP is 14. Her results suggests that NPs working in primary care practice may have more time to spend with each patient, and will thus have additional opportunities for educating their patients and initiating discussions with respect to vaccination.

NPs are well-suited to address the issue of vaccination, quite apart from just having both the time and opportunity for these discussions. Research indicates that they are well-placed to share responsibility for vaccine-related discussions with physicians and other nursing-related professions, a situation that could well be beneficial in tackling the larger issue of increasing vaccination rates (Wood-Harper, 2005). The nature of NP practice -grounded in patient-centered, holistic nursing care may well be advantageous when addressing the topic of vaccination with caregivers. Kennedy, Basket and Sheedy (2001) conclude that a holistic approach is needed to address vaccine hesitancy, an approach that hinges on the particular ability of a healthcare provider to address vaccine-related concerns in an appropriate way. According to Hamric, Spross, and Handon (2009), the holistic perspective in direct clinical care involves "a deep understanding of each patient as a complex and unique person who is embedded in a temporally unfolding life" (p. 126).

Primary care nurse practitioners in British Columbia have the mandate to practice from the perspective of holistic nursing, and to participate in initiatives that promote health and reduce the risk of complications, illness and injury for their individual clients, client groups and/or the population as a whole (CRNBC, 2011a). This emphasis within the scope of primary care lends itself well to making a positive contribution to increasing the awareness of vaccine benefits where vaccine hesitation is involved.

This project examines both experimental and non-experimental research where interventions have been proposed as a way of responding to vaccine hesitancy. The relevance to and implementation in primary care practice is discussed with a view to assisting NPs working with caregivers who are vaccine-hesitant, with the goal of increasing immunization uptake. Though this paper is primarily intended to be useful to NPs in primary care practice who are likely to work with caregivers to infants and young children, the recommendations are nonetheless relevant to primary care physicians, nurses who provide care to infants and children in both public and acute care settings, pediatricians, and midwives.

Theoretical Framework

Fuzzy-Trace Theory

The fuzzy-trace theory as outlined by Brainerd and Reyna (2001) guides this review of evidence and provides a theoretical framework for making sense of the findings gleaned from the literature. The fuzzy-trace theory (FTT) attempts to demonstrate the way in which cognition draws upon dual mental representations -gist and verbatim -to predict and explain cognitive phenomena, particularly in the domains of memory and reasoning (Reyna, 2012). When applied to the issue of vaccine hesitancy, according to Reyna (2012), the FTT provides a "process model of how people make vaccination judgments and decisions grounded in empirical evidence about risk perception, risk communication, and decision making" (p. 3790). Reyna goes on to note that "according to fuzzy-trace theory, any meaningful information inputs are assumed to be encoded into memory in two ways: a verbatim representation (the objective stimulus or what actually happened) and a gist representation (the subjective interpretation of information or interpretation of what happened)" (p. 3791).

For example, verbatim or literal representations encoded into memory include exact words or numbers (remembered, say, as a percentage of illness in a particular age group when exposed to a particular risk); Gist interpretations of these same numbers or words will differ across individuals, given that form of memory is entirely subjective and depends on everything a person knows, all of which will affect they way the interpret verbatim representations. Gist interpretations depend on culture, worldview, knowledge, life experience, prejudices, and beliefs surrounding plausibility (Reyna, 2012). Using the same example of a statement of risk in contracting an illness, the gist of this statement would vary depending on the level of risk the individual making the judgment deems to be threatening to their health, or on the prior experience the individual has had with the specific illness in question. Do they consider the illness "high risk" because it has been known on occasion to cause morbidity, or do they consider the illness to be "low risk" because it has an effective treatment?

FTT indicates that the gist representation of the information, rather than the verbatim representation, guides both short and long-term judgments and decision-making given that people have a "fuzzy-processing preference" (Reyna, 2012). This means that people tend to rely, whenever possible, on the gist of something –the fuzzy or imprecise representation—rather than a verbatim representation. Both gist and verbatim representations support differing forms of cognitive processing. Verbatim representations support precise, analytical thought processes where gist representations support intuitive processing, which is highly impressionistic. Reyna (2012) notes that the seemingly irrational thinking around vaccines can not be *solely* attributed to the level of emotion inherent to the information presented on anti-vaccine websites. While emotion does play a part in fuzzy representations, it is the meaning derived from the gist, not simply the feelings generated by the exposure, which connects the dots with inputs to apprehend the essence of the experience. Meaning derived in this way represents the core of how people process information, and then proceed to communicate their concerns about the health information they have processed, and this relates directly to the ways in which caregivers are most likely to make vaccine decisions.

As noted above, much of the research literature that advocates the role of PCPs in working with vaccine-hesitant caregivers highlights the importance of relational qualities, evidence-based information sharing, and open-communication (Healy & Pickering, 2011; Levi, 2007; Smith et al., 2006; "Vaccine safety," 2009). It indicates that the patient-provider relationship, enhanced by good communication strategies, may have some meaningful influence on vaccine uptake. The literature, however, does not shed much light on why one communication strategy is likely to work better than another. Nor does the research explore why the content of the anti-vaccine arguments are more compelling than the information put forward by healthcare providers.

Given the utility of fuzzy-trace theory to understanding how decisions are made with respect to vaccination uptake, and the findings of this integrative review, it appears that it would behoove health practitioners to appeal to vaccine-hesitant caregivers through different frames of reference, specifically one that stimulates the development of meaningful, pro-vaccine gist representations. The fuzzy-trace theory explains why these strategies are successful, and indicates why they are relevant to primary care practice, research, and education. This theory also supports the premise that the interpretation and subsequent meaning underlying our immunization strategies will have an impact on increasing vaccine uptake.

This paper does not intend to indicate that the information shared between PCPs and their patients with respect to vaccination is wrong. Rather, the challenge lies in encouraging PCPs to present information using gist representations that invoke *meaning* that stimulates favorable perspectives about immunizations to vaccine-hesitant caregivers instead of simply positing evidence-based facts that pronounce the safety of vaccines. Doing so could prompt an intuitive response on the part of the caregiver, one that would be more inclined to support vaccination and encourage the belief that the risks of immunization pale in comparison to the risks of communicable disease.

CHAPTER 2

Methods

The research question proposed by this capstone project is addressed by way of an integrative literature review. According to Whittemore and Knafl (2005), this method of reviewing a body of literature allows for a combination of diverse methodologies—for example those applied to both experimental and non-experimental research—as a strategy for informing evidence-based practice initiatives. The idea is that, by examining literature from a variety of sources and disciplines, a robust and appropriate body of information can be garnered to best address the research question defined by this project. The integrative review methodology is considered, in this case, as a productive way to identify evidence-based strategies that PCPs could find useful in their attempts to convince hesitant families about the safety of immunization, and thereby increase the overall vaccine uptake in the population. This literature review was undertaken in four steps: the search strategy was conceptualized, a preliminary search was conducted, followed by a focused search, an analysis, and a discussion.

Step I: Conceptualization and Search Strategy

The first stage of this review began with the process of identifying the concepts that would best inform the initial search strategy. This research was prompted by an acute awareness of the need for NPs to have evidence-based intervention strategies to assist them in the process of communicating with vaccine-hesitant caregivers—in a way that might lead to increased vaccine uptake overall. Effective strategies are needed to increase vaccine uptake in a population of caregivers where there is always the risk of a shift from vaccine hesitancy to vaccine refusal. It is thought that this risk is based, in part, on the way in which primary care providers respond to the vaccine-hesitant caregivers when caregivers ask probing questions or convey anti-vaccine viewpoints.

This research is based on the assumption that NPs as PCPs can influence the decision-making process that caregivers are subject to when considering the safety of vaccines for their children. This influence depends on the ability of healthcare professionals to recognize teachable moments and to anticipate where guidance is needed. It also depends on the extent to which healthcare professionals understand the context within which caregivers live, and the extent to which they are influenced by the widespread public debates about vaccine safety currently being broadcasted by multiple means. The search strategy was guided by the question "What are the evidence-based interventions that primary care nurse practitioners can employ to communicate the safety of immunization in order to increase vaccine uptake in hesitant caregivers?" This review examines this question in the context of primary care practice in Canada.

The first step in formulating the search strategy was to determine the eligibility criteria for the literature selection. Sources were restricted to research that considered strategies to increase the uptake of infant and early childhood vaccinations; studies that examined the uptake of vaccinations in older children (e.g., human papillomavirus (HPV)) were excluded. Evidence indicates that parents of older children have different reasons for opposing vaccination than those given by parents of younger children. For example, parents can be reluctant to have immunizations that protect against sexually-transmitted viruses (e.g., HPV, the human papillomavirus) administered to their adolescent children for a number of reasons (Demsey, Abraham, Dalton, & Ruffin, 2009; Sturm, Mays, & Zimet, 2005).

This integrative review considers a range of research that extends beyond the medical literature into the domain of the behavioural sciences, with the understanding that perspectives coming from the disciplines of sociology, psychology, and anthropology could well provide useful recommendations for healthcare when it comes to understanding human behaviours and motivations (Larson et al., 2011). The behavioural sciences are able to take into account both the intrinsic processes that motivate parents to question the safety of vaccines as well give weight to extrinsic factors that influence decision-making, such as cultural background, social trends, political climate, and socio-demography. Table 1 lists the criteria by which sources were considered to be eligible for this review.

Table 1 *Eligibility criteria for integrative literature review inclusion*

Inclusion Criteria	1. English language literature, that was published in academic journals between January 2003-September 2014. 2. Articles that relate to routine immunization schedules for infant and early childhood vaccine uptake. 3. Research reporting vaccine hesitancy or refusal. 4. Experimental and/or non-experimental research that reports vaccine refusal or hesitancy and makes recommendations applicable to primary care practice. 5. Keywords that include vaccination, trust, education, parents, safety, compliance, and refusal. 6. Articles addressing practice in primary care, nurse practitioners, physicians, paediatricians. 7. Research coming out of the behavioural sciences that is related to vaccine hesitancy or refusal that includes recommendations relevant to primary care practice.
Exclusion Criteria	1. Literature that considers philosophical opposition to the HPV or influenza vaccinations. 2. Studies that examine vaccine opposition for religious reasons. 3. Opinion pieces, commentaries, and editorials that discuss philosophical opposition and make recommendations for practice. 4. Articles that discuss vaccine uptake in under-vaccinated populations, whose caregivers are not philosophically opposed to immunizations. 5. Articles that report research that is not applicable to primary care practice.

This review included sources where the recommendations were derived from research applicable to primary care practice. Given that vaccine hesitancy is an issue facing many first-world nations according to Luyten et al. (2013), research that examines relevant vaccination issues in other parts of the world was included where it was deemed useful for informing primary care practice in Canada.

Step II: Preliminary Search

Once the inclusion and exclusion criteria had been set out, a comprehensive search of peer-reviewed literature was initiated by way of the following databases: PubMed, Medline, CINHAL, and the Cochrane Collaboration databases. Preliminary search terms –specific to identifying topics related to evidence-based nursing from the medical literature—were devised along the lines of those proposed by DiCenso, Guyatt, and Ciliska (2005). These are set out in Table 2, which groups the terms according to the population, the problem, and the recommended interventions. The search was conducted by combining the following terms in various ways and in each of the databases.

Table 2 *Search terms for the integrative review*

Population	parents
Problem	vaccines, patient compliance, vaccination, vaccine refusal, vaccine hesitancy, immunization, vaccine, vaccination rate
Intervention	education, safety, trust, communication, primary care

The literature search began with Medline; it combined the terms "parents" AND "vaccination" AND "education" and thereby yielded 519 results. This cumulative result was then combined with "safety" to reduce the number of prospective sources to 82. These results were further limited to English language articles published between 2003 and 2014 in order to include only the most current information, thus further reducing the sources under consideration to 74. The titles and abstracts of these 74 articles were scanned for relevance; those that did not meet the inclusion criteria but nonetheless provided relevant background and contextual information were identified for their supportive content.

Step III: Focused Search

Once this stage was complete, 42 papers were shortlisted, including five additional sources, which were identified by way of hand-searching through the "grey" or informally published academic literature, i.e., sources derived from the reference lists of the peer-reviewed publications that had been identified by way of the original electronic search. One study by Vannice et al. (2011), found to be of particular interest, was identified in this way.

Each of these articles, having met the inclusion criteria, was then reviewed in full and assessed for its relevance to the topic. Of the 42 papers shortlisted, 10 were excluded because they were opinion pieces or commentaries rather than primary studies. A further eight papers were eliminated because the recommendation to use social marketing campaigns as a strategy to increase immunization rates is not considered feasible in the context of primary care. Six studies were excluded because, although they looked at the characteristics of vaccine-hesitant parents, they did not identify any strategies primary care providers might use to propel these parents to consider vaccination. Three studies were excluded because they examined attitudes towards vaccines that are not in the routine schedule of immunizations for children. Two studies were excluded on the basis of their focus on increasing vaccine uptake in populations of children who are under-vaccinated due to socio-economic factors. A further two studies—although they focused on the relational context of patient/provider interactions and its effects on vaccine hesitancy and refusal—were excluded because they did not propose specific strategies to increase immunization uptake. Finally, a paper that had been flagged as useful for this review was excluded despite being applicable to primary care practice—on the basis that it acknowledged significant shortcomings in its data-collection process thus having implications for the reliability of the information reported.

Scientific rigour of the studies reviewed was assessed by way of "critical reading" strategies set out by LoBiondo-Wood, Haber, Cameron, and Singh (2013). A table of evidence was developed for the purpose of this review in order to rate each study on a scale of 1–7, depending on the type and strength of the findings. Findings from qualitative studies are ranked lower in the hierarchy of research proposed LoBiondo-Wood et al. (2012), where randomized clinical trials are considered to be the "gold standard." It should be noted, however, that qualitative research is nonetheless likely to provide insights relevant to the understanding of vaccine hesitancy—especially given a topic that lacks a significant body of literature from which to draw. Appendix A provides the table of evidence developed to assist the analysis along the lines of the hierarchy of evidence as proposed by LoBiondo-Wood et al. (2013).

In the end, eight primary studies and two review studies were selected for inclusion in this integrative review. They included one review from the Cochrane Collaboration (Kaufman et al., 2013), one systematic review (Sadaf et al., 2013), two randomized control trials (Hendrix, Finnell, Zimet, Sturm, Lane, & Downs, 2014; Saitoh et al., 2013), one quasi-experimental, pre-test/post-test study (Vannice et al., 2011), one study using mixed methods and experimental design (Glanz et al., 2013), one survey study (Kempe et al., 2011), and three qualitative studies (Leask, Chapman, Hawe, & Burgess, 2006; McMurray, Cheater, Weighall, Nelson, Schweiger, & Mukherjee, 2004; Opel et al., 2013). The Cochrane review and the systematic review, were included on the basis of their direct relevance to the research question and the expectation that the conclusions therein could add strength to the findings revealed by the primary studies.

Step IV: Analysis and Reporting

The eight primary studies and two review studies were analyzed in detail and specific themes or issues were identified. Specifically, each paper was examined for practice recommendations that could be useful to PCPs in the process of addressing the safety concerns of vaccine-hesitant caregivers. These recommendations were analyzed on the basis of their content and grouped into themes or categories. All 10 sources identified communication interventions as an overarching theme; this was broken down into three sub-themes: the content of what was to be communicated, the timing of the communication, and the lack of evidence to support the utility of a vaccine communication intervention. Each of these sub-themes encompasses recommendations considered to be relevant to primary care practice where the goal is to increase vaccine uptake in caregivers who hesitate to vaccinate their children on a philosophical basis.

The following section of this paper will identify the findings of the 10 review articles organized according to their respective themes, relate these findings to the fuzzy-trace theory, and discuss recommendations for primary care practice, education, and research.

Studies that did not meet the inclusion criteria for this integrative review can still offer insights in their own right, or support the findings of the directly relevant studies selected for this review. Similar themes emerge from the excluded studies, despite their examination of vaccine refusal or hesitancy in different contexts. Both combine to help understand and substantiate the collective findings of a limited body of research. Information from four excluded articles (Gazmararian et al., 2010; Luyten et al., 2013; Reich, 2014; Shelby & Ernst 2013) will be briefly discussed in light of the findings of the included studies in the following section.

CHAPTER 3

Findings

This integrative review addresses the question of what evidence-based strategies exist to help NPs communicate vaccine safety to hesitant families in order to increase vaccine uptake. A total of 10 review articles were chosen on the basis of a comprehensive literature search. Each study identified communication as a common theme as the only way in which healthcare providers could tackle the important issue of vaccine hesitancy. However, each article approached this theme from a different angle. Some findings focused on the content of the communication about vaccines, where others focused on the timing of the communication and its effect on how people make decisions about vaccination. Appendix D, displays a figure of the thematic analysis found while examining the findings of the review literature. The findings will be discussed in the context of fuzzy-trace theory; they will be compared with those proposed by the supportive but excluded review literature, and they will be evaluated for their potential impact on primary care NP practice.

Vaccine Communication Content

The introduction and background in Chapter 1 of this paper discuss the communication challenges faced by healthcare providers in the wake of vaccine hesitancy. To reiterate, healthcare providers are constantly challenged to communicate vaccine-preventable disease risks and to counter the arguments of anti-vaccine websites and mainstream media. Health communication itself has changed as caregivers turn to information now available on the Internet in order to answer health-related questions—where they are inundated by contradictory messages regarding the safety of vaccines and the risk of contracting and spreading a communicable disease. Research has responded to these challenges, looking at ways in which healthcare providers can best construct and deliver the content of their vaccine-related communication.

Child-Centred Communication

Hendrix et al. (2014) conducted an online survey of 802 parents in the US to examine the effectiveness of emphasizing the benefits to society when it comes to making decisions about vaccination. This study intended to challenge prior research which indicated that emphasizing the societal benefits of vaccination in adults led to increased vaccine uptake. Hendrix et al. looked at whether the same result would be true when it came to vaccinating children, using the measles, mumps, rubella (MMR) vaccination data, i.e., whether information emphasizing the benefits of this vaccine to children and/or to society would increase vaccine intentions. Results were compared with the standardized Centers for Disease Control (CDC) Vaccine Information Statement (VIS).

As part of a national online survey, four different online vaccine information statements were sent out to randomly selected parents with infants less than one year of age, to be followed with the survey questionnaire. Each household received one VIS and the survey. The first VIS simply set out the standard CDC information regarding the MMR vaccine without any reference to benefits, either to children or society in general. These households were identified as the control group. The second VIS emphasized the benefit of the MMR vaccine to the individual child; the third emphasized the benefits of the vaccine to society; and the fourth emphasized the benefits to both society and the child.

The online survey that accompanied each statement asked the participants to indicate, on the basis of the VIS, the likelihood of their vaccinating their child with the MMR vaccine—on a scale of zero to 100, with zero meaning "extremely unlikely to vaccinate" and 100 being "extremely likely." The participants were instructed to answer the questions only after reading the VIS and keeping their infants in mind. They were also asked about decisions they may have made in the past with respect to vaccinating their other children. They were not asked to report on the effect that the information provided by the VIS had on the intention to vaccinate. Socio-demographic data was also collected. The majority of those who responded were Caucasian, mothers, well-educated, and with a relatively high household income. This point is pertinent given that this demographic has also been shown to be more likely to have unvaccinated children on the basis of opposition rooted in philosophical beliefs (Smith et al., 2004). Hendrix et al. (2004) found that, where the direct benefit of MMR vaccination to the individual child was emphasized—or where the direct benefit to both the child and society was emphasized the results indicated a greater intention to vaccinate. Simply emphasizing the benefits to society did not result in a higher incidence of a parental intention to vaccinate.

There were several limitations to this study. First, the sample of caregivers canvassed was relatively homogenous, i.e., not representative at the socio-demographic level. Hendrix et al. (2004) acknowledged that having a more socio-demographically diverse sample might have produced different intention-response patterns for each of the four statements. Additionally, the differences in the vaccine intention levels between the four different VIS groups were modest. The authors noted that they did not see a substantial increase in MMR vaccine intentions when societal benefits were stressed in the absence of any direct benefit to the child. The authors, however, propose that even these modest differences could add up to a significant difference when taking into account public health considerations with respect to herd immunity rates. Whether or not this degree of difference would visible at the individual level within a primary care practice remains to be seen.

The other limitation to note with respect to the study conducted by Hendrix et al. (2004) is the evaluation of vaccine intention as the outcome variable. The data collected does not conclusively predict that parents made a decision to have their infant vaccinated for MMR— it simply identifies their intention to vaccinate at the time they completed the survey.

The Hendrix et al. (2014) study is nonetheless relevant to primary care and nurse practitioner practice given that the findings do indicate that communication between healthcare providers and caregivers must centre on the direct benefits of vaccination to the individual child, rather than stress the benefit to society as a whole. Sociological research that looks at the viewpoints of vaccine hesitant and resistant mothers helps to substantiate the findings of the Hendrix et al. (2014) study. Behavioral sociologist Jennifer Reich (2014) argues that mothers who refuse state-mandated vaccines for their children focus solely on their own children's health and reject the argument that their choice not to vaccinate their child undermines community health. Reich's findings also indicate that the benefits of vaccination would best be framed in terms of individual benefit in the hope of increasing vaccine intention.

Fuzzy-trace theory provides an additional perspective on the finding that caregivers will give priority to their own children's health over that of society at large. The retrieval of values and principles from one's background play an important role in forming the gist understanding upon which caregivers base their vaccine decision-making. Given that gist representations are subjective interpretations, the social values of the caregivers will affect their gist formation and their subsequent decision-making. From the perspective of the parent who sees only the health of their child as central—and gives no weight to the wider community—it is unlikely that a public health initiative, which gives precedence to the health of the "herd", will have the desired effect on these parents.

Therefore stressing the value of a public health initiative will fail to impart meaning to a caregiver with individualistic social values. Even if healthcare providers were aware of this finding, they may nonetheless feel compelled to impart their understanding of the extent to which immunizations protect the vulnerable members of an entire community in the hope of convincing caregivers that their individual choices have a widespread impact. Healthcare providers may not recognize the extent to which, by taking this approach, their statements may not be congruent with the position of the patients they are working with.

Research from both medicine and the behavioural sciences supports the finding that, where there is hesitation or opposition to vaccination, parents are rarely inclined to give credence to the societal benefits of vaccination. Two studies excluded from this review, on the basis of the exclusion criteria described above, do substantiate these findings. Gazmararian et al. (2010) examined maternal attitudes surrounding the influenza vaccination, which is not a routine childhood immunization. Luyten et al. (2013) did not focus exclusively on caregiver vaccine hesitancy but did look at the attitudes of vaccine skeptics who expressed doubts about all vaccines.

Gazmararian et al. (2010) examined the level of knowledge and the attitudes of a focus-group of mothers with respect to influenza vaccination. When investigators questioned the mothers about the value of protecting the wider community they noted that mothers, both pro-vaccine and vaccine-hesitant, viewed the protection of the individual child as the most compelling reason for vaccination; they found that the idea of vaccination to protect others from influenza did not resonate with most of the participants in the study. Interestingly, both the studies undertaken by Hendrix et al. (2014) and Gazmararian et al. (2010) included participants with a variety of opinions about vaccination—which suggests that providers should be framing all their vaccine-related conversations with caregivers, regardless of whether these caregivers are opposed or not, with an emphasis on the benefit of vaccination for the individual.

Looking at vaccine hesitancy from another perspective, Luyten et al. (2013) set out to examine the defining characteristics of vaccine skeptics by focusing on their basic psychological disposition rather than their underlying motives. The survey examined whether vaccine skeptics' attitudes towards vaccination were associated with their basic outlook towards other community members or society in general. The study found that the psychological disposition of vaccine skeptics made them less likely to value equality in their social relations. Alternatively, study participants who saw members of their community as equals had a more positive disposition towards vaccination. The researchers concluded that social marketing of vaccination – which focuses on the benefit to the community— does not match well to the prevailing viewpoints of vaccine skeptics. This finding confirms those of Hendrix et al. (2014); both indicate that vaccine communication tends to be more successful when centred around the benefit to the individual child.

Presumptive versus Participatory Communication

Opel et al. (2013) examined the influence of specific provider communication practices on parents' resistance to vaccine recommendations by way of a cross-sectional observational study. A year prior to this study, this method for observational research was pilot-tested with a smaller number of parents and was shown to provide valuable insights into communication practices that respond to parental vaccine hesitation (Opel et al., 2012). The pilot project found that providers who used a presumptive approach to initiating vaccine recommendations, e.g., "So it's time to have some immunizations today," versus a participatory approach, e.g., "Are we going to go ahead with immunizations today?" were more effective in increasing vaccine uptake in hesitant parents. The purpose of the second study was to confirm these findings and identify other communication practices that providers used that could be shown to either heighten or alleviate parental resistance to vaccination.

The researchers videotaped provider-patient conversations during health supervision visits at pediatric primary care clinics in Seattle, Washington. The participants were 18 years of age or older, spoke English, and had a child between the ages of one month and 19 months. All participants were attending primary care practice appointments for health supervision visits with either a pediatrician or a pediatric nurse practitioner. The participants were recruited by research assistants in the clinic waiting rooms and their demographic was ascertained to establish their eligibility. Parents who met the inclusion criteria were further screened using a Parent Attitudes about Childhood Vaccine survey (PACV) as a way of identifying vaccine-hesitant parents. The standard PACV was altered for the purposes of this study to include childhood health topics such as vitamin D, breastfeeding, and sleep patterns in order that parents not be alerted to the vaccine-centred focus of the study.

Vaccine-hesitant parents were over-sampled in the Opel et al. study (2013) in order to provide relevant insights into their behaviour. Both eligible providers and participants were told that the research intended to examine parent-provider communication patterns during health supervision visits, with attention to the way in which general health topics were approached in this setting. The topic of vaccination was not foregrounded in order to reduce the risk of the "Hawthorne effect" (or "observer effect")—the well-known effect that observation has on altering the behaviours of the observed—in this case, the effect of knowing in advance that the focus of the study was vaccination communication.

The Opel et al. study (2013) encompassed 111 vaccination discussions from 16 healthcare providers working in nine different practices. These interchanges were videotaped during health supervision visits. Fifty percent of the participants had already been identified as vaccine-hesitant on the basis of the PACV screening tool. Only the vaccine-related discussions were fully transcribed. Qualitative data from the videotaped sessions was coded through the use of conversational analysis to identify recurrent healthcare provider communication practices, as well as the patterns of parental responses to those practices. Both the conversational analysis investigators were purposely not made aware of the hesitancy status of the parent in order to avoid influencing their analysis. The final coding scheme included 15 vaccine communication practices.

Quantitative data generated by the Opel et al. (2013) survey was analyzed using Pearson's X^2 or Fisher's exact tests to compare this data to characteristics among vaccine-hesitant and non-vaccine-hesitant parents recorded in the health supervision visits. These analytic tests were also used to compare healthcare providers' communication practices with vaccine-hesitant parents and non-vaccine-hesitant parents, as well as discussions with first-time vaccinating parents and non-first-time vaccinating parents. Quantitative data analysis was also undertaken to explore the bivariate association between the outcome of parent resistance to the provider's recommendation, and the provider communication practices of initiating and pursuing further discussions related to vaccine hesitancy.

The Opel et al. (2013) findings provide some thought-provoking insights into vaccine communication practices. This research took a multi-faceted approach to look at the issue of communication practices and vaccine hesitancy and thereby provided insights at three levels: first, general communication practices on the basis of parental hesitancy status; second, parental response to a presumptive style: "So it's time to have some immunizations today," in contrast to the participatory style of "Are we going to go ahead with immunizations today?"; and third, provider response to parental resistance. The study found that 62% of providers did not explicitly pursue parents on the topic of vaccines; 55% discussed the rationale for vaccination; and 55% discussed the potential side effects of the recommended vaccinations. With respect to communication style, 74% of the providers (*n* = 69*)* used a *presumptive statement* to introduce the vaccination plan. In response, 74% of parents (*n* = 51) accepted the provider's presumptive statement on vaccine intention, and 26 % (*n* = 18) resisted. In contrast, where 26% of providers (*n* – 24) used a *participatory statement*, 4% (*n* = 1) of parents accepted a vaccination plan, 13% (*n* = 3) provided their own alternative plan for vaccination, and 83% (*n* = 20) showed resistance to a vaccination plan.

In cases where providers met with resistance to their vaccine recommendations, 50% (*n* = 19) of the providers continued to pursue their vaccination discussion, 21% (n = 8) offered a mitigated or altered vaccination plan (such as pursuing fewer vaccines), and 29% (*n* = 11) accepted parental resistance without further pursuit. Of the providers who continued to pursue their initial vaccine recommendations, 50% (*n* = 19) were characterized in the following way: 47% of parents (*n* = 9) accepted a vaccination plan after the provider continued to pursue his or her recommendation, and 53% (*n* = 10) continued to resist the provider. Upon meeting further resistance, 40% (*n* = 4) of providers offered a mitigated vaccine plan, 30 % (*n* = 3) accepted the parent's resistance, and 30% (*n* = 3) continued with the pursuit of their recommendations.

One of the strengths of the Opel et al. (2013) study is that researchers were able to observe first-hand the way in which providers communicate with parents about vaccination, in contrast to relying on second-hand survey reports of accounts given by parents or providers. With this approach, there is less room for a subjective interpretation of the spectrum of responses, and the objective "real world" observation is foregrounded, giving a better understanding of what actually takes place, and how parents respond accordingly. The researchers saw tremendous value in this approach as a way to address the gap in evidence that addresses effective provider communication behaviours in increasing childhood vaccine uptake (Opel et al., 2013).

One of the weaknesses of the Opel et al. study (2013) is the homogenous nature of the participant population. Most of the participating parents—both vaccine-hesitant parents and non-vaccine-hesitant parents were Caucasian, 30 years of age or older, and had a household income upwards of $75,000. Using a more diverse population sample could well have revealed that participants of different ages, ethnicities, or socio-economic background respond differently to presumptive or participatory conversation styles.

In addition, caution needs to be exercised in applying these results to other primary care practices. First, presumptive communication, or the continued pursuit of vaccine recommendations in the face resistance, risks offending some caregivers. It is a style that may be interpreted as authoritarian, and represents a threat to the right of a parent to manage the health of a child. Given the way in which healthcare providers are already depicted in anti-vaccine media representations, this approach may confirm that parental rights are not being respected.

Fuzzy-trace theory suggests that caregivers, faced with a presumptive approach where they have already formed a gist representation of healthcare providers—as controlling or presumptive on the topic of vaccines—are less likely respond well to this approach. On the other hand, caregivers who have yet to form a strong gist representation of vaccination may interpret the presumptive approach as an indication that going ahead with vaccination is the socially-acceptable norm, and may therefore be more receptive.

It is important to note that these strategies may not be successful in primary care clinics that do not offer vaccination services in situ. Even if a provider uses a presumptive initiation style to pursue a vaccine mandate, and the parent eventually decides in favour of vaccination, in the time between leaving the clinic and arranging an appointment with public health may give parents too much time, allowing them to renege on their decision. The decision to abandon a vaccination program may then be difficult for parents to admit in the course of subsequent "well-baby" appointments with their provider when the issue of current vaccine status arises.

The findings of the Opel et al. (2013) study were not replicated in the body of literature reviewed for this project. This is not to say that the results and recommended strategies are not relevant to NP practice. However, for the purpose of this project, the lack of other research to support these findings makes them difficult to incorporate into a firm recommendation for practice.

Narrative-Based Vaccine Communication

The strongest finding that emerged from this literature review with respect to vaccine communication content is that which espouses a departure from evidence-based discussions and recommends instead an engaging, more contextualized form of communication. Three studies in which this theme is foregrounded used the following terms to characterize this form of communication: experience, context, narrative, personal, and stories.

In a study undertaken by McMurray et al. (2004), qualitative semi-structured interviews were conducted with 69 sets of British parents who had pre-school-aged children. The participants were recruited through five general practice clinics, and they were purposively sampled to allow for diversity in family size, geographic location, and economic background. The healthcare practices involved in the study sent letters inviting all parents of children born within one year, ending on the 31st of March 1998, to participate in the study. Parents were provided with contact details in the event that they agreed to participate in the study. Practitioners from the five general practice clinics were also asked to describe the process by which vaccines were administered within each practice and these results were published as a separate paper. This study did not appear to offer any incentives for participation.

The purpose of the McMurray et al. (2004) research was to examine parental accounts of decision-making processes in light of the MMR vaccine controversy in order to identify which factors influenced vaccine uptake and what the nature of educational needs might be. An additional concern that the study hoped to address was that of a low percentage of uptake when it came to parent deciding to continue with the requisite second MMR dose. McMurray et al. took the view that the role of the primary care practitioner is key to effectively informing parents about vaccination, decision-making about health interventions, and managing risk.

Interviews were held in the homes of the participants and were conducted with non-clinical research team members in the hope that this would avoid the possibility of eliciting socially desirable responses. The content of the interview was centred on exploring the experiences and educational needs of parents when it came to receiving information and support in the decision-making process prior to the administration of the second dose of the MMR vaccine. The interviews were semi-structured to allow the conversation to flow and new issues to be introduced. Pre-study piloting and continuous transcript comparison were used to help maintain equivalence across the sample when it came to the coverage of subject topics and the approach to questions. The full transcripts of the interviews were analyzed using a “framework” approach: samples of the transcripts were reviewed to identify themes for data coding; codes were defined and validated by way of discussion between team members; overarching themes were established; and deviant cases were identified in order to convey the findings of the research in a meaningful way.

The findings put forward by McMurray et al. (2004) confirmed previous research, which also indicated that PCPs represent an important source of information about immunization. However, the primary finding by McMurray et al. was that medical, science-based information about vaccination safety did not increase parent understanding about the risks and benefits of vaccines, nor did this information increase uptake. This study also emphasizes that any information provided must be integrated into the pre-existing experiences and understandings of the parents. Further, that the information communicated must take into account what McMurray et al. describe as "tangible facts," the experiences and observations of parents in their own community. They note that the vaccination message be "presented in such a way as to inform and transform experiential information parents bring to the consultation" (p. 522). McMurray et al. emphasize that healthcare practitioners should relay medical information with the help of "visual imagery and case studies to provide vicarious experience of the impact of largely forgotten diseases" (p. 525), instead of simply relaying statistics and facts.

Kempe et al. (2011) looked at the concerns of parents with respect to the vaccine schedules. They surveyed American health care practitioners with a view to understanding the "prevalence of parental requests to deviate from standardized vaccine schedules...the responses to these requests...and attitudes about the burden and success of vaccine communications with parents" (p. 548). Kempe et al. surveyed what they described as nationally representative samples of pediatricians and family physicians—by way of the mail or the Internet. A total of 696 practitioners participated in the survey: 366

pediatricians, and 330 family physicians. All of the participants provided vaccines in situ to children under the age of two.

In the course of their survey, Kempe et al. (2011) document, among other things, physician responses to the questions about the effectiveness of risk-communication practices. Health Canada (2000) defines risk communication as "any exchange of information concerning the existence, nature, form, severity or acceptability of health or environmental risks." (p. 24). Physicians surveyed reported that the most successful way to convince vaccine-skeptical parents was by using a personal message, for instance, including a statement that detailed the physician's experience with vaccinating his or her own children or reassuring the parent that the physician would vaccinate his or her own children.

According to Kempe et al. (2011), the next most effective communication practice that physicians reported was to convey their personal experience with vaccine safety as it was experienced by their patients. Both of these strategies are seen to be more effective in conveying information that will influence decisions in favour of vaccine uptake. In this way they exceed the effectiveness of other communication practice strategies to promote herd immunity, protect vulnerable members of the community, and provide data about the likelihood of adverse effects. Kempe et al. concluded that comprehensive and innovative approaches to risk/benefit communication are needed in the practice setting. More specifically, they concluded that personalized messages which denote an experience that is tangible and compelling to both the healthcare provider and patient appear to increase the chances for vaccine uptake in parents that are hesitant or resistant to immunizing their children. These conclusions are similar to those presented by McMurray et al. (2004).

Leask, Chapman, Hawe, and Burgess (2006) attempted to identify the factors that kept parents sure of their own decision to vaccinate their children in the face of widespread anti-vaccination messages in the media. By recruiting Australian mothers and grouping them into six focus groups, the researchers proceeded to explore how these mothers responded to competing media messages about vaccine safety in the face of what they described as the “striking sophistication of the ‘anti’ vaccination case” (p. 7238). The purpose of this study was to determine whether new ways of “marketing” vaccinations might be necessary in response to the anti-vaccination discourse. Each of the six focus groups included between four and eight mothers, all with infant children. According to the authors, the participants were recruited by approaching mothers in the “waiting rooms of well-child clinics in four demographically varied but predominantly middle class areas across metropolitan Sydney, Australia” (p. 7239). Mothers who were vehemently opposed to immunization were excluded from the study, in part to avoid group conflict but also because the question being asked would not apply to those already opposed to vaccination.

Demographic information was obtained ahead of time by way of a questionnaire completed by each of the mothers before the session commenced (including the age of the children and their and immunization status). The mothers in each of the focus groups were then provided with a list of immunization-related questions to prompt open discussion amongst the participants. They were encouraged to share their spontaneous thoughts about childhood immunization and to identify what they found reassuring and what concerned them most about immunization. Following this, all the groups were shown two video “prompts” with typical examples of vaccine media coverage. The first showed negative media coverage, including an excerpt from a documentary relating to allegedly vaccine-injured children; the second showed positive coverage and included a segment where a physician discussed the dangers of non-vaccination, and footage showing children ill with pertussis and measles. Two of the six focus groups viewed an additional video containing footage that had been circulated by Australia's anti-vaccine lobby, showing footage of five medical doctors presenting their arguments against immunization.

Each group was asked to discuss their reaction to each video prompt with the researcher/moderator assigned to their group. These discussions were tape-recorded and transcribed. One to two days after the group meeting, the primary researcher contacted each mother for further discussion and debriefing, during which the researcher took extensive notes but did not make an audio recording. Data from the focus groups were transcribed and coded with software designed to do qualitative analysis. Thematic analysis was used to identify emerging themes, which were then organized into a coherent hierarchical scheme for analysis by the researchers.

Leask et al. (2006) emphasize that trust in the family doctor is integral to the feeling of comfort expressed by the mothers in this study when it came to making vaccination decisions. This study showed that participants valued doctors who took the time to explain procedures and discuss risks; participants felt less comfortable with practitioners who evaded vaccine discussions. Leask et al. recommend that clinical practitioners not rely on facts alone to convince parents of vaccine safety; this is thought to be insufficient given that such a communication strategy fails to account for the wider values and discourses that inform decision-making. Leask et al. noted that the fact-based content, commonly employed to convey vaccine safety, proceeds with the assumption that, once people are provided with the "facts," they will not be influenced by anti-immunization rhetoric. However, Leask et al. found that mothers rejected anti-vaccine information on the basis of their own logic, trust in their care provider, and their own personal experiences with vaccine-preventable diseases.

Leask et al. (2006) point out the value of personal experience, and recount the sharing of personal experience during the focus group sessions where "group members became uncharacteristically quiet with facial expressions and exclamations reflecting the sacredness with which they held the stories" (p. 7242). This observation underscores the recommendation to have primary care practitioners incorporate narrative accounts into the vaccine communication process.

This study successfully conveyed how middle-class women who support vaccination approach the process of making decisions in the face of anti-vaccination propaganda. Nonetheless, the risk of selection bias is high given that the mothers who participated in this study were recruited from clinic waiting rooms rather than by way of a random selection process. This study did not include a focused consideration of how health practitioners influence the parental decision-making process, a missing piece that was seen in the prior studies relevant to this theme.

Each of these studies question the use of communication strategies that rely solely on facts and favour the use of narratives that recount personal experiences, whether it be the experience of the practitioner or the caregiver. Even though each of these studies occurred in different geographical locations, with different participants, and utilized different research methods, there is discernable support for a departure from communication that contains evidence-based facts surrounding immunization in favour of narrative-based vaccine communication that is highly individualized by content from the healthcare provider's personal and professional experience.

Shelby and Ernst (2013), two mothers, and founders of the pro-vaccine website, Moms Who Vax, published an article in a peer-reviewed journal where they emphasized the importance of using narrative and storytelling to counteract the impact of the anti-vaccine movement. This article was excluded from the review but is nonetheless noted here because it provides a patient perspective on the impact of using personal narratives to influence the decision-making process. The authors argue that narrative and storytelling could help healthcare providers address the claims of vaccine-hesitant or vaccine-resistant parents. They base this recommendation on their conviction that storytelling strategies have allowed anti-vaccine groups to gain popularity and a widespread following. Storytelling on anti-vaccine websites—recounting experiences with vaccine-injured children—allow the formation of virtual communities of parents whose narratives transform into "facts" that drive beliefs, which in turn inform decision-making about medical issues.

Shelby and Ernst (2013) encourage pro-vaccine advocates to use this same paradigm of making personal stories public, and note that parents want to hear health care providers relate their own experiences through storytelling in the exam room. NPs who have previously worked in public health as registered nurses where they administered vaccines to children may have the advantage of being able to communicate a variety of experiences to parents. Similarly, any primary care provider who is a parent or has worked abroad in countries with outbreaks of vaccine-preventable communicable diseases can transform their experiences into a narrative that Shelby and Ernst predict will have a positive impact on vaccine uptake in hesitant parents.

Fuzzy-trace theory supports this tactic as narratives and storytelling are closely aligned with the meaning apprehension that creates gist representations and ultimately informs vaccine decision-making. In essence, healthcare providers need to match the elaboration and personalization of the stories shared by anti-vaccine information sources in order to provide a persuasive message that forms gist representation and supports decision making that leads to increased vaccine uptake. Healthcare providers may need to consider the possibility that the evidence-based information that informs their clinical practice may not translate into a sufficiently compelling case to prompt caregivers to reconsider their vaccine decision-making.

The intention of this review is to reconsider the previous emphasis on the patient-provider relationship as determining influence in the decision-making process to which caregivers are subject. However, the findings that favour the incorporation of narrative-based vaccine communication are among the most interesting revelations that this review has uncovered. This intervention does challenge PCPs to utilize their relational skills in interpreting caregiver's frames of reference into a narrative that incites pertinent understanding.

Vaccine Communication Timing

A significant focus of the research reviewed here has to do with the importance of vaccine communication timing. Specifically, when do conversations about immunization have the most benefit when it comes to increasing vaccine uptake in infants and young children? It is important to note that these recommendations generally identify a proactive or "upstream" approach to counteracting vaccine opposition. The idea is to prevent hesitancy and resistance from taking hold and gaining momentum, and not wait until it is established and then work to counteract the hesitancy by various means

Prenatal Vaccine Communication

Glanz et al. (2013) investigated the process whereby parents made decisions about vaccination and looked at the role of trust in their relationships with their physicians. They described their investigation as a mixed methods study that relied on focus groups to guide a survey design.

The participants in this study included 173 parents with children under the age of four, conducted over two years. All the participants were recruited by way of an American group health insurance plan on the basis of having either refused or delayed vaccinations due to personal, non-medical reasons. The study grouped the participants into seven focus groups where they were asked to contribute to in-group discussions about immunization. Four focus groups were comprised of parents who refused vaccines, and three groups were comprised of vaccine-hesitant parents who purposely delayed the vaccination schedule for their children.

Each of the focus group meetings were moderated and lasted between 60–90 minutes. The moderator asked questions relating to parental vaccine decision-making processes, parental experiences with their pediatricians, whether or not they trusted their pediatricians' advice, and their sources of vaccine information. Audio recordings were made and transcribed by independent transcriptionists. The data was analyzed by way of a team-based, inductive approach—which incorporates the principles of "grounded theory"—a qualitative research method that helps to explain real-world phenomena. The data was coded and categorized to reveal any unique themes that arose out of the focus group sessions.

The information that resulted from the focus group research was then used to develop a survey to examine parent-provider trust, vaccine decision-making, confidence in vaccine information, and demographics. A rough draft of the survey was pilot-tested by a small sample of parents, and then revised. This time the study included parents from the group health insurance plan who had not participated in the initial focus group sessions. These parents were divided into three groups: vaccine acceptors, delayers, and refusers. Surveys were mailed to a random sample of vaccine acceptors ($n = 500$), all of the delayers ($n = 227$) and all the refusers ($n = 127$). Descriptive statistics were used to calculate all demographic information obtained from the surveys, and responses to the vaccine-related survey questions were compared across the three groups of parents using chi-square tests and multivariable polytomous logistic regression. Logical regression models were based on the multilevel dependent variable (vaccine accept, delay, or refuse). Of the 16 closed-ended questions, nine were measured on a Likert scale; of these, six were described as either dichotomous or categorical; five questions measured on the Likert scale were dichotomized according to the strength of agreement (strongly agree, disagree, neutral).

Glanz et al. (2013) found that parents made their vaccine decisions during pregnancy or in the process of developing their birth plan. This finding is of interest to primary care practice, especially given that the study also indicated that parents who go on to delay or refuse vaccines are twice as likely to begin the process of making their vaccine decisions earlier than parents who accept vaccines. Additionally, because prenatal education does not generally address infant immunizations, these parents sought out multiple sources of information, including web-based resources, to inform their decision during pregnancy.

Glanz et al. (2013) emphasize that their results have important implications for the timing of vaccine communication. They advise that healthcare providers caring for prenatal patients should initiate vaccine-related conversations often during pregnancy, and in a balanced manner with sufficient information on both vaccine benefits *and* risks. In addition Glanz et al. point out that parents differentiate their trust in their physician. That is, most participants reported that they trust their doctor for advice relating to infant nutrition and development, but that they did not necessarily trust vaccine-related information because they felt this information did not adequately address both risks and benefits.

Given that parents are very attuned to the balance in vaccine-risk communication, it is important that healthcare providers review the risks and benefits of vaccination in relation to the risks of communicable disease. This could be challenging in cases where healthcare professionals suspect a hesitancy to vaccinate and are consequently inclined to focus their message on the benefits of vaccination in order to divert parents from the idea that vaccination could be harmful. In so doing, what practitioners leave unsaid could prompt parents to initiate their own investigation of vaccine risks, where their ability to separate fact from fiction is compromised by the massive volume of contradictory messages on websites, blogs, and in social media.

Finally, vaccine-hesitant parents in the Glanz et al. (2013) study described their vaccine decision-making as a continuously evolving process, which means that, to some degree, parents constantly wrestle with the fear that vaccine-preventable diseases have the potential to affect their child, and they will re-evaluate their decision based on this concern. This is particularly relevant to primary care; it echoes a similar recommendation by Lyren and Leonard (2006) to revisit vaccine discussions regularly with parents rather than dismiss parents who are hesitant or refuse vaccines from their practice, and thereby shut down communication lines

Glanz et al. (2013) acknowledge that a weakness of their study design was in the selection of a sample population from a single health plan in Colorado, a choice that could limit the generalizability of the research-findings. However, they emphasize that conducting this research in a State that allows non-medical, personal belief exemptions to school immunization requirements nonetheless provided an ideal environment to over-sample vaccine-hesitant parents. The authors, however, did not address a potential limitation of the study and that is the possibility that focus group discussions may have been affected by the bias of dominant and/or opinionated members—in which case the more reserved members could potentially hesitate to speak out and thereby skew the data in favour of the more extroverted viewpoints.

The findings of two additional review studies, which looked at the potential benefit of pre- and postnatal education, augment the findings put forward by Glanz et al. (2013). Saitoh et al. (2013) recruited 119 pregnant women from three areas in Tokyo, Japan, and assigned them to one of three groups: a vaccine-education prenatal group at 34–36 weeks gestation, an vaccine-education postnatal group at 3–6 days after delivery, or a control group which did not receive any instruction. The immunization status of all of the infants was assessed along with pre- and post-intervention written surveys. The intervention session consisted of one-on-one interactive education with one of the researchers where topics included information on vaccine types, the concept of vaccine-preventable diseases, the effectiveness and side effects of vaccines, and the procedure for booking infant immunizations. Saitoh et al. (2103) found that that the mothers of the intervention groups had a higher rate of vaccine uptake than the control group. However, they also found that there was no significant difference between the prenatal education group and the postnatal education group.

Although the Saitoh et al. (2013) study supports the conclusions of Glanz et al. (2013)—that prenatal vaccine education could increase immunization uptake—it is important to remember that this study took place in Japan where socio-cultural influences may play a part in vaccine decision-making. Saitoh et al. (2013) expected, from the outset, that perinatal immunization education would positively change parental immunization knowledge, attitudes, and beliefs. But this study did not refer to the organized anti-vaccine interests active in Japan, let alone to the extent of this impact on pro-vaccine messages. Nor did this study discuss the post-modern cultural context which, in North America, seems to result in more young parents questioning the authority of their healthcare provider. Therefore, the results of the Saitoh et al. (2013) study may not be replicated in countries with greater challenges when it comes to increasing the rate of vaccine uptake in hesitant and resistant caregivers.

Vannice et al. (2011) also examined the effect of prenatal and postnatal immunization education. In this study, the educational intervention took place at clinics in Tennessee and California and was provided to 272 mothers who had indicated concerns about infant vaccinations. Potential participants were selected from one of two clinics on the basis of referrals by clinic staff, whereupon they gave their informed consent, were introduced to the study, and provided with a screening survey. The participants were screened beforehand to ascertain their level of vaccine concern on a scale of one to three: (1) health advocates, (2) fence-sitters, and (3) worried. The participants were then randomly assigned to one of four groups. The first was provided with vaccine information during a prenatal visit, the second at a one-week, post-partum well-child visit, and the third at a two-month vaccination visit. The mothers in the two-month cohort were designated as the reference group on the assumption that mothers typically first receive information about vaccines at this stage. The fourth group of mothers were provided with vaccine-related information at all three points in time. The participants of each group was required to read a new-vaccine information pamphlet along with vaccine information statements from the Centers for Disease Control and Prevention. Attitudes towards vaccination were measured after the intervention and compared to the former level of vaccine concern. This data provided the basis for the analysis.

A post-test was used to measure individual satisfaction with vaccine information and participants were then asked at which point in their pregnancy they would prefer to receive this form of information. Changes in maternal attitude and beliefs about vaccine safety after receiving vaccine-related information were analyzed separately for each group. Results from the prenatal and one-week postnatal groups were compared to those of the two-month reference group in order to assess whether receiving information about vaccinations earlier resulted in a beneficial change. Comparisons within and across all groups were made for the first three groups. Longitudinal data from the fourth "all-time-points" group were analyzed separately. Fisher's exact tests were used to calculate the proportion of participants who reported positive attitudes toward vaccination, along with pretest and posttest responses within the three treatment groups. Differences in attitudes within the all-time-points group were analyzed using a "generalized estimating equation population-averaged" model applied to the four time points: initial screening, prenatal, postnatal, and the two-month vaccination appointment.

Vannice et al. (2011) found that there were no statistically significant differences in satisfaction levels that could be associated with the timing of vaccine information across the groups. Mothers in all groups were significantly more likely to respond positively to questions and statements that supported the safety and importance of vaccines. Receiving the vaccine information earlier did not result in any statistically significant changes in a participant's level of satisfaction. However, when the participants were directly asked to provide a preference as to when they would like to first receive vaccine-related information, 95% reported that they would prefer to receive it during pregnancy or at a well-child visit—before the two-month vaccination visit.

Although Vannice et al. (2011) did not discover a change in attitude towards vaccines, or in satisfaction levels based on the timing of the delivery of vaccine information, it is worth noting that participants *preferred* to receive information prior to scheduled vaccinations. These results echo the findings of Saitoh et al. (2013), and Glanz et al. (2013), but there are some differences. Saitoh et al. (2013) tested for one-on-one verbal communication as the means to increase vaccine uptake, whereas Vannice et al. (2011) looked at the relationship between early information delivery and participant response to the timing of this information; the latter did not examine the intention to vaccinate or actual vaccine uptake. The latter study also had a low level of recruitment randomization which leaves it at risk for selection bias.

Despite the differences between these studies, it is nonetheless important to note that early delivery of vaccine information can be readily incorporated into primary care practice, particularly where providers do not allot much time to their appointments. This way, a primary care provider could give vaccine information material to their prenatal patient and offer to discuss the content at the following appointment. This timing would be in keeping with the findings of Glanz et al. (2013), which indicate that vaccine-hesitant and vaccine-resistant parents begin their search for immunization information earlier than those who have already in favour of vaccination.

To summarize, all three studies inform the theme of early and prenatal vaccine communication; each indicates that delay in the delivery of vaccine information could be to the detriment of vaccine-uptake rates, especially in vaccine-hesitant parents. Fuzzy-trace theory enhances the understanding of this finding, given that the prenatal period for first-time parents represents a point in their lives where they lack "meaning" with respect to vaccination. These parents are characterized by a strong desire for knowledge and are also attentive to the experiences of others to help them make sense of the benefit and risks of immunizations. This process of creating meaning forms a gist representation that will ultimately inform their vaccine decision-making process. Given that it is easy for primary care practitioners to provide vaccination information early on, it seems obvious that this material can be readily worked into prenatal classes, as well as midwife and obstetrician practices. This will ensure that, at some point during the prenatal period, mothers are given the opportunity to process this information and ask questions as they occur along the way.

Insufficient Evidence on Vaccine Interventions

Two research reviews have been included in this literature review as a way of including a wider data set to inform the recommendations that this paper will provide. A Cochrane Collaboration review by Kaufman et al. (2013) considered the proposal that face-to-face information interventions may improve vaccine uptake by enhancing parental understandings. They note that the objective of their review was to "assess the effects of face to face interventions for informing or educating parents about early childhood vaccination on immunization uptake and parental knowledge" (p. 1). They selected studies which included randomized controlled trials (RCTs) and cluster RCTs designed to evaluate the effects of face-to-face information interventions—provided to either individual parents or groups of parents—which were either compared to a control group or another face-to-face intervention. This review included six RCTs and one cluster RCT. A cumulative total of 2,978 participants were represented by the seven studies selected for this review. Three studies were undertaken in low- or middle-income countries, and four were undertaken in high-income countries. The interventions ranged from single-session interventions to multi-session interventions, and focused primarily on the understanding and uptake of vaccines. However, the review also considered, as a secondary focus, research that looked at vaccine intentions, parental experiences with intervention, and adverse effects.

This review did not report any conclusive findings, noting that the evidence was limited, and where it existed the evidence was found to be of low quality. From this, the reviewers concluded that face-to-face educational interventions have little or no impact on vaccine uptake or on increasing vaccine-related knowledge. The reviewers acknowledged that there was insufficient evidence to properly comment on the secondary focus, such as the cost of implementing educational interventions. The reviewers do, however, propose that it would be feasible to incorporate face-to-face vaccine interventions into healthcare encounters but, given the lack of evidence in the research reviewed, they were not prepared to recommend such interventions in the event that they incur additional expense by being delivered outside of general healthcare delivery.

Sadaf, Richards, Glanz, Salmon, and Omer (2013) undertook an extensive systematic review of interventions aimed at reducing the rate of parental vaccine refusal and vaccine hesitancy. Their review focused on research concerned directly with evaluating interventions using quantitative outcome measures —specifically, parental vaccine-refusal behaviour, attitudes toward immunization, and/or intent to vaccinate. The review imposed restrictions on the date of publication from 1 January 1990 to 1 July 2013; it relied on four databases, search strategies that made use of the controlled vocabulary of Medical Subject Headings (MeSH), and a pre-search via Google Scholar.

For the purposes of this review, Sadaf et al. (2013) included studies that focused on HPV vaccine uptake as well as infant/early childhood vaccines. Thirty studies were selected. Of these, 13 examined before-and-after intervention data; three incorporated randomized control trials (RCTs), and seven did not; six were evaluation studies; and a total of 25 studies were undertaken in the US. The 30 studies were categorized into three groups: 1) "passage of state laws," including studies which looked at exemptions to school immunization requirements for philosophical reasons; 2) state- and school-level implementation of laws, including studies which looked at the procedural complexities of obtaining non-medical exemptions in the context of school policies around immunization requirements; and 3) studies that looked at parent-centred immunization information or education.

Sadaf et al. (2013) found that, out of all the studies that examined the delivery of parent-centred educational information, the use of material with brief summaries (such as pamphlets or brochures) appeared to be the most effective. The authors stress the need for studies aimed at developing interventions that are likely to influence perceptions, and for research that examines ways in which behaviour can be changed. Sadaf et al. acknowledge that their review was not comprehensive, and that it was limited by considering only studies that used quantitative research methods, by not hand searching, and by not incorporating any grey literature.

Both these research reviews indicate that, even though a large body research was identified and examined, there is little evidence that can be considered to be of good quality when it comes to identifying productive strategies for increasing vaccine uptake among those who are vaccine-hesitant, or those who refuse to vaccine their children.

These reviews confirm the results of this literature search. Although a substantial number of studies included in this integrative review were valuable in explaining the issue of philosophical opposition, and offered useful advice on managing parental concerns, there are few attempts to test any strategies for their ability to increase vaccine uptake in the actual setting of a medical practice. Much of the research that informs this review is based on non-experimental studies which make recommendations on the basis of parental feedback collected in the course of surveys and focus group discussions. Given the weight of evidence that underscores the importance of the role of the PCPs when it comes to influencing parental decision-making processes, it seems prudent that research initiatives examine this more closely.

To summarize, 10 studies were selected for closer examination on the basis of an integrative review of the research literature. From these, three themes emerged: communication content, communication timing, and the observation that there is a lack of research that investigates and identifies effective communication strategies to increase immunization uptake in rates vaccine-hesitant parents. Each of these themes was divided into sub-themes on the basis of strategies designed to communicate vaccine safety to vaccine-hesitant caregivers.

The following discussion will examine these sub-themes in greater detail and relate them to a decision-making process that involves both memory and reasoning, as it is understood in the context of fuzzy-trace theory. The discussion will also refer to supportive research literature that substantiates the applicability of the sub-themes to primary care practice in Canada and give consideration to the multiple influences that affect vaccine decision-making today.

CHAPTER 4

Discussion

An integrative review of the literature was undertaken in order to identify strategies that PCPs could employ to communicate vaccine safety and thereby increase the immunization uptake rate for hesitant caregivers. A total of eight research studies and two research reviews offered some recommendations with respect to potentially effective strategies. None of the studies or the reviews provided strong evidence towards any particular strategy but instead offered useful observations about strategies based on the findings of both experimental and non-experimental research. All the sources reviewed indicate that there is a need for more research to support these recommendations.

The following section of this paper will discuss the sub-themes that emerged in the course of this review –as well as in the grey literature and will refer to further research for additional perspective on the findings. The themes will be also be examined with respect to the way in which fuzzy-trace theory models memory and reasoning. And finally, these themes will be considered in the context the Canadian Immunization Guide recommendations for communicating effectively about vaccination. Following this, the recommendations will conclude this paper.

Social Orientation and Child-Centred Vaccine Communication

Providing scientific evidence is meant to assist in informing risk-and-benefit discussions with caregivers. Immunological science demonstrates that the benefit of vaccination extends beyond the individual and has an impact on the health of the wider community. High vaccination coverage leads to herd immunity and protects vulnerable members of the population from the spread of communicable diseases. PCPs, well aware of the scientific findings, may feel compelled to share these evidence-based facts in order to advocate for the protective aspects of widespread immunization, and thereby prompt an altruistic response in vaccine-hesitant caregivers. Hendrix et al. (2014) investigated "vaccine message framing," and found that there is no basis for taking a fact-oriented approach to communication; they advised that, instead, PCPs should stress vaccine benefit to the individual child when speaking with vaccine-hesitant or resistant caregivers.

As previously discussed in the "findings" component of this paper, Reich (2014) conducted a sociological study of 25 mothers living in Colorado to examine the gendered discourse of vaccine refusal. The participants were interviewed between 2007 and 2013. All these mothers either refused to vaccinate their children, or allowed some vaccines by choosing an alternative vaccine schedule. Reich found that these mothers were focused solely on their own children, and that they evaluated, and often rejected, the assertion that their choices undermine community health. At the same time, these mothers were able to ignore the benefit of herd immunity to their own children. Reich attributes this to a modern parenting phenomenon, which sees caregivers investing substantial resources in the development of their own children, and less concerned about the security and development of all children. Reich argues that modern-day parenting trend, particularly evident in more affluent families, influences the way in which these parents make decisions about healthcare. The participants in Reich's study often referred to their "freedom," i.e., to choose their healthcare providers, to manage their child's nutrition and their medical care, and to conduct their own research, given their mistrust of health information generated by mainstream institutions. Reich notes that these ideas about freedom are particular to the privileged and wealthy, and not representative of other socio-demographic groups in the US. She sees child-focused healthcare decision-making as a symptom of a prevailing cultural norm whereby mothers hold themselves uniquely responsible for their children's success, failure, health, and disability. Essentially, if this cultural norm indicates that mothers take on this level of responsibility in their children's lives, it also indicates that their focus will be placed squarely on the level of control they can exercise within their own family, making them less likely to consider how their healthcare decision-making can impact other children.

The discussion of child-centred communication, and how caregivers make decisions with respect to vaccination—based on perceived individual health needs instead of the needs of the community—can be seen in light of the tenets of fuzzy-trace theory (FTT). This theory identifies four aspects that have an impact on the process model of vaccine decision-making: knowledge, representations (gist and verbatim), retrieval of values, and processing (Reyna, 2012). Values in the FTT represent the relevance of key values or knowledge in context; processing involves understanding of how values apply to the option of vaccinating or not vaccinating.

Reich (2014) notes that, when negotiating vaccine-related communication, healthcare practitioners underestimate the way in which caregivers, usually mothers, strategically negotiate symbolic, value-laden terrain in making healthcare decisions for their children. Specifically, healthcare providers tend to place information at the forefront of their communication thereby negating the fact that information alone does not influence a caregiver's decision to vaccinate. The issue of vaccine hesitancy or refusal is symptomatic of larger systems of meaning, which include caregivers' desires to optimize the health of their children and their emphasis on their unique needs (and their lack of interest in promoting generic health policies). The combined influence of today's cultural norms around mothering, and the associated nuanced values that place an emphasis of the uniqueness of the individual child's health, are seen to have a significant influence on vaccine decision-making.

According to the FTT, not only do these factors influence the construction of gist representations of vaccination that will inform decision-making, they affect the retrieval of values and processing. These considerations, i.e., which factors influence parental vaccine decision-making, and how parents intrinsically make decisions, provide insights as to why healthcare practitioners struggle in their attempts to influence the decision-making process. If information alone does not impact the decision to vaccinate, how then do providers contend with the many societal forces that affect the decision-making process to which caregivers are subject? Based on the finding in this review, PCPs who frame vaccination discussions in a *child-centred* way, and focus primarily on *individual* benefits rather than emphasize the collective benefit may have the opportunity to increase vaccine uptake in vaccine-hesitant families.

The following section of this discussion will address findings from this integrative review that might help health care practitioners countervail the societal factors that effect vaccine hesitancy.

Post-modernism, Narrative Medicine, and Medical Professionalism

McMurray et al. (2004) note that healthcare practitioners tend to resort to the cognitive deficit model for structuring their conversations with vaccine-hesitant parents by way of offering science-based information in an effort to quell vaccine concerns. This is demonstrated in the literature that has been created to supplement healthcare provider knowledge of immunization in an effort to inform the information they share with their patients. Offit et al. (2002) addressed an increasing parental concern—that children receive too many vaccinations and are consequently at risk of overwhelming their immune system. This "special article" examined a number of relevant considerations and concluded that there was no cause for concern. The review was set out in such a way as to be of most use to healthcare practitioners requiring information to counter anti-vaccine claims and was published in *Pediatrics*, a widely-read peer-reviewed journal. Healy and Pickering (2011), in their article "How to Communicate with Vaccine-Hesitant Parents," identify a number of factors central to effective communication—which they describe as the ability to provide scientific facts by using direct, unambiguous language, and avoiding jargon and qualified statements.

This integrative review included three studies that recommend that healthcare providers who work with vaccine-hesitant or resistant caregivers should consider the experiential knowledge that parents bring to the conversation. Further, that practitioners respond by sharing a their own heuristic knowledge, including accounts of their vaccine-related experiences with other patients (Kempe et al., 2011; Leask et al., 2006; McMurray et al., 2004). Additionally, this research encourages healthcare providers to step out of their strictly professional role and talk about vaccinating their own children in order to demonstrate their faith in immunizations. These recommendations raise several questions about professionalism in the context of primary care practice, particularly with respect to the influence of postmodernism on healthcare. As discussed in the background to this paper, according to Kata (2011), the postmodern medical paradigm takes into account values as well as evidence, recognizes a preoccupation with risks over benefits, and acknowledges the rise of the informed patient. The effect of this paradigm can be seen in healthcare—with the current emphasis on shared decision-making between patients and PCPs, and the related shift in the locus of power between the two parties. According to Hilton (2008), traditional models of medical professionalism in the mid-20th century were characterized by omniscience and paternalistic attitudes. The idea that health professionals, particularly physicians, share stories about their own children requires a substantial leap.

According to Charon (2001), developments in patient-physician communication in primary care in the 1960s and 1970s placed greater emphasis on the value of narrative knowledge in medicine. Charon (2004) describes narrative as a "re-telling," a description, or a relating of events in a sequential and relational way. In the medical setting, narrative is shared between healthcare professionals and patients as a unique way of navigating the most fundamental aspects of the human condition. Despite changing notions of medical professionalism, it has been proposed that patients do expect some traditional aspects of professionalism, such as accountability, to direct their physician's practice. However, according to Charon (2001) they "also yearn for such private benevolence as tenderness in the face of pain…and comfort in the face of death" (p. 1900). It is possible that, with respect to vaccine refusal, benevolence conveyed by way of narrative in the medical setting could offer an opportunity for healthcare providers to engage caregivers in ways that may have an impact on their sense of meaning in relation to vaccine safety. This approach challenges healthcare providers to ask themselves if their own definition of professionalism can be stretched to include storytelling by way of personal and professional narratives in order to promote health in their patients.

Fuzzy trace theory supports the finding of incorporating narrative into vaccine communication in primary care. Reyna (2012) points out that, given the human preference for fuzzy-processing, people are more likely to use gist representations to support intuitive processing and inform their decisions about vaccinating. Narratives and storytelling help to connect the dots regarding the benefits of immunization in order for the essence and experience of receiving the information can be apprehended by the audience. From this, the *meaning* derived from this experience forms the gist that the caregiver will prefer to use when making decisions about vaccination. Anti-vaccine groups use gist-laden stories to satisfy a longing for clarity and to explain mysterious illnesses such as autism. Conveying meaning through narrative in vaccine communication would essentially mean matching the gist representations of the anti-vaccine movement with gists from the information shared by PCPs when discussing vaccinations.

Narratives and storytelling can also assist a primary care provider to counteract some of the difficult arguments put forward by anti-vaccine groups. Denialism has long been a tactic used by anti-vaccine websites to address science that supports vaccination (Dubé et al., 2013). Diethelm and McKee (2009) define denialism as "the employment of rhetorical arguments to give the appearance of legitimate debate where there is none, an approach that has the ultimate goal of rejecting a proposition on which a scientific consensus exists" (p. 2). Denialism lends itself well to challenge or disregard the science-based information healthcare providers convey to their patients. It lends itself much less-well to responding to the experiential knowledge a healthcare provider might share with a caregiver, especially when the healthcare provider confides information about his or her own children. Denying the healthcare provider's personal experience would contradict the post-modern belief that values and parental experience match or supersede scientific evidence. It would behoove healthcare practitioners to put to good use some of the tactics used by the anti-vaccine movement—to help promote pro-vaccine communication in primary care.

Prenatal Vaccine Communication

Of the ten studies reviewed, three addressed the theme of prenatal vaccine information (Glanz et al., 2013; Saitoh et al., 2013; Vannice et al., 2011). Two studies reported that providing vaccine information at the prenatal stage could increase vaccine uptake in vaccine-hesitant caregivers. Vannice et al. (2011) found that caregivers would prefer prenatal vaccine communication to come from their healthcare provider in order to help inform their decision as to whether or not to vaccinate their infants. Research that examined the timing of when caregivers make their vaccine decisions supports the idea of early immunization discussion. Brunson (2013), looking at how parents make decisions about vaccination, found that participants became aware of the prospect of vaccination during pregnancy or shortly after giving birth. Kennedy, LaVail, Nowak, Basket, and Landry (2011) surveyed parental confidence with respect to vaccines and found that most parents sought information about vaccine safety before taking their child to be vaccinated. This research suggests that there is large gap in the time between when caregivers begin to think about and look into vaccination on their own, and the time when more formal discussions usually take place with their primary care provider or public health nurse.

In British Columbia, if immunizations are not discussed with a mother prenatally or during the immediate postnatal period, the first opportunity is generally at the first appointment with the infant's primary care provider, anywhere from one week to one month later. At this time, if the Rourke Baby Record (Rourke, Leduc, & Rourke, 2014) is used to guide the assessment and education sharing during the appointment, the practitioner is obliged to discuss immunization pain-reduction strategies and record any vaccinations already received. These charts do not come with guidelines for the practitioner in addressing parental concerns prior to the administration of vaccinations, typically at the age of two months.

The strength of the prenatal immunization education strategy is that it would be relatively easy to adapt the education provided during prenatal appointments to include vaccine-related information. It also could be added to the curriculum of prenatal classes. The most noticeable weakness of such a strategy is that the potential of educational interventions at the prenatal stage is not sufficiently well-researched to single it out it as a successful strategy that would encourage providers to incorporate information sessions of this nature into their practice.

At present, studies by Saitoh et al. (2013), and by Zúñiga de Nuncio et al. (2003), provide the only research that looks at prenatal immunization education for its potential to increase vaccine uptake. The Zúñiga de Nuncio et al. (2003) study was excluded from this review because it looked at educational intervention in an under-vaccinated prenatal Latino population, and because it was not concerned with increasing vaccine uptake in those who were philosophically opposed to vaccination. Based on the findings of this integrative literature review—and taking into consideration the low vaccination rates in British Columbia—it would seem timely to advocate for research that examines the impact of prenatal education interventions that are initiated in the primary care setting.

Fuzzy-trace theory conceptualizes the prenatal period for first-time caregivers as a moment where they are at risk for a "meaning threat," which Reyna (2012) describes as a gap or a conflict in understanding that increases the desire for meaning. Women who become cognizant of vaccine risks during pregnancy are likely to experience this increased desire for understanding as they prepare to evaluate the threat/benefit proposition with respect to the health of their unborn child. At this early stage, according to Reyna (2012), meaning is most likely to be derived from minimal knowledge, experience, bias, beliefs about plausibility, and low levels of exposure to causal narratives in first-time parents. It seems that, during this impressionable period, as parents begin their search for meaning, prenatal education, or even an informal discussion, would help to form a gist representation that favours vaccination.

The Canadian Immunization Guide and the BCCDC Immunization Communication ASK Tool

There are no evidence-based practice guidelines in Canada to advise healthcare providers on best practices in communicating with caregivers who are philosophically opposed to immunizations. However, both federal and provincial health bodies provide recommendations on how questions that relate to vaccine safety can be addressed, and how healthcare providers can initiate immunization discussions with their patients. Both sources offer invaluable information to healthcare providers. The Canadian Immunization Guide (Public Health Agency of Canada, 2013a) and the Immunization Communication

Tool (BCCDC, 2013) are designed to inform the practice of healthcare providers who administer the vaccinations along with providing information about communicating vaccine safety. Given that PCPs generally do not administer vaccinations, they may not refer to them as frequently as the key points about vaccine safety are embedded in information regarding storage and administration of immunizations.

The Public Health Agency of Canada has adapted material provided by the National Advisory Committee on Immunization (NACI) to produce the Canadian Immunization Guide, an online resource for healthcare providers when it comes to immunization practice. The Canadian Immunization Guide sets out 16 guidelines for optimal immunization practices, which are recommended for use by all health professionals who administer vaccines or manage immunization services (Public Health Agency of Canada, 2013a).

These guidelines provide a great deal of information on how healthcare professionals should approach their role as vaccine providers to deliver accessible, timely, informed, and safe immunizations. For providers unsure of the role a vaccine provider plays, these guidelines specify the competencies for evaluating immunization practices, identifying deficiencies, areas of excellence, and resources needed to achieve immunization goals. Three guidelines apply to the issue of vaccine hesitancy; they describe what healthcare providers should know in advance, and recommend ways in which to communicate to a patient regardless of his or her position on immunizations. None of the guidelines directly address the issue of vaccine hesitancy or refusal. Appendix C includes a table of the three guidelines relevant to this paper (Guidelines 4, 5, and 6).

The online Canadian Immunization Guide includes links embedded in guidelines four and five which bring up a separate webpage where key points set out effective communication principles. Here, vaccine hesitancy is defined and factors influencing reasons for hesitancy are identified. The Guide advises that, to communicate effectively about vaccination when responding to vaccine hesitancy, one must adopt a vaccine-recipient-centred approach, respect differences of opinion about immunization, represent the risks and benefits of vaccines fairly and openly, and communicate clearly about current knowledge by relying on an evidence-based approach.

The recommendation to provide a vaccine-recipient-centred approach is congruent with the findings of this review. For example, Hendrix et al. (2014) found that child-centred communication increases the intention to vaccinate. Much of the rest of the information in the Guide, as it concerns effective communication, centres on the evidence that can be used to refute claims of elevated vaccine risks. Recommendations emphasize that sufficient time be taken to discuss vaccination, that a respectful manner be used, jargon be avoided, and science-based information be provided. The guide emphasizes that "regular health care providers, such as vaccine providers, are perceived as trusted individuals and have a vital role in ensuring continued success of immunization programs and in maintaining confidence in the effectiveness and safety of vaccines" (Public Health Agency of Canada, 2013a).

As noted above, in British Columbia, health providers such as family doctors or nurse practitioners rarely provide vaccines. Depending on the caregiver's relationship with the staff at his or her public health centre (where children in the province are typically immunized), the vaccine provider is just as likely to be a registered nurse unfamiliar to the family. Whether or not the nurse is perceived as a trusted individual would likely be more dependent on the extent to which a generalized sense of trust in healthcare providers exists in the absence of an established relationship.

The British Columbia Centre for Disease Control has developed the Immunization Communication Tool for Immunizers (BCCDC, 2013). The research considered for this integrative review is primarily concerned with the "how" of vaccine communication or the *way* in which healthcare providers convey information to caregivers in hopes of increasing immunization uptake rates. The BCCDC communication tool is concerned with the "what"—the content, or actual information that healthcare providers need in order to answer specific questions about vaccine safety. For example, one finding that emerged in the course of this review was that vaccine information should be transmitted early, during the prenatal period. The Immunization Communication Tool (BCCDC, 2013) provides information appropriate for this early stage with respect to vaccine safety, vaccine ingredients, immune overload, thimerosol, and autism (BCCDC, 2013). It also provides evidence to refute the prevailing viewpoints of anti-vaccine groups and translates the clinical jargon into plain English.

Included in this document is the ASK strategy for effective immunization communication: **A**cknowledge your client's concerns; **S**teer the conversation (to refute myths or close the conversation if the client is a conscientious objector); **K**nowledge (know the facts well). This strategy exemplifies an evidence-based resource available to healthcare providers to supplement their knowledge of childhood immunizations, complete with tips on how to initiate conversations with their patients.

It is important to note that both the Canadian Immunization Guide (Public Health Agency of Canada, 2013), and the Immunization Communication Tool (BCCDC, 2013) offer excellent evidence-based information well-suited to address the concerns of vaccine-hesitant parents. However, given that the information may not be accessed as frequently by primary care providers, who do not typically provide vaccines, they may not be aware of it despite their role as frontline advisors to caregivers with respect to vaccine-related decisions. Ideally, the information generated by federal and provincial authorities should be directed to all healthcare practitioners who are best placed to advise and influence the decision-making processes to which caregivers are subject to when it comes to developing their understanding of vaccine-related issues.

CHAPTER 5

Recommendations and Conclusion

It was the intention of this integrative review to look at evidence that could inform primary care practitioners in the process of working with vaccine-hesitant caregivers. In the course of this review, three prevalent sub-themes were identified: child-centered communication, narrative vaccine communication, and prenatal vaccine communication. These themes were linked to healthcare practice by way of supportive literature from the behavioural sciences and the fuzzy-trace theory approach (Reyna, 2012). Currently, much of the information provided to support practice hinges on educating PCPs with respect to the arguments to refute anti-vaccine claims. However, it fails to acknowledge the complexities of the influences to which caregivers are subject to when it comes to questioning the safety of vaccines, or refusing to vaccinate their children. The following section will include recommendations for practice, research, and education with respect to the issue of vaccine hesitancy, the findings of the review, and the supporting literature that informed this project.

Recommendations for Practice

The issue of vaccine hesitancy is of particular importance given the low vaccine uptake rates in British Columbia—which are seen to be responsible for the regular outbreaks of vaccine-preventable diseases, events that were previously kept to minimal levels in the province (BCCDC, 2012). Whether or not the issue of vaccine hesitancy or refusal is entirely to blame, the low rate of vaccine uptake nonetheless presents a significant health threat to both individual and population health. It is important that PCPs understand how their practice influences the decision-making process of caregivers who are unsure about whether to vaccinate their children, or who are refusing vaccination altogether.

Even though the findings of this review are not derived from a large body of research, they do offer useful recommendations that could assist PCPs when it comes to addressing vaccine hesitation in ways that are less likely to have a negative impact on their relationships with their patients. The recommendations to provide child-centred information, to use narrative to discuss personal experiences with immunizations, and to begin the vaccine-related communication during prenatal appointments differ from the conventional recommendations for healthcare providers to date. The recommendations provided here endeavour to invest vaccine communication with more meaning than it would have were it to rely solely on the transmission of scientific facts as the only means to convince a hesitant caregiver of the safety of vaccines.

It is important that healthcare providers take the lead and introduce this topic to parents rather than find themselves in a reactive position when parents introduce their vaccine concerns. The confidence conveyed by the healthcare provider when introducing the topic, the engagement the patient feels at that moment, the knowledge gained—and even a narrative shared—will all assist in forming the gist and verbatim representations upon which the patient will draw in the process of making vaccine-related decisions (Reyna, 2012). It is argued here that the strength of this gist representation will influence how a caregiver will react when faced with anti-vaccine information. Ideally, PCPs will approach vaccination discussions with meaningful, evidence-based answers to their patients' questions. Ideally, too, they will initiate such discussions during the prenatal stage before parents begin to form their questions—and before they have time to form their opposition.

PCPs who are themselves unsure about how to respond to questions about vaccine safety have available to them the Canadian Immunization Guide as well as the BCCDC Immunization Communication Tool. These resources represent appropriate and up-to-date information and will supplement PCPs knowledge about vaccine safety—especially given the extent to which the BCCDC makes a concerted effort to keep abreast of the latest anti-vaccine propositions and generate recent updates to the resource material (BCCDC, 2013)

Recommendations for Education

Pelly et al. (2010), in their assessment of health education in Canada, emphasize that graduates of professional programs in health leave their studies with significant gaps in their understanding of vaccination-related topics. Specifically, the authors of this study found that graduates lack sufficient information when it comes to responding to questions about vaccine indications and contraindications, adverse effects, and safety. It is worth noting that these issues are also those most frequently identified by parents who philosophically oppose vaccines. Healthcare practitioners working in primary care or pediatric settings will likely encounter families and individuals who choose not to vaccinate on the basis of their beliefs, and who consider themselves philosophically opposed. Wilson (2008) argues that the level of preparedness that health practitioners bring to this interaction could have an impact on the decisions that caregivers make as to whether or not to vaccinate their children. Sufficient knowledge about vaccine risks and benefits provides a strong foundation from which PCPs can convey confidence and build meaningful discussions with their patients. If healthcare providers in primary care feel uncomfortable answering questions due to lack of knowledge, time constraints, or are themselves hesitant, then their uncertainty will inevitably be communicated to patients looking to have their own uncertainty validated.

In order for primary care NPs to feel confident about conveying vaccine-related information to their patients, reliable information that covers the issue of vaccine hesitancy and refusal should be included in their educational program –especially to those who expect to be involved in family practice. In this way, PCPs will have solidified their understanding of the facts and feel somewhat prepared to respond to common anti-vaccine arguments by countering with evidence for the safety of vaccines when it comes time to discuss the topic with caregivers.

One issue that is glaringly absent in the literature reviewed for this project is the acknowledgement that there may be PCPs and nurses who themselves have doubts about the safety of vaccines. Healthcare providers who are critical of vaccines have the potential to undermine public confidence in immunizations, particularly if they choose to share their views in a public forum. It is essential to ensure that healthcare professionals begin their careers with full knowledge about the current vaccine debate in order to ensure confident recommendations in favour of vaccination.

Recommendations for Research

The two research reviews incorporated in the findings for this integrative review indicate that there is a profound need for research that looks more closely at interventions as they relate to vaccine-hesitancy. It seems that a tremendous amount of research has been undertaken in order to better understand the demographics of vaccine-hesitant caregivers, their beliefs, how they make decisions, and what informs their decisions. But, there is critical shortage of research that looks at interventions that are specifically oriented towards increasing the *intention* of caregivers to vaccinate. Consequently, there is also an absence of useful strategies for guiding healthcare providers as to what may work. Perhaps the hesitation to conduct this kind of research has to do with the realization that it is difficult to nail down a one-size-fits-all strategy given the multitude of factors which caregivers are obliged to consider.

The findings that have emerged from this integrative review suggest that further research might consider examining the outcome of incorporating a vaccination education module into prenatal classes in a geographic area known to have low vaccine coverage for young children, and analyze whether this would increase the intention to vaccinate, or affect vaccine uptake rates in the cohort exposed to the module. This would be a relatively straightforward research project. The quality of the research would, however, depend on the careful development and delivery of such a module—given that there is ample evidence to suggest that information in itself is insufficient to compel the parents who are most likely to be hesitant about vaccines to immunize their children. The module would need to incorporate case studies and/or personal narratives to which prospective parents in the prenatal class can relate in order for them to derive meaning and strong gist representations from such an experience.

A project of this nature, provided to prospective parents—along with information designed to address anti-vaccine claims that might come up during a prenatal class—could offer a valuable research opportunity to see if providing early, meaningful, information on vaccines brings about higher rates of vaccine uptake. This recommendation for research involves trying to incorporate an upstream intervention, where information is transmitted early in the child-rearing process, before parental ideas become fully formed and entrenched.

Conclusion

Vaccine hesitancy followed by vaccine refusal has resulted in a significant health problem for Canada. Declining vaccination rates in young children have caused an increase in vaccine-preventable communicable diseases due to increasingly low herd immunity. PCPs continue to be the main source of vaccine-related information for concerned caregivers and parents. This integrative literature review has examined the ways in which nurse practitioners—as primary care providers—can increase vaccine uptake for patients in their care. This discussion also provided a historical background to vaccine opposition and considered the modern-day influences on the decision-making processes to which caregiver are subject when it comes to vaccine safety. These considerations highlighted the relevance of this topic to primary care and NP practice.

Ten studies were selected on the basis of a literature search, and the findings from these studies informed this review and foregrounded several key themes—communication strategies that are best achieved by being child-centred, narrative rich, and timed to occur at the prenatal stage.

These themes were discussed in the findings section above, and examined in the context of excluded studies, grey literature, and research from behavioural sciences. Fuzzy-trace theory was applied to the findings of this integrative review for its ability to bring insight into the way in which parents make vaccine-related decisions, and to hypothesize whether these strategies could be effective for vaccine communication. Recommendations for practice were discussed along with suggestions for further research. The need for further research is of particular importance due to the fact literature reviewed here indicates there is a shortage of research to inform healthcare providers about which interventions are most likely to increase vaccine intentions and uptake

It is hoped that this project will shed light on the issue of vaccine hesitancy as a way of enabling nurse practitioners—and all primary care providers—to understand that parents and caregivers do not act simply on the basis of a difference of opinion, or a lack of knowledge, when it comes to making the decision not to vaccinate. There is, currently, a multitude of internal and external factors that influence vaccine decision-making—some of which nurse practitioners have an opportunity to address.

This project asserts that meaningful vaccine communication that is child-centred, includes narrative, and begins early could help nurse practitioners influence the views of parents and caregivers with respect to childhood vaccination, and in this way better inform the decision-making process. The ultimate goal of these communication interventions is to decrease the risk for vaccine- preventable communicable disease and mortality for both individuals and the community as a whole.

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APPENDIX A

This table of evidence rates research articles on a scale of 1–7 depending on the type and strength of each study (LoBiondo-Wood, Haber, Cameron, & Singh, 2012).

Level 1: Systematic review or meta-analysis of randomized controlled trials (RCTs); evidence-informed clinical practice guidelines based on systematic reviews.

Level 2: A well-designed RCT.

Level 3: A controlled trial without randomization (quasi-experimental study).

Level 4: Single non-experimental studies- case-control, correlational, cohort studies.

Level 5: Systematic reviews of descriptive and qualitative studies.

Level 6: Single descriptive or qualitative study.

Level 7: Opinion of authorities and/or reports of expert committees.

Table 3 *Integrative review evidence*

Author and Date	Location of Study	Level of evidence	Population and focus	Study findings	Sample Size
Glanz et al. (2013)	Colorado, USA	4	Parents with children <4 years of age To describe parental vaccine making behaviours and trust in provider	Interventions to address parental vaccine concerns may be more effective if they are applied early (during pregnancy) and often (pregnancy to infancy)	1st phase: 173 2nd phase: 854
Hendrix, Finnell, Zimet, Sturm, Lane, & Downs (2014)	USA	2	Parents of infants <12 months old To determine if emphasizing benefits of MMR directly to the child or to society impacts parents' vaccine intentions for their infants	Healthcare providers should emphasize MMR benefits to the child	802 parents
Kaufman et al. (2013)	Australia (Cochrane Review)	1	To assess the effects of face-to-face interventions for	The limited evidence available is low	6 RCTs and 1 cluster

			informing or educating parents about early childhood vaccination on immunization uptake and parental knowledge	quality and suggest that face-to-face interventions to inform parents about vaccination have little or no impact on immunisation status or knowledge of vaccination	RCT
Kempe et al. (2011)	USA	4	Paediatricians and family physicians (1)To assess the prevalence of parental requests to deviate from vaccine schedules (2) responses to such requests (3) attitudes about the burdens and success of vaccine communication with parents	Burden of communicating with parents about vaccines is high. Physicians report greatest success with convincing sceptical parents using messages about their own personal choices and experiences	366 (PED) 330 (GP)
Leask, Chapman, Hawe, & Burgess (2006)	Australia	6	Mothers of young children Explore how parents respond to competing media messages about vaccine safety	Personal experiences, value systems, and level of trust in health professionals are fundamental to decision-making. Stories of people affected by vaccine-preventable disease needs to enter discourse	36 mothers
McMurray, Cheater, Weighall, Nelson, Schweiger, &	UK	6	Parents of children age 4-5 years Primary care practitioners, managers, and immunization	Vaccination messages in primary care are failing to get through because the information	69 interviews with parents 12 interviews

Mukherjee (2004)			coordinators To explore parents accounts of decision-making relating to MMR vaccine controversy, identify uptake determinants and education needs	provided does not take in to account parent's pre-existing experience and understanding. Relation of medical research using visual imagery and case studies to provide vicarious experience of communicable disease	with staff at PC clinics
Opel et al. (2013)	USA	6	Patients, paediatricians and NPs To characterize provider-patient vaccine communication and determine the influence of specific provider communication practices on parent resistance to vaccine recommendations	How providers initiate the vaccine discussion is an important determinant of parent resistance When providers pursue their original vaccine recommendation in the face of resistance, many parents will relent and agree to vaccinate.	111 vaccine discussions with 16 providers from 9 practices

Sadaf et al. (2013)	USA Systematic review	1	Systematic review of data on the effectiveness of interventions to address parental vaccine refusal and hesitancy	Limited evidence to guide implementation of effective strategies. Need for appropriately designed, executed and evaluated intervention studies to address the gap in knowledge	30 studies
Saitoh et al. (2013)	Japan	2	Pregnant women To determine if perinatal immunization education increases vaccine uptake in infants	Perinatal immunization education improved immunization status of infants, increased women's knowledge on immunization and intention to vaccinate infants	119 pregnant mothers
Vannice et al. (2011)	USA	3	Mothers who indicated concerns about infant vaccines To determine if giving vaccine information materials before the 2-month vaccination visit to mothers with concerns about vaccine safety positively changed their attitudes and beliefs about vaccine safety	Distribution of vaccine information significantly improved attitudes regardless of the visit they were provided. Allowing adequate time to review vaccine information may benefit concerned mothers	272 mothers

APPENDIX B

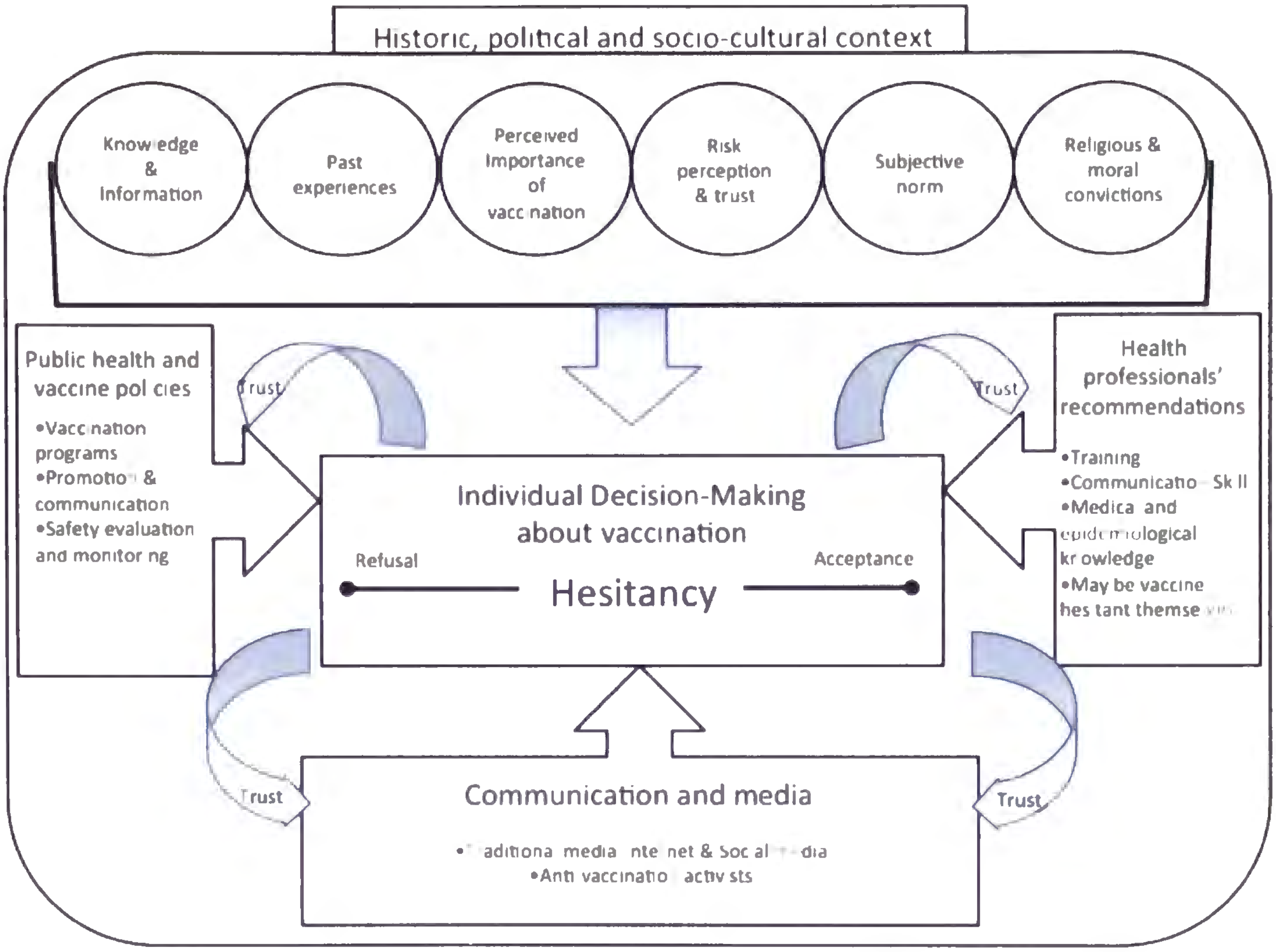

Figure A *Conceptual model consisting of three domains of factors that interact and may lead to vaccine hesitancy at the individual level.*

This model depicts vaccine hesitancy as an individual behaviour, influenced by decision-making that is shaped by a range of different factors. These factors range from individualized characteristics, such as knowledge and moral convictions, to broader factors, such as historic, political, and socio-cultural influences. Adapted from "Conceptual model of vaccine hesitancy," by E. Dube, C. Laberge, M. Guay, P. Bramadat, R. Roy, and J. A. Bettinger, (2013), *Human Vaccines & Immunotherapeutics, 9*(8), p. 1764.

APPENDIX C

Table 4 *Canadian Immunization Guide: National Guidelines for Immunization Practices, Selected Guidelines Relevant to Vaccine Hesitancy*

Guideline 4	Vaccine providers should communicate current knowledge about immunization using an evidence-based approach. Vaccine providers should educate people in a culturally sensitive way, preferably in their own language, about the: importance of vaccination, diseases that vaccines prevent, recommended immunization schedules, need to receive vaccines at recommended ages, and importance of bringing the immunization record to every health care visit.
Guideline 5	Vaccine providers should inform vaccine recipients and parents in specific terms about the risks and benefits of vaccines that they or their child[ren] are to receive.
Guideline 6	Vaccine providers should recommend deferral or withholding of vaccines for true contraindications only.

APPENDIX D

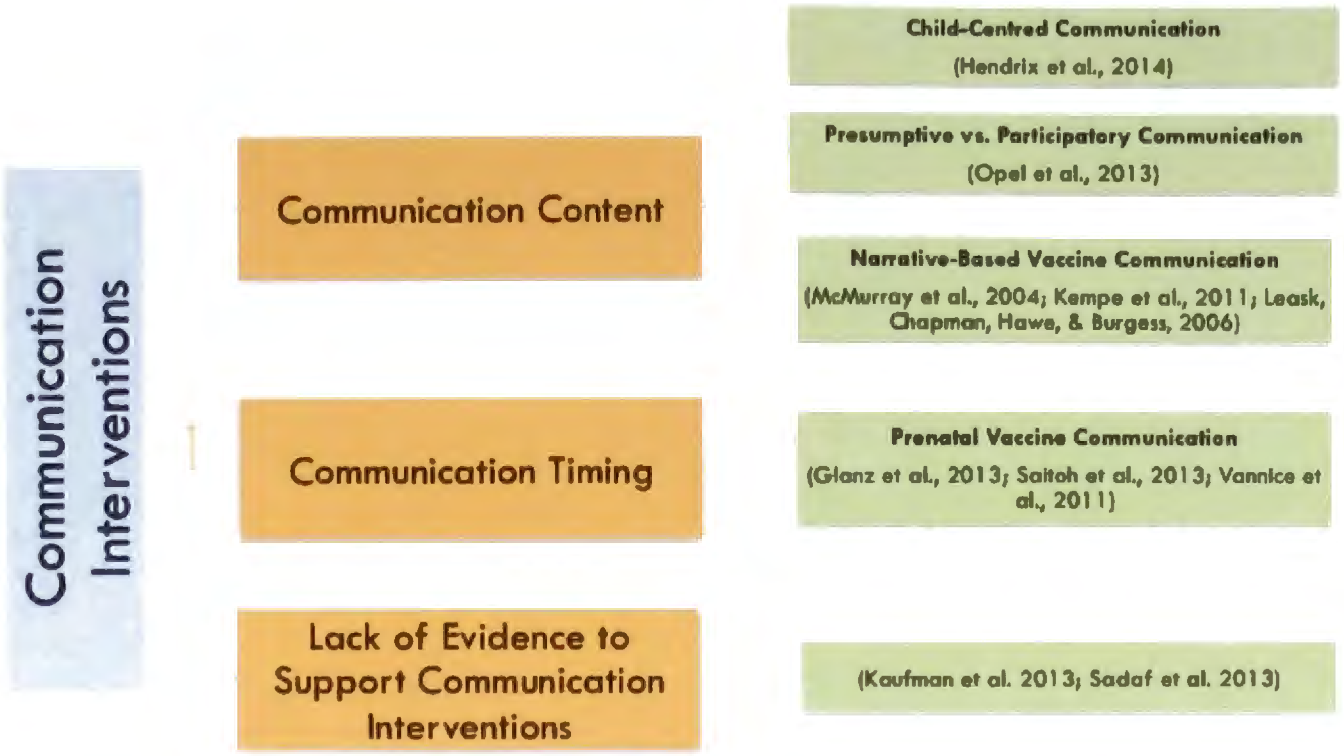

Figure B *Thematic analysis of the literature review findings.*

This figure depicts the themes derived from the findings of the literature review articles. All 10 sources identified communication interventions as the overarching theme. From this, three further themes were identified: communication content, communication timing, and a lack of evidence to support communication interventions. The themes of communication content and timing included four subthemes that identified what strategies could be utilized when addressing vaccine hesitancy in primary care.