Public Health Crisis and Emergency Risk Communication to Family Physicians in Canada: A Phenomenological Exploration

by

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Abstract

Family physicians are a cornerstone of the Canadian public health and health care systems. During times of public health crisis, the role of the family physician as both recipient and translator of complex and rapidly-evolving health information is emphasized. How family physicians actually experience public health crises while practicing medicine on the front lines is rarely illuminated in the literature; and qualitative investigations relating to the risk communication processes surrounding such events to this particular knowledge-user community are scarce. The primary purpose of my research was to explore how public health crises and the related risk communication processes surrounding such events are experienced by family physicians in Canada, utilizing a phenomenological approach. I also sought to offer insights from family physicians on how public health agencies and professional organizations might improve risk communication to this community in the event of a future public health crisis. Secondary to the phenomenological exploration, I aimed to determine the current understanding and knowledge gaps about this phenomenon as can be gleaned from the literature. I conducted individual phenomenological interviews with sixteen family physicians across Canada. The interview data were subjected to two different analytical methods: a phenomenological interpretation and a qualitative content analysis. I then supplemented and situated the core phenomenological project with a scoping review on the current reporting of ways in which public health crisis and emergency risk information is communicated to family physicians. My findings resulted in the formulation of four papers: a scoping review; a phenomenological paper; a qualitative content analysis; and a short commentary paper. The results of my research illuminate what it may actually be like to live through or experience a public health crisis as a

family physician in Canada. My findings also point to varied and experiential advice on how to improve risk communications to family physicians in the event of a future public health crisis.

Preface

This thesis is an original work by Nicole Allison Kain. The research project, of which this thesis is a part, received research ethics approval by the University of Alberta's Health Research Ethics Board (HREB); Project Title: Crisis and Emergency Risk Communication to Family Physicians in Canada; study ID: Pro00032565 dated April 8, 2014. Amendment approvals were received October 27, 2014 and June 29, 2015 to reflect a small change in recruitment and follow-up participant member-checks, respectively. The amended study ID was Pro00032565_AME2 and finally Pro00032565_AME3.

Nicole Allison Kain conceptualized the study explicated in this thesis and conducted the research including developing the research questions, recruiting the participants, collecting the data, analyzing the data and composing the papers for this paper-based dissertation. Dr. Cynthia (Cindy) Jardine (doctoral supervisor) oversaw the formation of the study and assisted with approaches to qualitative data analysis and dissemination of results. All of the papers contained in this thesis were the initial work of Nicole Allison Kain, with the supervisor and supervisory committee making substantial contributions to the editing and organization of the finald papers. One of the papers (Chapter Six), "The Evolving Face of Public Health Crises in Canada; Are We Ready?" was published on April 18, 2016 on the Canadian Medical Association Journal (CMAJ) Blogs; this same paper was accepted as an oral presentation at the Canadian Public Health Association (CPHA) 2016 Annual Conference in Toronto, Ontario, June 13, 2016. Dr. Cindy Jardine is a co-author of this paper. A version of the scoping review (Chapter Three); a version of the phenomenology paper (Chapter Four); and a version of the qualitative content analysis paper (Chapter Five); will be submitted for publication in 2017.

Dedication

For my family and friends who are not just outstanding physicians,
but incredible people first.

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I am forever grateful to my loving and brilliant parents, Brian and Elizabeth, and my incredible sister Danielle, for being amazing role models and for always believing in my abilities and my strength. Without your unwavering and unconditional love and encouragement, I would be lost. Thank-you to my wonderful, strong, supportive and inspirational fiancé Aaron, my partner in life, for loving me. To my brother-in-law Chris, your dedication, creativity and drive have been an inspiration. Thank-you to my beautiful nephew Gabriel for being the best little boy. My family is my life.

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1.0 CHAPTER ONE – INTRODUCTION AND BACKGROUND

Public health crises (such as those that occur when a novel infectious disease outbreak spreads rapidly across an area of the globe, or when a forest fire rages out of control impacting the air quality and subsequent breathing abilities of a population, or when low-lying geographical areas are pummeled by torrential rains causing flooding that severs access to hospitals and medical care) are events that have the potential to cause catastrophic impacts on the health and well-being of the public. In Canada, such crises have occurred many times in the past decades, with notable events that have impacted the health of Canadians including but certainly not limited to: the damaging Ice Storm of 1998 in Southern Ontario and Quebec (CBC, 2016); the Walkerton *E. Coli* outbreak in 2000 (Kondro, W., 2000); the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003 (Naylor, C. D., 2003); the immense impact of Hurricane Juan on the East coast in 2003 (Fulmore, C., & Russel, S., 2005); the H1N1 pandemic influenza outbreak of 2009-2010 (Public Health Agency of Canada & Health Canada, 2010); the damaging floods in Southern Alberta in 2013; destructive wildfires in the Northwest Territories and the Western and Prairie provinces during recent dry seasons (CBC, 2014; Stutter, J. D., 2016); the Ebola outbreak and scare in 2014 (Stevenson, L., et al, 2014); and most recently the Zika virus outbreak in the Americas in 2016 (Heukelbach, J., et al, 2016). Appropriate and timely communication relating to the risks associated with such events is essential to ensure the safety and health of the public (Kondro, W., 2000; Naylor, C. D., 2003).

Public health crises are highly complex events that require integration from many different sectors such as government organizations (e.g. the Government of Canada), public health agencies (e.g. the World Health Organization), health professional organizations (e.g. the College of Family Physicians of Canada) and health service providers (e.g. family physicians) to

mitigate. The World Health Organization (WHO) uses the Oxford Pocket Dictionary's 1992 definition, and defines a crisis in terms of public health emergencies as a difficult situation, whose "greatest value is that it implies the possibility of an insidious process that cannot be defined in time, and that even spatially can recognize different layers / levels of intensity" (WHO, 2008a). A crisis may not initially be evident, and it demands analysis to be recognized. Conceptually, this definition of a crisis can cover both preparedness and response, together known as "crisis management" (WHO, 2008a). The word "crisis" itself has origins in Late Middle English, denoting the "turning point of a disease: medical Latin, from Greek *krisis* (decision), from *krinein* (decide)" (Oxford Dictionaries, 2016). A crisis therefore represents a turning point or a decision. In public health a crisis may be an infectious disease outbreak; a chemical or biological emergency; or a climate-related event – all of which have an impact on population and/or public health. Specifically, a public health emergency may be defined as "an occurrence or imminent threat of an illness or health condition, caused by bio-terrorism, epidemic or pandemic disease, or [a] novel and highly fatal infectious agent or biological toxin, that poses a substantial risk of a significant number of human facilities or incidents or permanent or long-term disability" (WHO, 2008b).

As the gatekeepers and typically the first point of contact in the health care system, family physicians in Canada are integral to both responding to and communicating information about public health crises. More than two thirds of Canadians indicate that their family physician is their most important caregiver (College of Family Physicians of Canada, 2004) and almost ninety percent of Canadians believe that having a family physician allows them to feel confident in their ability to access timely, appropriate care in the broader Canadian health system (College of Family Physicians of Canada, 2004). In Canada family physicians are the main providers of

primary medical care, and in the event of a public health crisis, are therefore integral to the timely delivery of critical medical services (College of Family Physicians of Canada, 2005). As part of the front line defense during a public health crisis or emergency risk event (Canadian Medical Association, 2010), it is important that family physicians have access to appropriate, timely and adequate risk information and knowledge in order to maintain the trust relationships with their patient populations and ultimately to improve their patients' health. When a public health crisis occurs, such as the Severe Acute Respiratory Syndrome (SARS) epidemic in 2003 or the H1N1 pandemic influenza outbreak in 2009, family physicians are required to receive and translate complex information from public health agencies and professional organizations to their patient populations. Reviews conducted of these events outline the necessity for improved risk communication of appropriate and timely information to family physicians (Canadian Medical Association, 2010; Naylor, C. D., 2003). More recently, the Ebola outbreak in West Africa has again emphasized the importance of "robust emergency preparedness and response systems" for such public health crises and other health-related emergencies (Khan, Y., et al, 2015).

My research contributes to the literature surrounding public health crisis and emergency risk communication, and in particular this type of communication to family physicians in Canada. I also sought to illuminate the experiences of family physicians living through a public health crisis via phenomenological inquiry, and to provide considerations from family physicians on how to improve risk communication from public health agencies and professional organizations to this group as a unique knowledge-user community. My research is situated in a qualitative research paradigm and is a multimethod study (Morse, J. M., 2003), combining data from a phenomenology project (sixteen individual phenomenological interviews with Canadian family physicians) and a scoping review of the literature relating to this topic. The

phenomenology interview data were analyzed in two ways: a qualitative content analysis, and a phenomenological analysis and writing process. A qualitative multimethod study or design is defined as having two or more qualitative research methods, each conducted rigorously and each complete projects in themselves (Morse, J. M., 2003). This differs slightly but importantly from the definition of a qualitative mixed methods design, which is defined as having one complete qualitative method as the "core" method or project, plus one or more incomplete or supplementary qualitative methods, within a single study (Morse, J. M., 2010). Essentially, this research is a multimethod study comprised of two complete projects (the phenomenological study and the scoping review); and one of those projects (the phenomenological study) was subjected to a mixed-method analysis (both a qualitative content analysis and a phenomenological interpretation).

1.1 Public Health Crisis and Emergency Risk Communication to Family Physicians in Canada

It is generally acknowledged that "good" or effective risk communication is not a one-way, top-down method of information flowing from the "experts" to a particular individual, group or community. Rather, effective risk communication is considered to be a two-way dialogue between "experts" (those with technical risk knowledge and information) and an individual / group / community to exchange knowledge, information and experience about a risk or risk situation (Jardine, C., 2008). It is this exchange of information, this dialogue between technical risk experts (i.e., public health officials or professional / government organizations) and the "recipients" or knowledge-users of risk information (i.e., family physicians), that allows for effective risk communication. A pivotal aspect of appropriate and effective risk communication is involving those who will use the knowledge and those who may be affected by the outcomes

in the planning aspect of communication strategies (Henrich, N., & Holmes, B., 2011). Yet when considering risk communication strategies and planning from a public health perspective, policy is often created from a top-down perspective, from large international organizations such as the World Health Organization (WHO), to be interpreted by a national public health agency such as the Public Health Agency of Canada, and then further modified or adjusted to meet the needs of health care service providers at the provincial, regional or municipal level. Although organizations such as the WHO do consult with member-countries for guidance and policy implementation regarding emergency preparedness, surveillance and response (WHO, 2016), such top-down information diffusion strategies are in direct conflict with effective risk communication, and as such may not be successful in disseminating timely, appropriate, relevant and accurate information. Such failures might result from the requirement for official communications to be approved via a lengthy process, in turn affecting the relevance and timeliness of the risk information; or perhaps as a result of risk information being applicable to only certain geographical areas or populations (e.g., risk information might be different depending on a population's socio-economic status or the physical size of a municipality / region / country).

Experiential knowledge, or *a posteriori* (Latin, "from later") knowledge, is the expertise, knowledge and understanding that is gained through experience; it may be contrasted to textbook or propositional knowledge. Proponents of experiential knowledge purport that certain kinds of knowledge can only be acquired by having certain kinds of experiences (Holt, T., 2008). Such experiential knowledge and recommendations from family physicians that have gone through or experienced a public health crisis might be considered to be critical to the development of appropriate risk communication strategies and consequently positive practice outcomes for this

group in the event of a future public health crisis or emergency risk event. Most research regarding risk communication of public health crisis or emergency information, aptly referred to as "CERC" (Crisis and Emergency Risk Communication), focuses on the general public as recipients (Reynolds, B., 2008; Reynolds, B., & Seeger, M., 2005; Veil, et al, 2008). As a theoretical framework developed by the Centers for Disease Control (CDC) in recent years, CERC has yet to be applied to Canadian family physicians as a specific knowledge-user community. In this research, I have attempted to broaden the application of CERC to consider family physicians as a unique group, who are both recipients and transmitters of risk information.

1.2 Research Goals and Research Questions

This research was conducted with two overarching goals in mind. The primary goal of this research is to describe and explore using phenomenological human science research methods what it is like for family physicians in Canada to experience a public health crisis. By eliciting lived experience descriptions (LEDs) from a selection of family physicians in Canada regarding their experiences during a public health crisis, and by crafting these LEDs into anecdotes upon which I have reflected using a phenomenology of practice approach, a rich and detailed description of this phenomenon is illuminated.

Further to this, the secondary and concurrent goal of this research is to identify ways in which public health crisis and emergency risk information is currently communicated to family physicians from public health agencies and professional organizations, and how such communication might be ameliorated in the Canadian context in the event of a future public health crisis. By providing a rich description of this particular phenomenon, in addition to providing considerations on how to improve risk communication to family physicians in the event of a future public health crisis, this research provides valuable information to public health

agencies and health care organizations to assist in policy formation, evidence-based decision-making, and knowledge translation.

The questions guiding my research were: What is it like to experience a public health crisis as a practicing family physician in Canada? How is public health crisis information currently communicated to family physicians in Canada? How might the related risk communication processes surrounding such events be improved?

1.3 Research Objectives

This research was guided by the following objectives:

1) Identify, via a scoping review of relevant literature, the current ways in which public health crisis or emergency risk event information is communicated to family physicians, with a specific focus on the Canadian context;
2) Describe, using detailed LEDs and anecdotes gathered in phenomenological interviews with a selection of family physicians across Canada, what it is like to actually experience a public health crisis both as a practicing family physician and a family medicine resident / trainee; and
3) Provide considerations, from a selection of family physicians who have experienced a public health crisis, on how to improve risk communication to this group in the event of a future public health crisis or emergency risk event.

1.4 Justification of Research Approach

I chose a qualitative multimethod research design for this study, utilizing a scoping review and in-depth individual phenomenological interviews with family physicians that were

analyzed using both qualitative content analysis and phenomenology. Phenomenology is the primary research methodology that has guided this research. Following recent public health crises in Canada and globally (e.g. SARS, H1N1, Ebola, various environmental public health crises) I wondered about the experiences of family physicians in Canada: although they might be varied, the shared similarities and the "essential" aspect(s) of those experiences might be explored. At the time of writing, few publications were found that explored how family physicians experience public health crises and their related risk communication processes from a phenomenologic perspective. Previous research conducted regarding family physicians and public health crises was generally quantitative research identifying physicians' attitudes, knowledge and beliefs about a crisis (Caley, M., Sidhu, K., & Shukla, R., 2010; Chen, F. M. et al, 2002; Dabrera, G., et al, 2012; Edgehere, O., et al, 2015; Flicoteaux, R., et al, 2014) which does not help to illuminate and understand family physicians' actual experiences; what it's *really like* to live through a public health crisis as a practicing family physician in Canada.

This exploration via phenomenologic inquiry can help to elucidate aspects of family physicians' experiences are not usually recognized by public health agencies or other health care organizations. An acknowledgement of "what it's really like on the ground" as a family physician during a public health crisis will identify and illustrate ways for such organizations to increase supports and improve risk communication to this group during such emergency risk events, thus improving their efficacy in providing timely and appropriate information to their patients. By receiving information and, in turn, communicating effectively about the risks pertaining to a public health crisis, family physicians can help to improve the overall health and well-being of the patient populations that they serve. The scoping review and the qualitative content analysis, serve to provide additional context and elicited perspectives to the experiences

of family physicians living through a public health crisis. They also provide considerations and advice to public health agencies and professional organizations, based on the relevant peer-reviewed literature and recommendations from family physicians during the individual interviews, on how to improve risk communications to this group in the event of a future public health crisis in Canada.

1.5 Phenomenology

This study is positioned from an overarching qualitative research methodology, specifically focused upon the methodology of phenomenology of practice (van Manen, M., 2007). Phenomenology is the reflective study of pre-reflective human experience, or a recognizable human experience. Phenomenology as a human science research method draws on philosophy of Edmund Husserl and his followers, that involved studying and exploring the ways in which phenomena are brought to consciousness (Braude, H. D., 2013). As such, it can be said that phenomenology originally came into being as a method of philosophical inquiry as the objective study of objects (things) or experiences or phenomena that are usually considered subjective, by way of removing the subjective experience or feeling to reveal the phenomena on its own; "Hence phenomenology's traditional slogan: 'Back to the things themselves!'" (Crotty, M., 1996, p.3). Although it could be argued that many of the ideas within the phenomenological field of inquiry are embedded within qualitative inquiry in general (Earle, V., 2010), in modern social theory phenomenology may be defined as "a philosophical approach to the study of experience… [that] shares a particular interest in thinking about what the experience of being human is like, in all of its various aspects, but especially in terms of the things that matter to us, and which constitute our lived world" (Smith, J. A., Flowers, P., & Larkin, F., 2009, p.11, in

Guest, G., Namey, E., & Mitchell, M., 2013, p.10). The term "phenomenology" may be used to refer to both the philosophical movement and to a method of qualitative inquiry that aims to understand an individual's lived experience(s) (Mayan, M. J., 2009; Guest, G., Namey, E. E., & Mitchell, M. L., 2013).

Compared to other methods of qualitative data collection, such as ethnography (concerned with emic/internal, cultural meaning) or grounded theory (concerned with theoretical meaning), phenomenology focuses on *lived meaning.* Lived meaning refers to the way that an individual understands and experiences their world as meaningful and real. Lived meanings "describe those aspects of a situation as experienced by the person in it" (van Manen, M.,1990, p.183). Phenomenology is a qualitative research method used to understand individuals' lives and experiences (Oiler, C., 1982). As a research methodology, it "focuses on individual experiences, beliefs, and perceptions" (Guest, G., Namey, E. E., & Mitchell, M. L., 2013, p.8). Phenomenology is designed to draw out rich and detailed descriptions of a phenomenon, via individual experiences and perceptions (Guest, G., Namey, E. E., & Mitchell, M. L., 2013) and is generally used to answer such questions as, "What is the lived experience of...xxx?" Phenomenology offers an attractive method to shed light on personal subjectivity and the human condition (Braude, H. D., 2013), in a deeper and more reflective way than alternate human science research methods. Researchers conducting phenomenology explore or question the eidetic meaning of a phenomenon, that which makes something what it *is* – and without which, it could not be what it is (van Manen, M., 1990). Researchers who focus on generating data to examine participants' lived experiences have made frequent use of phenomenological interviews. The goal of the phenomenological interview is to generate in-depth, detailed descriptions of a human experience (Roulston, K., 2010). An emphasis on rich, thick descriptions of phenomena is

a central tenet of phenomenology method, in that these rich descriptions provide examples for understanding situations and phenomenon as they occur to those who are experiencing them (Howell, K. E., 2013). Phenomenology does not offer an over-arching theory with which to explain or control the world; rather it offers the possibility of "plausible insights that bring us in more direct contact with the world" (van Manen, M., 1990, p.9).

1.6 Phenomenology: An Abbreviated History

Edmund Husserl, a German philosopher in the early 20th century considered by many to be the "father" of phenomenology, introduced the concept of the *epoché* or "bracketing", which comes from the mathematical term (brackets). Husserl emphasized the necessity to "bracket" or suspend preconceptions and presuppositions about phenomena, to arrive at understandings of phenomena themselves prior to abstraction or theoretical suppositions (Crotty, M., 1996, p.20). The phenomenological *epoché* or reduction consists of two opposing but complimentary methodical moves: the *epoché* or bracketing, followed by the reduction. First the *epoché* "suspends or removes what obstructs access to the phenomenon"; then the reduction "returns, leads back to the mode of appearing of the phenomenon" (Taminiaux, J., 1991, in van Manen, M., 2014, p.215). This implies that phenomena have an objective stance, and that if only we can "bracket" or suspend our preconceptions or pre-ideas about such phenomena, we will be able to gain insights into phenomena as they really exist, or as "truths". Husserl is often considered to be a transcendental phenomenologist, meaning that he believed one could "transcend" one's own preconceptions about things and go back to the "things themselves" (Earle, V., 2010, p.287).

Martin Heidegger, a student of Husserl's, advanced phenomenological thought by questioning the concepts of bracketing and reduction (Crotty, M., 1996); Heidegger asserted that

"understanding is never without presuppositions" (Earle, V., 2010, p.288) and that truth is subjective. Heidegger thus introduced the concept of the "hermeneutic circle," which "allows for reciprocal activity between pre-understanding and understanding… Pre-understanding relates to the knowledge we have by the very nature of our 'being in the world' and such understanding cannot be eliminated in a process of reduction" (Earle, V., 2010, p.288). Hermeneutics is an interpretation of experience (or phenomena) via text or some other symbolic form: this is where individual's stories, interview transcripts, field notes and essentially all texts come into play in phenomenological inquiry.

Maurice Merleau-Ponty was an influential French philosopher dedicated to the school of phenomenological thought. He was an existential phenomenologist, meaning that he believed that phenomenological description has "the potential to remind us of the nature of our pre-reflective experience prior to philosophical and scientific distortions" (Earle, V., 2010, p.289). Merleau-Ponty rejected empiricism or positivism as a distorted account of reality, asserting that the real world cannot be reduced in the way that Husserl suggested (Crotty, M., 1996). He instead offered a special kind of reduction that is a return to the perceptual pre-conceptual experience of the child with the aim being to rediscover 'a dimension of being and a type of knowledge in which man forgets in his natural attitude'. He proposed that the goal of phenomenology is to reduce one's preconceived perceptions (pre-ceptions) and to rediscover this "primacy of perception" (Earle, V., 2010, p.289).

1.7 Phenomenology of Practice

The term "phenomenology" is a combination of the Greek *phainomenon* and *logos*, signifying the activity of giving an account, giving a *logos*, of various phenomena, of the various

ways that things can appear (Sokolowski, R., 2000, p. 13). The phenomenology of practice is a "project of sober reflection" on lived human experience (van Manen, M., 2007, p.12), with "sober" meaning that such reflections must be critical, thoughtful, and questioning about the lived experiences upon which we are reflecting. Simultaneously, the practice of phenomenology allows us to open up human experiences to wonder; phenomenology is also a project of fascination, "a fascination with meaning" (van Manen, M., 2007, p.12). Max van Manen, a contemporary phenomenologist, provides a more practical (rather than philosophical) application ("action sensitive") of phenomenology, with the introduction and explication of specific methods for researchers interested in conducting phenomenological inquiry (Earle, V., 2010, p.289). Van Manen's describes phenomenology as human science research involving research activities: turning to a phenomenon of particular interest to the researcher; investigating experience as we live it rather than as we conceptualize it; reflecting on themes that characterize the phenomenon; describing the phenomenon through the art of writing and rewriting; maintaining a strong and oriented relation to the phenomenon; and balancing the research context by considering parts and whole (van Manen, M., 1990).

The phrase "phenomenology of practice" refers to the types of inquiries or explorations of phenomena that address and serve professional practitioners, as well as the ordinary practices of everyday life (van Manen, M., 2014, p.15). The phenomenological question asks: what is it about this phenomenon that makes it possible for it to be? (van Manen, M., 1990). In other words, without *what,* would that experience cease to be that experience or phenomenon? Or without *what*, would that object cease to be that exact object? What is at the heart of that phenomenon or object that makes it what it is? For example, a cup (e.g. to hold water) can be any shape, size or colour. But without *what* would a cup cease to be a cup? What gives a cup its

"cup-ness"? It could be argued that a cup is only a cup when it is a vessel with empty space inside, an empty place to hold water. Therefore, we might conclude that a cup is in fact the empty space inside of that cup. The empty space gives the cup, and is in fact a possible response to the phenomenological question of the cup. In this research, the phenomenological question is: what is it about the experience of family physicians in Canada living through a public health crisis that is unique to this experience?

Van Manen's methodologic approach to phenomenologic inquiry, with the understanding that during the actual research process one may work at various features simultaneously or intermittently (van Manen, M., 1990), was employed in this research study. The phenomenon of particular interest is the experience of a public health crisis or emergency risk event by a family physician, and the related risk communication processes surrounding that event. The phenomenological goal underlying this project is to make sense out of this particular facet or feature of human existence (van Manen, M., 1990). This phenomenon is investigated through individual interviews with family physicians who identify as having experienced a public health crisis or emergency (as either a practicing family physician or while in family medicine residency / training), and by attempting to elicit pre-conceptions or pre-experiences of that phenomenon; turning "to the things themselves" *Zu den Sachern* (Husserl, E., 1980, in van Manen, M., 1990, p.31). The themes, relating to the phenomenological question (as outlined above), are actively reflected on: "a true reflection on lived experience is a thoughtful, reflective grasping of what it is that renders this or that particular experience its special significance" (van Manen, M., 1990, p.32).

The art of writing and re-writing is essential to phenomenological research, in the same way that language and thinking are difficult to separate (van Manen, M., 1990). Writing and re-

writing occur throughout the phenomenologic research process in an exhaustive attempt - or hermeneutic circle - to illuminate the phenomenon. The draft writing itself also takes place in a non-linear process, as described in van Manen, M. (2014, p. 376): heuristic draft writing (instilling or evoking a sense of wonder in the reader); experiential draft writing (inserting lived experience material, or anecdotes, that are recognizable and compelling into the text); thematic draft writing (grouping the experiential material into themes or headings / subheadings); insight cultivating draft writing (reflecting on sources that draw on related texts and other scholarly phenomenological material); vocative draft writing (being tactfully attentive to the vocative and poetic nature of language and integrating such language into the text); and inceptual draft writing (bringing forward the deeper, sometimes speculative or surprising meaning of or insights about a phenomenon in the text).

As Heidegger said, phenomenology is "to let that which shows itself be seen from itself in the very way in which it shows itself from itself" (Heidegger, M., 1962; in van Manen, M., 1990, p.33). An attempt is made to maintain a strong and oriented relation to the phenomenon by constantly going back to (grounding in) the phenomenological question, and avoiding temptations to be side-tracked by speculations or settling for preconceived conceptions and opinions (van Manen, M., 1990). While undertaking this research, I have attempted to balance the research context by considering both parts and whole. Conducting interviews with family physicians, followed by transcription of the interviews, followed by selection of LEDs (van Manen, M., 2014) followed by writing or crafting anecdotes from those LEDs, followed by reflection on one specific interview or theme and then consideration of that interview's or theme's part in the whole research process resulted in balancing the research context of this project.

In order to gain access to the pre-reflective experiences of family physicians during public health crises, I have employed several approaches to the *epoché* and phenomenological reduction, as discussed in van Manen, M., (2014, p.215), Chapter Eight: "Philosophical Methods: The *Epoché* and Reduction." The *epoché*-reduction is an invitation to openness; a reflection on lived experience that is neither inductive nor deductive but rather reductive (i.e. it reduces a phenomenon to the purest form). There are preparatory elements of the reduction proper: the heuristic *epoché*-reduction: wonder; the hermeneutic *epoché*-reduction: openness; the experiential *epoché*-reduction: concreteness; and the methodological *epoché*-reduction: approach. The practice of phenomenology is a practice of opening ourselves to wonder; we must focus on the concreteness of experiences or phenomena using a methodological approach. Following these elements, the reduction-proper is applied in five varieties: the eidetic reduction: eidos or whatness; the ontological reduction: ways of being; the ethical reduction: alterity; the radical reduction: self-givenness; and the originary reduction: inception or originary meaning (van Manen, M., 2014).

In using the phenomenological approach, an experience or phenomenon is reduced by focusing on the "whatness;" for example, without *what* would that experience not be that particular experience? The eidetic reduction consists of "grasping some essential insight(s) in testing the meaning of a phenomenon or event" (van Manen, M., 2014, p.228). The ontological reduction consists of reducing an experience or phenomenon by the way in which that experience or event is in the world; it explicates the "mode or ways of being that belong to or are proper to something" (van Manen, M., 2014, p.231). The ethical reduction consists of reducing a phenomenon by acknowledging the "otherness" or alterity; one must "not only ask for the meaning of being, self, or presence, but also for the meaning of what is *not* self" (italics added;

van Manen, M., 2014, p.232). The radical reduction focuses on the method by which an experience or phenomenon "gives itself as itself," while reducing or removing all senses of subjectivity (van Manen, M., 2014, p.233). The radical reduction is the way in which a phenomenon presents itself by itself; or "self-givenness." Finally, the originary reduction consists of going back to or orienting oneself to the originary or inceptual beginning of the phenomenon or experience; a "flash of insight" whereby we not only gain a phenomenological understanding of the experience or phenomenon, but we also gain an original "sight of ourselves as humans" (van Manen, M., 2014, p.235). By applying these various approaches to the *epoché*-reduction, I have attempted to reflect and write about the experiences of family physicians during public health crises in a way that is meaningful and exploratory, and that provides insights into this particular phenomenon.

1.8 Scoping Review & Qualitative Content Analysis

As part of the multimethod research design, I chose to conduct two additional components to provide explanation and insight within the context of the phenomenological methodology (Morse, J. M., 2010): a scoping review of peer-reviewed literature pertaining to crisis and emergency risk communication to family physicians; and a qualitative content analysis of recommendations from participants on how to improve risk communication to family physicians in the event of a future public health crisis.

I elected to do a scoping review of peer-reviewed published literature as this methodology is relevant to fields which have a diverse and/or emerging knowledge base (Arksey, H., & O'Malley, L., 2005; Khan, Y., et al, 2015), and is therefore well-suited to the topic area of crisis and emergency risk communication to family physicians. Scoping reviews

may be conducted for four reasons: to examine the extent, range and nature of research; to summarize and disseminate research findings; to identify research gaps in the existing literature; and to determine the value of undertaking a full systematic review (Arksey, H., & O'Malley, L., 2005). My scoping review addresses three of the four reasons: assess the extent, range and nature of the current literature regarding public health crisis and emergency risk communication to family physicians, with a focus on Canadian literature; provide a broad overview and summary of the current ways in which public health crisis and emergency information has been reported in the literature as being communicated to family physicians, with a focus on the current Canadian context; and identify knowledge gaps in the existing literature, in addition to areas for future research pertaining to this topic. A fourth objective in my scoping review was to identify positive aspects and successes in the existing literature regarding public health crisis and emergency risk communication to family physicians.

I also chose to analyze the participant interview data using a qualitative content analysis method, in addition to the phenomenological analysis. Qualitative content analysis focuses on characteristics of language with attention to the content or contextual meaning of the text (McTavish, D. G., & Pirro, E. B., 1990; Tesch, R., 1990); and goes beyond merely counting words or phrases (as in quantitative content analysis) but examines data for the purpose of classifying large amounts of text into a manageable number of categories or themes representing similar meanings (Weber, R. P., 1990). I used this supplemental method to analyze the content of the sixteen transcripts in an objective and systematic fashion in order to describe, group and understand what recommendations family physicians have for public health agencies and professional organizations in the event of a future public health crisis, on advice regarding, and considerations of how to improve risk communications to this group.

1.9 Overview of Chapters

This dissertation adopts a paper-based format, and is comprised of four separate but closely interrelated papers to present the output of my research findings. The chapters are as follows: an introduction and background chapter (Chapter One); a methodology chapter describing the various qualitative research data collection and analysis methods used (Chapter Two); a scoping review paper outlining the scope of peer-reviewed published literature on crisis and emergency risk communication to family physicians (Chapter Three - a version of which will be submitted to the Canadian Journal of Public Health); a phenomenological paper exploring the experiences of family physicians in Canada living through a public health crisis (Chapter Four - a version of which will be submitted to Canadian Family Physician); a qualitative content analysis paper analyzing the results of interviews with family physicians focusing on their recommendations to improve risk communications in the event of a future public health crisis (Chapter Five - a version of which will be submitted to the Canadian Medical Association Journal [CMAJ]); and a short commentary article on the evolving face of public health crises in Canada (Chapter Six - a version of which was published by CMAJ Blogs April 18, 2016; Kain, N. & Jardine, C., 2016). The final chapter (Chapter Seven) provides a summary, conclusions of my research and considerations for public health agencies and professional organizations to improve risk communications in the future.

1.10 Personal Context of the Researcher

It is important to situate myself as the researcher within the context of my research topic in order to disclose: my personal perspective; my relationship with my research participants; and the worldview or paradigm (Guba, E. G., 1990; in Creswell, J. W., 2007) from which I

completed my research. My personal ontology and epistemology is situated within an interpretivist, post-positivist and post-constructivist perspective; as is common to qualitative researchers (Mayan, M. J., 2009; Creswell, J. W., 2007). I assume that although there are realities and facts (e.g. that the SARS outbreak occurred and claimed the lives of several health care workers in Toronto), *how* those realities and facts are experienced differs based on the individuals living through them and experiencing certain events or experiences or phenomena. One person's reality is real to them, while another individual's reality might differ, but is equally *real.* Reality is "subjective and multiple, as seen by participants" in my research (Creswell, J. W., 2007, p.17). In the phenomenological research I have conducted, I use anecdotes to help illuminate the realities and experiences of my participants, as a form of providing evidence of differences or uniqueness and similar or shared experiences. I am not attempting to interpret my participants' experiences (e.g. as in Interpretive Phenomenological Analysis, or IPA, from Smith, J. A., Flowers, P., & Larkin, F., 2009); rather I am attempting to shed light on this phenomenon, to suspend my own interpretations and to let the phenomenon speak for itself (Lewis, M., & Staehler, T., 2010).

I came to my PhD program in Public Health Sciences as a public health nurse with a Master's degree in Public Administration, with a focus on health policy. I had been employed as a nurse consultant on the vaccine preventable diseases team at the Ministry of Health and Long-Term Care (MOHLTC) in Toronto, Ontario, when the H1N1-2009 influenza pandemic emerged. For the duration of the pandemic in Canada, I was heavily involved in the MOHLTC's Emergency Operations Centre, and had regular (sometimes daily) meetings with Ontario's 36 Public Health Units and other local, regional and national public health agencies and professional organizations. As the pandemic progressed, I found myself wondering *why* and *how* some

physicians (including my father, who was at the time practicing family medicine; my mother, who is an outstanding clinical and research oncologist; and my sister, who at the time was completing her medical degree at the University of Toronto) made certain decisions regarding the prevention, health promotion and their patients' treatment for and protection from H1N1. For example, why did some family physicians recommend the H1N1 pandemic vaccine, but others did not? Where did family physicians get the information required to make such decisions, when individuals like myself at the provincial government level were only setting out recommendations and receiving information at the same time? What was it like for family physicians to actually live through this (quite frightening, at times) public health crisis? How can the risk communication surrounding such events be improved to family physicians in Canada? When the second wave of the pandemic had subsided, in early 2010, I knew I wanted to answer explore these questions; and ultimately (hopefully) have a positive effect on family physicians' practices, public health policy, or risk communication strategies in the event of a future public health crisis in Canada.

I came to the method of phenomenology almost by chance, while attending a qualitative methodology workshop series, "Thinking Qualitatively," hosted by the University of Alberta's International Institute for Qualitative Methods. I was presented with phenomenology, and was immediately struck with the wondrous and wonder-full way in which phenomenological research methods were used. Phenomenology allows us to see and explore experiences in a way that I had never seen before. It was as if I was actually *seeing* my own research for the first time. I knew at that point it was the methodology on which I wanted to focus my dissertation. However, I also wanted to be able to provide useful considerations from family physicians for public health agencies and other professional associations, in the event of a future public health crisis. I chose

a qualitative multimethod approach to my research in order to gain not only a new and rich understanding of what it is actually like for a family physician to live through a public health crisis, but also to provide insightful advice from physicians practicing on the ground, at the front lines.

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2.0 CHAPTER TWO: METHODOLOGY

2.1 Preface

In this chapter, I have attempted to explicate in detail the qualitative data collection and analysis methodologies that I employed to answer the questions guiding my research. In this section I describe the overarching research design of qualitative multimethod, in addition to outlining the various data collection methods I used in this research (the scoping review and the phenomenological interviews with family physicians). I briefly address the distinction between "mixed methods" and multimethod" qualitative research designs. I also describe the data analyses methods that I employed when analyzing the phenomenologic interviews (both a phenomenological analysis, and a qualitative content analysis). I outline the trustworthiness of qualitative research in general, using specific examples from my study, to emphasize the "rigor" of this research. It is not my intent to publish this chapter as an independent research paper, but rather to illuminate and describe the various qualitative research methodologies that I have employed in this project.

2.2 Research Design: Qualitative Multimethod

I approached this research from a qualitative research perspective, focusing on phenomenology but using multiple qualitative methods in data collection, analysis and interpretation. I conducted a scoping review of relevant literature; and I conducted individual semi-structured phenomenologic interviews with sixteen family physicians across Canada. Interview data were analyzed in two ways: a nonlinear form of research – a phenomenology of practice analytical process and writing; and a qualitative content analysis.

Combining and increasing the number of research methods or strategies allows for the dimension and scope of a research project to broaden; and the use of multimethod research design enables the researcher to "obtain a more complete picture of human behavior and experience" (Morse, J. M., 2003, p. 189). I chose to use multiple methods in this research to not only understand what is currently known (and not known) through the literature on public health crises and emergency risk communication to family physicians in Canada (scoping review); but also to understand how such experiences are actually lived through by practicing family physicians (phenomenology); and to provide insights from practitioners that will assist public health agencies and professional organizations to improve risk communications in the future (qualitative content analysis).

There are both benefits and hazards that warrant acknowledgement and assessment when combining qualitative methods in multimethod research. One benefit is that by employing multiple methods, the same data might be used to answer different questions, and/or it might be analyzed in different ways. The research process and the type of method(s) used, are guided by the questions posed. Therefore, when combining different qualitative methods, the question asked using phenomenology is different from those question(s) asked of the additional method(s) of data collection (scoping review) and analysis (qualitative content analysis). Morse, J. M. (2010) suggests that several questions might be posed to ascertain whether data (e.g. from the pheonomenologic interviews that I conducted) might be used in different ways, thereby warranting multiple methods: Will the data provide the required information? How good is the data to provide that information? Does the data set provide the most appropriate and best description(s) of the phenomena in question? Is the data pertinent (applicable) and current? If

these questions can be answered with "yes," Morse, J. M. (2010, p. 488) recommends the usage of the data set; if not, collect new data.

Although the two terms are sometimes used (erroneously) interchangeably, an important differentiation that I am assuming between "mixed method" research and "multimethod" research is that "mixed methods" tends to refer to the mixing or combining qualitative and quantitative methodologies and/or research paradigms in a research project (Morse, J. M., 2010); whereas multimethod designs tend to be a combination of methods from the same research paradigm (e.g. multiple qualitative methods; or multiple quantitative methods). Although some (notably, Morse, J. M., 2010) argue that using multiple qualitative methods it may be referred to as a "legitimate form of mixed method design" (Morse, J. M., 2010, p. 483), there remains a lack of consensus regarding the definition or application of mixed and/or multimethod research design (Morse, J. M., 2003; Morse, J. M., 2010).). Essentially, my dissertation is a multimethod study comprised of two complete projects (the phenomenological study and the scoping review); and one of those projects (the phenomenological study) was subjected to a mixed method analysis (both a qualitative content analysis and a phenomenological interpretation).

A hazard that might be considered when conducting multimethod research is that of the "incompatibility thesis," or the risk that qualitative and quantitative research paradigms may not mix (Howe, K. R., 1988, p. 10). However, given that I have chosen what I believe to be complimentary multiple qualitative methods to address my research questions, this hazard is mitigated. Both phenomenology and qualitative content analysis are methods of qualitative data collection / analysis, which come from or reflect an interpretivist epistemology. I subscribe to the

philosophical underpinnings of interpretivism, understanding that all experiences are interpreted by, and real to those who are experiencing them (Mayan, M. J., 2009).

2.3 Study Setting

This research took place over two years, from April 2014 – April 2016. I conducted the scoping review at the University of Alberta in 2015, and conducted approximately half of the interviews via Skype from the University of Alberta (the remainder were conducted in-person in Edmonton Alberta, Toronto Ontario, and Kingston Ontario). Recent infectious disease virus outbreaks (H1N1 pandemic influenza, Ebola, Zika), as well as climate-related crises (e.g. flooding, forest fires) were at the forefront of public health and health care practitioners' minds during this time. Particularly in Alberta, the flooding in the southern part of the province in 2013 and the H1N1 pandemic influenza in 2009, as well as the Ebola outbreak in West Africa in 2014, were regularly noted in popular news media as well as in peer-reviewed literature pertaining to healthcare practitioners (Environment Canada, 2013; Ebola Response Team WHO, 2014; Baker, M., 2010; Caley, M., Sidhu, K., & Shukla, R., 2010; Dearinger, A. T., et al, 2011; Edgehear et al, 2015; Flicoteaux, R., et al, 2014; Hidiroglu. S., et al, 2010; Howard, A. F., et al, 2012; Howard, P., & Howard, J., 2012; Jaakkimainen, R. L., et al, 2014; Kunin, M., et al, 2013b; Masotti, P., et al, 2013; Goldberg, A. B., et al, 2015). My own experience as a public health nurse on the vaccine preventable disease team of a provincial health ministry, coupled with my numerous family and friends who are general practitioners or otherwise involved in healthcare, piqued my interest in exploring this research area. This study was important and timely for me to undertake.

2.4 Sample, Sampling Strategy, and Recruitment

2.4.1 Family Physician Research Advisory Committee (FPRAC)

In order to appropriately engage the community of family physicians in Canada within and throughout the research process, a "virtual" Family Physician Research Advisory Committee (FPRAC) was established specifically for this research project. This virtual committee was comprised of a group of 7 family physicians, representing a diverse demographic from across Canada, including varied practice locations (Nova Scotia, Ontario, BC) and types of practice (e.g. engaged as part of a family health team, working as a hospitalist). Members on this committee were selected from those family physicians identified through my previously established professional / personal relationships, and those family physicians who confirmed that they were willing and able to commit their time and resources to the committee.

In April 2014 I sent a private invitation letter email to all 7 members of FPRAC (Appendix 1: FPRAC Invitation Email) to respect the confidentiality of members and to introduce the background, research goals and objectives of the study in addition to specific goals of the committee (see below). The committee was not intended to "meet" in person, but rather to provide ongoing feedback via email, Skype, telephone or in-person contact with me at previously agreed-upon times. I emailed FPRAC committee members approximately once every 6 months for the duration of the research (April 2014 – April 2016). The time commitments of this committee equated to approximately 10-20 minutes every six months. The goals of FPRAC were to:

a) inform me of issues relevant to family physicians in Canada, and specifically issues related to public health crises and crisis/emergency risk communication information;

b) develop and maintain a positive symbiotic working and research relationship between the me and the community/network of family physicians in Canada, as per the principles of engaged scholarship and knowledge translation;
c) provide ongoing feedback and suggestions regarding the research being conducted and its relevance to family physicians in Canada;
d) assess, via pre-testing of the semi-structured individual interview guide, the appropriateness of the interview guide and questions (see below); and
e) collaborate with me in the facilitation of the dissemination and knowledge translation of the study results and recommendations.

2.4.2 Pre-test of Individual Interview Guide with FPRAC

I developed a broad semi-structured phenomenologic interview guide (Appendix 5: Family Physician Individual Interview Guide), in consultation with a member of my supervisory committee who had extensive knowledge and experience using phenomenological research methods in health research, and sent this via email to members of FPRAC in April 2014. The purpose of this pre-test with a small group of family physicians was to ensure appropriateness of the interview guide, and to further develop overarching themes and/or questions for the individual interviews if appropriate.

2.4.3 Participant Selection and Recruitment

Participant selection was primarily done through purposive sampling. Although this term is not clearly defined in phenomenological research (Norlyk, A., & Harder, I., 2010), in this research I use the word "purposive" to represent that the participants were selected in a

deliberate manner – e.g., that they are family physicians who have experienced a public health crisis. Recruitment began with members of FPRAC in order to identify colleagues or coworkers of members who were willing to participate in this research project. Additional recruitment was done through snowball sampling, via colleagues or acquaintances of members of FPRAC, and by members of my supervisory committee, and by drawing upon previous personal and professional relationships. Potential participants were emailed a personalized 1-page study recruitment letter with contact information for participation (Appendix 2: Participant Invitation Email). If a potential participant expressed interest in participating in the study, they were emailed a study background / information sheet (Appendix 3: Participant Background / Information Sheet) and a consent form (Appendix 4: Participant Informed Consent Form) which was signed, dated and emailed back to me prior to participating in the study. There were no incentives offered for participation, and no identified risks to participants.

2.4.4 Sample

The terms "sample" or "sample size" do not apply to the type of phenomenological research that I have completed, as the goal was neither to generalize or make sweeping recommendations about an entire population or group (e.g. all family physicians in Canada); it was instead to "reveal, open and explore a possible human experience" (van Manen, M. A., 2013, p.82). In total I conducted 16 in-depth individual interviews with family physicians (or recently retired family physicians) in various locations in Canada.

Inclusion criteria were that participants must (at time of interview):

- be either a family medicine physician or retired family medicine physician in Canada (e.g., at the time of interview or prior to it, they were licenced with the College of Family Physicians of Canada);
- have experienced a public health crisis during their time as a practicing family medicine physician or family medicine resident, which either directly or indirectly impacted their practice (for example, the recent Ebola outbreak in West Africa may not have had a direct impact on their practice but they may have experienced that crisis and recognised it as something that has or may have had implications for their own practice);
- be a family physician who is willing and able to devote 30-60 minutes for a one-on-one interview (which is difficult at best if they have a busy family practice).

2.5 Demographic Profile of Study Participants

Six physicians had practice locations in Ontario (three in Kingston, two in Toronto and one in Ottawa); two physicians had practice locations in Nova Scotia (both in the Halifax area); one physician practiced in Winnipeg, Manitoba; five physicians had practice locations in Alberta (two in the Edmonton area and three in the Calgary area); one physician practiced in British Columbia (Vancouver); and one physician practiced in the North West Territories (Yellowknife).

Ten of the 16 participants were female. One of the participants was retired from practicing medicine, and the remaining fifteen participants practiced in various clinical and/or academic settings: general family medicine, care of the elderly, infectious disease specialization, academic appointment(s), and hospitalists, or a combination of these. Number of years in practice, although not formally collected, ranged from approximately one year to over 40 years.

2.6 Ethical Considerations – Participant Interviews

This study was approved by the appropriate Health Research Ethics Board (HREB) at the University of Alberta (Appendix 6: Ethics Approval Notice). There were no conflicts of interest declared. The approved study was classified as "minimal risk" meaning that the probability and magnitude of harms to participants is no greater than those encountered by participants in their everyday lives. It was not anticipated that participants would be exposed to risks or discomforts associated with this research. Individual interviews lasted no more than 45 minutes. Prior to family physicians participating in this research project, an informed consent process took place. Potential participants were informed of the study background, the researchers and research process involved, and potential anticipated research results. Participants had the opportunity to withdraw from the research at any time without repercussion. Interviews were held at locations specified by and convenient for the interviewees (e.g. office, affiliated university, via video conference). The individual interviews were audio-recorded upon consent and I transcribed them verbatim using non-identifiable names and/or numbers (e.g. Family Physician 1, Interviewer) to maintain confidentiality as much as possible.

Participants were given contact information for myself and my supervisor to facilitate withdrawal or change of information if required. Non-specific benefits to participants (e.g. members of FPRAC and family physicians that participated in the individual interviews) included improvement of risk communication strategies regarding public health crises, reflection upon and possible improvement of physician – patient communication regarding public health crises, and the potential of improvement of participants' own risk communication practices surrounding a public health crisis. There were no relationships that could compromise the freedom to decline or that may have put undue pressure on potential participants to agree to the

study. Some participants had either a pre-existing personal relationships with me (i.e. friends/family of mine who happen to meet the inclusion criteria for participation) or professional relationships with colleagues.

Participants were able to change, withdraw or end their participation in the research within one month of completing their participation (e.g. if a participant completed an interview March 1st, they had the opportunity to modify, end or withdraw from the research up until April 1st.) None of the participants withdrew from the study after participating.

Privacy and confidentiality of participants who could be identified by email address was maintained by using my secure University of Alberta email account (nkain@ualberta.ca) that was accessed only by me on my private locked laptop. Participant name/surname or initials were collected as a unique identifier and to speak with participants during the individual interviews. Email address and/or telephone number were collected (upon consent) to contact the participant in the future (if applicable). Only names and emails or telephone numbers were retained once data collection was complete in order to check back with participants to ensure correctness/completeness of the interviews (e.g., member-checking for the qualitative content analysis). All other identifiable data was destroyed.

Research data on digital files (e.g. transcripts, audio mp3 files of interviews) were encrypted on my personal computer. Backup files were copied onto my personal external hard drive, which was kept in a secured and locked cabinet to which only I have access. Files will remain protected as outlined above in both digital (encrypted) and hard copy (locked) form for 5 years following the completion of the research, upon which time they will be destroyed (as per University of Alberta policy). Any hard copies will be shredded professionally and digital files will be deleted from my personal computer and external hard drive.

2.7 Data Sources: Scoping Review & Phenomenological Interviews

2.7.1 Scoping Review

I conducted a scoping review of published research literature in the field of crisis and emergency risk communication to family physicians. The purpose of this scoping review was to assess and characterize the current state of the literature surrounding crisis and emergency risk communication to family physicians, with a focus on literature pertaining specifically to Canadian family physicians. A professional health sciences research librarian at the University of Alberta assisted in developing the search strategy, and the search was completed August 18, 2015 (see Chapter 3, Scoping Review).

2.7.2 Phenomenological Interviews

Individual phenomenological interviews were held either in-person (face-to-face whenever possible) or via Skype (video-conference method) with sixteen family physicians from various locations across Canada. I employed a phenomenological approach in guiding the interviews, facilitated by using a pre-tested semi-structured phenomenological interview guide, with questions such as "Have you ever experienced a public health crisis as a family physician? Can you walk me through a typical day in the crisis?" (see Appendix 5: Family Physician Individual Interview Guide).

In a broad sense, saturation in qualitative research is achieved when all thematic leads have been followed, when no new data emerge, when data has been checked and re-checked and/or when the "story" or "theory" is complete (Mayan, M. J., 2009). However, the concept of "saturation," in phenomenology, is somewhat limited. Given that the idea behind this form of

phenomenological inquiry is to access individual experiences and illuminate the shared aspects of these individual experiences, the concept of saturation was not applied to data collection.

Individual interviews were slated to last approximately 30 - 60 minutes. It was anticipated that this amount of time would be required to achieve rich, detailed descriptions of the "essence" of the phenomenon in question, while still recognizing that family physicians as a participant group are likely to have limited time in their practice schedule(s). Actual interviews lasted between 16 minutes and 45 minutes, with an average interview length of approximately 30 minutes. Shorter interviews may have impacted the amount of information imparted in the interview, but as mentioned previously most participants had limited time available for participation in this research, and any time allotted was greatly appreciated. As is deemed appropriate for phenomenological interviews, I attempted to take a "neutral but interested" stance. The relationship between phenomenological interviewer and interviewee may be described as pedagogical, in that the interviewer's role is to be a "student" of the interviewee, "learning as much about the topic of inquiry as possible through sensitive questioning" (van Manen, M., 1990; in Roulston, K., 2010, p.17).

The interview transcripts were grouped into themes, and these themes were then coded to identify descriptions of the experiences of family physicians during public health crises, and then by clustering these descriptions into categories to describe the "essence" of this phenomenon (Starks, H., & Trinidad, S. B., 2007). The detailed data analysis and interpretation procedures are outlined below.

All participants were asked as a final question in the individual interviews regarding what suggestions they might have to improve risk communications in the event of a future public health crisis or emergency risk event. Responses varied, but the basis of these recommendations

is meant to provide considerations to help inform public health and other health care organizations (e.g. Public Health Agency of Canada; College of Family Physicians) on how to improve risk communications to family physicians in future public health crises and formed the basis of Chapter Five.

2.8 Interview Data Analysis and Interpretation

Interview data were analyzed in two ways. First, the entire interviews were analyzed using a phenomenology of practice method – from the whole, to the parts, and back to the whole. Then, participant responses to the final interview question (recommendations for public health agencies and professional organizations on how to improve risk communication to family physicians in the event of a future public health crisis) were subjected to a qualitative content analysis. See Chapter Four for the phenomenological analysis, and Chapter Five for the qualitative content analysis. Chapter six, the commentary paper, was composed utilizing a modified mixture of phenomenological and qualitative content analysis; however, the focus for this Chapter was much more narrow (i.e., the analysis focused on climate-related public health crises that were experienced by participants).

2.9 Trustworthiness ("Rigor") of the Research Process

Qualitative methods of data collection have been criticized for scientific inadequacy, i.e. lacking the "traditional" criteria of scientific (quantitative) rigor: reliability, validity and objectivity (Sandelowski, M., 1986). In qualitative research (Guba, E. G., 1981; Guba, E. G., & Lincoln, Y. S., 1981; Guba, E. G., & Lincoln, Y. S., 1982; Lincoln, Y. S., & Guba, E. G., 1985), alternatives to these "traditional" criteria for quantitative research are offered, using the

overarching term, “trustworthiness” (Guba, E. G., 1981). This idea of trustworthiness proposed by Guba, E. G. (1981) (depicted further by Guba, E. G., and Lincoln, Y. S. [1981, 1982, 1985] and expanded on by Given, L. M., & Saumure, K., [2008]), involves a set of parallel concepts in quantitative-qualitative research: generalizability vs. transferability; internal validity vs. credibility; objectivity vs. confirmability. Trustworthiness provides qualitative researchers with a means by which they can illustrate the worth, or rigor, of their research “outside the confines of the often ill-fitting quantitative parameters” (Given, L. M., & Saumure, K., 2008, p.897).

Many researchers have employed Guba’s (1981) criteria to assess rigor in qualitative research (or “naturalistic inquiry”), and to “prove” that they are doing rigorous research. Others, notably Morse et al. (2002) believe that reliability and validity remain appropriate concepts or tools with which to measure rigor in qualitative research. They are concerned that this shift from focusing on reliability and validity as measures of rigor, to focusing on end-point “criteria and standards for evaluation of the overall significance, relevance, impact, and utility of completed research,” (Morse et al, 2002, p.3) results in a de-emphasis of ensuring rigor throughout the research process which can ultimately have a negative impact on the quality of the research being produced. In my research, rigor was ensured by embedding the construct of “trustworthiness” throughout the stepwise phenomenological research process as outlined above. This approach was chosen as being more appropriate than the concepts of “reliability” and “validity” given the understanding in phenomenology that there are multiple “truths” that may exist simultaneously; there is no “single” objective truth, and that “truth is multiple and context-specific” (McConnell-Henry, T., Chapman, Y. & Francis, K., 2011, p.29).

2.10 Validity / Credibility

In place of validity in traditional quantitative methods, Guba, E. G. (1981) suggests that the criterion of credibility (sometimes referred to generalization or fittingness) be applied. Qualitative research is considered to be credible when it presents such detailed and rich descriptions of human experience or phenomenon that people having that experience would be able to immediately recognize it from those descriptions as their own; or when other researchers or readers of those descriptions would be able to recognize that experience or phenomenon when confronted with it (Sandelowski, M., 1986). Feedback and input via email and in-person from members of FPRAC helped to inform and modify the interview guide before the individual interviews were conducted to ensure appropriateness and credibility of questions and responses. This ensured 'validity' (credibility) of the interview guide as being able to elicit descriptions of the experiences of family physicians relating to crisis and emergency risk communication in such a way that others (not involved in the pre-test) might recognize and be familiar with those descriptions as representing said experiences (see section on validity).

In phenomenology, unlike other forms of inquiry, it is not expected or anticipated to achieve generalizations. The only generalization allowed, is to never in fact *generalize* (van Manen, M., 2014, p.352). Two types of "phenomenological generalizations" might be realized: existential generalizations and singular generalizations. Existential generalizations are those essential aspects of a phenomenon which allow for the possibility of recognizing recurring aspects of the meaning of a particular phenomenon (for example, the phenomenon of telling a joke). Contrary to this, singular generalizations orient to what is singular or unique about a phenomenon that makes it "possible to recognize what is universal about that phenomenon" (van Manen, M., 2014, p.352).

2.11 Reliability / Auditability

Instead of reliability, Guba, E. G. (1981) proposes that auditability or "transferability" be used. Qualitative research is auditable or transferable when another researcher or reader of the study can clearly follow the "decision trail" and arrive at the same conclusion that the qualitative researcher did; or when another researcher or reader could arrive at a similar or comparable conclusion by following the logical progression of events in the study (Sandelowski, M., 1986). Again, contrary to other methods of qualitative inquiry, phenomenological inquiry does not share the same sense of transferability. Because phenomenology is focused on the "essential" or unique experiences which illuminate the phenomenon in question in a broader sense, one phenomenological inquiry may be different than another phenomenological inquiry, even if the research question is similar. "What is it like to experience a public health crisis as a practicing family physician?" This question likely has innumerable different responses, all of which are correct – as the phenomenological response would involve a rich description of what that experience is like, for one family physician. The concept of generalizability may be achieved in phenomenological inquiry when one phenomenon is illuminated in such a way to be recognizable as that phenomenon by one who did not participate in the research itself.

2.12 Objectivity / Confirmability

Finally, instead of objectivity Guba, E. G. (1981) proposes that the criterion of confirmability be met in qualitative research. Research may be considered confirmable when "auditability, truth value, and applicability are established", and in this sense confirmability relates to the findings of qualitative inquiry, not the subjectivity or objectivity of the researcher(s)'s stance (Sandelowski, M., 1986).

When considering confirmability, the concept of "member-checking" may be raised. Member-checking is essentially going back to participants after they have participated in a research project, in order to "check" or "confirm" that what they have said is reflected appropriately in the research. Member-checking was performed with study participants regarding their statements on recommendations that were analyzed using the qualitative content analysis method. In February 2016, participants were emailed an anecdote or statement from their transcript data, and asked to confirm whether or not this statement (or statements) was something they could recognize as saying; or explicated an experience that they might have or could have had.

Although member-checking has long been considered the "gold standard" in for rigor in research (McConnell-Henry, T., Chapman, Y. & Francis, K., p.28), this approach is not always appropriate in phenomenological explorations. I did perform member-checking when doing the qualitative content analysis piece, whereby I sent participants anecdotes of what they had said in the interview with me, to ensure that I was capturing the essence of what they had said; or that it was recognizable as something they could have said. However, I did not perform member-checking as part of the phenomenological research and analysis. Time and space are essential to the phenomenon being described, and there is no guarantee that a family physician's account of his or her experiencing a public health crisis, would be the same if they re-counted it or re-visited it in a different context or situation or time. Member-checking might be considered to be incongruent with phenomenology (McConnell-Henry, T., Chapman, Y. & Francis, K., 2011). The underlying assumption of phenomenology as methodology is that data do not have a single meaning or interpretation; there is not an empirical way to measure and generalize human experience (van Manen, M., 1990).

2.13 Feasibility

To gain a deeper understanding and insight into how family physicians in Canada experience public health crises I used multiple data gathering and data analysis approaches. The primary anticipated challenge I had was actually recruiting sufficient numbers of family physicians as participants, who had experienced a public health crisis and who had the time available to be interviewed for this research. In actuality, although it took me somewhat longer than anticipated to conduct the 16 interviews (May 2014 – March 2015), this worked out to conducting approximately 1 – 2 interviews per month which I found to be a steady and agreeable pace. Beyond this, there were minimal anticipated or realized difficulties in conducting this research. Time remained the primary pressure in that I wanted to publish my findings before another public health crisis occurred (e.g., prior to another influenza pandemic or natural disaster so that my findings might be incorporated into considerations for public health agencies and professional organizations). At the time of publication and defense of this dissertation (November 2016), there had already been two recent public health crises that might have direct applications for my research: the Zika virus outbreak in 2015-2016; and the Fort McMurray Fire in Summer 2016. The Zika virus outbreak remains an emerging public health issue to which my findings may be applicable. The Fire and the surrounding public health crisis had direct impacts on the experiences or practices of family physicians in Alberta, in addition to those public health crises already outlined in this research.

2.14 Chapter Two References

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3.0 CHAPTER THREE – SCOPING REVIEW

3.1 Preface

In this chapter, I outline a scoping review that I conducted in 2015 to describe the state and extent of the literature surrounding public health crisis and emergency risk communication to family physicians, with a focus on literature pertaining to physicians practicing in Canada. I employed Arksey and O'Malley's (2005) stepwise method for this scoping review. Thirty-eight articles were included for final analysis in this review, and an overview of pertinent information and recommendations based on the identified articles are summarized. A version of this chapter will be submitted for publication as a stand-alone paper to the Canadian Journal of Public Health in 2016.

3.2 Public Health Crisis and Emergency Risk Communication to Family Physicians

Public health crises have the potential to pose significant challenges to individuals, families, communities, regions and populations. Regardless of the type of event that causes the crisis – be it a novel infectious disease outbreak, or a climate-related disaster – there remains substantial opportunity for difficulties, especially when considering risk communication during a public health crisis. Risk communication is an area of research and practice that informs many public health and health promotion campaigns (Reynolds, B., & Seeger, M., 2005). Successful risk communication has been defined by the National Research Council (NRC) as "an interactive process of exchange of information among individuals, groups, and institutions [that] raises the level of understanding of relevant issues or actions for those involved and satisfies them that they are adequately informed within the limits of available knowledge" (United States National Research Council, 1989, p.2). Other definitions of risk communication include: "the exchange

of information among interested parties about the nature, magnitude, significance, or control of a risk" (Covello, V. T., 1992, p.359) and that risk communication is a field that "deals with risk elements, whether they are appropriately tolerable, and risk consequences'' (Heath, R. L., 1995, p.257). These definitions outline several possible goals of successful risk communication: a raised level of understanding of relevant issues/actions; satisfaction with the process or exchange of information; and adequate and timely information. The NRC identified three types of goals for risk communications: advocacy, education and decision making partnership (United States National Research Council, 1989). An advocacy goal would be to enforce or encourage a behavior or belief; an educational goal would be to inform; and an example of the third kind of goal would be to establish or foster a decision-making partnership (Bostrom, A., 1997).

There is limited research regarding the risk communication of public health crisis or emergency events to Canadian family physicians as a specific risk communication audience and knowledge-user community. Most risk communication pertaining to public health crises is directed towards the general public as the recipients of risk information (WHO 2004; Veil, S., et al, 2008; CDC 2015; Covello, V. T., 2003). Despite widespread support for pre- public health crisis / emergency audience research, it is rarely done (Sandman, P., M. & Lanard, J., 2004; Henrich, N., & Holmes, B., 2011). An identification and understanding of the current literature relating to the risk communication of public health crisis information to family physicians is essential for Canadian public health agencies and professional organizations to maximize the potential of risk communication to this group, and ultimately to improve related public health outcomes to Canadians through better preparedness for the next crisis.

3.3 Research aim, question and objectives

Within this context, and as part of a larger research project examining how public health crises and their related risk communication processes are experienced by family physicians in Canada, I conducted a scoping review (Arksey, H., & O'Malley, L. , 2005; Grant, M. J., & Booth, A., 2009; Levac, D., Colquhoun, H. L., & O'Brien, K. K., 2010; Colquhoun, H. L. et al, 2014; Pham, M. T., et al, 2014), to assess and characterize the current state of the literature surrounding crisis and emergency risk communication to family physicians, with a focus on literature pertaining specifically to family physicians in Canada. A public health sciences research librarian with experience in conducting scoping reviews at the University of Alberta (TC) and a research assistant at the University of Alberta (SS) assisted with the literature search and subsequent selection of articles in the review. A public health researcher with extensive experience in qualitative research in public health (CJ) was consulted regularly regarding inclusion/exclusion criteria, and themes.

The research question for this scoping review was: *What is known from the existing literature about how public health crisis and emergency risk communication is conveyed to family physicians?* A scoping review aims to rapidly identify and outline key concepts underpinning a research area and the main sources and types of available evidence relating to that topic, "especially where an area is complex or has not been reviewed comprehensively before" (Mays, N., Roberts, E., & Popay, J., 2001, p.194, in Arksey, H., & O'Malley, L., 2005, p.5), or when the relevant field has "an emerging and diverse knowledge base" (Khan, Y., et al, 2015, p.2). The overall research objectives of this scoping review are to:

1) assess the extent, range and nature of the current literature regarding public health crisis and emergency risk communication to family physicians, with a focus on Canadian literature;
2) provide a broad overview and summary of the current ways in which public health crisis and emergency information has been reported in the literature as being communicated to family physicians, with a focus on the current Canadian context;
3) identify positive aspects and successes in the existing literature regarding public health crisis and emergency risk communication to family physicians; and
4) identify knowledge gaps in the existing literature, in addition to areas for future research pertaining to this topic.

3.4 Methods

3.4.1 Approach

I conducted a scoping review of published research literature in the field of crisis and emergency risk communication to family physicians. Published research literature includes any article(s) published in a peer-reviewed academic journal, such as a commentary piece, a summary article, or a novel research article. Grey literature was not included in this review. TC assisted in developing the search strategy. As outlined by Arksey, H., & O'Malley, L. (2005), five stages were adapted and used as a basis for the methodological framework for this scoping study:

1) Identifying the research question;

2) Identifying relevant studies;
3) Study selection;
4) Charting the data; and
5) Collating, summarizing and reporting the results.

A sixth and final step of the scoping review, consultation with experts relevant in the field, has been described by Arksey, H., & O'Malley, L. (2005) as "optional." In my scoping review, I did not consult with stakeholders, as this stage was considered unnecessary due to the breadth of articles identified in the first five steps. Additionally, consulting with experts or stakeholders was incompatible with the resources available and the timeframe allotted for conducting this scoping review.

3.4.2 Step 1: Identifying the Research Question

The research question was purposefully broad, as the intent was to generate a wider breadth of knowledge in the initial search. This allowed for the question to be narrowed or more focused on crisis and emergency risk communication to family physicians in Canada, once some sense of the general scope of the field had been gained (Arksey, H., & O'Malley, L., 2005).

"Crisis and emergency risk communication" was defined for this review as the scope of communication and communication activities relating to a public health risk (e.g. smoke from forest fires), crisis or emergency (e.g. pandemic influenza outbreak) (Upshur, R. E., VanDenKerkhof, E. G., & Goel, V., 2001). For this review, "family physician" was defined as any primary care or general services physician, either in training for practice (e.g. family medicine resident), practicing (either as a family physician, general practitioner, or primary care

physician / practitioner, both independently or as a part of a family health team or similar group / clinic), or retired. An "all-hazards approach," similar to that outlined by Khan, Y., et al (2015, p.2), was used to include literature relating to a range of crises and emergencies, such as natural disasters (e.g. hurricanes, flooding, forest fires), infectious disease outbreaks (e.g. Ebola, SARS, H1N1), and other terrorism- or biohazard or technologically-related events (e.g. an article focusing on risk communication to family physicians following the September 11, 2001 terrorist attacks or the anthrax attacks in the United States).

3.4.3 Step 2: Identifying Relevant Studies

A search strategy was adopted that involved several electronic databases: Ovid MEDLINE 1946- and MEDLINE In-Process & Other Non-Indexed Citations, Ovid Embase 1996-, Ovid PsycINFO 1987-, EBSCOhost CINAHL, EBSCOhost Library & Information Science Source, Scopus, and Web of Science: Science Citation Index 1900-, Social Sciences Citation Index 1900-, Conference Proceedings Citation Index- Science 1990-, and Conference Proceedings Citation Index- Social Science & Humanities 1990. These databases were selected in consultation with TC and because they have been used in other recent scoping reviews by Canadian authors pertaining to similar health topics, such as: electronic personal health record systems (Archer, N., et al, 2011); health information technology to facilitate communication involving health care providers (Gentles, S. J., Lokker, C., & McKibbon, K. A., 2010); and the evidence base of primary research in public health emergency preparedness (Khan, Y., et al, 2015).

Only studies published between January 2000 and August 2015 were included in the search. The starting date of 2000 was selected as this was prior to major recent public health

crises or related emergency events, such as the 2001 9/11 terrorist and anthrax attacks in the USA and the global SARS outbreak (2003). Only English-language studies were included because of resource limitations.

Search terms were developed for the three central concepts relevant to this scoping review: 1) Pandemics and or crisis / emergency health situations; 2) Family physicians; and 3) Risk Communication. Subject Headings and keywords were used in the search. Subject headings and search operators were modified for each specific database as deemed appropriate by the librarian (TC).

The terms "knowledge" and "information" were searched for interchangeably with "communication." The terms "emergency" and "crisis" and "public health emergency" and "public health crisis" were searched for interchangeably. The term "family physician" was used interchangeably with the terms "general practitioner," "family doctor," "primary care physician," and "primary care doctor" (for full details on search strategies and complete list of search words, see Appendices 1 and 2 at the end of this dissertation).

3.4.4 Step 3: Study Selection

The study selection process is summarized in Figure 1 (page 60). Studies were selected based on those that represented a "best fit" or were deemed most appropriate with the research question for the scoping review. Study selection was an iterative process that included screening first by title only, second by abstract, and finally by full-text review. In total 3009 articles were retrieved based on the search terms pertaining to the research question. Of these, 1157 were duplicates. I applied the inclusion / exclusion criteria (Tables 1 and 2) to the titles and abstracts of the remaining articles, resulting in 312 papers. I then reviewed the titles and abstracts of the

312 articles. From those 312 abstracts, I concluded that 87 articles were appropriate for full text review. In conjunction with SS, I conducted an initial pilot review of 10% of studies to ensure consistency in applying the inclusion and exclusion criteria for the full text of 87 articles. Of the 87 full text articles reviewed, 38 were selected for final synthesis. The same inclusion / exclusion criteria (Tables 1 and 2) were applied to all stages of screening and resulted in the final selection of 38 articles.

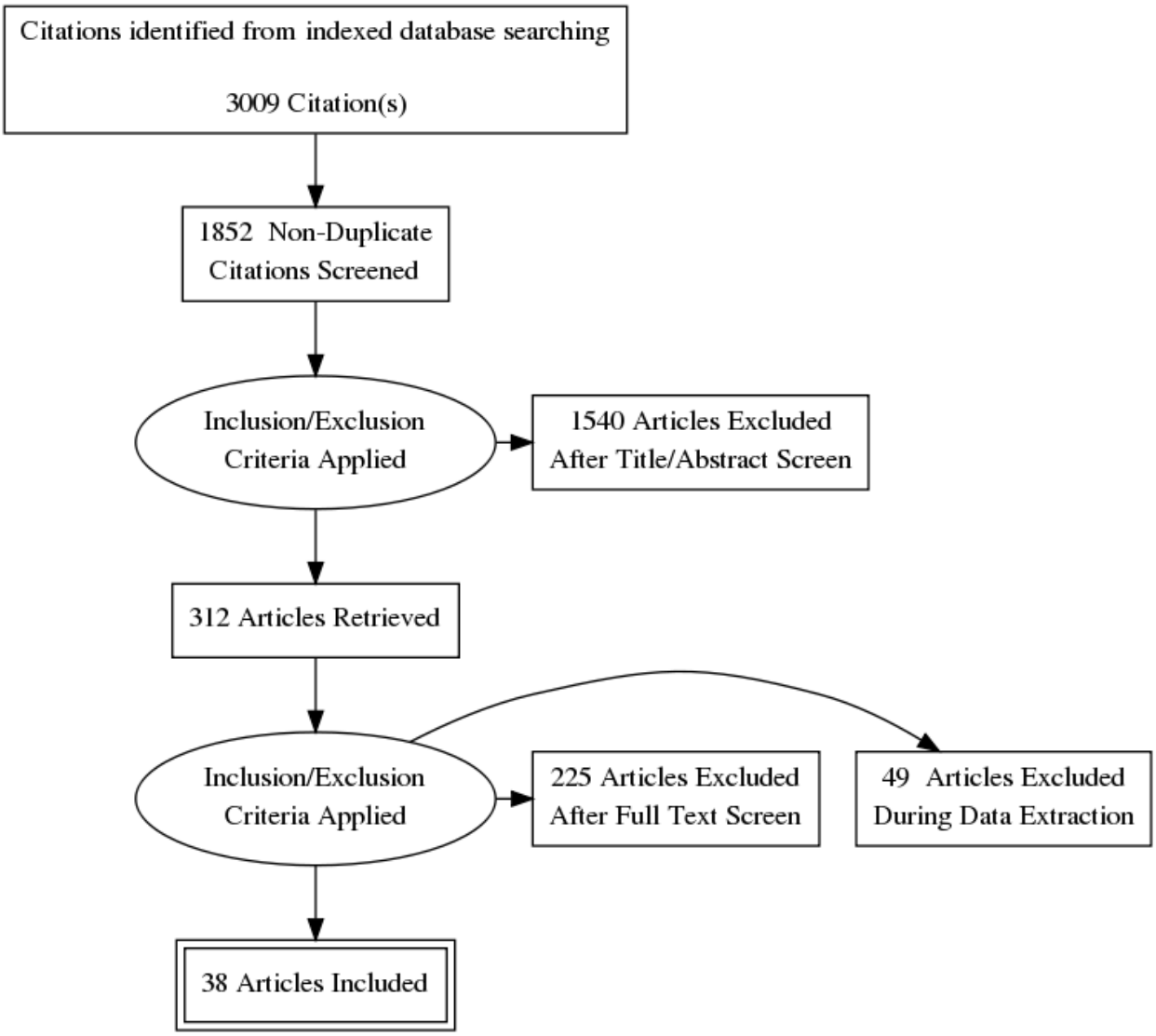

Figure 1: Flow diagram of article selection process

Inclusion criteria were applied for full-text selection of articles (Table 1). The articles had to meet all three of the inclusion criteria to be included in the final selection of articles. These criteria were developed in relation to the research objectives and refined based on consensus by myself and CJ. A pilot was conducted using 10% of full text articles reviewed independently by two reviewers, myself and SS, to ensure consistency in applying the inclusion criteria for the scoping review. This initial pilot revealed limited agreement in the inter-rater reliability assessment of articles. Following the pilot and after consultation with CJ, it was determined that an additional 5% of studies were to be reviewed by myself and SS to reach consensus in the study selection process. In this subsequent pilot, consensus was attained. Following this agreement I then reviewed the remaining full text articles for inclusion. All included 38 articles from the final application of inclusion criteria were cross-referenced against exclusion criteria (see Table 2).

Table 1: Inclusion Criteria for Assessment of Articles

Criterion 1:	Is the article peer-reviewed OR published (e.g. as an editorial or commentary piece) in a peer-reviewed journal?
Criterion 2:	Does the article address the specific population of family physicians? (If article references family physicians *in addition to* other groups e.g. nurses, pediatricians, pharmacists, the article *will* be included.)
Criterion 3:	Does the article include some aspect of crisis or emergency risk communication to family physicians? OR, Does the article identify a positive aspect or success regarding crisis and emergency risk communication to family physicians? OR, Does the article identify knowledge gaps and/or areas for future research pertaining to crisis and emergency risk communication to family physicians?

Table 2: Exclusion Criteria for Assessment of Articles

Criterion 1:	The article is not peer-reviewed or is not published in a peer-reviewed journal (e.g. a chapter from a peer-reviewed book)
Criterion 2:	The article is published in a language other than English
Criterion 3:	The article is published before 2000

3.4.5 Step 4: Charting the Data

The articles extracted for inclusion were then organized or "charted" onto a "data charting form" (Arksey, H., & O'Malley, L., 2005, p.16). Charting is a qualitative technique for synthesizing, interpreting and organizing data by sifting through research material according to key themes (Ritchie, J., & Spencer, L., 1994). As recommended by Levac, D., Colquhoun, H. L., & O'Brien, K. K., (2010), I iteratively developed the data abstraction chart and categories in consultation with CJ, to determine which variables would be most suitable for extraction in order to answer the research question posed by the scoping review.

Information from the articles was charted as follows (as adapted from Arksey, H., & O'Malley, L., 2005 and Khan, Y., et al, 2015):

- Author(s);
- Year of publication;
- Study location (e.g. city, country);
- Number of pages;
- Type of article (e.g. research article, commentary, recommendations);

- Study population (e.g. family physicians; primary care teams including family physicians);
- Research question / objective / aim of the article;
- Context and scope of the crisis or emergency event (e.g. H1N1 pandemic influenza 2009 in Canada);
- Methodology / specific study design; and
- Important / key results, recommendations or conclusions.

If fields could not be completed or were not applicable for a study (e.g. a commentary piece that did not have a "study population" per se, but was written by a family physician and published in a peer-reviewed journal), those fields were left blank. Following the data abstraction / charting process, I read and re-read each article to ensure comprehension and synthesis of information. Assessment of the quality of evidence in the articles was beyond the scope of this review.

3.4.6 Step 5: Collating, Summarizing and Reporting the Results

The final step of the scoping review was broken down into three stages, as adapted from Levac, D., Colquhoun, H. L., & O'Brien, K. K. (2010): analysis (collating and summarizing); reporting the results and key recommendations regarding public health crisis and emergency risk communication to family physicians; successes and knowledge gaps in the literature; and implications for future research, policy and practice. See Table 3 (Summary of 38 final articles) below.

Table 3: Chart of 38 Articles in Scoping Review

Author(s)	Year	Article Source / Journal	Title	Study Location	Type of Article	Context / Scope
Baker, M.	2010	The British Journal of General Practice: The Journal of the Royal College of General Practitioners	Communicating in a crisis: The H1N1 influenza pandemic.	Great Britain	Editorial / commentary	2009 H1N1 Pandemic Influenza (UK)
Bocquet, J., Winzenberg, T., & Shaw, K. A.	2010	Australian Family Physician	Epicentre of influenza – the primary care experience in Melbourne, Victoria	Australia	Research	2009 H1N1 Pandemic Influenza (Australia)
Caley, M., Sidhu, K., & Shukla, R.	2010	The British Journal of General Practice : The Journal of the Royal College of General Practitioners	GPs' opinions on the NHS and HPA response to the first wave of the influenza A/H1N1v pandemic.	Great Britain	Research / Brief Report	2009 H1N1 Pandemic Influenza (UK)
Chen, F. M., Hickner, J., Fink, K. S., Galliher, J. M., & Burstin, H.	2002	The Journal of Family Practice	On the front lines: Family physicians' preparedness for bioterrorism.	United States	Research	Post-September 11 attacks in the United States
Collins, N., Litt, J., Winzenberg, T., Shaw, K., & Moore, M.	2008	Australian Family Physician	Plan your pandemic. A guide for GPs.	Australia	Checklist for General Practitioners	2008 Australia – planning for pandemic influenza
Collins, N., Litt, J., Moore, M., Winzenberg, T., & Shaw, K	2006	The Medical Journal of Australia	General practice: Professional preparation for a pandemic.	Australia	Supplement	2006 Australia – planning for pandemic influenza
Croy, C. D., Smail, C., & Horsley, E.	2012	Family Practice Management	Preparing for and recovering from a natural disaster	Missouri, United States	Practice Management Article	2011, after tornado hit town of Joplin, Missouri
Dabrera, G., Anyaegbu, E., Addiman, S., Keeling, D., Ashton, C., Whala, S., . . . Balasegaram, S.	2012	Journal of Business Continuity & Emergency Planning	Is preparedness for CBRN incidents important to general practitioners in east London?	London, U.K.	Research	2010 – prior to the 2012 Olympics in London
Dearinger, A. T., Howard, A., Ingram, R., Wilding, S., Scutchfield, D., Pearce, K. A., & Hall, B.	2011	Journal of Public Health Management and Practice	Communication efforts among local health departments and health care professionals during the 2009 H1N1 outbreak.	Kentucky, United States	Research	2009 H1N1 Pandemic Influenza (Kentucky)
Edeghere, O., Fowler, T., Wilson, F., Caspa, R., Raichand, S., Kara, E., . . . Olowokure, B	2015	Journal of Health Services Research & Policy	Knowledge, attitudes, experience and behaviour of frontline health care workers during the early phase of 2009 influenza A(H1N1) pandemic, Birmingham, UK.	Birmingham, U.K.	Research	2009 H1N1 Pandemic (UK)
Eisenman, D. P., Stein, B. D., Tanielian, T. L., & Pincus, H. A	2005	Journal of General Internal Medicine	Terrorism's psychologic effects and their implications for primary care policy, research, and education.	United States	Research / Recommendations	2005 United States, post-anthrax attacks
Eizenberg, P.	2009	The Medical Journal of Australia	The general practice experience of the swine flu epidemic in Victoria--lessons from the front line	Australia	Rapid Online Publication / Commentary	2009 H1N1 Pandemic Influenza (Australia)
Flicoteaux, R., Pulcini, C., Carrieri, P., Schwarzinger, M., Leport, C., & Verger, P.	2014	Vaccine	Correlates of general practitioners' recommendations to patients regarding vaccination for the 2009-2010 pandemic influenza (A/H1N1) in France: Implications for future vaccination campaigns.	France	Research	2009 H1N1 Pandemic Influenza (France)

Genicon, C., Meynard, J. B., Duron, S., Haus-Cheymol, R., Ollivier, L., Le Goff, C., . . . Mayet, A	2014	Revue d'Epidemiologie Et De Sante Publique	Feedback on the management of the 2011 measles outbreak by French military general practitioners: An evaluation study.	Metropolitan military units in France	Research	2010/2011 measles outbreak epidemic in France
Goldberg, A. B., Ratzan, S. C., Jacobson, K. L., & Parker, R. M.	2015	Journal of Health Communication	Addressing Ebola and other outbreaks: A communication checklist for global health leaders, policymakers, and practitioners.	N/A	Communicati on checklist	2014 Ebola crisis (global)
Herceg, A., Geysen, A., Guest, C., & Bialkowski, R	2015	Communicable Diseases Intelligence Quarterly Report	SARS and biothreat preparedness--a survey of ACT general practitioners.	Australia	Research	2003/2004 – during and post-SARS outbreak in Australia
Hidiroglu, S., Ay, P., Topuzoglu, A., Kalafat, C., & Karavus, M.	2010	Vaccine	Resistance to vaccination: The attitudes and practices of primary healthcare workers confronting the H1N1 pandemic.	Istanbul, Turkey	Research	2009 H1N1 Pandemic Influenza (Turkey)
Hogg, W., Huston, P., Martin, C., & Soto, E.	2006	Canadian Family Physician	Enhancing public health response to respiratory epidemics: Are family physicians ready and willing to help?	Ottawa, Canada	Research	2004 Post-SARS (Ottawa, Canada)
Howard, A. F., Bush, H. M., Shapiro, R. M.,2nd, & Dearinger, A.	2012	Journal of Public Health Management and Practice	Characteristics of Kentucky local health departments that influence public health communication during times of crisis: Information dissemination associated with H1N1 novel influenza	Kentucky, United States	Research	2009 H1N1 Pandemic Influenza (Kentucky, United States)
Jaakkimainen, R. L., Bondy, S. J., Parkovnick, M., & Barnsley, J.	2014	Canadian Family Physician	How infectious disease outbreaks affect community-based primary care physicians: Comparing the SARS and H1N1 epidemics.	Toronto, Canada	Research	2014 Toronto post-SARS and H1N1 2009 Pandemic Influenza
Kahan, E., Fogelman, Y., Kitai, E., & Vinker, S.	2003	Family Practice	Patient and family physician preferences for care and communication in the eventuality of anthrax terrorism.	Israel	Research	2002; post-September 11 and anthrax attacks (Israel)
Kort, R., Stuart, A. J., & Bontovics, E.	2005	Canadian Journal of Public Health	Ensuring a broad and inclusive approach: A provincial perspective on pandemic preparedness.	Ontario, Canada	Recommenda tions / perspective	2005 Ontario; post-SARS
Kunin, M., Engelhard, D., Piterman, L., & Thomas, S.	2013	Australian Family Physician	Response of general practitioners to infectious disease public health crises: An integrative systematic review of the literature.	Australia, Israel & England	Research	2009 H1N1 Pandemic Influenza (Australia, Israel & England)
Lauer, J., Kastner, J., & Nutsch, A.	2008	Journal of Public Health Management and Practice	Primary care physicians and pandemic influenza: An appraisal of the 1918 experience and an assessment of contemporary planning.	United States	Research	1918 Influenza Pandemic; post-SARS (United States)
Masotti, P., Green, M. E., Birtwhistle, R., Gemmill, I., Moore, K., O'Connor, K., . . . Shaw, R.	2013	BMC Public Health	pH1N1 – a comparative analysis of public health responses in Ontario to the influenza outbreak, public health and primary care: Lessons learned and policy suggestions.	Ontario, Canada	Research	2009 H1N1 Pandemic Influenza (Ontario, Canada)

Miller, M., & Solomon, G.	2003	Pediatrics	Environmental risk communication for the clinician	United States	Recommendations	2003; post-anthrax attacks (United States)
Moore, M. G.	2006	New South Wales Public Health Bulletin	A general practice perspective of pandemic influenza	Australia	Recommendations	2006; post-SARS (Australia)
Pearce, C., Shearer, M., Phillips, C., Hall, S., Kljakovic, M., Glasgow, N. J.,…Patel, M.	2011	Australian Health Review: A Publication of the Australian Hospital Association	Views of GPs and practice nurses on support needed to respond to pandemic influenza: A qualitative study.	Australia	Research	2009 H1N1 Pandemic Influenza (Australia)
Putzer, G. J., Koro-Ljungberg, M., & Duncan, R. P.	2012	Disaster Medicine and Public Health Preparedness	Critical challenges and impediments affecting rural physicians during a public health emergency.	Florida, United States	Research	Post-September 11, post-Hurricane Katrina in United States
Robinson, M.	2003	Australian Family Physician	A rural GP's Perspective	Australia	Perspective / commentary	Post-Massive Bushfire season in Australia
Rosewell, A., Patel, M., Viney, K., Marich, A., & Lawrence, G. L.	2010	Communicable Diseases Intelligence Quarterly Report	Impact of faxed health alerts on the preparedness of general practitioners during communicable disease outbreaks.	Australia	Research	2006 (Australia) following measles outbreaks in that country
Sarikaya, O., & Erbaydar, T.	2007	BMC Public Health	Avian influenza outbreak in turkey through health personnel's views: A qualitative study	Turkey	Research	2006 avian influenza outbreak in East Turkey
Staes, C., Wuthrich, A., Gesteland, P., Allison, M., Leecaster, M., Shakib, J. H. et al	2011	Journal of Public Health Management and Practice	Public health communication with frontline clinicians during the first wave of the 2009 influenza pandemic.	Utah, United States	Research	2009 H1N1 Pandemic Influenza (Utah)
Tice, A. D., Kishimoto, M., Dinh, C. H., Lam, G. T., & Marineau, M.	2006	Prehospital and Disaster Medicine	Knowledge of severe acute respiratory syndrome among community physicians, nurses, and emergency medical responders	Hawaii, United States	Research	2003 SARS (Hawaii)
Tiong, W. W., & Koh, G. C.	2013	Annals of the Academy of Medicine, Singapore	Ethical considerations in the review of Singapore's H1N1 pandemic response framework in 2009.	Singapore	Short communication	2009 H1N1 Pandemic Influenza (Singapore)
Wong, W. C., Wong, S. Y., Lee, A., & Goggins, W. B.	2007	American Journal of Infection Control	How to provide an effective primary health care in fighting against severe acute respiratory syndrome: The experiences of two cities.	Hong Kong and Toronto, Canada	Research	2003 SARS (Hong Kong and Toronto)
Wynn, A., & Moore, K. M.	2012	American Journal of Public Health	Integration of primary health care and public health during a public health emergency.	Kingston, Canada	Commentary	2009 H1N1 Pandemic Influenza

3.5 Analysis

Articles ranged from 2 – 12 pages, with both the median and mean length of article equating to approximately seven pages. The majority of articles and / or studies were authored in or took place in North America (USA n = 11; Canada n = 5); Australia (n = 9); and Europe-Middle East (France n = 2; England n = 4; Turkey n = 2; Israel n = 1). One study was conducted in Singapore, and two studies were conducted or written using data or other resources and/or were authored in from multiple countries (China – Canada; and England – Israel – Australia). One paper was a systematic review, which did not have ties (authorship or setting) to a specific location.

Most articles (n = 24) were classified as research articles and contained original research studies. The remaining citations were checklists / recommendations and / or practice management papers (n = 8); commentary-style articles (n = 5); and 1 systematic review of the literature regarding the response of family physicians to infectious disease public health crises. Out of the 24 research articles, less than one-third (n = 7) employed qualitative methodologies for data collection, such as key informant interviews or focus groups with general practitioners. The majority of research articles (n = 17) employed quantitative data collection strategies, such as surveys or questionnaires sent to physicians.

The study population in most articles (n = 19) was general practitioners, primary care physicians or family physicians (terms used synonymously in this review). Other study populations, as per the inclusion criteria for article selection, listed general practitioners or family physicians or primary care physicians as one of several varied groups (e.g. general practitioners, allied health personnel, nurses, public health directors, and etcetera). One paper outlined a study with a specific population, general practitioners in military units in France.

Some papers (n = 5) did not have a specific "study population" per se; these articles tended to be commentary-style papers detailing a specific family physician's experience during a public health crisis or emergency, or a specific region (e.g. local health unit) and their experiences or recommendations following a public health crisis or emergency risk event.

The year and scope for most articles (n = 30) were related to infectious or communicable public health disease outbreaks, epidemics or pandemics, such as the H1N1 influenza pandemic in 2009; the SARS outbreak in 2003; the Ebola outbreak in 2014; or local/regional avian influenza outbreaks or measles outbreaks. The remaining articles (n = 5) pertained to research done post September 11, 2001, on anthrax attacks or similar chemical, biological, radiological and nuclear (CBRN) emergency events and preparedness; and local or regional environmental or climate-related public health crises or emergency risk events (e.g. a tornado in Missouri or bushfires in Australia).

From the 38 articles retrieved in this scoping review, several overarching themes regarding crisis and emergency risk communication to family physicians emerged: knowledge, attitudes, perceptions and beliefs of family physicians; confusion / redundancy; collaboration / organization; externally-facing communication; internally-facing communication; education / training; practice / staff considerations; patient considerations; and fluidity of risk communication planning processes.

3.5.1 Knowledge, attitudes, perceptions & beliefs of family physicians

Results from a large survey in the United Kingdom described how general practitioners there perceived risk communications regarding H1N1, and the clarity of information provided from public health agencies, as poor (Caley, M., Sidhu, K., & Shukla, R., 2010). Respondents

considered that the national health organizations' (the National Health Service and the Health Protection Agency) responses to the first wave of pandemic H1N1 had both strengths and weaknesses. Perceived strengths included general practitioners' familiarity with and accessibility of current guidance on the management of influenza symptoms as well as the ability to obtain antivirals and infection-control advice. Perceived weaknesses were lack of clarity in the information provided, and that information was unclear, duplicated and/or conflicting**.**

In the U.S., preparedness for a bioterrorist attack was associated with knowing how to obtain information in the event of an attack. Few family physicians felt prepared to respond to a bioterrorist event, yet training in bioterrorism preparedness was significantly associated with physicians' perceived ability to respond effectively to a bioterrorist attack (Chen, F. M. et al, 2002). In the U.K., one study illustrated that family physicians were willing to improve their knowledge regarding CBRN emergencies (Dabrera, G., et al, 2012), while another British study confirmed that knowledge and use of personal protective equipment (PPE) and infection control procedures among primary care practitioners was consistently high during H1N1 (Edgehere, O., et al, 2015).

French researchers concluded that in the pandemic H1N1 context, general practitioners' perceptions of disease severity were a major determinant of physicians' recommending the H1N1 vaccine or not (Flicoteaux, R., et al, 2014). In Australia, researchers soliciting general practitioners' knowledge and attitudes regarding public health crises found they need timely information, appropriate information delivery mechanisms, resolution of communications issues, education, accessible guidelines and protocols, and planning and role delineation. They also found that practitioners felt that planning for future infectious disease outbreaks must include

family physicians so that the plans reflect a feasible response in the general practitioner setting (Herceg, A., et al, 2005).

Authors of an Israeli study (Kahan, E., et al, 2003) found that family physicians feel they should be supplied with appropriate information and guidelines for treatment of patients exposed to a communicable disease or other public health risk (e.g, CBRN attack), and that both patients and primary care physicians believe that general practitioners should play a major role in responding to potential bioterrorist attacks. In one Australian study, primary care physicians thought that national non-governmental organizations rarely provided useful information during the H1N1 pandemic outbreak, yet local public health divisions were perceived as having a practical and useful role providing hands-on assistance and support to clinics throughout the crisis. This was deemed to indicate that more planning is required in the coordinated response of the general practice sector to a pandemic (Pearce, C., et al, 2011).

3.5.2 Confusion / Redundancy

Baker (2010) found that most public health crisis or emergency risk events are typically accompanied by confusion, related to the communication and / or receipt of information about the event, in addition to the emerging nature of crisis information in real-time. When considering public health crisis and emergency risk communication to and from family physicians, although material may come from different sources and differing perspectives, it is important to avoid any elements of inconsistency that could lead to confusion and loss of confidence. One Australian study suggests that family physicians did not perceive any coordination in the delivery of information sent by all organizations involved in the pandemic H1N1 outbreak (Pearce, C., et al, 2011).

Family physicians in a U.S. study felt overwhelmed by email communications from public health agencies during the H1N1 pandemic, and study authors concluded that communication between public health agencies, health care organizations and clinicians was redundant due to the receipt of information from multiple national and local sources (Staes, C. J., et al, 2011). Masotti, P., et al (2013) suggested that local, regional and national risk communication strategies ought to be strengthened by collaborating in risk communication planning pre-crisis, in order to eliminate contradictory messages from different sources and decrease confusion when communicating information to family physicians and other healthcare practitioners.

Caley, M., Sidhu, K., & Shukla, R. (2010) proposed that national organizations should disseminate information in a more coordinated fashion to prevent family physicians from being overwhelmed and confused with duplicated information. Bocquet, J., Winzenberg, T., & Shaw, K. A. (2010, p.316) recommended that general practice clinics appoint an "information coordinator" during a public health crisis (e.g. one of the physicians in the practice group or a nurse-coordinator), to sift through all communications and determine what is relevant for that specific practice.

3.5.3 Collaboration / organization

Goldberg, A. B., et al (2015) described how practitioners work as a 'spoke in the wheel' of the health care system, and when a public health crisis or emergency risk event occurs, family physicians and other stakeholders and organizations (e.g. global health leaders, researchers, policymakers) must collaborate to enact an organized and integrated risk communication plan. A common goal needs to be agreed upon; leadership needs to be coordinated; a communication

strategy needs to be developed; a communication operation needs to be launched; and communication effectiveness must be maximized by engaging the audience, acknowledging and responding to emotions, and tracking and evaluating implementation of the overall strategy. It is essential to establish effective partnerships between family physicians and public health services to support GPs' capacity to respond to emergencies (Hogg, W., et al, 2006).

In one U.S. study it was suggested that the designation of a public information officer may positively influence crisis and emergency risk communication between local health departments and health care practitioners, specifically family physicians (Howard, A. F., et al, 2012). Kort, R., Stuart, A. J., & Bontovics, E. (2005) proposed that all sectors, including primary care physicians, must be included in pandemic or other public health crisis planning from the outset, and stakeholders should coordinate / advocate with broader emergency response systems and establish mechanisms for risk communication and information exchange among all sectors. Wynn, A., & Moore, K. M., (2012) described how collaboration between Ontario's primary care practitioners and public health units contributed to a successful response to the H1N1 pandemic in that province.

Lauer, J., Kastner, J., & Nutsch, A. (2008) found that although it is important to include family physicians in pandemic planning, and certainly general practitioners are willing to serve their patient populations during times of public health crisis, primary care physicians may not have the time to engage fully in planning activities due to their busy schedules; therefore governments and health networks should develop plans for coordinating family physician care and other activities during emergency risk events.

3.5.4 Externally-facing communication

Externally-facing communication is when the focus of communication activities is outside to the population of family physicians and public health agencies (e.g., communication to patient populations and/or the public) (Khan, Y., et al, 2015). Flicoteaux, R., et al (2014) found that general practitioners should be adequately informed about the course of the crisis (e.g., the H1N1 pandemic; efficacy and safety of protective measures e.g. vaccines) in order to increase the general public's acceptability and understanding of related public health policies. Putzer, G. J., Koro-Ljungberg, M., & Duncan, R. P. (2012) noted that existing barriers that may be present during non-crisis times, including communication barriers between patients and physicians in specific populations such as rural family physicians, must be mitigated utilizing strategically implemented health policies and risk communication strategies. Robinson, M. (2003) outlined that public education and risk communication regarding potential public health crises is essential to the success of a risk communication program involving general practitioners; and Sarikaya, O., & Erbaydar, T. (2007) underscored that open communication between government, primary care practitioners and the public should be emphasized as an important component of a successful risk communication plan.

3.5.5 Internally-facing communication

Internally-facing communication refers to communication where the focus of communication and information exchange activities is within the system (e.g. family physicians communicating to their peers, or communication between family physicians and public health or professional organizations) (Khan, Y., et al, 2015). Family physicians need to maintain frequent links with local public health units for updates and revisions of protocols, in addition to checking

public health bulletins for updated information (Collins, N. et al, 2008; Eisenman, D. P., et al, 2005). Two-way risk communication between public health agencies and family physicians is crucial when preparing for and addressing public health crises or emergency risk events (Collins, N. et al, 2008). One report from the U.S. regarding H1N1 pandemic risk communication concluded that although 95% of local health departments (LHDs) reported that physician notification was a risk mitigation strategy, only half of surveyed physicians received any risk communication from LHDs, suggesting that deficiencies exist in the outreach and effectiveness of internally-facing communication during public health crises (Dearinger, A. T., et al, 2011).

Communication and consultation with front-line general practitioners is imperative when planning appropriate and timely implementation processes relating to public health crises (Eienberg, P., 2009). Without the opportunity for appropriate two-way risk communication between family physicians and public health authorities, GPs may revert to their professional autonomy and be unwilling to follow official guidelines or policies (Kunin, M., et al, 2013b), emphasizing the importance of engaging GPs in pre-crisis planning and establishing trustworthy two-way channels of communication. In Australia, divisions of general practice play a pivotal role in disaster plans, particularly in coordinating the availability of ongoing medical services, facilitating communication between family physicians and other essential services, and integrating family practice into post-crisis recovery (Robinson, M., 2003). Bocquet, J., Winzenberg, T., & Shaw, K. A. (2010) recommended that GPs need a streamlined, clinically appropriate, regularly updated electronic source of information that is focused on primary care, and that prioritizes urgent changes of protocol in real time during a crisis. Additionally, effective two-way communication from family physicians back to public health authorities would enable

rapid dissemination of information from the field (e.g. clinical or disease surveillance information).

3.5.6 Education / training

Family physicians may appear to be unprepared for, but willing to address, serious public health emergencies such as SARS (Hogg, W., et al, 2006). During the SARS outbreak in 2003, most family physicians from Toronto and Hong Kong who responded to a survey had no training in infectious disease control, and were not confident in dealing with SARS (Wong, W. C., et al, 2007). Public health agencies and other organizations should assist in educating and training this group for potential future public health crises. Academic divisions or departments can and should provide academic detailing to general practices in advance of a communicable disease outbreak, and assist with infection control, vaccination, and personal protective equipment training (Collins, N. et al, 2006). Training in relation to relevant crisis or emergency policies and guidance could improve family physicians' preparedness for such incidences, without burdening general practitioners (Dabrera, G., et al, 2012). In relation to CBRN, disaster planning and communications should include training primary care physicians about the emotional and behavioural responses (Eisenman, D. P., et al, 2005).

Educating and training family physicians in the supply and use of personal protective equipment (e.g. appropriate masks/gowns), performing public health responsibilities, and obtaining support from appropriate authorities were identified as challenges in the responses of general practitioners to infectious disease public health crises (Kunin, M., et al, 2013a). The fundamentals of public health risk and crisis communication (e.g. as outlined by Covello, V. T., 2003) should be incorporated into undergraduate and postgraduate medical training in order to

increase relevant knowledge and skills regarding public health crises and emergencies, in addition to emphasizing the relevance of primary care practice in responding to and communication about such events (Miller, M., & Solomon, G., 2003). Faxed alert systems have been shown to be useful in preparing GPs for a communicable disease outbreak (Rosewell, A., et al, 2010), and one might extrapolate that other types of communication alerts (email, social media) could also help prepare family physicians for a public health crisis or emergency risk event. However, in order for this form of training to be successful, relevant contact information (fax numbers, email addresses) must be updated consistently. Effective means of information dissemination, education and training regarding public health crises is essential for family physicians, as well as the institution of policies and procedures in medical offices and clinics in communities (Tice, A. D., et al, 2006).

3.5.7 Practice / staff considerations

Planning for risk communication to family physicians regarding public health crises should include pre-risk event assessment of physician practices; a review of public health communications strategies; and enquiry into workforce protection (personal protective equipment, antiviral medications, escape routes) (Bocquet, J., Winzenberg, T., & Shaw, K. A. 2010). During times of public health crisis, emergency operations and logistics personnel should have access to timely information regarding the status of general practices – whether they are open or closed, whether they are seeing patients with the disease (where applicable, e.g. if the crisis is a communicable disease outbreak, such as H1N1), and how family physicians will provide services to their patients (clinics, telephone assessment and management, or home visits) (Collins, N. et al, 2006).

In the event of a climate-related crisis or emergency, family physicians should be prepared to practice out of a temporary site and consider practical issues such as: not entering their practice building until the gas has been turned off; keeping updated business records and lists of equipment/supplies/vaccinations/medications so they're easier to replace and claim losses; store any money or receipts in a safe; make copies of degrees or awards to store off-site; use an electronic medical record (EMR) system and back it up off-site daily; and ensure their office insurance policy has adequate coverage for damage (Croy, C. D., Smail, C., & Horsley, E., 2012). Similar considerations should be taken in the event of a communicable disease outbreak or pandemic, such as establishing the practice's communication lines (internet, fax, telephone); planning for business continuity; planning practice infection control measures; establishing the practice's supply chains for essential materials; and staying up-to-date with current information from public health agencies (Moore, M. G., 2006).

Recent research from Canada indicates that serious community-based infectious disease outbreaks are a personal concern for family physicians, and study authors call for further investigation examining the timely flow of relevant risk communication information through differing health care sectors and government agencies (Jaakkimainen, R. L., et al, 2014).

3.5.8 Patient considerations

When considering crisis and emergency risk communication to family physicians, inherent in this concept is the position of family physicians as both recipients and translators of timely, accurate and important health or risk information. Genicon, C., et al (2014, p.119) concluded that military general practitioners play an "essential role" in translating and communicating risk in an infectious disease (measles) outbreak. They outlined that vaccination

against this disease did not seem to be well understood or accepted by military patients, underlining the importance of physicians' role in patient considerations. GPs have multiple critical roles including: the provision of medical services to their communities and patient populations during a public health crisis; provision of risk information about the crisis; and acting as gatekeepers to mental health, counseling and other community-based services involved in the response to such events (Robinson, M., 2003).

3.5.9 Fluidity of risk communication plans

Several articles emphasized that risk communication plans for family physicians must remain fluid, living documents, consistently incorporating and updating information from lessons learned in real risk events (e.g. H1N1 pandemic influenza, 2009). Specifically, national or generic information should be able to be separated from local or specific information for general practitioners during a public health crisis (Baker, M., 2010). A balanced and flexible approach to public health crises is important to allow family physicians to adhere to government policies and regulations (Tiong, W. W., & Koh, G. C., 2013). Local, regional and national professional organizations and health departments need to regularly and actively review and update their plans for professional communications (Baker, M., 2010). The Turkish experience during pandemic H1N1 shows the need to adopt effective risk communication messages targeting primary care practitioners, and that to improve risk communication during similar public health crises risk communication must be tailored to the specific crisis situation at hand, cognizant of the needs of both healthcare workers and the public (Hidiroglu, S., et al, 2010).

3.6 Extent, range and nature of the current literature regarding public health crisis and emergency risk communication to family physicians in Canada

It is evident from this scoping review that there are limited articles published in English, peer-reviewed journals regarding crisis and emergency risk communication to family physicians in Canada. When conducting the literature search, the research team purposely did not limit to specify "Canada" or "Canadians," in an attempt to cast a wider net for pertinent studies. Only a handful of articles (n = 6) were authored by Canadians or used data from Canada (Hogg, W., et al, 2006; Jaakkimainen, R. L., et al, 2014; Kort, R., Stuart, A. J., & Bontovics, E., 2005; Masotti, P., et al, 2013; Wong, W. C., et al, 2007; and Wynn, A., & Moore, K. M., 2012). All six articles were authored in or used data sourced from the province of Ontario. Out of these 6 articles, two-thirds (n = 4) were research articles (the others were descriptive pieces and / or commentary - style papers).

Each of the six Canadian articles was focused on communicable / infectious disease outbreaks or similar public health crises and emergency risk events, such as 2004 Severe Acute Respiratory Syndrome (SARS) or the 2009 H1N1 influenza pandemic. The aims or objective(s) of the articles were as follows:

1) To describe Ottawa family physicians' perceptions of their preparedness to respond to outbreaks of infectious diseases or other public health emergencies and to assess their capacity and willingness to assist in the event of such emergencies (Hogg, W., et al, 2006);
2) To compare how the infectious disease outbreaks H1N1 and severe acute respiratory syndrome (SARS) affected community-based general practitioners and family physicians (Jaakkimainen, R. L., et al, 2014);

3) To review and detail the development of the Ontario Health Plan for an Influenza Pandemic (OHPIP) released in June 2005 (Kort, R., Stuart, A. J., & Bontovics, E., 2005);
4) To document stakeholder experiences and perceptions relating to 5 key characteristics of public health unit (PHU) Pandemic Influenza Plans: planning and implementation, human and financial resources, priority lists/vulnerable populations, mass immunization, and collaboration with Primary Care/Family physicians; to compare differences among local PHU Pandemic Influenza plans; to document stakeholder perceptions of what worked well and didn't work well; and to identify policy suggestions regarding changes needed to improve local health system pandemic influenza plans (Masotti, P., et al, 2013);
5) To compare the response and management of severe acute respiratory syndrome (SARS) by the family physicians of the Hong Kong and the Toronto health systems, and to provide evidence to improve health policy and practices in a newly emerging infectious disease (Wong, W. C., et al, 2007); and
6) To provide a detailed evaluation of how collaboration between an Ontario public health unit and its primary care providers facilitated an optimal response to the 2009 H1N1 influenza pandemic (Wynn, A., & Moore, K. M., 2012).

Four of the six Canadian articles were research articles, employing methods as: a cross-sectional self-administered survey to family physicians in Ottawa (Hogg, W., et al, 2004); a mailed survey sent to community-based general practitioners and family physicians (Jaakkimainen, R. L., et al, 2014); a multi-phased comparative analysis comprised of key

informant interviews with primary care physicians, medical officers of health and data from a Pan-Ontario symposium (Masotti, P., et al, 2013); and a questionnaire sent to family medicine tutors affiliated with the University of Hong Kong or the University of Toronto (Wong, 2007).

3.7 Overview and summary of the current ways in which public health crisis and emergency information is communicated to family physicians in the current Canadian context

Public health crises, such as infectious disease outbreaks, are a personal concern for Canadian general practitioners and have considerable effects on their clinical practice (Jaakkimainen, R. L., et al, 2014). Family physicians in Canada tend to receive communication regarding public health crises via multiple sources, including postal mail, faxes and electronic mail (e-mail) (Jaakkimainen, R. L., et al, 2014). Effective two-way risk communication between public health agencies and primary care, including community-based family physicians, is essential to integrate into public health crisis and emergency management plans (Jaakkimainen, R. L., et al, 2014).

It is crucial to set up effective and collaborative partnerships and communications between primary care and public health services to support family physicians' capacity to respond to emergencies (Hogg, W., et al, 2006). All sectors of the health care system must be included in pandemic planning and communications at the outset, including family physicians, and mechanisms must be established for communication and information exchange among practitioners, committees and working groups / government (Kort, R., Stuart, A. J., & Bontovics, E., 2005). Planning for public health crises should be more comprehensive and operationalized at all levels, including primary care; and local / provincial / national communication strategies need

to be improved so that communications messages will be consistent (Kort, R., Stuart, A. J., & Bontovics, E., 2005).

An integrated community-wide response and communications plan including government organizations, public health agencies and primary care practitioners may be the best approach to decrease the impact of a public health crisis, such as a pandemic disease. Consensus exists for more detailed planning for public health crises and the inclusion of multiple health system and community stakeholders, such as primary care physicians (Masotti, P., et al, 2013). Relevant and practical training in infection control can be made available to family physicians in the form of continuous medical education (Wong, W. C., et al, 2007).

3.8 Positive aspects and successes documented in the existing literature regarding public health crisis and emergency risk communication to family physicians

Family physicians are willing to address serious public health emergencies (Hogg, W., et al, 2006), and Canadian family physicians have experienced several such events (e.g. SARS, H1N1) in recent years. Sharing the ‘‘lessons learned’’ including communications strategies between family physicians and other levels of health care / different organizations in different regions during an infectious disease outbreak will help prepare for the next epidemic (Wong, W. C., et al, 2007), as it is inevitable such public health crises will continue to occur.

Ontario’s primary care practitioners in collaboration with public health agencies contributed to a successful response to the 2009 H1N1 pandemic in southeastern Ontario. The existing structure can facilitate timely, coordinated, and comprehensive communications and response during public health emergencies, and provides a promising new direction for health care organization. In Ontario, the integration of primary care and public health in response to

pandemic disease activity is a promising model for future population-based approaches to communication strategies and disease control (Wynn, A., & Moore, K. M., 2012). This model could be modified for use by other jurisdictions and made specifically relevant to different types of crisis (e.g. climate-related crisis versus infectious disease outbreak).

3.9 Knowledge gaps in the existing literature and areas for future research

It is clear from the small number of citations specifically pertaining to crisis and emergency risk communication to family physicians in Canada (n = 6) that further research specifically exploring this topic is warranted. However, many of the themes identified in the 38 articles included in the final review are applicable to the Canadian context and may merit exploration by researchers based in this country.

Some of the 38 articles in the full review referenced a climate- or environment-related public health crisis such as a tornado in the United States or a bush / forest fire in Australia (Croy, C. D., Smail, C., & Horsley, E., 2012; Robinson, M., 2003), but the majority of articles in our review discussed communicable disease outbreaks such as the SARS outbreak in 2003 or the H1N1 pandemic influenza of 2009/2010. Further research may be justified in how risk information is communicated to family physicians regarding such climate-related public health crises or emergencies, especially in the Canadian context – for example, forest fires in the West, flooding in the Prairie Provinces, or hurricanes in the Maritimes.

Out of 38 articles included in the full review, only 24 were research articles and out of those research articles, only seven were qualitative research studies. Although qualitative research tends to be more labour intensive than quantitative research (e.g. facilitating focus groups or interviewing key informants versus distributing an electronic questionnaire), it is

imperative to explore how public health crisis and emergency risk information is communicated to family physicians via these research methods to obtain rich, in-depth information from physicians practicing on the ground. There is limited research explicating an in-depth understanding of the reasons as to *why* family physicians responded to the surveys and other quantitative data sets as they did; nor is there an understanding of *how* these public health crises are actually lived through and experienced by family physicians. Such information may not be obtained via quantitative data collections alone, so qualitative research methods (e.g. a phenomenological study exploring the experiences of family physicians in receiving and translating public health crisis / emergency risk information) are necessary. The knowledge gap surrounding the "why" and "how" questions outlined above must be addressed using qualitative research methodologies.

Unfortunately, it is apparent from this scoping review that many of the "lessons learned" regarding public health crisis and emergency risk communication to family physicians rarely seem to end up in peer-reviewed literature. Furthermore, the small number (n=6) of Canadian references likely do not amount to all relevant information on public health crisis risk communications to family physicians in Canada. More publications in peer-reviewed literature that are directed towards family physicians as the primary readership (e.g. The Canadian Medical Association Journal; Canadian Family Physician) would help disseminate the lessons learned from previous public health crises in Canada, and how to communicate risk more appropriately to family physicians in the event of a future public health crisis or emergency event.

The creation of a register of available services and of a virtual network for sharing information is an initial step in assessing primary care response to public health crises (Hogg, W., et al, 2006). Further work examining the timely flow of relevant information through

different health care sectors and government agencies still needs to be undertaken (Jaakkimainen, R. L., et al, 2014).

3.10 Strengths & Limitations of this scoping review

This scoping review offers a broad overview of the literature published in the past 15 years relating to public health crisis / emergency risk communication to family physicians, with a specific focus on the Canadian context. To our knowledge it is the first review of this kind to address the specific research question, "What is known from the existing literature about how public health crisis and emergency risk communication is conveyed to family physicians?"

A limitation of this scoping review is that new articles and papers are being published quite frequently regarding public health crises and risk communication to health care providers, and some more recent articles may have been missed in this study from the date of the actual search (August 18, 2015) to the time of publication (for example, articles relating to the Zika virus outbreak in the Americas in early 2016). Secondly, although many articles initially screened in this review (n = 1892) contained some aspect of public health crisis and / or emergency risk communication and / or family physicians, only a limited number (38) met the inclusion criteria for my review, and out of that number an extremely limited number of citations (n = 6) pertain specifically to crisis and emergency risk communication to family physicians in Canada.

I focused on articles published in peer-reviewed, English language journals and therefore may have missed grey literature, as well as articles published in other languages. However, I do think that this review provides a succinct overview of the literature that is relevant to this area of research, and is an excellent base upon which to understand how public health crisis and

emergency risk information is currently communicated to family physicians as documented in the peer reviewed literature.

3.11 Conclusions

Public health crisis and emergency risk communication to family physicians (such as that which occurs during an infectious disease outbreak like SARS or H1N1 or during a climate related emergency event such as widespread forest fires or flooding) is an important topic area to understand and explore in order to improve risk communication strategies and to mitigate the impact of such crises on the Canadian population. This scoping review identifies the current state, range and extent of literature regarding public health crisis and emergency risk communication to family physicians, with a specific focus on the current Canadian context, in addition to successes and areas for improvement or further research in this topic area. This review outlines several themes pertaining to this research topic, including: knowledge, attitudes, perceptions and beliefs of family physicians; confusion / redundancy; collaboration / organization; externally-facing communication; internally-facing communication; education / training; practice / staff considerations; patient considerations; and fluidity of risk communication planning processes. Further peer-reviewed qualitative research is warranted to unveil the answers to the questions of "why" family physicians have responded to public health crises and their related risk communication processes as they have in the literature, in addition to "how" family physicians – particularly those practicing in Canada – actually live through these experiences. Such research also needs to be published in an accessible format for family physicians, such as the Canadian Journal of Public Health; the Canadian Medical Association Journal; and Canadian Family Physician – the peer-reviewed medical journal of the College of

Family Physicians of Canada. It is my hope that with this scoping review I have illuminated the extent and nature in which public health crisis information is communicated to family physicians, and that I have stimulated interest in this topic for public health agencies and professional organizations to improve public health risk communication to family physicians in the future.

3.12 Chapter Three References

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4.0 CHAPTER FOUR – PHENOMENOLOGICAL EXPLORATION

4.1 What might it be like for a family physician to experience a public health crisis?

4.2 Preface

In this paper, I have explored what the experience of practicing during a public health crisis might be like for a family physician in Canada. In keeping with a phenomenological research and writing approach (van Manen, M., 2014), the writing itself is a tentative and reflective. I have weaved anecdotes derived from participant interviews into the body of the paper to assist the reader to access the subjectivity of possible experiences of a public health crisis. In this manuscript I have intentionally used a hesitant and cautious tone, to present the experiences of family physicians living through a public health crisis, and also to reflect on those experiences in a way that reveals more about the experience itself. In reading this paper, the reader may ask questions such as the following: What might the experience of a public health crisis be like for a family physician? What ethical responsibilities might a family physician encounter in a public health crisis situation? And how might family physicians uniquely or commonly experience a public health crisis? A version of this chapter forms the basis for an oral presentation to be presented at the Qualitative Health Research conference in Kelowna, British Columbia, in October 2016.

4.3 Introduction

> *My practice is downtown. Many of my patients are homeless. With this flood, it's difficult because we don't know where our patients are. This is probably the most disconcerting aspect for me in my practice, where people get sent all over the place and there's no communication. Where did everybody from the drop-in centre go? From the various shelters, where did people get distributed to? And it's frustrating because a lot of these people are vulnerable to begin with. They need care and it's not available because we don't know where they are.*

We can imagine that being a family physician practicing in Canada is a rewarding occupation. A family physician might deliver a newborn child; might see that child throughout their childhood and into adolescence; then see that adolescent into adulthood and in some cases, might even retain a patient in their practice into old age and assist in providing palliative or end-of-life care. The family physician in Canada is the "jack of all trades," with knowledge and expertise ranging from broken bones and lacerations on the skin; to internal cardiac and gastrointestinal problems; to sexual and reproductive health across the lifespan; to mental and emotional health and well-being; to communicable and chronic disease prevention and public health promotion. The family physician cares for the healthy, the vulnerable, and the sick. When a public health crisis occurs, how does this change or modify the family physician's practice? What is it like to experience a public health crisis as a practicing family physician? How might these experiences be different than and unique to the quotidian practices in family medicine in Canada?

By and large in Canada, the occupation of family medicine physician has minimal risk. While the general practitioner is likely exposed to more common colds than an engineer, he or she is safe in his or her practice relative to a firefighter, policeman, or soldier. Still, there are risks to the family physician from working late and long hours in an after-hours clinic dealing with the stress of providing care to the sick or ill. Like other caring professionals, the primary care physician can suffer moral distress or endure caregiver burnout (Ekstedt, M. & Fagerberg, I., 2005). Moral distress would seem to occur "when one knows the right thing to do, but institutional constraints make it nearly impossible to pursue the right course of action" (Jameton, A., 1984, p.6).

But what about when a public health crisis, such as the SARS outbreak in 2003 or the H1N1 influenza pandemic in 2009 - 2010, occurs; and suddenly the occupation of family physician might be unsafe, isolating, or frightening? What happens to a family physician when such a crisis or emergency occurs? What might such an experience tell us about the experience of safety for a family physician? How might a physician feel both alone and unsupported, yet surrounded by many others in a clinic or hospital environment? How might a "public health crisis" actually be lived through by a family physician? While existing research has helped to understand deficiencies in leadership, risk communication, and existing policy during public health crises (Hogg, W., et al, 2006; Jaakkimainen, R. L., et al, 2014; Kort, R., Stuart, A. J., & Bontovics, E., 2005; Masotti, P., et al, 2013; Wong, W. C., et al, 2007; and Wynn, A., & Moore, K. M., 2012), how family physicians actually live through such crises and what this living-through tells us about the physicians themselves and even the practice of family medicine in Canada is a relatively unexplored area of research. In other words, existing research offers limited insights into how practicing family physicians are situationally affected by the unpreparedness, isolation, responsibility, vulnerability, confusion and chaos, and crisis that might accompany such events.

4.4 Methods

The aim of this study was to explore experiential phenomena associated with public health crises. In particular, the focus was on family physicians practicing in Canada. Phenomenology of practice, a context-sensitive form of interpretive qualitative inquiry, was employed (van Manen, M., 2014).

I conducted sixteen individual semi-structured interviews with family physicians in Canada, from June 2014 to March 2015. Interviews were conducted in-person or via Skype video conferencing. Each interview lasted approximately 30 minutes, and commenced with the question: "How would you define a public health crisis?" Following this orienting question, participants were asked to identify a crisis (or crises) that they had experienced. Participants detailed their current practice (e.g. specializing in care of the elderly; or infectious diseases), and were asked to walk me through what it was like, or describe in detail a particular incident or experience they had during a public health crisis (based on their own definition of what such an event means to them). Crises detailed by participants included the SARS outbreak in 2003; the H1N1 pandemic influenza outbreak in 2009-2010; Hurricane Juan in Nova Scotia in 2003; Severe Flooding in Alberta in 1995 and 2013; and Forest Fires in the Northwest Territories in 2014. When interviewing family physicians about their experiences during a public health crisis, several participants recalled and described experiences that took place while they were in their family medicine residency training. All interviews were audio-recorded and transcribed verbatim.

The process of writing this paper itself is a reflective component of the phenomenological method: "To write is to reflect; to write is to research" (van Manen, M., 2014, p. 20). The aim of this writing is to explore and present what it may be like for family physicians in Canada to experience a public health crisis. Recollections from participants included particular experience from when the participants were either a practicing family physician, or a family medicine resident, and had lived through what they defined as a public health crisis. Anecdotes presented in the paper were constructed from the interview material to present plausible descriptions of phenomena associated with public health crises. It is not my intention to provide sweeping

generalizations about what family physicians experience during a public health crisis. Rather, I hope to illuminate this experience in an original phenomenological composition, meaning that there is something about this text that is "not derived from a prior phenomenology" (van Manen, M., 2014). Phenomenology might be described as more a method of questioning than answering, and in this vein I do not seek to answer questions in this paper about how we *should* or *ought to* address public health crises, or how we might improve the risk communication to family physicians from public health agencies and professional organizations. Rather, I hope to provide insights and reflective questioning on the experience of living through a public health crisis as a family physician in Canada, and in this way allow the reader to actually live-through this experience.

4.5 Results

4.5.1 Preparedness

> *I'm concerned that if a case of Ebola makes its way here we aren't fully prepared. We aren't properly trained in personal protective equipment and things like that, there isn't quite enough focus on that. Other people might be exposed.*

To become a practicing family physician in Canada, one must go through years of schooling and medical training. Following undergraduate training and a competitive admission process, Canadian physician trainees enter into medical school for four years. Thereafter, residency training is completed, a minimum of two years. Following this, new family physicians seek mandatory registration by a provincial or territorial medical regulatory authority such as the College of Physicians & Surgeons of Alberta or the College of Physicians & Surgeons of Ontario prior to being able to undertake their practice in family medicine. Training is preparation for the variety of ailments or illnesses that a family physician's patient might present. Yet during a

public health crisis, the family physician might feel unprepared. He or she might not have received appropriate training for protective medical equipment to deal with airborne illnesses. He or she might be unfamiliar with prophylactic medications to prevent illness. He or she might lack the experience of working with the unknown. The family physician is typically the person whom patients trust to give them reliable, valid, and up-to-date information about a myriad of diseases; and yet the family physician might not feel prepared to answer patients' requests for information, or to provide medical treatment when they are not yet familiar themselves with the causative agent of the crisis (e.g., a novel virus outbreak).

"Being prepared" or preparedness is a practice in being able to "make ready beforehand;" a state of readiness or "being ready" (Oxford Dictionaries, 2016b). Yet the concept of preparedness is perhaps inappropriate to use in the context of a family physician being prepared for a public health crisis. How can we ever be prepared for a crisis to ready beforehand what new changes will bring about? How can we prepare for events for which we cannot predict or prepare? Conversely, being "unprepared" might indicate that a physician is not ready or able to deal with something because he or she was not made fully ready by their training. Unpreparedness is not necessarily felt as being wholly incomplete; rather it might be felt as a state of knowing one is not prepared, or fearing failure (due to lack of preparation).

> *There are a couple of key ticking time bombs in the Yellowknife area, one is just natural weather and climate-related, which manifested last summer and we had an incredibly big forest fire season. It was a horrible summer from the standpoint of anyone with chronic respiratory diseases, so that was a big concern. It's supposed to go on a cycle so we're expecting the next couple summers to be very smoky as well. I'll see a lot of that in clinic. They see a ton in emergency too because people with even mild respiratory problems will tend to go to there rather than seeing us in clinic, we tend to be backed up and booked weeks or months in advance. I'll see some of that this summer, too.*

Family physicians can become accustomed to the cycles and patterns of illnesses in their community. There may be a history of health crises in the community and an expected future of crises. The experience of a public health crisis has a time of anticipation and a time of recovery as the crisis is an event in itself with a past, present, and future. Family physicians might experience a public health crisis as an experience in time. Past, present and future might feel altered or slowed during a crisis; alternatively, time may seem to hasten and family physicians could be left feeling overwhelmed with little time to perform their jobs and daily activities. Preparedness requires a thoughtful "being made readiness" for the future, in the present or perhaps even looking to past public health crises, such as "the Mother of All Pandemics", the Spanish Influenza Pandemic in the early 20th century, to provide insights into the present and in the event of a future public health crisis (Taubenberger, J. K. & Morens, D. M., 2006). For a family physician, a public health crisis might be an experiencing of the future and past; or of the future as present. Anticipating what might arise during a public health crisis (e.g. to patients, the community, vulnerable populations) is an experience of time when the future comes into the present. Perhaps even more so than in a normal practice setting, the family physician experiencing a public health crisis may feel an increased responsibility to their patients, their practice and their community. Preparedness in the anticipation of future patients (e.g. those who have not yet arrived at a medical clinic; or those who have not yet become ill but who are at risk of developing sickness) becomes an increased threat to the family physician's practice.

> *This is months into Ebola epidemic in West Africa, and we are hearing very little from public health. I realize that it's possible that somebody could walk in my clinic…what am I going to do if that happens? We feel vulnerable. We feel like somebody could walk through the door any minute and we aren't prepared.*

The routine of the family physician is to deal with the often unexpected realities of their patients' lives. Yet a public health crisis may rupture a family physician's taken-for-granted routine practice. Some aspects of family practice may be so taken-for-granted (ritualized), that the family physician may not realize its presence or meaning or importance until after it is taken away or altered. Ritualized behaviours or experiences are those that have become so much of our cultural or social existence that we rarely reflect on or even notice them (van Manen, M., 2002). An example of such a ritualized experience in family practice is the taken-for-grantedness of the walk-in-clinic. Normally, the walk-in clinic serves a patient population and individuals with a variety of ailments might present themselves to be attended to by the family physician: a mother towing a sick child behind her; a college student from another region who has no family doctor in the vicinity; a construction worker with a small laceration from the day's work. Yet in times of crisis, the family physician may be unprepared for the new and unknown patients that may walk through his or her clinic door.

In contrast, preparedness or making ready beforehand might also be an experience of family physicians during a public health crisis. Family physicians, especially since the SARS and Ebola outbreaks of 2003 and 2014/2015 (respectively), might be required by their employer or clinic group to undergo emergency management training. This might include training on appropriate masking / gowning / gloving procedures (e.g. with N95 masks) for infectious disease outbreaks, or running through an emergency / crisis simulation with their work colleagues, or perhaps designating key contacts and planning office / clinic coverage during a public health crisis. Family physicians may indeed experience a public health crisis as an experience of preparedness, and being made ready beforehand for a breadth of emergency situations that may impact their practice, from infectious disease outbreaks to climate-related disasters.

4.5.2 Isolation

> *I don't think public health and family medicine are well-linked here. I have no recommendations on when to use Tamiflu or not, or when to prescribe Tamiflu to people, which I worry retroactively may cause resistance. I'm talking to one of my colleagues who says "Oh I'll just fire off an email" to public health and she gets a reply saying "Oh do please screen actually! Because we'd like to start counting." There's no broad communication so I feel like I'm the only person in Yellowknife screening people! I'm not sure how well they stay in touch with us on-the-ground clinicians.*

Isolation, or being isolated, meaning "standing detached from others of its kind" is from the Latin *insulatus* "made into an island" (Online Etymology Dictionary, 2016b). The family physician might experience isolation, separation and segregation during a public health crisis. They might feel isolated from other health care team members; segregated from patients and the public; and different or separate or feeling very much "the other" to the nurse, the attending physician, or other staff at the hospital or clinic. Another taken-for-granted experience in family practice we might consider is the communication between public health authorities (e.g. the local Medical Officer of Health or Health Unit), and the family physician. Typically, public health and primary care authorities work closely together, with family physicians and other primary care providers looking to public health agencies for guidance, information and tools (for example, immunization recommendations). With a great deal of communications from public health agencies (e.g. the Public Health Agency of Canada) or professional organizations (e.g. The College of Family Physicians of Canada), we might imagine that family physicians take such communications for granted in their day-to-day practices. It appears that it is only when such communications become sparse, and those communications or information are essential to safe practice, does this communication itself become known to the practicing family physician. When

considering a public health crisis caused by a natural disaster, communication might be severed by physical means:

> *All around me the roof had blown off some of the hospital, and people in the hospital setting were trying to move patients but there was no call out, there was no ability to call out to physicians in the area, "we need you, we need help." We have learned some things since that experience like trying to coordinate care better, but in the face of that, in the face of a natural disaster, there really at that time was no sense that we were communicating on any great level.*

During a public health crisis, communication between family physicians and other health care professionals might be intermittent, sparse, or even absent. Although personal communications and social media have allowed for much more information to be transmitted in recent years, during a crisis even these forms of communication could be affected. When the family physician cannot call out to someone for assistance, what are they to do? How might a family physician perform his or her duties (the duty of care) without appropriate back-up from the rest of the health care system? Does the role of a family doctor shift when a public health crisis or emergency event occurs?

> *I'm racing against the clock; what am I supposed to be doing? Where am I supposed to be going? I'm in a makeshift hospital ward made specifically for SARS patients – those who are clearly very sick. I've had no training on how to put on this mask, this N95 mask that has suddenly assumed great importance. I hear the heavy industrial fans, almost like vacuums, drowning out the regular din of the hospital corridor, keeping the noxious air away from the rest of the hospital, making this special SARS ward apparently more "safe" to be in. Safe, but for whom? For the SARS patients? For the other patients, who are not banished to this isolation ward? For me, a family medicine resident thrust unprepared into the role of "SARS team member"? I don't feel safe. I'm unprepared, isolated and alone.*

For a family medicine resident, the experience of confusion and uncertainty may not be unique. Since residents are not yet trained in all aspects of care, and typically have not yet acquired years of medical practice from which they honed their medical skills and expertise, we can imagine that the family medicine resident feels overwhelmed, or confused, or unprepared for the tasks that are presented before them. How might the family medicine resident be both in a busy and frantic hospital, yet at the same time feel so isolated and alone? What is it about the experience of a public health crisis that may force this dichotomy of being onto a medical trainee?

Typically, family medicine residents are rarely isolated and alone. The system of medical schooling is such that prospective physicians endure years of medical school, where they tend to be in the company of hundreds of other medical students, professors, varied health professionals and other physicians. Upon entering their residency, these trainees are often mentored by a more experienced physician or group of physicians. Residents in Canada may participate in small group learning to learn the skills and attributes of a competent family physician, such as communication, health advocacy, collaboration, medical expertise, leadership, and professionalism (RCPSC, 2015). Yet in a time of crisis, the physician might be called to a position of isolation: in a (literal) isolation room, such as a reverse-vacuum room in an infectious air-born respiratory disease outbreak. Isolation might also occur when the resident or the physician is forced to take necessary precautions to prevent disease transmission, such as quarantining themselves according to appropriate public health guidelines and even laws – like the Public Health Agency of Canada's "Quarantine Act" (Government of Canada, 2007).

Conversely, the experience of a public health crisis for a family physician might be an experience of inclusion. From Latin *includere,* inclusion means to "shut in", to the action / state

of including or being included within a group, or a person that is included within a whole (Oxford Dictionaries, 2016c). Although experiencing a public health crisis as a practicing family physician might be isolating, it might also be an experience of inclusion. New connections might be made with colleagues, and new connections might be formed with other disciplines (e.g. nursing, physiotherapy, emergency medical technicians), staff (e.g. receptionists, cleaning staff), and organizations (e.g. public health units / agencies, other hospitals or primary care networks). Such connections and being included in a larger community and network of individuals uniting to fight the same cause might result in the family physician experiencing a public health crisis as an experience of inclusion.

4.5.3 Responsibility

> *H1N1 is so big, and there's so much communication from public health. I'm very involved. They're setting up clinics and asking for volunteers to go to the clinics and things like that. In family practice we are responsible for making sure that the right information is getting to the residents as well.*

Responsibility comes from Latin, *respondere*, "to respond," meaning being accountable for one's actions, being reliable and trustworthy, and retains the sense of obligation from the Latin root word (Online Etymology Dictionary, 2016c). A good family doctor is not simply someone who applies their medical knowledge and expertise in healing and the reduction of suffering, but also is someone who cares about their patients. Indeed, the Hippocratic Oath expresses the contract of responsibility. Yet when a crisis occurs, and the family doctor's concern for patients increases, how might this affect the physician him- or herself? How does the family doctor carry the burden of worrying about his or her patients until the crisis has subsided?

> *In terms of my patients, the evacuations continue to expand and we're watching it… we watch the shelters get flooded, and then I start to be very worried about my patients.*

What might it be like for a family physician to worry even more about their patients, to have increased concern for their well-being during a public health crisis? Typically, we might worry about individuals or situations in our everyday lives. We might worry about a test result, or worry that we will be late for an appointment or a lunch date with a friend. But this type of worrying is different than the worry that the family physician feels for their patients during a public health crisis. The family physician is responsible to (or responsible for) their patients' health and well-being, leading us to believe that this type of worry could be far more troublesome.

How might a family physician experience irresponsibility during a public health crisis? To be irresponsible is to not act with a sense of responsibility; yet do family physicians ever not act with a sense of responsibility? If a physician is experiencing personal stressors or problems and appropriate help is not sought, family physicians, especially during a time of public health crisis, might be being irresponsible. When a public health crisis occurs, we can imagine that even more stress factors could be added to the physician's workload and that in order to provide the best possible care to their patients populations, family physicians need to seek help for their own personal problems that may be impacting their professional and personal lives.

4.5.4 Vulnerability

> *My husband is also a physician and we've got two little ones and we live in an area that's a block from the Bow River, and our community's sandwiched between two evacuated communities so we ourselves are waiting for a flood evacuation. Which thank goodness doesn't happen, we don't get flooded. My husband is supposed to be on call across on the other side of the flood, and they want him to come in. Meanwhile, I'm trying to manage the kids and pull things up*

off the basement floor. In terms of communication and family support it's kind of poor.

To be vulnerable is to be easily physically, emotionally or mentally hurt, influenced or attacked (Cambridge Dictionary, 2017). The family physician may experience a public health crisis as an experience of vulnerability. The family physician isn't just a doctor; they are a person first living within a community who might also be vulnerable to the consequences of a public health crisis. The family physician might experience a sense of vulnerability; perhaps not unlike the patient population that they serve. A family physician is someone's daughter or son; someone's brother or sister; perhaps a wife or a husband or a best friend; or perhaps a father or mother. When a public health crisis occurs, the family physician may experience this as a personal crisis affecting not only their patients and their practice, but also their own friends, their own communities and their own family for whom he or she is also responsible. We can imagine some concerns that the family physician might have: if the crisis is a flood, "Is my family in the flood zone? Can I actually get home after work today?" If the crisis is a novel and virulent communicable disease, "Are my children safe? Can my husband get the vaccine?"

In terms of my family and personal stuff, I realize that people don't seem to be taking the flood seriously, and I'm worried.

Family physicians are often the first point of contact in the health care system; and tend to be the individuals that patients go to for information and support. During a crisis, general practitioners may find *themselves* in need of support, and information and

communication from a trusted source about the disease or natural disaster. At what point during a public health crisis does the family physician become an individual, a member of the public, and not a member of the health care or emergency response system where the burdens of responsibility are too much and he or she needs others for support?

> *This is jarring for me as a resident because we have a pandemic vaccine shortage, and we're seeing these patients before we are even vaccinated. Emergency room staff and nurses are offered pandemic vaccines, but residents and medical students are second tier for vaccination. I'm expected to go see all these patients unvaccinated and the vaccine is available, but they say "because you're not an active staff here, even though you're working here, you're not eligible until the second round of vaccinations."*

Working "on the front lines" during a public health crisis might be an experience of (un)safety, vulnerability and susceptibility to illness or infection. Such experiences may reveal or expose that the physician could actually get very sick, because they are working with very sick people. What is it to feel "vulnerable?" To be vulnerable is to feel exposed, requiring protection. The possibility of physical or emotional harm is present in the vulnerable. The origin of the word "vulnerable" is from Latin, *vulnerare,* "to wound" (Oxford Dictionaries, 2016d). In being vulnerable the family medicine resident is in a position to be wounded by the experience of a public health crisis – perhaps both emotionally due to the highly stressful surroundings, and physically by becoming infected with a virus or other means of illness.

Family physicians and other health care providers might be considered "first tier," or of primary importance to protect during a public health emergency, so that they may in turn attend to and care for others in the population. During the H1N1 influenza pandemic outbreak of 2009, Canada experienced a vaccine shortage, whereby some public health agencies and organizations were required to allocate vaccines (Canadian Medical Association et al, 2010). For perhaps

arbitrary or logistical reasons, some family medical residents may not have been given the H1N1 vaccine in the first round of vaccinations in many regions in Canada during the outbreak. Vaccination priority was often given, as is outlined in the anecdote above, to staff physicians and nurses working in emergency rooms or other high-volume areas. This designation of who was to receive the vaccine first, the "priority list", has been the subject of much ethical debate (Upshur, R., 2012) centering on questions such as: who *should* receive the vaccine first? Who *ought* to receive the vaccine first? Who *must* receive the vaccine first? How can we define "priority"?

Experiencing a public health crisis as a practicing family physician might also be an experience of security. To be secure, one feels safe, protected, sheltered and perhaps even immune. A family physician might endure a public health crisis but also feel physically safe, and protected from the crisis at hand (whether it is an infectious disease to which they are immune; or a forest fire that is miles away but they must deal with overflow patients from another community directly affected by the fire). A family physician might feel sheltered from the crisis, if it is primarily affecting a patient population that is not their own. Finally, a family physician might feel immune to the crisis, if for example they received the Ebola vaccine and are travelling to an area to provide medical attention to Ebola victims. In these ways, experiencing a public health crisis as a family doctor might be an experience of security as well as vulnerability.

4.5.5 Confusion and chaos

> *It's just really, really chaotic and I'm only trying to address my little population of patients. And yet all around me the roof has blown off some of the hospital, and so people in the hospital setting are trying to move patients but there's no ability to call out to physicians in the area, "We need you, we need help!"*

Chaos, from the Greek *khaos*, originally meant a large hole, a gaping void or chasm. In Greek Mythology, Chaos was the Goddess of "emptiness and confusion who gave birth to the Universe" (Oxford Dictionaries, 2016e). In modern language, the idea of chaos could be interpreted as emptiness or confusion, complete disorder (or a state of dis-order). A chaotic state implies urgency, distress, and helplessness. To feel without help, or without hope for help, is a sentiment that most can relate to through encountering situations that are beyond our control. The experience of chaos for a family physician may be particularly distressing. A family physician might question what exactly their role is ("What am I doing?"); or, they might even question their own sanity: "This is crazy!" Other times, chaos can present as an obstacle to overcome.

> *I leave my house to go to my clinic, same as I would any other day, despite trees having been collapsed all around me, and roads flooded. It's only when I'm halfway to work when I realize, "This is crazy! What am I doing?" There will obviously be no patients that are able to get in. There's one patient that I'm desperately trying to get into a day treatment to get some IV antibiotics for an infection that we were just not able to attend to with oral medications. I climb my way into the hospital to see if I can access her records in some way, so that I can call her and contact her. I'm only able to do that if I'm physically present to demonstrate that I'm a physician.*

It is a safe assumption that a family physician in Canada does not normally have to climb over downed trees and into their hospitals or clinic workspaces. Nor does a family physician have to be physically present to demonstrate that he or she is in fact a doctor. Instead, a physician travels to work with usual minimal effort and communicates with colleagues by a prescription, a dictation, or simply a phone call. The family physician's job, and in particular his or her duty of care, does not necessarily stop or comply with such events as a natural disaster or hurricane when they occur. Despite trees being downed and hospitals closed and roads flooded,

the family physician's patients are still in need of treatment, they still require attention. Despite the impact on the social aspects and well-being of their patients, a public health crisis might also be an experience of overcoming physical barriers to practice for a family physician. *Being* physically present and *being* there (wherever "there" is) suddenly assumes more importance; it becomes a requirement to practice family medicine during a crisis or emergency risk event to overcome confusion and chaos.

> *I'm working in the emergency room and essentially we had a corner of the emergency room, a big room with 16 beds for people with H1N1 symptoms. So patients triaged with H1N1 were put in this room and then the doctors would go in and see all these patients. I thought, "This is totally ridiculous!" These poor people with a cough or pneumonia were being exposed to 20 other people that probably had H1N1. So essentially anyone with fever and cough was put in this room until it was sort of figured out if they had H1N1, or if they needed treatment.*

Experiencing a public health crisis as a practicing family physician is likely an uncommon experience for most individuals. Such uncommon experiences are those with which most of us are unfamiliar (van Manen, M., 2002). For example, the able-bodied individual may never quite know what it is like to be wheelchair-bound. However, we can imagine that in times of public health crisis, the family physician or the family medicine resident might experience seeing the health care system as an outsider. Suddenly, the health care system, of which the physician is a part, may become foreign, altered or strange. In the quotidian aspects of day-to-day medical training and in providing medical care, we hope that family medicine residents are not confronted with the inadequacies, deficiencies, and other health system issues. We hope that family medicine residents and physicians can instead focus on their work, their training, seeing patients, and practicing medicine. The experience of a public health crisis may become one of confrontation: a confrontation not only between the family physician and the medical system, but

also a confrontation between the family physician and patients themselves whereby the doctor is related to confronting his or her patients in triage.

Conversely, the experience of a public health crisis might be an experience of order for a family physician. To experience order is an experience of planning, procedures, regulations, and management. The family physician might participate in emergency planning activities in his or her clinic / office setting. The family physician would likely be following procedures and policies set in place prior to the crisis, in order to maintain consistency and orderliness in day-to-day and crisis responsibilities. Regulations set prior to crisis time must be followed, and following such engrained regulations in one's practice might certainly contribute to the experience of order in a public health crisis.

4.5.6 Crisis

Crisis, from the Greek *krisis*, is a turning point in a disease, or a point of no return. Once the crisis stage has been reached, there is no turning back. In a way, we can appreciate that a public health crisis could perhaps be an experience of disease. Yet what is diseased? What is "in crisis"? Is it the physician-patient relationship? Or perhaps, considering that a public health crisis is an event that may affect the health and well-being of many individuals or populations, is it the physician-health care system relationship? We can imagine that family physicians and residents are confronted with this crisis – as to how they (as doctors) fit into the broader health care system; and in turn how their patients fit into and affect that same system.

> *The protocol keeps changing… it's stressful in a crisis because we have more and more patients and we keep doing more and more for them as well, just adding to our list of things that we're worried about and possible complications and things to monitor for.*

The career of a family physician might be often depicted as one accentuated by stress. Indeed, from the time of undergraduate and medical school examinations through to the daily stresses of a family medicine practice (e.g. financial demands, deadlines, administrative worries), we can imagine that the family physician may feel stressed. From an evolutionary biology perspective, stress is actually a good thing. It "increases the ability of organisms to cope with situations that require action or defense" (Neese, R. M., Bhatnagar, S., & Young, E. A., 2007). Yet, as with many biological defenses, stress may also be harmful. To feel stress is to have pressure or tension applied; it is a state of "mental or emotional strain or tension resulting from adverse or demanding circumstances" (Oxford Dictionaries, 2016f). Feeling stress in a crisis situation is perhaps a "normal" response, but for the family physician this may not be a normal or usual experience.

> *I feel more stressed than usual, for sure. I'm really worried, especially being a family medicine resident…we do a certain amount of acute care but acute care was never something that I was very interested in. I'm not the family medicine resident doing any electives in the intensive care unit or even emergency. Suddenly I'm kind of in this situation where I have a lot of very sick children under my care and it's really stressful.*
>
> *The intensive care unit [ICU] is too full; there aren't enough beds and we're trying to make ICU-type beds in other beds in different parts of the hospital. So we have kids under our care that we might have normally sent to a more acute area of the hospital, a more intensive area… so as a resident it's stressful.*

An emergency room doctor or a physician in the intensive care unit (ICU) might be more accustomed to dealing with stressful situations. For example, a gun-shot victim might be brought into the emergency department requiring immediate and urgent medical care; or a patient in the ICU may suddenly stop breathing and undergo cardiac arrest. In these situations, the emergency room and ICU doctors are specifically trained to deal with such stressful scenarios; such

specialist physicians are often required to complete upwards of five years of post-graduate medical residency training. The family physician, conversely, does not typically encounter such acute, high-stress and urgent patients in their office. If such an emergency case like a gun-shot victim or individual having a heart attack were to present at a family physician's practice, that physician might provide immediate first-aid as best they can, but would likely have to transfer the patient to a tertiary care hospital (i.e., one that can provide emergency and intensive care). In a public health crisis, the family physician is situated in a more stressful environment because they are often the first line of defense and have limited ability to triage patients to additional resources.

Experiencing a public health crisis as a family physician might also be an experience of control. To be "in control" we might imagine that someone has authority, force, management, and supervision. We can imagine being a family physician during a public health crisis as a role of authority. Family physicians have authority over many people and things, including (but not limited to) their clinic staff, hours worked, etc. The family physician has input into enforced actions, for example notifying public health that a patient needs to be under quarantine. In this case the public health unit might force this individual patient or patients to stay home. The family physician has several roles pertaining to management in a public health crisis: management of their day-to-day clinic activities and staff, as well as management of their patients' symptoms and/or disease processes. Finally, family physicians have supervision duties that may be enacted during a public health crisis: they might supervise a vaccination clinic, or a group of medical students or residents. Each of these aspects of control might allow the family physician to experience a public health crisis as having some control.

4.6 Discussion

During times of public health crisis, family physicians are likely to experience of multitude of emotions and phenomena. The family physician might be unprepared, or caught off guard; he or she could very well feel isolated and vulnerable, and perhaps experience an increased sense of responsibility to their patients and their communities. Confusion and chaos tend to abound in times of crisis, and surely family physicians who have experienced such a public health emergency or crisis are not immune to such phenomena.

Practice makes perfect – or does it? Practicing family medicine is just that – a "practice." Family medicine practice is a career in which many stressors must be balanced – running an office or a clinic smoothly, keeping updated on the latest healthcare technologies and diagnostic information, maintaining a manageable work-life balance. When a public health crisis occurs, we can imagine that even more stressors are piled upon the family physician's plate. For a family physician or a family medicine resident, a public health crisis might be experienced as feeling unprepared, isolated, alone, vulnerable, stressed, and confused. The family physician may experience communication problems; be concerned about the welfare of their own family; or actually be physically unable to perform their jobs. Further research is warranted into understanding family physicians and residents' experiences during a public health crisis, as the crisis itself can never be truly "made ready for;" and the breadth of public health crises that impact and deeply affect this group is immense. Further phenomenological exploration into the everyday aspects of practicing family medicine in Canada would be beneficial to illuminate the differences between such practice and the experiences that occur during a public health crisis.

Perhaps family physicians and residents might benefit from clinical teaching scenarios involving public health crises, so that they could be better-equipped to deal with such stressful

events when they occur. Perhaps more supports are needed for family physicians when such crises occur; yet it is difficult to identify from where such supports might come. Perchance, government agencies and public health organizations might allocate special funds; or possibly a portion of the family physician's annual registration fee might be portioned off to be of assistance in such events. Concrete options for child care and other necessary services could potentially relieve some of the burden on family physicians during a public health crisis, so that they may continue to provide the necessary care and information to their patients and communities.

This manuscript, not unlike other phenomenological texts, prospers on a certain "irrevocable tension between what is unique and what is shared," (van Manen, M., 2002, p. 71) between the particular and transcendent meaning, and between the pre-reflective and reflective aspects of human experience (van Manen, M., 1997). Perhaps by accompanying family physicians through their experiences practicing during a public health crisis, we might gain a more sensitive and profound understanding of this phenomenon, this lived experience. A more profound understanding of this lived experience will help direct public health agencies, government organizations and practitioners themselves to reflect on this phenomena when planning for the next public health crisis, and perhaps make way for innovative ways in which to mitigate the negative facets and expand upon and embrace the positive features of this phenomenon.

4.7 Chapter Four References

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5.0 CHAPTER FIVE – QUALITATIVE CONTENT ANALYSIS

5.1 Preface

In order to provide relevant and meaningful considerations for public health agencies and professional organizations, I asked all interview participants if they had any suggestions or recommendations on how they might like risk communications to be conveyed to them, as a specific knowledge-user group, in the event of a future public health crisis. I conducted a qualitative content analysis on the responses to this question, and have summarized participants' thoughts and recommendations as considerations in this paper. A version of this chapter will be submitted as a stand-alone paper for publication to the Canadian Medical Association Journal.

5.2 Succinct, relevant, timely and reliable: Improving risk communication to family physicians in the event of a public health crisis

In Canada, family physicians are the main providers of primary medical care and, in the event of a public health crisis, are therefore integral to the timely delivery of critical medical services (College of Family Physicians of Canada, 2005). As part of the front line defense during a public health crisis (Canadian Medical Association, 2010), it is important that family physicians have access to appropriate, timely and adequate risk information and knowledge in order to maintain the trust relationships with their patient populations and ultimately to improve their patients' health. When a public health crisis occurs, family physicians are required to receive and translate complex information, from public health agencies and professional organizations, to their patient populations. Family physicians require effective risk communication from agencies like the Public Health Agency of Canada, or the College of

Family Physicians of Canada, to perform their jobs safely and effectively under these circumstances.

Effective risk communication is not a singular method of information flowing from the "experts" to the recipients. Rather, effective risk communication is considered to be a two-way dialogue between those with technical risk knowledge and information, and an individual / group / community to exchange information, knowledge and experience(s) about a risk or a risk situation (Jardine, C. G., 2008). However, beyond the general consensus that risk communication is a reciprocal process, different definitions of this concept often include unique variables and understandings (Sheppard, B., Janoske, M., & Liu, B., 2012). A crucial aspect of appropriate and effective risk communication is involving those who will use the knowledge / information, and those who may be affected by the outcomes, in planning communication strategies (Henrich, N., & Holmes, B., 2011). However, public health policies on risk communication planning and strategies are typically created from a top-down perspective at large international organizations (WHO, 2016), to be interpreted by a national public health agency, and then further modified or adjusted to meet the needs of health professionals at the provincial, regional or municipal level. Although groups such as the World Health Organization (WHO) do consult with member-countries (e.g., Canada) for guidance and policy implementation regarding emergency preparedness, surveillance and response (WHO, 2016), such top-down risk communication often do not result in timely, appropriate, relevant and accurate information being distributed for primary care physicians in Canada.

A recent scoping review (Kain, N., not yet published.; see Chapter Three) exploring literature relating to crisis and emergency risk communication to family physicians identified only thirty-eight papers or documents relevant to this specific research area. Only six of these

papers (Hogg, W., et al, 2006; Jaakkimainen, R. L., et al, 2014; Kort, R., Stuart, A. J., & Bontovics, E., 2005; Masotti, P., et al, 2013; Wong, W. C., et al, 2007; Wynn, A., & Moore, K. M., 2012) contained research or recommendations pertaining specifically to Canadian family physicians or the Canadian experience; and none of these qualitatively explored the experiences and related recommendations from family physicians in Canada on how to improve risk communications in the event of a future public health crisis.

The purpose of this paper is to identify and articulate concise and concrete recommendations from family physicians in Canada, to inform considerations on how public health agencies and professional organizations might improve crisis and emergency risk communications in the future. The research questions are: From the perspective of practicing family physicians, how can risk communication to family physicians from public health agencies and professional organizations be improved during a public health crisis or emergency risk event? What methods of communication and practical tools might be of use to family physicians in the Canadian health care system? What aspects of family practice might be improved with more effective, timely, concise and appropriate information during a public health crisis?

5.3 Method

The content analysis method (Krippendorff, K., 2013), and specifically an inductive qualitative content analysis method (Elo. S., & Kyngas, H., 2007), was used to analyze the research data in an attempt to answer these particular research questions. Qualitative content analysis is one of numerous qualitative analytic research methods that may be used to describe and summarize textual data (Hsieh, H. F., & Shannon, S. E., 2005). Relative to other forms of qualitative inquiry, such as grounded theory or phenomenology, data are interpreted with a lower

degree of inference focusing on the content or contextual meaning of the text (McTavish, D. G., & Pirro, E. B., 1990; Tesch, R., 1990). Unlike quantitative content analysis, which involves simply counting words or phrases, qualitative content analysis involves examining data intensely to classify large amounts of text into a manageable number of categories or themes representing similar meanings (Weber, R. P., 1990).

For the purpose of this paper, content analysis was applied to interview transcripts in a systematic fashion in order to describe, group, and understand recommendations from family physicians working "on the ground" to inform considerations for public health agencies and professional organizations on how to improve risk communications in the event of a future public health crisis.

5.3.1 Setting, Participants and Data Collection

Data was generated from sixteen individual interviews informed by a study oversight committee, the Family Physician Research Advisory Committee (FPRAC).

FPRAC was assembled in April 2014 specifically for this research project involving a total of seven family physicians in various locations across Canada. The goals of FPRAC were to: (1) keep me appraised of issues relevant to family physicians in Canada, and specifically issues related to public health crises and crisis/emergency risk communication information; (2) develop and maintain a positive symbiotic working and research relationship between myself and the community/network of family physicians in Canada; (3) provide ongoing feedback and suggestions regarding the research being conducted and its relevance to family physicians in Canada; (4) assess, via pre-testing of the semi-structured individual interview guide, the appropriateness of the interview guide and questions of the researcher; and (5) collaborate with

me in the facilitation of the dissemination and knowledge translation of the study results and considerations.

Individual semi-structured interviews were used to directly generate data for the study. Members of the Family Physician Research Advisory Committee (FPRAC) identified colleagues or co-workers who were willing to participate in this research project. Additional recruitment was done through snowball sampling, via colleagues or acquaintances of members of FPRAC, and by members of my supervisory committee through established personal and professional relationships. In total, I conducted individual semi-structured interviews with sixteen family physicians from different practice locations across Canada, from June 2014 – March 2015. Six physicians had practice locations in Ontario (three in Kingston, two in Toronto and one in Ottawa); two physicians had practice locations in Nova Scotia (both in the Halifax area); one physician practiced in Winnipeg, Manitoba; five physicians had practice locations in Alberta (two in the Edmonton area and three in the Calgary area); one physician practiced in British Columbia (Vancouver); and one physician practiced in the North West Territories (Yellowknife). Ten of the 16 participants were female. One of the participants was retired from practicing medicine, and the remaining participants practiced in various clinical settings: general family medicine, care of the elderly, infectious disease specialization, academic appointment(s), and hospitalists, or a combination of these.

Inclusion criteria were that participants must (at time of interview): be either a currently practicing family medicine physician or retired family medicine physician; have experienced a public health crisis during their time as a practicing family medicine physician or family medicine resident, which either directly or indirectly impacted their practice; and be individuals who had enough time to devote 30-60 minutes for a one-on-one interview with the researcher.

Potential participants were excluded if they were not family physicians (e.g., an emergency physician or psychiatrist), or if they were a current family medicine resident (i.e., they had not yet obtained certification and registration as a practicing family physician at the time of the interview).

Interviews lasted no more than 45 minutes, and most were approximately 30 minutes in length. Interviews were held either face-to face whenever possible or via Skype video conferencing, and were audio-recorded upon consent for transcription purposes. I developed a semi-structured interview guide in collaboration with a member of my supervisory committee with extensive experience in conducting interviews and focus groups. Questions explored the experiences that participants had with a public health crisis or crises, and each participant was asked what recommendations they might propose for the improvement of risk communication strategies from public health agencies and professional organizations in the event of a future similar public health crisis. The interview guide, and all other related study materials were approved by the Health Research Ethics Board at the University of Alberta.

5.3.2 Data Analysis

Interviews were transcribed verbatim, and responses to the question "What recommendations do you have for public health agencies and professional organizations in the event of a future public health crisis?" were analyzed using a manifest qualitative content analysis method (Krippendorff, K., 2013) via a stepwise procedure (Andersson, E., et al, 2016). I conducted each interview and following each interview, every transcript was transcribed by myself, and then read and re-read to identify common and contrasting themes regarding recommendations from family physicians and potential considerations for public health agencies

and professional organizations. Several steps were taken to ensure the trustworthiness of this qualitative research pertaining to confirmability, credibility and transferability (Shenton, A. K., 2004). Confirmability was ensured by meeting on a regular basis with my PhD supervisor, a senior researcher, who has extensive experience in qualitative research methods and with content analysis, to discuss the content analysis process and emergent themes. To ensure credibility, I composed a summary of advices made by each participant, which was sent via email to each participant in March 2016 to ensure that I correctly understood and interpreted physicians' recommendations. Participant responses to these emails confirmed my understandings and interpretations, which were synthesized into seven unique themes. Transferability of the results was enhanced by inclusion of family physicians with different practice locations, years in practice, and experiences with public health crises (e.g. some had experience with communicable disease outbreaks such as SARS or H1N1, while other participants had experience with climate-related public health crises such as a hurricane or severe flooding in their practice community). Within the results description I have attempted to display the different experiences and their related recommendations in their heterogeneity (Bertschey et al, 2015).

5.4 Results

All participants had recommendations to and/or considerations for public health agencies and professional organizations on how to improve risk communication strategies in the event of a future public health crisis or emergency risk event, indicating that certainly there is room for improvement in this arena. Recommendations came from a wide variety of public health crisis experiences. Crises included environmental or climate-related events: forest fires in the Northwest Territories resulting in thick smoke causing breathing issues for patients; Hurricane

Juan wreaking havoc on the city of Halifax in 2004; widespread flooding in Alberta in 2013. Other experiences of public health crises such as the SARS outbreak in 2003, the H1N1 pandemic influenza outbreak in 2009 or the Ebola outbreak in West Africa were discussed. Regardless of the type of crisis (e.g. communicable disease outbreak or environmental emergency), participants had specific recommendations for more effective communication on public health crises in the event of a future such event. These recommendations are detailed in the form of considerations below.

5.4.1 Single trusted source of information

Participants clearly identified that a single, trustworthy source of information would improve risk communication in the event of a future public health crisis. Important information during such events as the H1N1 pandemic influenza outbreak in 2009/2010 was rapidly changing and family physicians noted frustration in the receipt of information from several different sources. Family physicians need accurate up-to-date information in the event of a public health crisis so that they may address and inform their patient populations appropriately.

> *The most frustrating part looking back was that information was coming uncoordinated from numerous different agencies. It's important for these agencies to collaborate and to work together so that there's one stream of information instead of ten different streams that you have to sort through. I think that the public health officer, the chief public health officer in Canada and through the network of public health medical officers, is probably in Canada, the best way to do it.* Participant 1, Kingston, Ontario

In addition to having a single trusted source of information, such as the Chief Medical Officer of Health or other trusted public figure head, it was suggested that the information coming from public health agencies to family physicians "on the ground" be sequenced and organized in a way that makes sense for the practicing physician.

> *If possible, one single message should be communicated. Second, layer the information as it's coming so that there would be one page, in bullet-form, the critical things for protecting your patients, your staff, and the general public.* Participant 3, Kingston Ontario

5.4.2 Timely and succinct communication

Participants universally emphasized the importance of timely and succinct communication from public health agencies and professional organizations. Email is a quick and resource-friendly method of disseminating information to many people in a short amount of time, so it's not surprising that family physicians recommend sending updates regarding crisis information in this fashion. Information from public health authorities should be synthesized, summarized and sent to physicians in bullet form with the main points or updates clearly highlighted. In a busy family practice, there is rarely time to review lengthy documents or research papers and during a public health crisis this time is likely to be diminished even further. Participants hinted that although information may be available to them, it's preferable to have details and facts sent directly to physicians themselves, rather than have to search or scan through various sources to find the most recent updates.

> *Practical on the ground recommendations are what I'd be seeking. Any recommendations that come forward need to be grounded in what's realistic and practical. Speaking as a family physician, having some resources that are appropriate to a family practice setting: it needs to be grounded in realism. We've gone from no communication to too much and we need to try and find the balance there.* Participant 7, Halifax NS

> *I want short and sweet relevant emails sent in a timely fashion. So if you don't have email communication with the physician, then send it by fax. But don't send a 15-page fax, don't send a 15-page email. Send me a flow sheet; send me something that's straightforward. Send me some kind of chart; send me some sort of quick synopsis of what I need to do. I don't mind having a link to something longer and more detailed if I want to read it. Send me an email directly; don't just assume I'm going to go look it up myself. And then keep it short and sweet.* Participant 8, Halifax N.S.

> *You need to have good email communication, but the emails need to be skillfully crafted by someone who knows something about communication because I'm not going to read even four paragraphs: I want bullet points, I want to see highlights. Anyone who is a clinician who spends five minutes per patient and who has to come up with a plan in five minutes doesn't have time to read that.* Participant 15, Yellowknife NWT

Early communication with family physicians was emphasized by participants to be an important aspect of good risk communication. Considering that family physicians are both recipients of risk information and communicators of that information to their patient populations, it is imperative that as a group they are informed with the facts and updates regarding the crisis as soon as possible, even if those updates are only to confirm what is still unknown about the risk(s). Participants would like to see public health agencies and professional organizations collaborating and engaging with mainstream media (e.g. television news, newspapers, radio) in order to have factual and timely risk communication to both family physicians and the public.

> *Don't let all the rumors go around, don't let people get panicked. Communicate with us as soon as possible and create those guidelines soon. We need to have guidelines to be able to help our patients and also to be informed about all the news, and preventative measures available. Media is very important, because many people only buy newspapers, or are informed by what they watch on TV. Early communication; being honest about statistics, about cases that are critical; what exactly we should look for, and how to triage the patients the best way possible. So that family physicians as the first line don't overload the emergency rooms.* Participant 10, Edmonton AB

5.4.3 Considering the learners (medical students/residents)

Several participants detailed their experiences as a family medicine resident or medical student during a public health crisis. These experiences allowed participants the opportunity to reflect on considerations pertaining specifically to learners. Other participants suggested advice from the perspective of a teacher or preceptor, to ensure that learners are included in appropriate

risk communication strategies from public health agencies and professional organizations. These participants thought that it was imperative to consider the medical students and residents' perspectives during a public health crisis, and to bear in mind that this group might have different communication considerations.

> *I was a resident when SARS was around…but during SARS it was more like, you're in "resident mode;" you just do what you're told. At that point I wasn't gathering the information myself I was just doing whatever they told me to do.* Participant 8, Halifax N.S.

> *We responded in the education side from the learner's perspective about what a preceptor can do to help their learner at the time of a disaster, because everyone forgets about the learners. Even on a smaller level if you have a code where a child dies, in a car accident or something, everyone forgets about the students all the time.* Participant 11, Calgary AB

> *Ensure that your learners are safe, because if they're not "necessary" then they should be treated as full front-line workers, even though they're not actually on staff.* Participant 16, Vancouver B.C.

5.4.4 Ensuring access to information for physicians (email or other)

Although participants overwhelmingly referenced email as being the best method with which to communicate to family physicians during a crisis, some participants also outlined other methods, from the more traditional vehicles to transmit information (e.g. fax machine; documents mailed via post to physician clinics), to recent social media information outlets such as Twitter and Facebook. Different methods of accessing information seemed to be related to the participant's years of practice; for example more recent graduates tended to prefer social media as a method for information access, compared to physicians in practice for many years who preferred the more "traditional" methods like faxes and emails.

> *They could be more aggressive about getting emails out to people. I went for so long without knowing that I could sign up for certain email lists to be kept up to date with the*

best information. It would be nice if they had a list, like "these are the essential things that you should subscribe to, to be on top of things. Every doctor in Canada should probably be getting these emails." There's so much stuff out there, you don't want to get a million emails every day and you're not going to read them all. Participant 2, Ottawa Ontario

As a locum I would get some information, but because you're a locum you don't necessarily have a registered practice address so there would be some stuff I wouldn't get. Use multiple mailing lists or all the different organizations' lists to make sure that everyone's captured. Thinking of different types of practice models, not everybody's going to have one primary practice address. Participant 4, Kingston Ontario

Email alerts are the best way to communicate to family physicians. It comes in and within minutes I'll know what I need to know; and if I need more information, I'll know where to look for it. In this day and age, with instant communication, that's really helpful. Government agencies should also be more active in Twitter for communicating really urgent information because there's a whole generation of health professionals who are more into Twitter than email; they rely on social media. Public health needs to keep up with this. You can't transmit a lot of information on Twitter, but at least you can say "we posted guidelines, you can check them out here." And then have their website where it's accessible. The key is communicating the information. Participant 6, Toronto Ontario

I never check my work email from home, but social media on the other hand, it's so ubiquitous now. I find out from Facebook faster than anything else! I'm a member of a Facebook group, the "First Five Years of Practice", and they're really quick with things. Newer grads, it's more the way we're communicating now. Apps would also be good. I would much rather have a person come and talk to me, but I know that's not feasible in a lot of these situations. If there's a meeting and somebody was talking, at least you know you had the opportunity to ask questions, that would be helpful. Same idea with social media: if there was a group where you could kind of respond and clarify that would be good, so it's not one-sided and didactic. Participant 12, Winnipeg MB

5.4.5 Improving public health & family medicine collaboration

Participants would like to see an improvement and increase in collaboration between public health agencies and other government or professional organizations, and family physicians that are working as part of the first line of defense in a public health crisis. It is important for good risk communication regarding public health crises that the people transmitting the information acknowledge their consideration and concern for knowledge-users

(e.g. family physicians). A sense that public health personnel were creating communication documents in isolation of those who actually use those documents was detailed.

> *It would be helpful that there be some expression or an awareness that public health is doing this from on high, but that they're concerned and interested in physicians on the ground. Just as the GP's have to take their head and lift it up beyond that one-on-one patient interaction and that immediate family, and think more about public health. We're getting all these conflicting messages from on high, from people in very protected situations, that aren't actually doing the leg work. To know that these very gifted smart public health people have actually taken that into account as part of the dimension of good communication with family physicians is important. "We're on your side; we're doing this to be helpful, we thought hard about this, this is the best we know at this point." Because when recommendations are changing quickly, if the initial ones aren't given with humility, it undermines the confidence that people have in public health.* Participant 3, Kingston Ontario

> *It lends credibility if you have a practicing physician to be one of the information-givers as well. Because public health, right or wrong, has this reputation of people that pop out of the box whenever these crises occur and then they disappear again and we don't know anything about them. And a lot of them quite frankly are not great communicators. They pop out when there's a crisis and then they go back down and we don't know who they are as individuals. Referencing things from the past gives you a sense that people are planning on it, frequent communications but have somebody that's actually on the front line to be able to speak as well. One of the things that happens is that people believe that the public health is an arm of the government, so they're there to manage us rather than help us. And so if you can say, "this happened, here's what we did, here's the result" it will show that there is accountability.* Participant 11, Calgary AB

Several participants also mentioned the public health responsibilities that are inherent to the practice of family medicine. Professional responsibilities such as ensuring that physicians are on appropriate email lists, or that public health agencies have their accurate and updated contact information, were referenced.

> *My biggest wish is for every family physician to actually understand their public health obligations. If we are truly family and community, it's not this dyad between the patient and the doctor. This idea of getting family physicians to look one level up, public health to look one level down, because now the locus of where care ought to be delivered in the 21st century is in that intersection.* Participant 5, Toronto Ontario

> *If it's public health's domain, then public health takes care of it and we have to ensure that public health has our contact information for us to be able to get that information. Or if they don't then we have to seek that out. That's our professional responsibility.* Participant 7, Halifax NS

5.4.6 Information for patients – Helpful

Many participants mentioned that having information about the crisis at hand to give to patients would be very "helpful." That term specifically, "helpful," was used almost universally to reference information for patients such as pamphlets or handouts. During a public health crisis a family physician has even less time than during a non-crisis period to spend with patients, and so having up to date and accurate information to direct patients towards was emphasized as an important aspect of good risk communication for this group. Practical information relating to disease processes, or where to get more information as a patient, was desired.

> *It's always nice to have handouts to give to patients. I do this when I go to the doctor too, you try to process the information but you just hear it once and you leave and you forget half of it, so I like to try to give people something to read later to go over. And sometimes it can prompt questions that they might have, so that's helpful.* Participant 2, Ottawa Ontario

> *We often get the bulletins directed towards us, as physicians, and certainly for other conditions we're given handouts so we can give to patients, but in H1N1 it would have been helpful to have something to give out to people and leave in the waiting room, like "the doctor doesn't think you have H1N1 and here's more information about it," or "here's what you can do to prevent the spread of it." Having available handouts or websites you can print handouts from, or things that can fit into your EMR that you can just click on to print handouts for people, would be very helpful.* Participant 4, Kingston Ontario

> *For some physicians hard copy mail outs are still helpful. It is helpful to have information that you can implement in your clinic or handouts and pamphlets that you can give patients. The other thing that is exceptionally helpful is if there's a public health advertising campaign in the local media. If organizations like the College of Family Physicians or the Public Health Agency of Canada or provincial health services, if they put*

an ad on TV saying "if you have these symptoms it's probably influenza, stay home!" Participant 13, Calgary AB

Handouts and written things to give my patients are always helpful. We don't have enough standardized good, hard copy information sheets for people and that's how patients remember things. They're not going to remember 40-50% of what we tell them so there needs to be something they can take home as well. And also skillfully crafted so they want to read it. Participant 15, Yellowknife NWT

5.4.7 Infrastructure / simulations in place pre-crisis

An overarching theme in participants' suggestions was that appropriate information dissemination infrastructure be in place pre-crisis, and that such infrastructure be tested on a regular basis using simulations or other tests. Drawing parallels to other industries and related crises such as the financial industry and the financial crisis of 2008 (Encyclopaedia Brittanica, 2008), physicians recommended that public health agencies and health care organizations need to run simulations and stress tests in order to improve communication and population health outcomes during future public health crises or emergency risk events.

We should actually go through all of the recommendations from the SARS reports, and rather than just doing a tick box exercise, "we've done that", do something like they've done with the banks in the aftermath of the financial crisis: run simulations and stress tests. It's one thing to say "we fixed it" but then you wait until the actual event occurs and you're going to be de-bugging systems, whereas if we did more simulations we would know whether things work or not. Participant 5, Toronto Ontario

The key is to not wait until these events happen, but to have the infrastructure in place ahead of time; set up these communication mechanisms beforehand. I wonder if they should consider, every few months sending a test email out just to see; like an evaluation component or just to see which email addresses become non-active over a 6 or 12 month period. Participant 6, Toronto Ontario

In some of the communications we received they referenced SARS and say, "Because of SARS we've done this, because of this event in the past we've put this in place" and I think that helps the people on the ground. The fact that public health is not just responding at the spur of the moment; but that some thought has gone into this in the past. It's grounded in

past experience, and people need to realize that. It's about engaging the practices and the clinics BEFORE these things occur. It's similar to when I was in a clinic with 10 or 12 full-time docs, we would have regular fire drills. We'd have regular code practices. We should have also decided, "Ok if there is a public health crisis, who do we call or what do we do?" We never considered that. Participant 11, Calgary AB

Run simulations. You have to practice this stuff. You can't send a memo and say, "do these 13 steps." It will not work. Participant 14, Calgary AB

5.5 Discussion

The results from this research suggest that Canadian family physicians have a wide variety of practical solutions, suggestions and considerations on how to improve risk communication in the event of a future public health crisis. Family physicians have incredibly varied practices across the country, and consequently varied experiences and proposals relating to public health crises and their related risk communication processes. Suggestions on how to improve risk communication during a public health crisis to this group were detailed by participants.

Previous research (Hogg, W., et al, 2006; Jaakkimainen, R. L., et al, 2014; Kort, R., Stuart, A. J., & Bontovics, E., 2005; Masotti, P., et al, 2013; Wong, W. C., et al, 2007; Wynn A., & Moore, K. M., 2012) pertaining specifically to crisis and emergency risk communication to family physicians in Canada focuses only on communicable or infectious disease outbreaks or similar public health crises, such as SARS or H1N1. My research results go beyond this idea of a public health crisis as solely a communicable disease outbreak, to include environmental or climate-related crises like forest fires or floods, and their related risk communication processes. Like Jaakkimainen, R. L., et al (2014), my results confirm that public health crises are a personal concern for family physicians in Canada and may have considerable effects on their clinical practice. Family physicians in my study also echoed these papers outlining that as a group, they

tend to receive communication regarding public health crises via multiple sources, including postal mail, faxes and electronic mail (e-mail).

Participants recommended that in the event of a future public health crisis, a single source of trustworthy information is desired. That information should also be timely, succinct and feasible for family physicians working "on the ground" during a public health crisis to integrate into their daily practice, e.g. having a bullet-point update provided by the Public Health Agency of Canada and sent to their email. Alternatively, social media such as Twitter or Facebook may be used as an additional method of translating risk information to family physicians and especially to newer medical practitioners during a public health crisis or emergency risk event. Information for family physicians to give to their patients regarding the crisis at hand, in the form of hard-copy handouts or pamphlets was consistently desired and would be considered to be helpful.

It is essential to set up effective partnerships and communications between primary care and public health services to support family physicians' capacity to respond to emergencies (Hogg, W., et al, 2006). All sectors of the health care system must be included in pandemic planning and communications at the outset, including family physicians, and mechanisms must be established for communication and information exchange among practitioners, committees and working groups / government (Kort, R., Stuart, A. J., & Bontovics, E., 2005). Family physicians in my study recommended that public health and family medicine collaboration be increased, in order to acknowledge a consideration and respect for practitioners working on the front lines during such events. Similarly, my participants noted that appropriate information dissemination infrastructure should be in place pre-crisis, and that such infrastructure be tested on a regular basis using simulations or other tests.

Family physicians in my study recommended that public health agencies and professional organizations should consider the information needs of the learners, e.g. family medicine residents and medical students, as this is a unique group with unique information requirements. These results suggest that further research on appropriate risk communication strategies regarding public health crises to this group of knowledge-users is warranted.

Such recommendations from practitioners "on the ground" who have experienced a public health crisis, are important for public health agencies and professional organizations to consider. If these insights are considered or indeed adopted by public health and government authorities, the risk communication of public health crisis information to family physicians might be greatly improved, thus resulting in a more informed and prepared population of primary care practitioners. Informed and prepared family physicians will mitigate the impact that future public health crises may have on population and public health.

5.6 Limitations

My findings are based on a convenience sample of sixteen family physicians in Canada; therefore, there remains a question as to whether the results reflect a selection bias in participant characteristics (e.g., these results may not reflect the advices of family physicians in the provinces of Quebec or Newfoundland; or those practitioners in remote or isolated communities). However, from the outset of this research it was not my intent to provide sweeping recommendations based on a large quantitative survey of family physicians in Canada, but rather to provide detailed qualitative considerations from family physicians, who have experienced a public health crisis while in practice, on how to potentially improve risk communication during a crisis or emergency risk event.

Qualitative analysis such as this research is inherently subjective because "the researcher is the instrument for analysis" (Starks, H., & Trinidad, S. B., 2007). I have experience as a public health nurse in infectious disease prevention, and also as a nurse consultant at a provincial government agency in vaccine preventable diseases, and therefore I may have approached this study with an inherent view of how to improve risk communication strategies in the event of a public health crisis. However, there was an active attempt to "bracket" or restrain from my own experiences or views when conducting the interviews and the analysis. While additional credibility may have been achieved through co-coding and thematic analysis by another researcher, I felt that sufficient credibility was achieved through sending participants "member-checks," a summary of recommendations or considerations and correlating themes, and having them confirm the understanding and interpretation(s) by the researcher.

5.7 Conclusion

This research provides thoughtful and varied considerations and advice from practicing family physicians on how to improve risk communication from public health agencies and professional organizations to this group in the event of a public health crisis. Participants recommended that a single, trustworthy source of information is desirable and that information coming from that source be timely, accurate and succinct. Electronic communication methods such as email are the best way to ensure access to risk information for family physicians. Accessible and helpful patient information, such as pamphlets or handouts is desired. Communicators of risk information should consider specific populations such as residents and medical students. Public health and family medicine must improve collaboration and have

infrastructure in place pre-crisis in order to improve risk communication to family physicians during such events.

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6.0 CHAPTER SIX– COMMENTARY PAPER

6.1 Preface

During interviews with sixteen family physicians across Canada, family physicians were asked to define what a "public health crisis" is to them. Of particular interest was that their definitions included a wide variety of crises (from flooding and forest fires to infectious disease outbreaks like SARS and H1N1) that seemed to transcend the traditional understanding of 'public health crisis.' This paper was composed utilizing a modified mixture of both phenomenological and qualitative content analysis methods; however, the focus for this chapter was much more narrow than either the phenomenological analysis, or the qualitative content analysis (i.e., in this analysis, I focused on climate-related public health crises that were experienced by participants). The following chapter has been published online on CMAJ blogs in April 2016; a version of this paper was the basis for an oral presentation at the Canadian Public Health Association in June 2016. Recent events such as the Fort McMurray wildfire (May/June 2016) likely reinforced the media interest in this research, and at the time of publication (September 2016) I have responded to interviews from two national news outlets. The "tone" of this paper is a commentary, which was chosen so as to directly communicate an aspect of this research to the knowledge user community of family physicians in Canada.

6.2 The Evolving Face of Public Health Crises in Canada; Are We Ready?

Autumn 2003: Hurricane Juan claims eight lives, destroys countless buildings and residences causing power outages across the Maritimes and is recorded as the most damaging storm in Halifax's modern history (The Weather Network, 2013). June 2013: southern Alberta is pummeled by torrential rains, combined with melting ice that causes rivers to overflow their

banks; paralyzing communities and resulting in the loss of four lives and an estimated $6 billion in damages. Hospitals are forced to close, physicians can't get into their offices due washed out roads - including portions of the Trans-Canada Highway (Environment Canada, 2013). Summer 2014: the "worst fire season in decades" sees more than 130 wildfires burning in the Northwest Territories blanketing massive geographical areas in thick smoke, resulting in twice as many individuals being treated by physicians for severe asthma attacks and other serious respiratory issues (CBC, 2014).

Flooding, wildfires, and hurricanes: the coming of the apocalypse? Not quite; but these events do share a commonality: they have all been referred to as a "public health crisis" by Canadian family physicians – a reflection of the evolving face of such crises. With infectious diseases remaining an enormous threat to population health globally (Heesterbeek, H., et al, 2015) and pandemics such as SARS, H1N1, and the Ebola outbreak in West Africa making global news headlines (Ebola Response Team WHO, 2014), public health crises are on the forefront of government and healthcare agendas (Heesterbeek, H., et al, 2015). The World Health Organization defines a public health emergency as "an occurrence or imminent threat of an illness or health condition, caused by bio-terrorism, epidemic or pandemic disease, or (a) novel and highly fatal infectious agent or biological toxin, that poses a substantial risk of a significant number of human facilities or incidents or permanent or long-term disability" (WHO, 2015). However, in recent interviews with Canadian family physicians, many are using a much broader definition. When asked to define a "public health crisis" their responses focused on a central theme: an event that has the potential to negatively impact the health of, or increase public health risks to many people at once – sometimes with devastating consequences. Although physicians

cited the usual suspects (SARS, H1N1, Ebola), adverse climate events were also discussed as significant events impacting physicians' lives and practices.

A physician in Halifax detailed their experience during Hurricane Juan: *I left to go to my clinic, despite trees having been collapsed everywhere and roads flooded... I climbed my way into the hospital... All around me the roof had blown off some of the hospital, and so we were trying to move patients but there was no ability to call out to physicians in the area, 'we need you, we need help.'* An Alberta doctor outlined their experience in 2013's floods: *The hospital, clinics, everybody's houses were flooded and closed so they couldn't get to them; even when the waters receded after a week or two, there was so much damage to the clinics and the hospitals that you couldn't reopen and work.* Finally, a physician practicing in the N.W.T. spoke of their experience with wildfires: *Last summer we had an incredibly big forest fire season, and it was a horrible summer from the standpoint of anyone with respiratory diseases. That was a big concern for me, a crisis.*

Redefining a public health crisis to include climate-related events has enormous implications for practice, planning, resource allocation and policies in Canada. With such environmental crises becoming more commonplace (PHAC, 2015) and impacting the health and well-being of many people in a short amount of time, concerning questions arise: who is addressing these crises? Is the government prepared to deal with such a breadth of possible emergencies that have the potential to decimate the healthcare system? How does family medicine practice in Canada fit into the evolving face of public health emergencies?

Some doctors expressed the view that we need not "re-invent the wheel" when responding to public health crises. Whether those calamities are caused by a particularly virulent strain of antibiotic-resistant *C. Difficile*; a novel respiratory virus; or by Mother Nature, every

crisis must be dealt with by engaging in a multi-pronged approach and utilizing current infrastructure. A paper published by the College of Family Physicians of Canada in 2005 details recommendations for the integration of family physicians and public health authorities/ government during public health crises; yet in these recommendations the authors reference primarily infectious disease outbreaks or pandemics, "family doctors should be educated in the science and clinical aspects of potential public health emergencies, e.g. infection control during an influenza pandemic" (College of Family Physicians of Canada, 2005), the so-called "typical" public health emergencies. Ten years on, organizations need to start thinking outside the box when it comes to these situations, and update existing recommendations to address a wider variety of public health crisis.

Recently the federal government detailed a $12M investment for natural disaster and public health emergency response, involving four specific projects to mitigate the impact of natural disasters and tackle public health emergencies (Government of Canada, 2015). This is a good start – but more needs to be done (Watts, N., et al, 2015). Instead of merely reacting to a crisis when it occurs, public health authorities and governments need to be proactive: upgrade existing emergency programs and conduct real-time exercises to enhance preparedness for anticipated public health crises related to climate change (Colbourn et al, 2015). The Canadian government must work with physicians to develop electronic applications to track relevant and concurrent crises in real-time; enable electronic medical records to update for current air quality reports and climate events; implement immediate emergency notification systems detailing the same information from a single trusted source; and allow for such tools to be readily available to all family physicians. If such changes are not made at the systemic level to recognize the evolving face of public health crises, the consequences could be catastrophic, resulting in lives

lost and costly damages to property and infrastructure, as exemplified by the flooding, hurricane and forest fires detailed above. Canada's government must decide how to allocate and utilize current resources, in addition to generating novel practical resources to assist physicians in dealing with the changing face of public health crises.

6.3 Chapter Six References

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7.0 CHAPTER SEVEN – SUMMARY, CONSIDERATIONS & CONCLUSION

7.1 Summary

Public health crises such as a communicable disease outbreak or a devastating natural disaster are highly complex events that require integration from many different sectors such as government organizations, public health agencies, health professional organizations and health service providers to mitigate. In Canada, family physicians are the main providers of primary medical care, and in the event of a public health crisis are therefore integral to the timely delivery of critical medical services. As a vital component of the front line defense during a public health crisis, it is important that family physicians have access to appropriate, timely and adequate risk information and knowledge during times of public health crisis or emergency risk events in order to maintain the trust relationships with their patient populations and ultimately to improve their patients' health. However, our knowledge and understanding of the risk communication needs of family physicians is limited, particularly in a Canadian context. The aim of this research was to explore how public health crises and the related risk communication processes surrounding such events are experienced by family physicians in Canada, utilizing a phenomenological approach. I also sought to offer insights from family physicians on how public health agencies and professional organizations might improve risk communication to this community in the event of a future public health crisis. The secondary aim of this research was to determine the current understanding and knowledge gaps about this phenomenon as can be gleaned from the literature.

I conducted a scoping review to explore the current state of published literature relating to public health crisis and emergency risk communication to family physicians, with a specific focus on family physicians in Canada. This revealed a paucity of information, particularly in a

Canadian context, and a general lack of detailed, contextual understanding on this topic. I interviewed 16 family physicians from different practice locations across Canada, exploring their experiences during such crises, and exploring the risk communication processes relating to these events. Each interview revealed both unique and shared experiences, and the phenomenological analysis of this experiential data exposed aspects of what it might be like to live through a public health crisis as a family physician in Canada. Finally, I used a qualitative content analysis method to analyze participant responses on recommendations regarding how to improve risk communications from public health agencies and professional organizations in the event of a future public health crisis.

The definition of a "public health crisis" as defined by family physicians in Canada is evolving to include not only the "typical" crises caused by a disease process like communicable disease outbreaks; but also adverse climate events like hurricanes, forest fires, and major floods. Public health crises are a personal concern for Canadian general practitioners and have considerable effects on their clinical practice. Family physicians in Canada tend to receive communication regarding public health crises via multiple sources, including postal mail, faxes and email. More recently, physicians receive risk event information via social media outlets as well (e.g. Twitter, Facebook). Family physicians are willing to address public health crises in their practices, and have certainly experienced several such events (e.g. SARS, H1N1) in recent years. Risk communication to family physicians from public health agencies and professional organizations has proven to be lacking in certain areas; participants had many practical and varied considerations on how to improve such communications in the event of a future public health crisis. A family physician living through a public health crisis may feel unprepared or like an outsider; may experience of poor communication; may be concerned about their own family

and have an increased concern for patients; may feel physically unable to provide care; or experience of a sense of chaos, helplessness, isolation, vulnerability and stress. Perhaps knowing what it may be like to experience a public health crisis as a family physician, to actually read what it is like for these individuals to live through such events, might encourage public health agencies and professional organizations to approach the planning for these crises with novel and / or different supports to help mitigate some of these stressful and negative experiences, ultimately resulting in improved medical practice and ultimately improved patient care. The provision of considerations for improving risk communication to family physicians during these events will also greatly facilitate these agencies and organizations in their efforts to provide effective support and assistance during crisis situations.

7.2 Limitations

Family physicians are a difficult participant group to interview, for no other reason than their seemingly perpetually busy schedules. Although I had anticipated barriers to participation at the beginning of my study (including time to actually complete the interviews and potential income lost for not practicing during the interview time), this was the primary barrier that required mitigation. Given the small sample size (16), and the purposive and snowball sampling method that I used to recruit family physician participants, the findings from my study may not be generalizable to *all* family physicians in Canada. However, 16 participants may be considered to be a large number of interviewees for a phenomenological exploration and a qualitative content analysis, and generalizable or sweeping recommendations were never my intent to obtain from this research. The formation of the Family Physician Research Advisory Committee (FPRAC) assisted in mitigating this limitation, by assisting in the recruitment of potential participants and

pre-testing the study interview guide questions to ensure their relevance to family physicians outside of my participants.

I conducted some of the interviews in-person, and some were conducted via video-messaging (Skype). Due to budget constraints, I was unable to travel to and interview every participant in-person. There is a possibility that some participants may have revealed more information about their experiences (or less) depending on the medium in which the interview took place. However, I made every attempt to conduct the interviews in a consistent manner, and to ensure that the interviewees were comfortable with the format of the interview, either in-person or via Skype.

7.3 Considerations

As a practical outcome of this research, I offer some potential advice or considerations for public health agencies (e.g. the Public Health Agency of Canada) and professional organizations (e.g. The College of Family Physicians of Canada) based on my results:

- Public health crises should consider including an all-hazards approach / definition to include not only communicable diseases (e.g. SARS, H1N1, Ebola) but also climate-related crises, such as was seen with hurricane Juan in 2003, major flooding in Alberta 2013, forest fires in NWT in 2014 and the Fort McMurray wildfire in 2016.

- Public health organizations and agencies should make every effort to prepare as much as possible for a crisis by having strategies, infrastructure and simulations in place pre-crisis (e.g. conducting real-time exercises with family physicians to enhance preparedness;

developing electronic applications to track relevant and concurrent crises in real-time; enable electronic medical records to update for current air quality reports and climate events; implement immediate emergency notification systems detailing the same information from a single trusted source; and allow for such tools to be readily available to all family physicians).

- Effective two-way risk communication between public health agencies and primary care agencies and personnel is important to integrate into public health crisis and emergency management plans. E-learning modules or workshops on effective risk communication should be considered for individuals in leadership roles at public health agencies and government organizations that are responsible for information dissemination during a public health crisis.

- Whenever possible, all sectors of the health care system (including family physicians) should be included in public health crisis planning and communications at the outset, and mechanisms must be established for ongoing communication and information exchange among practitioners, committees and working groups / government. This could include the creation of forums for discussion and communication and interaction between governments / public health agencies / professional organizations and practicing family physicians to have their voices heard and respected, and their experiences integrated into future planning for such events. A way to realize this might be to invite a family physician from each primary care network, or community, to act as the primary care

spokesperson; to be the “voice” of family physicians at the table with public health agencies and other organizations when planning for public health crises.

- Ideally, planning for public health crises should be more comprehensive and operationalized at all levels, including primary care. Local / provincial / national communication strategies should be well-coordinated, so that contradictory messages from different sources are eliminated and information is consistent.

- Successful local or regional communication models already in place might be used to inform future national and population-based approaches to public health crisis risk communication strategies and disease control.

- Ideally, family physicians might benefit from the receipt of timely and succinct communication during a public health crisis, from a distinct, principal trusted source of information, e.g., the Chief Medical Officer of Health. This individual or source (e.g. the Public Health Agency of Canada) should be recognized, trusted by and transparent to family physicians in Canada.

- Careful consideration should be given for learners during a public health crisis (e.g. medical students, family medicine residents, other trainees) so that they are kept appropriately appraised of new information and are protected when a public health crisis occurs. This should include special regard for medical school training or family medicine residency programs that specifically address public health crises.

- A comprehensive database of email addresses, phone numbers, fax numbers, mailing addresses and social media accounts (if applicable) should be assembled for all family physicians and family medicine residents and medical students – either provincially or nationally, perhaps organized by a national organization like the Canadian Medical Association – and tested for accuracy on a quarterly-annual basis to ensure access to updated information for all physicians.

- The relationship between public health and family physicians could be ameliorated by acknowledging the roles of each group during a public health crisis, increasing transparency and allowing for interdisciplinary information-sharing and collaboration.

- Relevant, accurate and timely information for patients (such as pamphlets, handouts, websites or downloadable electronic applications), provided from a trusted national public health organization or agency during a public health crisis, might be very helpful for family physicians during such events.

- The actual lived-through experiences of family physicians during a public health crisis should be considered (e.g. uncertainty, confusion, stress, chaos) when deciding on ways to improve the risk communication processes surrounding such events. Promoting positive experiences should be regarded as a top priority for policy-makers and public health and professional agencies in order to improve the practice of family medicine and public health during these crises.

7.4 Conclusion

The findings from my research add to the ongoing discourse regarding public health crises and the integration of primary care training, research and practice. Given the lack of qualitative research and specifically the lack of phenomenological exploration into how family physicians in Canada actually experience or live through a public health crisis, and the related risk communication processes surrounding such crises, my findings highlight the importance of addressing this population as a risk communication audience while emphasizing the many varied experiences that a family physician may have during such an event. This research offers important insights into and considerations for public health agencies and professional organizations on how to improve risk communication to family physicians in Canada during a public health crisis. It is also my hope that by illuminating the experiences of individual family physicians during such risk events, their stories might be shared with a larger audience in an effort to reveal more about this phenomenon than "meets the eye."

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APPENDICES

Appendix 1: FPRAC Invitation Email

Re: Family Physician Research Advisory Committee (FPRAC) – First communication
April 16, 2014

Dear FPRAC member,

First of all, I want to thank-you whole-heartedly for agreeing to participate on FPRAC. The title of this research project is "Crisis and Emergency Risk Communication to Family Physicians in Canada," and as a family physician (either resident or practicing), each of you have specific experiences and unique ideas about family medicine in Canada that you bring to the table. I am so happy and excited to have you as an integrated and engaged part of this research.

Secondly, I want to give a bit more of a clarification on what being a member of FPRAC entails:

- Membership on FPRAC will not take up more than 10-30 minutes of your time, each month, from now until Dec. 2014.
- The main component ("meat and potatoes") of this research will be individual interviews conducted with 20-30 family physicians from across Canada, using Phenomenology (i.e., trying to illuminate the shared and unique experiences of GP's relating to public health crises or emergencies). This is ***NOT*** the job of FPRAC. So***, I will not be interviewing you about your experiences.*** Instead, ***I want to get your feedback*** on the interview guide (ie. If you think there's anything I should add, modify, etc.) before I conduct these interviews.
- Another aspect of FPRAC which is integral to this research is ***your connections***: as you likely know, conducting research with family physicians is difficult because as a community, you are all VERY busy! A fact which I can completely appreciate. I also know that according to the literature, the surest way that a family physician will partake in research is if his/her trusted colleague or friend suggests that research project to him/her. If you have any colleagues that you think might be interested in participating (i.e., being interviewed either on Skype or in-person for approx. 60min regarding their experiences), please let me know.

To this email I'm attaching the interview guide that I will be using for the individual interviews. I would appreciate ***any and all feedback*** (including questions you may have about phenomenology!) ***by Wednesday April 30th.***

I am also attaching the project background and information sheet, for your convenience and information.
I hope this email clarifies what FPRAC is, and I really look forward to your input and feedback on this exciting project over the coming months! Feel free to contact me any time at nkain@ualberta.ca.

Sincerely

Nicole Kain

Appendix 2: Participant Invitation Email

March 19, 2014

Dr. Firstname Lastname
Job Title
Room and Building Number
Street Address, Street Address
City, Province, Canada T6G XXX

Re: Recruitment to participate in a research study, "Crisis and Emergency Risk Communication to Family Physicians in Canada"

Dear Dr. Lastname:

Have you ever experienced a public health crisis or emergency event during your time as a practicing family physician?

Such events – e.g., the SARS outbreak in 2003; or the H1N1 pandemic influenza outbreak in 2009 – represent a special form of challenging risk communication for public health agencies / professional organizations (e.g., the WHO, the CPHA, the U.S. CDC), that is characterized by ***the need to rapidly respond to a sudden event that may cause significant and widespread harm.***

The overall goal of this research is to understand and explain how public health crisis / emergency events and their related risk communication processes are experienced by Canadian family physicians. A clearer and more in-depth understanding and translation of how family physicians experience such events may provide important insights to public health agencies and professional associations in the future regarding appropriate risk communication strategies.

This study will be exploratory, using qualitative methodology in a phenomenology tradition. The researcher will be conducting individual interviews with approximately 20-30 family physicians in Canada regarding their experiences with public health crises and emergency risk communication. Interviews will not exceed 75 minutes.

The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

This is an exciting opportunity to share your in-depth and personal experiences about a public health crisis or emergency risk event that you have gone through in your practice as a family physician. There are no risks to participate in this study.

Please contact the researcher at nkain@ualberta.ca for further information about this study.

Thank-you in advance for your consideration of participation in this important and timely research project.

Sincerely,

Nicole A. Kain, RN, MPA, PhD Candidate
nkain@ualberta.ca

Appendix 3: Participant Background / Information Sheet

STUDY PARTICIPANT INFORMATION / BACKGROUND SHEET

Background Information

Title of Project: Crisis and Emergency Risk Communication to Family Physicians in Canada

Researcher: Nicole Kain, PhD Student **Thesis Supervisor:** Dr. Cindy Jardine

Purpose: The purpose of this thesis research project is to understand and explain how public health crisis / emergency events and their related risk communication processes are experienced by a selection of Canadian family physicians. A clearer and more in-depth understanding and translation of how family physicians experience such events may provide important insights to public health agencies and professional associations in the future regarding appropriate risk communication strategies. The overarching research question for this project is: What is the experience of Canadian family physicians in receiving, translating and communicating public health crisis / emergency information? How can this experience be understood, explained and ameliorated in the current Canadian health care context?"

Timing: The research will take place between April 2014 and December 2014. Data collection will be completed by December 2014.

Methods: The researcher will be conducting semi-structured individual interviews with approximately 20 to 30 family physicians in Canada regarding their experiences with public health crises and emergency risk communication. Interviews will not exceed 60 minutes.

Consent: The researcher is asking for your written consent to participate in this research by being individually interviewed and audio-recorded about your experiences as a family physician regarding crisis/emergency risk communication. Your decision about whether to participate is voluntary. You may withdraw from the study within one month of participating.

Confidentiality: To keep your information private, the researcher will:
• not use your name in any notes, tapes, transcripts, or reports – the researcher will use numbers or created names (e.g. Participant 1) for everyone in the study.
• Keep your consent and the information you give locked up in separate places and / or encrypted electronically.
• Destroy your consent form and the information you give after a period of five years.

Benefits: You are contributing to the body of knowledge surrounding the risk communication of public health crisis / emergency event information to family physicians in Canada. You may benefit indirectly by helping to improve public health agencies' and professional organizations' risk communication of communicable disease information to you and other family physicians in Canada.

Risks: It is not anticipated that there are any risks to participating in this study.

Withdrawal from the study: You may stop at any point during the interview and do not need to give a reason why. You may also change your mind about being in this study within one month of participating (i.e. if you were interviewed on July 1st, you may withdraw your participation and anything that you have said at any time until August 1st). You can stop being in the study by contacting the researcher at nkain@ualberta.ca or the researcher's supervisor at cjardine@ualberta.ca.

Use of your information: The researcher will be analyzing the information from the individual interviews, along with field notes and journal entries from observations during the interview process. The findings will compose the major body of the researcher's PhD thesis. These findings will also be incorporated into recommendations for appropriate knowledge users, such as public health agencies and professional organizations in Canada that communicate such public health crisis / emergency event information to family physicians. Finally, the findings will be used for academic presentations and peer-reviewed publications.

Further Information: Please contact the researcher at nkain@ualberta.ca for further information about this study.

Ethics Approval: The plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta. For questions regarding participant rights and ethical conduct of research, contact the Research Ethics Office at (780) 492-2615.

Appendix 4: Participant Informed Consent Form

CRISIS AND EMERGENCY RISK COMMUNICATION TO FAMILY PHYSICIANS IN CANADA: STUDY PARTICIPANT INFORMED CONSENT FORM

Part 1: Researcher Information		
Researcher: Nicole Kain, PhD Student **Thesis Supervisor:** Dr. Cindy Jardine **Affiliation:** University of Alberta, School of Public Health **Research Study:** Crisis and Emergency Risk Communication to Family Physicians in Canada		
Part 2: Consents		
	Yes	No
Do you understand that I am asking you to participate in a research study about crisis and emergency risk communication to family physicians in Canada?		
Have you received and read the Study Information / Background Sheet?		
Do you understand that this study is helping to inform a PhD Thesis research project?		
Do you agree to participate in an individual audio-recorded interview during this study?		
Do you understand the benefits and risks involved in taking part in this research study?		
Have you had an opportunity to ask questions and discuss the research study with the researcher?		
Do you understand that you are free to refuse to be in the study or change your mind about being in the study within one month of your participation? You do not have to give a reason and it will not affect your relationship with the university.		
Do you understand what the researcher will do to keep the information you provide private?		
Do you understand that the plan for this study has been reviewed for its adherence to ethical guidelines by a Research Ethics Board at the University of Alberta, and for questions regarding participant rights and ethical conduct of research, you may contact the Research Ethics Office at (780) 492-2615?		

• Nicole Kain explained this study to me on _____ (Date).

• If you would like to receive a preliminary written report of the research findings, and / or to confirm or clarify what was said during the interview, please provide information about the best way for the researcher to contact you:

Address: _____

Telephone: _____

Email: _____

• Further, I agree that the researcher may contact me about future research opportunities at the address, telephone number or email address given above: _____Yes _____No

Signature of Participant: _____ Date:_____

Appendix 5: Family Physician Individual Interview Guide

INDIVIDUAL FAMILY PHYSICIAN INTERVIEW GUIDE

Title of Project: Crisis and Emergency Risk Communication to Family Physicians in Canada

Researcher: Nicole Kain, PhD Student **Thesis Supervisor:** Dr. Cindy Jardine

In conducting empirical phenomenological human science research, the interview serves the purpose of gathering and exploring experiential narrative material. Therefore, while the interview is procedurally "unstructured," it is clearly "oriented" to opening up the lived experience of the phenomena under study, such that relevant meaningful stories and anecdotes are available for phenomenological reflection.

Interviews will be directed to public health crisis/emergency experiences and the related risk communication processes that family physicians have found meaningful, such that the direction of the interview will follow the physician's experiences as remembered of the public health crisis / emergency event. This interview guide will only be used to help draw out experiences of public health crisis / emergency events if the accounts are not forthcoming by unstructured questioning (i.e. to help get the interview started).

Orienting Questions
(To encourage/prompt interviewee to begin thinking about a particular experience)

1. A crisis may be described as a "risk manifested," or you may have your own definition of what a crisis means to you. How would you define a public health crisis or emergency event?

2. Have you experienced a public health crisis or risk event as a practicing family physician?

Phenomenology Questions
(To elicit experiential material)

3. Can you think back to a time when you experienced a public health crisis or risk event? Can you describe that event or walk me through it?

4. Can you walk me through how you felt? Can you give me a particular example of when/how you felt that way?

5. Were your initial feelings or instincts about yourself? Your patients? Your family? Your practice? Your colleagues? Can you tell me about one of those moments?

6. How was that experience different from a regular day (week, month) in your practice? How was that event similar to a regular day (week, month) in your practice?

7. Do you remember receiving any communication about that event? Can you tell me about that communication?

8. Can you tell me about how you heard about the event? Who was there?

9. Can you walk me through a typical day during the crisis?

10. How did you generally get information? Can you tell me about a particular moment?

Recommendations

(To stimulate practical insights from this study – and if enough time remains)

11. What recommendations do you have for public health agencies and / or professional organizations, to improve risk communication of communicable disease information to family physicians?

12. What would specifically be of assistance to you in your practice, in the event of a future public health crisis or emergency event?

13. Do you have any other recommendations, or specific topics that you would like to discuss that we have not yet addressed?

Thank-you so much for your time, it is greatly appreciated!

Appendix 6: Ethics Approval Notice

Ethics Application has been Approved

ID:	Pro00032565
Title:	Crisis and Emergency Risk Communication to Family Physicians in Canada
Study Investigator:	Nicole Kain
Description:	This is to inform you that the above study has been approved. Click on the link(s) above to navigate to the HERO workspace. **Note**: Please be reminded that the REMO system works best with Internet Explorer or Firefox. Please do not reply to this message. This is a system-generated email that cannot receive replies.

University of Alberta
Edmonton Alberta
Canada T6G 2E1

Appendix 7: Scoping Review Search Strategy

The search was conducted on August 18th, 2015. The search was designed by a health sciences librarian (TC) in conjunction with the researcher (NK). The following databases were searched: Ovid MEDLINE 1946- and MEDLINE In-Process & Other Non-Indexed Citations, Ovid Embase 1996-, Ovid PsycINFO 1987-, EBSCOhost CINAHL, EBSCOhost Library & Information Science Source, Scopus, and Web of Science: Science Citation Index 1900-, Social Sciences Citation Index 1900-, Conference Proceedings Citation Index- Science 1990-, Conference Proceedings Citation Index- Social Science & Humanities 1990.

Subject Headings and keywords were used in the search. Subject headings and search operators were modified for each specific database. The search contained three concepts: pandemics and emergency health situations; family physicians; and communication. An English language filter was used and only studies published after the year 2000 were retrieved.

In total 3009 articles were retrieved. Of these, 1157 were duplicates, leaving 1852 articles. Titles and abstracts of 312 articles were reviewed independently by a member of the research team (NK). Full text of 87 articles was reviewed independently by NK. We conducted an initial pilot of 10% of studies reviewed by two reviewers to ensure consistency in applying the inclusion and exclusion criteria for the 87 articles. Following this pilot another 5% of studies were reviewed by the same two reviewers to reach consensus in the study selection process. Of the 87 full-text articles reviewed, 38 were selected for final synthesis.

Appendix 8: Scoping Review Complete Search Terms

Medline 1946-

1. Physicians, Family/
2. Family Practice/
3. Primary Health Care/
4. general practitioners/ or physicians, primary care/
5. General Practice/
6. (family adj (medicine or physician* or doctor*)).mp.
7. (family adj3 (practice or health or clinic*)).mp.
8. (primary adj2 care).mp.
9. or/1-8
10. exp Disasters/
11. disease outbreaks/ or epidemics/ or pandemics/
12. (disaster* or pandemic* or outbreak* or catastroph* or epidemic*).mp.
13. (public health crisis or public health crises or public health emergenc* or public emergenc*).mp.
14. or/10-13
15. exp Communication/
16. exp medical informatics/ or information systems/
17. Knowledge Management/
18. exp information management/
19. exp information services/ or exp "information storage and retrieval"/ or knowledge/
20. (communication or information or knowledge).ti.
21. (communication or information or knowledge).ab. /freq=2
22. (communication or information or knowledge).hw.
23. alert*.tw,kf.
24. or/15-23
25. risk communication.mp.
26. 9 and 25
27. 9 and 14 and 24
28. 26 or 27
29. exp africa/ or exp south america/ or exp asia/
30. (africa or south american or kenya or tanzania or ghana or nigeria or senegal or egypt or pakistan or india or china or brazil or argentina or mexico).mp.
31. 29 or 30
32. 28 not 31
33. limit 32 to (english language and yr="2000 -Current")
34. remove duplicates from 33

MEDLINE In-Process & Other Non-Indexed Citations

1. Physicians, Family/
2. Family Practice/
3. Primary Health Care/
4. general practitioners/ or physicians, primary care/
5. General Practice/

6. (family adj (medicine or physician* or doctor*)).mp.
7. (family adj3 (practice or health or clinic*)).mp.
8. (primary adj2 care).mp.
9. or/1-8
10. exp Disasters/
11. disease outbreaks/ or epidemics/ or pandemics/
12. (disaster* or pandemic* or outbreak* or catastroph* or epidemic*).mp.
13. (public health crisis or public health crises or public health emergenc* or public emergenc*).mp.
14. or/10-13
15. exp Communication/
16. exp medical informatics/ or information systems/
17. Knowledge Management/
18. exp information management/
19. exp information services/ or exp "information storage and retrieval"/ or knowledge/
20. (communication or information or knowledge).ti.
21. (communication or information or knowledge).ab. /freq=2
22. (communication or information or knowledge).hw.
23. alert*.tw,kf.
24. or/15-23
25. risk communication.mp.
26. 9 and 25
27. 9 and 14 and 24
28. 26 or 27
29. exp africa/ or exp south america/ or exp asia/
30. (africa or south american or kenya or tanzania or ghana or nigeria or senegal or egypt or pakistan or india or china or brazil or argentina or mexico).mp.
31. 29 or 30
32. 28 not 31

Embase 1996-
1. general practitioner/
2. general practice/
3. primary health care/ or primary medical care/
4. general practitioner/
5. (family adj (medicine or physician* or doctor*)).mp.
6. (family adj3 (practice or health or clinic*)).mp.
7. (primary adj2 care).mp.
8. or/1-7
9. disaster/ or mass disaster/ or natural disaster/
10. epidemic/
11. exp pandemic/
12. (disaster* or pandemic* or outbreak* or catastroph* or epidemic*).mp.
13. (public health crisis or public health crises or public health emergenc* or public emergenc*).mp.
14. or/9-13
15. interpersonal communication/ or voluntary reporting/

16. mass communication/ or e-mail/ or fax/ or interactive voice response system/ or interdisciplinary communication/ or internet/ or mass medium/ or mobile phone/ or postal mail/ or public relations/ or social media/ or exp telecommunication/ or telephone/ or television/ or text messaging/ or videoconferencing/ or webcast/ or wireless communication/
17. medical informatics/
18. exp information system/
19. knowledge management/
20. information service/
21. knowledge/ or nursing knowledge/ or professional knowledge/
22. (communication or information or knowledge).ti.
23. communication.ab. /freq=2
24. information.ab. /freq=2
25. knowledge.ab. /freq=2
26. alert*.mp.
27. or/15-26
28. 8 and 14 and 27
29. risk communication.mp.
30. 8 and 29
31. 28 or 30
32. exp africa/ or exp asia/
33. exp "south and central america"/ or exp central america/ or exp south america/
34. developing country/
35. (africa or south american or kenya or tanzania or ghana or nigeria or senegal or egypt or india or pakistan or china or brazil or argentina or mexico).mp.
36. or/32-35
37. 31 not 36
38. limit 37 to (english language and yr="2000 -Current")
39. remove duplicates from 38

PsycINFO 1987-
1. family physicians/ or family medicine/ or general practitioners/
2. primary health care/
3. (family adj (medicine or physician* or doctor*)).mp.
4. (family adj3 (practice or health or clinic*)).mp.
5. (primary adj2 care).mp.
6. or/1-5
7. disasters/ or natural disasters/ or emergency management/ or emergency preparedness/
8. epidemics/ or pandemics/
9. (disaster* or pandemic* or outbreak* or catastroph* or epidemic*).mp.
10. (public health crisis or public health crises or public health emergenc* or public emergenc*).mp.
11. or/7-10
12. exp communication/ or communication systems/ or communications media/ or information/ or information dissemination/ or knowledge transfer/ or messages/
13. exp information systems/ or exp communication systems/ or exp electronic communication/ or exp expert systems/ or information/ or information dissemination/ or information science/ or information services/ or exp information technology/ or knowledge management/

14. (communication or information or knowledge).ti.
15. (communication or information or knowledge).ab. /freq=2
16. (communication or information or knowledge).hw.
17. alert*.mp.
18. or/12-17
19. 6 and 11 and 18
20. (risk adj3 communication).mp.
21. 6 and 20
22. 19 or 21
23. limit 22 to yr="2000 -Current"

CINAHL

S1 (MH "Physicians, Family") OR (MH "Family Practice") OR (MH "Primary Health Care")
S2 family N0 (medicine or physician* or doctor* or practice or health or clinic)
S3 family N3 (practice or health or clinic*)
S4 primary N2 care
S5 S1 OR S2 OR S3 OR S4
S6 (MH "Disasters") OR (MH "Disaster Planning") OR (MH "Mass Casualty Training") OR (MH "Fires") OR (MH "Mass Casualty Incidents") OR (MH "Natural Disasters") OR (MH "Disease Outbreaks") OR (MH "Influenza, Pandemic (H1N1) 2009")
S7 disaster* or pandemic* or outbreak* or catastroph* or epidemic*
S8 "public health crisis" or "public health crises" or "public health emergenc*" or "public emergenc*"
S9 S6 OR S7 OR S8
S10 (MH "Communication+") OR (MH "Communications Media+") OR (MH "Clinical Information Systems+") OR (MH "Health Information Networks") OR (MH "Knowledge Management+") OR (MH "Professional Knowledge+") OR (MH "Information Science+")
S11 communication or information or knowledge
S12 S10 OR S11
S13 S5 AND S9 AND S12
S14 risk N3 communication
S15 S5 AND S14
S16 S13 AND S15 Limiters - Published Date: 20000101-20151231 Narrow by Language: - english

Library and Information Science Source

S1 disaster* or pandemic* or outbreak* or catastroph* or epidemic*
S2 (medicine or physician* or doctor* or practice or health or clinic) OR (family N3 (practice or clinic*)) OR (health* N3 (practice or clinic*))
S3 S1 AND S2 **Limiters** - Published Date: 20000101-20151231; Publication Type: Academic Journal

Scopus

(((((TITLE-ABS-KEY ("family medicine" OR "family physician*" OR "family doctor*")) OR ((TITLE-ABS-KEY (family W/3 practice) OR TITLE-ABS-KEY (family W/3 health) OR TITLE-ABS-KEY (family W/3 clinic*))) OR (TITLE-ABS-KEY (primary W/3 care)))

AND ((TITLE-ABS-KEY (disaster* OR pandemic* OR outbreak* OR catastroph* OR epidemic*)) OR (TITLE-ABS-KEY ("public health crisis" OR "public health crises" OR "public health emergenc*" OR "public emergenc*"))) AND (TITLE-ABS-KEY (communication OR information OR knowledge) AND PUBYEAR > 1999)) OR (((TITLE-ABS-KEY ("family medicine" OR "family physician*" OR "family doctor*")) OR ((TITLE-ABS-KEY (family W/3 practice) OR TITLE-ABS-KEY (family W/3 health) OR TITLE-ABS-KEY (family W/3 clinic*))) OR (TITLE-ABS-KEY (primary W/3 care))) AND (TITLE-ABS-KEY ("risk communication") AND PUBYEAR > 1999))) AND NOT (TITLE-ABS-KEY ("obesity epidemic*") AND PUBYEAR > 1999)) AND NOT (TITLE-ABS-KEY (africa OR "south america" OR "central america" OR china OR pakistan OR india OR ghana OR nigeria OR brazil OR "south africa" OR argentina) AND PUBYEAR > 1999) AND (LIMIT-TO (LANGUAGE , "English"))

Web of Science

Science Citation Index Expanded --1900-present, Social Sciences Citation Index --1900-present, Conference Proceedings Citation Index- Science--1990-present, Conference Proceedings Citation Index- Social Science & Humanities --1990-present
Indexes=SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, BKCI-S, BKCI-SSH, CCR-EXPANDED, IC Timespan=2000-2015
#2 (TS=(family NEAR/3 practice) OR TS=(family NEAR/3 health) OR TS=(family NEAR/3 clinic*)) AND LANGUAGE:(English)
#3 (TS=(primary NEAR/3 care)) AND LANGUAGE: (English)
#4 #3 OR #2 OR #1
#5 (TS=(disaster* or pandemic* or outbreak* or catastroph* or epidemic*))
#6 (TS=("public health crisis" or "public health crises" or "public health emergenc*" or "public emergenc*"))
#7 #6 OR #5
#8 (TS=(communication OR information or knowledge))
#9 #8 AND #7 AND #4