The Population-Centered Medical Model: A Theory of Practice for Public Health and Preventive Medicine

Sudit Ranade, *The University of Western Ontario*

Supervisor: Brown, Judith Belle, *The University of Western Ontario*
Co-Supervisor: Thind, Amardeep, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Family Medicine

© Sudit Ranade 2023

Follow this and additional works at: [https://ir.lib.uwo.ca/etd](https://ir.lib.uwo.ca/etd)

**Recommended Citation**


This Dissertation/Thesis is brought to you for free and open access by Scholarship@Western. It has been accepted for inclusion in Electronic Thesis and Dissertation Repository by an authorized administrator of Scholarship@Western. For more information, please contact [wlswadmin@uwo.ca](mailto:wlswadmin@uwo.ca).
Abstract

Introduction

Public health physicians occupy a unique place in the fields of both medicine and public health. Trained in each field, and often holding positions of authority in public health systems, public health physicians are sometimes challenged to identify their roles in either field of practice. Public health physicians work to achieve population health, but there has been limited theoretical development in this field of practice.

Objectives

The objective of this research was to develop an empirical theory of practice for public health physicians.

Methods

A literature review of current practice models applicable to public health physicians was performed. A discourse analysis of Chief Medical Officer of Health (CMOH) media briefings during the COVID-19 pandemic was conducted to understand the socially constructed public-facing identities of public health physicians. A Grounded Theory study of practice was conducted by interviewing public health physician participants.

Findings

Current practice models for medicine do not account for the work of public health physicians, whose ‘patients’ are populations. Practice models for public health do not account for the unique roles and responsibilities of physicians in public health. The literature review affirmed that there are no published models of practice that are specific to public health physician practice. From the discourse analysis, it was found that Chief Medical Officers of Health (CMOHs) construct a social identity that is recognizably medical by virtue of its technical and relational aspects. The implication of this social identity is that CMOHs view themselves as
physicians, and further that they also view populations as patients. The findings of the grounded theory study led to the development of a theory of practice for public health physicians, the Population-Centered Medical Model (POP-CMM). In this model, public health physicians bring values, knowledge, and stances into the practice of public health medicine. Public health physicians view populations as their patients, and the method of practice involves diagnosis and intervention that is focused on systems and prevention. This process of practice relies on knowledge sharing and relationship building between public health physicians and populations.

Conclusion

The POP-CMM forms a theoretical grounding for the training and practice of public health medicine in Canada. Taken with the findings of the discourse analysis, this inquiry reveals that the practice of public health medicine (and perhaps medicine in general) is constituted by a set of core processes that are enacted across a range of discursive settings. These findings have implications for conceptualizing competence in medical training and practice, as well as for progress toward a general model of medical practice across a spectrum of patients from n=1 to n=N. Further research could demonstrate its transferability to the practice of public health physicians in other countries, to the practice of other professionals in public health, and to the practice of medicine in general.

Keywords (alphabetical order)

Discourse Analysis, Grounded Theory, Medical Practice, Medicine, Model, Physicians, Population Health, Public Health, Public Health Practice, Theory
Summary For Lay Audience

Public health physicians are doctors who work to achieve health for the whole population. They have one foot in the world of medicine and one foot in the world of public health. This means they can have difficulty explaining their work to other doctors, to people in public health, and to the public. This project aims to build our understanding of how public health physicians practice public health medicine. First, looking at the available literature there are no frameworks or theories that public health physicians can use to describe their own work. Next, looking at how public health physicians present themselves publicly in the media, it appears that they construct an identity as physicians who see populations as their patients. Finally, asking public health physicians about the processes they use to care for populations led to the development of a model or theory of practice for public health medicine, the Population-Centered Medical Model (POP-CMM). In this model, public health physicians bring values, knowledge and stances to their practice. They consider populations as patients, and diagnose and intervene on public health issues with a focus on systems and prevention. This practice relies on knowledge sharing and relationship building between public health physicians and the population. The POP-CMM can be used to help describe what public health physicians do, to set the stage for training public health physicians, and to build better practice in public health medicine. Taken together, the findings from both studies suggest a new way to think about competence in medical practice – as a set of core processes that are enacted by discourse in different settings or genres.
Co-authorship Statement

A version of Chapter 3 of this manuscript was published as:


Though other chapters have not yet been submitted for publication, the following CRediT authorship statement can be considered to apply to the entire manuscript:

**Sudit Ranade**: Conceptualization, Methodology, Formal analysis, Data curation, Writing – original and subsequent drafts, Writing – review & editing, Visualization.

**Judith Belle Brown**: Conceptualization, Formal analysis, Writing – review & editing, Supervision.

**Tom Freeman**: Conceptualization, Formal analysis, Writing – review & editing. Supervision.

**Amardeep Thind**: Conceptualization, Formal analysis, Writing – review & editing. Supervision.

This manuscript was developed as part of research that was exclusively for the purpose of the student’s PhD dissertation, and it is estimated that at least 80% of the work contained herein was conducted by the student alone.
Dedication

Om

To the universe.
To the pursuit of knowledge and wisdom.
To my parents for encouraging me to learn about everything.
Acknowledgements

This journey was like no other – matched in difficulty only with parenting and residency training, and marked by life milestones of love and also of loss. None of this would have been possible without my family. I am grateful to them for their unwavering support of this pursuit over its years. I am grateful that my parents sought out a better life for themselves and for me. Thank you for your unconditional love. Thank you to my partner and kids for recognizing how important this study is to me, and for being gracious enough to share me so I might be fascinated by this work – I owe you all “big time”! Dr. Amanda Terry, without you I may never have heard of the PhD program in Family Medicine – thanks for the conversation that led to me formally becoming a student yet again! If it were not for Dr. Judith Belle Brown, I may never have arrived at the topic of this dissertation. Thank you for requiring me to take Advanced Patient-Centered Medicine, despite my protestations that I don’t see individual patients in public health! To my supervisory committee – Dr. Amardeep Thind, Dr. Tom Freeman and Dr. Judith Belle Brown – thank you for your contributions and encouragement, for our great conversations, and for pulling me back from fascinating “rabbit holes” of inquiry when needed. Thank you also to Elizabeth McInnis and Stacey Bastien, for keeping me on track administratively and for all the great chats along the way! To my examination committee, thank you for taking the time and energy to review and evaluate this dissertation. To my teachers, mentors, and gurus – thank you for sharing your insights with me and encouraging me to learn and grow. Thank you to Dr. Jasmine Pawa and Dr. Cristian Rangel for many illuminating discussions along the way! To the authors of the Patient-Centered Clinical Method, and ‘theory-thinkers’ such as Effie Hanchett - I see how valuable your work is to the field. Thank you for thinking about practice, in order to describe it, shape it and improve it. I hope that my contribution will be able to do the same. I am grateful for the opportunity to have learned from the participants in these studies, and I hope the knowledge generated herein will be useful to practitioners in my field for years to come.
List of Figures

Figure 2-1: Venn diagram depicting search strategy
Figure 2-2: Integrative Model of Consciousness as a Theoretical Sub-structure for Patient and Population-Centered Medicine
Figure 3-1: CMOHs enact care by being experts and managing relationships
Figure 4-1: Conceptual Model of Population-Centered Medical Method (POP-CMM)
List of Tables

Table 4-1: Demographic Characteristics of Participants
List of Appendices

Appendix 2-A: Table Comparing Medicine and Public Health
Appendix 2-B: Search Strategy for Literature Review
Appendix 3-A: Examples of Persuasive Rhetoric in CMOH Briefings
Appendix 4-A: Letter of Information and Consent
Appendix 4-B: Semi-structured Interview Guide
Appendix 4-C: Ethics Approval from The Western University Health Sciences Research Ethics Board
List of Abbreviations

CanMEDS – Canadian Medical Education Directives for Specialists

CanMEDS-FM – Canadian Medical Education Directives for Specialists – Family Medicine

CCFP – Certificant of the College of Family Physicians (Canada)

CFPC – College of Family Physicians of Canada

CGT – Constructivist Grounded Theory

CMOH – Chief Medical Officer of Health

COPC – Community-Oriented Primary Care

EBPH – Evidence-Based Public Health

FRCP – Fellow of the Royal College of Physicians of Canada

GT – Grounded Theory

MOH – Medical Officer of Health

PCCM – Patient-Centered Clinical Method

PHPM – Public Health and Preventive Medicine

POP-CMM – Population-Centered Medical Method

RCPSC – Royal College of Physicians and Surgeons of Canada

UK – The United Kingdom of Great Britain and Northern Ireland
Table of Contents

Abstract........................................................................................................................................................................i

Introduction....................................................................................................................................................................i
Objectives .......................................................................................................................................................................i
Methods ...........................................................................................................................................................................i
Findings ........................................................................................................................................................................i
Conclusion .....................................................................................................................................................................ii
Keywords (alphabetical order) .......................................................................................................................................ii

Summary For Lay Audience............................................................................................................................................ iii

Co-authorship Statement ............................................................................................................................................... iv

Dedication........................................................................................................................................................................ v

Acknowledgements ........................................................................................................................................................ vi

List of Figures............................................................................................................................................................... vii

List of Tables ................................................................................................................................................................. viii

List of Appendices ........................................................................................................................................................ x

List of Abbreviations ..................................................................................................................................................... xi

Table of Contents ........................................................................................................................................................... xii

Chapter 1 ......................................................................................................................................................................... 1

1 Introduction .................................................................................................................................................................. 3

1.1 Overview ......................................................................................................................................................... 3
1.2 Public Health, Medicine, and the Population as Patient ............................................................................. 3
1.3 Theory and Practice in Medicine .................................................................................................................. 9
1.4 Outline of Manuscript .................................................................................................................................. 11

Chapter 2 ..................................................................................................................................................................... 12

2 Theories of Practice .................................................................................................................................................... 13

2.1 Introduction ..................................................................................................................................................... 13
2.2 Theories of Public Health Medical Practice ............................................................................................... 13
2.3 Synthesis and Overview of Public Health Practice Models ................................................................. 15

2.3.1 Structural Models ........................................................................................................................................ 15
2.3.2 Critical Models ............................................................................................................................................ 16
2.3.3 Humanist Models ....................................................................................................................................... 16
2.3.4 Ethico-legal Models .................................................................................................................................. 20
2.3.5 Translational Models ................................................................................................................................. 21
2.3.6 Practical Models .......................................................................................................................................... 21

2.4 Approaches to Practice from Training Institutes and Other Professions ........................................... 23

2.5 The Patient-Centered Clinical Method and Public Health Medicine ................................................... 24

2.5.1 Exploring Health, Disease and the Illness Experience ........................................................................ 25
2.5.2 Understanding the Whole Person ............................................................................................................. 27

2.5.3 Finding Common Ground ........................................................................................................................ 28
2.5.4 Enhancing the Patient-Clinician Relationship ....................................................................................... 29

2.6 The Need for Theory in the Practice of Public Health Medicine ........................................................... 30

2.7 Research Questions .......................................................................................................................................... 33

Chapter 3 ..................................................................................................................................................................... 35
## Appendices

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-A</td>
<td>Table Comparing Public Health and Medicine</td>
<td>137</td>
</tr>
<tr>
<td>2-B</td>
<td>Search Strategy and Results</td>
<td>139</td>
</tr>
<tr>
<td>3-A</td>
<td>Examples of Persuasive Rhetoric in CMOH Briefings</td>
<td>141</td>
</tr>
<tr>
<td>4-A</td>
<td>LOI and Consent Form</td>
<td>144</td>
</tr>
<tr>
<td>4-B</td>
<td>Semi-Structured Interview Guide</td>
<td>149</td>
</tr>
<tr>
<td>4-C</td>
<td>Ethics Approval for Grounded Theory Study</td>
<td>153</td>
</tr>
</tbody>
</table>
Chapter 1
“In science, there is no telling what kinds of new access to the hidden parts of the world we might eventually achieve.”

From Theory and Reality: An Introduction to the Philosophy of Science by Peter Godfrey-Smith (p36)
1 Introduction

1.1 Overview

The relationship between physicians and their patients is at the core of any constructive path toward health and healing. This relationship is characterized by interpersonal actions, legal and fiduciary duties and obligations, and contextual patient-dependent explorations of the meaning of health and illness. Although physician training primarily focuses on caring for individuals, some physicians are placed in positions of responsibility for the health of not only a set of known patients but also of communities, populations, states and nations. The responsibility of physicians towards aggregate entities like communities and populations has not been explored to the same extent as the responsibilities and roles of physicians with respect to individual patients. Therefore, this paper will outline a journey of inquiry that began with the question: How does a physician care for a population?

This chapter will give an overview of some historical developments in practice that have occurred in the fields of both public health and medicine in Canada and globally.

1.2 Public Health, Medicine, and the Population as Patient

In Canada, public health and preventive medicine is “the medical specialty primarily concerned with the health of populations” in which a public health specialist “monitors and assesses the health needs of a population and develops, implements and evaluates strategies for improving health and well-being through interdisciplinary and intersectoral partnerships”\(^2\)\(^{(p1)}\) Although the history of the relationship between physicians and society dates as far back as there have been healing traditions, the formally legislated role of physicians in maintaining the health and safety of a defined population may have begun with the Public Health Act of 1872 in what is now the United Kingdom (UK). This act, as well as other legislation introduced in 1888, 1909, and 1929, required local sanitary and council authorities to appoint a Medical Officer of Health (MOH) who would direct the enforcement of public health acts related to food inspection, sanitation, housing as well as assessment and surveillance of disease.\(^3\)

Between the 1900s and the present, public health in the UK has undergone structural and philosophical shifts that have expanded, contracted and relocated its
domain within government, medicine and society. These shifts and their impact on community medicine physicians are described extensively by Jane Lewis in a book entitled “What Price Community Medicine? The philosophy, practice and politics of public health since 1919.” A few important themes arise from Lewis’s discussion: namely, the advent of social medicine in the 1930-40s, the inception of the National Health Service, and the ongoing dialogue about the appropriate “house” for prevention and public health activities.

Briefly, the full incorporation of social medicine into the practice of public health was hindered by its development and advancement largely within academic institutions rather than at the ‘coal-face’ of public health activity. The advent of the NHS resulted in increasingly restricted spheres of activity for community services, and public health physicians being driven increasingly toward the administration of hospital services rather than their traditional focus on the community and determinants of its health. Notably, after over 40 years within the NHS, public health in the UK has been re-decentralized back to its origins in local communities, which has implications for public health practice and its use of and understanding of evidence for practice. Finally, the issue of “housing” for public health has been contested throughout the years, including considerations of who should lead and administer public health services, what constitutes the scope of public health action, and to what extent public health intervention should focus on individuals versus broader societal determinants of health. Notably, many of these very tensions resurfaced during the COVID-19 pandemic, perhaps without the recognition that they existed well before the present time. This swirl of activity has taken place in what Lewis describes as a theoretical “vacuum” that places public health physicians in a potentially vulnerable professional state:

“… the position of community physicians was subject to serious conflicts in terms both of their relationship with other members of the medical profession, and the nature of their primary responsibility…”

Lewis notes that increasing recognition of the wider determinants of health brought public health physicians into political arenas that required confronting power structures in society, including established power dynamics in medicine and health care.
The history of public health in Canada follows a similar pattern to that of the UK – occurring in waves that focused primarily on sanitation, followed by infection control, followed by chronic (or non-communicable) disease, and increasingly intertwined with social and political developments and ideas. Dame Sally Davies describes these waves of public health as structural, biomedical, clinical and social, and argues for the advancement of a fifth ‘cultural’ wave of public health practice.5

In 1882, Ontario was the first province in Canada to create a provincial Board of Health which held an advisory role and included the Chief Medical Officer of Health.6 In 1884, Ontario’s public health act required the establishment of local boards of health and the appointment of local Medical Officers of Health, with similar developments in other provinces occurring from 1880-1900.6 Many of these developments were spurred, as so often happens in public health, by health emergencies such as cholera, smallpox and diphtheria. In Canada, public health was officially designated as a specialty of medicine by the Royal College of Physicians and Surgeons of Canada in 1947.6 Even at that time, “qualifying for this specialization status was a challenge, owing to the public nature of public health services in contrast to the personal relationships inherent in private medical practice”.6(p5.12) Though not explicit at the time, the notion of a population as a “patient” must have been a key linkage point supporting the designation of medical responsibilities in public health, one that stemmed from the responsibility of physicians toward individual patients and extended those responsibilities to populations as patients. This extension of responsibility outward from the patient has also appeared in contemporary considerations of the practice of family medicine, specifically the notion of the family physician being a community resource and serving a defined practice population, though the College of Family Physicians of Canada (CFPC) does not explicitly characterize communities or populations as patients.7

In Ontario, the educational requirements to practice as a Medical Officer of Health are that the practitioner must be certified as a specialist in public health and preventive medicine by the Royal College of Physicians and Surgeons of Canada (RCPSC) as well as possess one year of graduate certification that includes “epidemiology, quantitative methods, management and administration, and disease prevention and health promotion”.8(p1) The prior regulation had previously allowed for a Medical Officer of
Health to be any physician who also possessed additional graduate training in a public health discipline and, as a result, there are some practicing Medical Officers of Health in Ontario who are family physicians without certification in public health and preventive medicine. In some other provinces and territories, the requirement for positions as Medical Officers of Health is only that the candidate be a physician, with no training requirement specified. So, the current field of public health practice in Canada is populated by both those who have training in family medicine with or without additional public health training, as well as those who have training in public health and preventive medicine (who may also have completed training in family medicine).

The history of public health in the United States follows a similar path to the one outlined above for Canada and the UK. In 1882, a rare joint session of the board of health (public health governance) and the medical society (medical governance) of North Carolina was addressed by Dr. W.P. Beall, who said:

> By the term Preventive Medicine, as used in this paper, is meant any and all means, which, intelligently used, tend to promote existing health, and to reduce to a minimum the ravages of any disease. *This, of course, embraces much, that is, strictly speaking, outside of the province of the physician*; as sanitary engineering, removal and disposal of filth, the proper location and construction of dwellings, etc., *but in this country the physician is practically the custodian of the public health, and should be qualified to give intelligent advice on all these points.* The importance of my subject is self-evident. If the science of medicine, when applied to the healing of disease, is one of the noblest to which man [sic] can devote his time and talents, how much nobler is it when it strives to invade the strongholds of disease, and, by restricting and limiting the avenues through which it makes its attacks, adds immensely to the wealth, prosperity, and happiness of mankind [sic] [italics added].

Beall’s view of the role of physicians in public health is largely relevant today – they practice in multiple settings and perform functions which are associated primarily at the level of community rather than with individual patients. Public health physicians in these roles are expected to give expert advice and direction on all matters related to the public’s health, including health care.
It is important to note that, in both Canada and the US, public health and medical training and scholarship have developed along separate disciplinary lines. The Flexner report shaped the development of the first schools of medicine, while the Welch-Rose report to the Rockefeller Foundation stimulated the endowment of schools of public health at Johns Hopkins University and later at Harvard University and the University of Toronto.\textsuperscript{10,11} This academic separation, along with the structures in place for grant funding, siloed the development of research and practice in medicine and public health such that they developed more in parallel than in partnership. One can see evidence of the separation between public health and medicine in their relative descriptions as provided by the Harvard School of Public Health (Appendix 2-A). With medicine and public health so clearly delineated from each other, it would be difficult to imagine under this framework the role of physicians in public health or conversely the role public health plays in supporting the health of individuals. Instead, the table provides further evidence of the fact that, because public health physicians practice at the intersection between public health and medicine, they also practice at the margins of each discipline. This position can present as a vulnerability to professional marginalization, but equally it can be viewed as an opportunity to act as a connection between the practice of medicine for populations as well as for individuals.

Two important global historical developments in public health medicine are also important to note – Latin American Social Medicine and rights-based approaches to health. Latin American Social Medicine is a particular type of public health medicine that arose in Latin American societies whose model of health care was highly intertwined with social justice and a predominantly Marxist political philosophy. These models have influenced a series of waves within public health of social justice approaches, perhaps bolstering the increasing recognition of health equity as a foundational principle of public health systems.\textsuperscript{12–16} The other important development is a rights-based approach to human health, which relates the health status of populations to duties and obligations of the state to protect and preserve those human rights.\textsuperscript{17–20} These developments shape the practice of public health by offering new perspectives on how, why, and in what way public health physicians should intervene to address a population health issue.
If a physician is to impact the health of a population, or community, it is important to recognize the myriad interpretations and perspectives on the definitions of population and community. Because a population could be defined as any collection of people, a population can be characterized by descriptions of the aggregated characteristics of individuals within that population. However, there is also another definition of population, usually described by the word ‘community’. Community refers to social connections between the people in a population – a group of people who share common interests, values, or some other social bond that can be described. The social and biological constructions of a population, presented within an ecological or systems perspective, suggest that populations (or communities) are higher-order, emergent properties of interactions among and between individuals. A population is therefore its own unit of analysis that requires its own analytical methods and tools. While a physician may use a history, clinical examination and laboratory testing to assess the health of a given patient, population-level tools distinct from those used in clinical practice with individual patients (such as epidemiologic investigations and community needs assessments) are required to assess health in a population.

Over time, involving physicians in the health of communities necessarily means they will bring their professional perspectives to that practice. The physician perspective is biased toward action with and on behalf of the patient, which expands the perception of that role to include not only assessment and surveillance (the traditional domains of epidemiologists) but also evidence-informed interventions to protect and promote the health of the public. In a study of public health professionals for a PhD thesis in public health ethics, Barry Pakes noted that most public health physicians who were surveyed “saw their primary duty to the population as a whole […] with their duty to individuals as secondary. Some reasoned that this duty to the public is a fundamental aspect of being a public health professional, while others believed that they had this obligation because they filled a ‘duty void’; that no one else was duty bound to protect the public-at-large, but there were others, individuals and institutions, whose primary responsibility was the well-being, or rights of individuals”. This sense of duty and obligation to a patient is central to the connection between medical practice with individual patients and the practice of medicine with populations.
In 1921, Frederick Green of the American Medical Association wrote:

In spite of the rapid development of public health administration as a function of municipal, state and national governments and the constantly increasing demand for properly trained and qualified men [sic] to serve in official positions, medical students are still trained almost exclusively for the treatment of individual patients. Practically nothing is taught regarding social medicine. [...] It is only in the last few years that any differentiation has been undertaken between the training necessary for individual practice and that required of a man [sic] who desires to devote himself to the service of the community or the state....[italics added]27(p2122)

Despite the aforementioned differentiation undertaken in training paths since the 1920s, it is still true that most training in medicine is for the treatment of individual patients, and that the development of practice methods and tools for the care of populations and communities specifically by public health physicians has not advanced to the same degree as those in individual-focused medicine.

Sporadic development of the concept of "population as patient" has occurred in the field of nursing, where the most commonly applied term is "community as client". An early proponent of this theoretical development was Effie Hanchett, whose work deals with the themes of the nursing process and how it relates to providing care to a community.28–30 There have been significantly fewer corresponding developments in the concept of population as patient in the practice of public health medicine, whose models will be described in the following chapter.

1.3 Theory and Practice in Medicine

Medicine has been described as “a vocation in which a doctor’s knowledge, clinical skills, and judgement are put in the service of protecting and restoring human well-being”.31(p9) The proliferation of medicine and medical sciences has generated a number of independent fields of inquiry such as medical philosophy32, medical ethics33 and medical sociology.34,35 No single theory of the practice of medicine exists, however there have been attempts to define the practice of medicine through explanatory theories of practice. 20th century medical practice has been defined by a dialogue regarding how best to incorporate its scientific, technical and humanist elements in the service of patients.36,37 In addition, there are ongoing debates about the primary function
of medicine\textsuperscript{38} as well as the kinds of theories which should apply to the training of physicians and the practice of medicine.\textsuperscript{39}

Though inquiry into the practice of medicine and public health is a distinctly intra-professional exercise, as an academic endeavour any such inquiry must be rooted in a theoretical perspective. An ontological and epistemological characterization of the work of medicine and public health is beyond the scope of this manuscript. The theoretical perspective of this manuscript is rooted in social constructivism\textsuperscript{40} and in socially constructed reality, because the practice of medicine involves diagnoses and interventions whose meanings and effects are (co-)constructed through interaction between physicians and others (patients, other physicians, families and caregivers, and communities). As McWhinney describes, physicians "interpret the patient’s illness in terms of physical pathology, the name of the disease, causal inferences, and therapeutic choices" while patients interpret "in terms of experience: what it is like for him or her to suffer from the illness, beliefs about its nature, and expectations of therapy".\textsuperscript{41(p26)} As social constructive researchers, "we stand within our research process rather than above, before, or outside it".\textsuperscript{40(p321)} This is particularly evident in the studies contained in the third and fourth chapters, which rely on practice-based experience and qualitative methods to interpret the observations into practice-relevant findings and assertions.

The terms ‘theory’ and ‘model’ are sometimes used without appropriate definition or characterization in academic research, creating some confusion as to their meaning and application.\textsuperscript{42} Some have characterized the difference as “models can be described as theories with a more narrowly defined scope of explanation; a model is descriptive, whereas a theory is explanatory as well as descriptive”.\textsuperscript{43} Leonelli describes a system in which interactions with the world produce objects, which are processed as data, which are ordered as models representing the world, which are in turn interpreted as knowledge, which then informs further interactions with the world.\textsuperscript{44} Cartwright expands upon this characterization to add that each of these domains can be used to inform theory.\textsuperscript{45}

As this manuscript focuses on the development of a theory of practice, the term ‘theory’ should be understood as an explanatory, middle-range\textsuperscript{45,46} (rather than grand)
theory that sets out concepts related to the practice of public health medicine and their constituent components. The approach to theory generation in this inquiry is largely inductive, flowing from data and observation through iterative and comparative analysis toward theoretical constructs. In most of this manuscript the word 'model' is used to describe the output of the research, in recognition of the nature of the inquiry and the limited testing of its explanatory powers.

1.4 Outline of Manuscript

This chapter has outlined the background of the research topics that will be explored in the remainder of the manuscript. The following chapter will describe the methods and findings of a literature review demonstrating the lack of theories of practice that are specifically for public health physicians. The third chapter will describe the methods and findings of a discourse analysis of Chief Medical Officers of Health (CMOHs) during the COVID-19 pandemic, which supplies evidence of the physician identity that public health physicians discursively enact through media briefings. The fourth chapter will characterize the processes of care that public health physicians use with respect to populations using Constructivist Ground Theory (CGT). Finally, the fifth chapter will discuss the implications of the collective findings for the theory and practice of public health physicians, as well as for medicine in general.
Chapter 2
2 Theories of Practice

2.1 Introduction

This chapter will describe the findings of a literature review examining theoretical models of public health practice that apply to populations, specifically those which apply to physician practice. Then, it will examine current theoretical approaches to the practice of caring for individual patients and explore their potential relevance to caring for populations. Finally, this section will characterize the research questions which flow from the current state of knowledge about this topic and propose investigations to address those questions.

2.2 Theories of Public Health Medical Practice

This section describes the results of a literature review for theories of practice that are relevant to public health medicine. The literature review encompassed five databases (MEDLINE, CINAHL, EMBASE, Scopus and Web of Science). Though the search terms were specific to each database, the goal was to find published literature at the intersection of three main conceptual domains: Community/Population or Public Health, Medicine and Theories of Practice (Appendix 2-B). Figure 2-1 depicts the intersection of these concepts as a diagram.

![Figure 1-1 Venn diagram of concepts for literature review](image-url)
The search strategy yielded 9,894 articles, of which 2,281 were selected based on their titles and abstracts for further review. There were three inclusion criteria for full-text review. First, the article must contain a theory or approach to practice. Second, the theory or approach must address public health practice. Finally, the theory or approach must be specific to physician practice. There were no limitations based on date of publication or language. Many papers were in French, Portuguese, Spanish, Japanese, German and Russian. This became a practical limitation for analysis and so these papers were also excluded from full text analysis. It is important to note that there were no papers that fully satisfied all three inclusion criteria.

Having not even a few articles that met all inclusion criteria necessitated a different approach to reviewing the literature. One approach could have been to revise or reduce the inclusion criteria but, as there were three core concepts that were being explored (physician practice, public health, and theoretical approaches), removing one of these core concepts could substantially alter the utility of the review and miss potentially important sources of information. An alternative strategy was chosen, which was to review articles in the overlapping zones between each pair of conceptual categories to gain a general sense of the frameworks that were described in the literature. Those articles that broadly met the intersection of “public health” and “medicine” were notable for the general absence of theory. Articles that were identified at the intersection of “theory of practice” and “medicine” were limited in their application to public health and dealt almost entirely with the care of individuals (exceptions such as Community-Oriented Primary Care will be reviewed later). By far the largest set of articles occupied the intersection of the concepts of “public health” and “theory of practice”. A descriptive synthesizing review of 800 of these articles was conducted to categorize theoretical approaches to public health practice, although none were specific to physician practice. The database search was supplemented by grey literature searches using similar search terms on Google Scholar, Amazon (for textbooks and other resources) as well as the public internet for educational, training and practice materials available from regulatory and training agencies around the world.
2.3 Synthesis and Overview of Public Health Practice Models

Public health literature offers many models for training and practice. It is notable that each of these is debated and discussed and there is no consensus on which models are the most useful for public health practice.\(^{47}\) This attempt to categorize the conceptual models of public health has resulted in six groups: Structural, Critical, Humanist (with Integral Models as a special case), Ethico-legal, Translational, and Practical (Practice-Focused).

2.3.1 Structural Models

The structural group of models includes applications of systems theory to public health, critical systems heuristics, chaos and complexity theory, and systems architecture as examples.\(^{23,48-53}\) The idea behind these is to characterize the systems and structures that influence health and then develop interventions to affect systems-level drivers of health. These and the other theories presented here are debated, contested and contextualized through dialogue with public health practitioners and researchers.\(^{54-56}\) They are also applied to a range of areas and topics within public health practice.\(^{57,58}\) An important subset of systems theories that has gained traction in public health has been ecological systems theories which include socio-ecological models, environmental ecological models and One Health, which is notable for bridging animal health and human health perspectives.\(^{25,59-64}\) The conceptual advantage of systems-level approaches is that they offer the potential of the most effective, ‘upstream’ impacts on health,\(^{65}\) but the disadvantage is that complex systems can rarely be fully characterized and so interventions built upon an incompletely characterized system may be less effective than interventions that aim to effect change within a narrower scope. Notably, these frameworks aim to describe systems rather than processes, so an ecological model might set out potential levels of intervention for a public health practitioner, but it is unlikely to describe the process of intervention that would characterize public health physician practice.
2.3.2 Critical Models

Critical models emphasize disciplinary lenses from social and political sciences and lend critical and innovative insights into public health. These include critical social theory (feminist, race, gender, class, etc.), intersectionality, social psychological and behavior theory, and relational models to describe health and its determinants. They also include political science and policy frameworks where healthy public policy is the desired outcome. The advantage of these approaches is they offer a new lens through which to understand human behaviour and decision making, as well as ways to understand or predict how interpersonal dynamics and other social conditions affect public health. Though these models can inform the physician practice of public health, it is also apparent that none of these theories alone could completely describe the nature or processes of that practice.

2.3.3 Humanist Models

Humanist models are those that emphasize human agency, participation, empowerment and community-driven approaches to public health. They include elements of shared power and capacity building and can be viewed as responses to the perception of an overly top-down hierarchical process of public health intervention. Among these empowerment and community-driven approaches, Community-Oriented Primary Care (COPC) and Community Action for Health (CAH) deserve special mention. Community-Oriented Primary Health Care describes primary care practice that extends beyond the clinic’s boundaries into the community. Kark compares ‘complementary’ functions of clinical and epidemiological skills between the care of individuals and the care of population groups. Kark’s approach describes the care of individual patients as involving patient examination (including history taking), diagnosis or health status assessment, treatment, and continuing observation. The comparator skill sets for populations are described as survey, community diagnosis, treatment and continuing surveillance and evaluation. Kark argues for a broader approach to general practice that extends into knowledge of and (to some extent) treatment of syndromes at both the individual and community-level:
If primary-care physicians are to extend their practice to include community medicine, they will need some of the additional skills of the community physician. They must be able to investigate and answer the basic questions that face the practitioner of community medicine concerning the state of health of the community, what is being done and what could be done about it, methods of health surveillance, and evaluation of health care. It is very seldom that doctors in primary care give much attention to answering these questions about the community as they do to similar questions about an individual patient who seeks their care.\textsuperscript{89(p65)}

COPC has a laudable goal of extending the domain of medical practice into the community while continuing to focus on the care of individuals, so in some respects it may be seen as a model of practice for public health. However, many of the interventions described as belonging to COPC are focused on individuals with attention to the community context, and arguably these types of interventions are aligned with providing patient-centered care to individuals but not to the community itself as a patient or unit of analysis and intervention. The presupposition of the community-oriented model of care is that the care provided by family physicians is to known individuals in the community. By contrast, public health physicians are responsible for the care of a population whose size prevents them from knowing each individual within it. For COPC to be fully realized, it would need to function both as local public health and as local health care, but there is a strong argument that the breadth of knowledge required to function competently in each area (family practice or public health) has broadened considerably, so as to preclude adequate competence in both with training in just one. Even the array of recommended clinical preventive interventions has grown to the point where primary care practitioners report significant barriers to delivering prevention and health promotion in clinical settings\textsuperscript{90–92}, and public health practitioners might argue that many of these individual-level interventions are among the least effective at bringing about population-level health.\textsuperscript{65}

Community Action for Health is “a complete and sustainable process in which any community – social, geographical, or professional – is involved as a full partner at all
stages of the health care process; identification of needs, selection of priorities, planning, implementation and evaluation of activities occur in close cooperation with the formal health sector, as well as with other sectors concerned. This definition captures the essence of other similar community involvement or engagement approaches to public health, and is a response to perceptions of top-down processes often used by governments to implement programs. There is an abundance of choice among frameworks to engage and involve communities. A recent review of community engagement frameworks in Canada found forty-five frameworks, sixteen of which could be applied specifically to community action on the determinants of health. These kinds of frameworks hold promise for the translation of patient-centered medicine to population-level intervention, because they set out processes and mechanisms by which a physician or public health agency could work directly with the patient (population) to understand and intervene for better health. However, though community engagement is part of public health practice, these and other humanist models do not explicitly refer to or include the roles and responsibilities of public health physicians toward their populations as patients.

2.3.3.1 Integral Models – a special case of Humanist Models

Integral approaches are theories that characterize health as an integrative process of consciousness expansion. They include or build upon ideas from Newman, Cohen, Hanlon and Wilber that will be explored below in greater detail. In a series of articles addressing the future of public health and the skills and knowledge that will be needed for public health practice in the future, Hanlon and colleagues apply Platonic philosophy to the future of public health as the intersection of "the good, the true, and the beautiful" – that is, the combination of science, art and ethics. Hanlon also offers Ken Wilber’s integral theory as a starting point for conceptualizing the new public health. Integral theory posits that there are four quadrants of consciousness – intentional (I, self), behavioural (It), cultural (We) and social (Its). Each quadrant is characterized by a distinction between individual or collective on one dimension and objective or subjective on the other. Each quadrant has its own ‘types of truth’, and Wilber argues that an “all-quadrant, all-level approach is the minimum degree of
sophistication that we need in order to secure anything resembling a genuine integral theory of consciousness”. As examples, the intentional quadrant of consciousness is individual and subjective, while the social quadrant is characterized by collectivity and inter-objective claims to validity.

As with every theory, the integral theory of consciousness has its criticisms and limitations. It is also supported and mirrored by other work describing health as a process of consciousness expansion and has been applied to the theory of nursing practice as well as to family medicine. It may also form an appropriate theoretical substructure to bridge the Patient-Centered Clinical Method for physicians working with individuals and a Population-Centered Method for public health physicians working with populations. The four process components of the Patient-Centered Clinical Method fit nicely as a bridge between the individual subjective and the individual objective quadrants of consciousness described by Wilber. Indeed, in the early pages of the Patient-Centered Clinical Method text, the endpoint of the process is described as “Integrated Understanding; Synthesis Unique for Each Patient” and being patient-centered “requires a balance between the subjective and the objective, a bringing together of the mind and the body”. This integrative understanding can only be achieved by bridging the individual subjective world of the patient with the individual objective world of clinical observation and diagnosis that takes context into account.

By logical extension from the individual to the collective, the Integral Model may present a useful substructure for a population-centered medical method (Figure 2-2), in which integrated understanding is achieved and a diagnostic synthesis is unique to each community, consistent with the Patient-Centered Clinical Method idea of integrated understanding of the patient’s experiences and contextual situation.
Developing an integrative approach to either public health or clinical medicine is not without risk. Richard Nice, in a foreword to a text by Bourdieu, describes how out-of-the-box thinking can be affected by our own limitations of thought: “a text which seeks to break out of a scheme of thought as deeply embedded as the opposition between subjectivism and objectivism is fated to be perceived through the categories which it seeks to transcend, and to appear contradictory or eclectic (except when forcibly reduced to one or the other alternative).”\(^{106}\) Despite this potential limitation, there are increasing calls for ‘integrative’ approaches to medicine, public health and even to the synthesis of knowledge in research.\(^{107-110}\) As Lewinsohn writes, “the battle is for the integration of all disciplines as equal partners in a joint effort: for science as much as for humanism. A new synthesis of both is the quintessential condition for the doctor and medicine to fulfil their ageless functions”.\(^{111}(p^{1269})\)

2.3.4 Ethico-legal Models

Ethical and legal perspectives on public health are primarily concerned with the principles and regulations to justify interventions, especially regarding interventions from the state that limit personal freedoms. A 2012 review by Lee identified seven "practice-
based" and six “theory-based” frameworks for public health ethics. In the ethico-legal category of frameworks, there are persistent discussions around which models to use, how to use them, as well as how closely the ethics of public health converge or diverge from the ethics of clinical medicine. They will not be covered extensively here, except to suggest that ethical frameworks typically outline considerations for decision making in practice rather than outlining those actions or steps that constitute practice itself.

2.3.5 Translational Models

The translational models of public health practice consider the primary function of practice as one of translation of some type of knowledge from the theoretical realm to the practical one. Knowledge translation experts have attempted to build theories and models that suggest how knowledge could be translated for public health. Recent iterations of these models overlap with community-driven or empowerment approaches, positioning the role of public health as brokering knowledge and synthesizing various kinds of knowledge and experience into intervention. As an example, the decision-making framework for public health produced by the National Collaborating Center for Methods and Tools specifically positions ‘public health expertise’ at the intersection of community health issues in local context, community and political preferences and actions, research evidence and public health resources. These models are also widening their recognition of diverse types of knowledge, and of how each can be integrated into understanding an issue. However, viewing the primary role of public health as one of translating knowledge fails to account for the duties and obligations of physicians toward patients, and it fails to account for the requirements of public health physicians to intervene with both patients and populations to protect and promote health.

2.3.6 Practical Models

Practical, or practice-focused, models of public health are generally of three kinds: those that view public health as primarily related to intervention design, implementation and evaluation; those that conceptualize public health as a diagnostic or clinical process
applied to populations; and those that set out guidelines for fulfilling assessment functions of public health such as community health assessments. These can be very useful for the general practice of public health, but with respect to public health physicians there are some limitations to their application. First, these models rarely account for the responsibility of public health physicians to protect health where it is threatened and are therefore more applicable to planned interventions than to outbreaks, emergencies, and health protection functions. Second, there are no practice-focused models that are specific to the practice of physicians, so models of care that are developed for general public health professionals may not account for the roles that physicians are expected to play and the responsibilities that physicians have regarding their practice of public health medicine. Finally, practical models that present tools for community health assessment are limited to the assessment or diagnostic portion of practice and do not give insight into the therapeutic or interventional components of practice.

The practical model that most closely approximates both diagnostic and therapeutic stances toward a population is the PRECEDE-PROCEED model developed and expanded by Lawrence Green and colleagues. The steps in this method include Social Assessment; Epidemiological, Behavioural, and Environmental Assessment; Educational and Ecological Assessment; Administrative and Policy Assessment and Intervention Alignment; Implementation; Process Evaluation; Impact Evaluation; Outcome Evaluation. PRECEDE-PROCEED has been used with many topics and intervention settings in public health. This model also overlaps closely with the nursing process model described later in the paper. Though they seem complete in terms of their approach to planning interventions, none of these models pertains explicitly to physician practice and it is unclear whether these models reflect the actual processes of care undertaken by physicians in public health.

Another practice-focused model that bears mention is the Evidence-Based Public Health (EBPH) approach. This well-developed framework from Brownson parallels the idea of evidence-based medicine and has been expanded since its inception to include training modules, competencies, and assessments to guide practice. EBPH has seven steps: community assessment, quantifying the issue, developing an initial
statement of the issue, determining what is known through the scientific literature, developing and prioritizing program and policy options, developing an action plan and implementing interventions, and evaluating the program or policy. EBPH is described as an approach that is “both an art and a science. The science is built on epidemiologic, behavioral and policy research showing the size and scope of the problem. The art of decision making often involves knowing what information is important to a particular stakeholder at the right time”.\textsuperscript{130(p193)} There are elements of this model that could be translatable to the practice of evidence-based public health by physicians, but they are not a complete picture of public health physician practice just as evidence-based medicine incompletely captures the process by which physicians care for individual patients.

2.4 Approaches to Practice from Training Institutes and Other Professions

Outside of academic theories and models, supplementary information on the practice of public health can also be found both in public health literature as well as in guidance documents related to training and practice. In Canada, the Public Health Agency of Canada has published guidance documents for the practice of public health professionals in general\textsuperscript{131}, and further work elucidated public health competencies for more specific groups of public health professionals, including physicians.\textsuperscript{132–134} Similar practice guidance available for public health professional organizations around the world also takes the form of sets of competencies and skills that are believed to be required to practice as a public health professional. The key limitation of an approach to describing the role of the physicians through competencies is that there needs to be a unifying or underlying process through which the different roles are enacted. For example, the Canadian Medical Education Directives for Specialists (CanMEDS) framework describes physician roles such as Scholar, Advocate or Leader with Medical Expert as an integrating role\textsuperscript{135}, but a process model such as the Patient-Centered Clinical Method is required to describe how these roles are integrated and enacted to fulfill a physician’s responsibilities. Also, competency models tend to be based on theoretical models of practice that are generated by consensus rather than by empirical inquiry.
Allied health professional practice can also be a source of information for the development of physician practice models. The nursing field has had significant theoretical development since its inception, and it has developed models of caring for the community that are specific to nurses in public health. A recent literature review identified twelve models of care used in public health nursing, and three of them were specifically considered to be “population-focused” – The Intervention Wheel, the ASTDN public health nursing practice model, and the public health nursing practice model from Los Angeles. Of these, the Los Angeles model explicitly includes practice steps that are common features of what has been termed the ‘nursing process’: assess, diagnose, plan, implement, and evaluate. The nursing process may also be recognizable to those familiar with the literature on quality improvement processes, such as “Plan-Do-Study-Act”. While nursing models of caring for a population may help to inform a model of public health physician practice, they do not account for the responsibilities and duties assigned to public health physicians, especially those related to the autonomy and authority granted to public health physicians in many jurisdictions.

2.5 The Patient-Centered Clinical Method and Public Health Medicine

A 2014 scoping review of patient-centered approaches in healthcare identified 25 patient-centered care models from papers across a range of practice types from primary care to neonatal intensive care and urology. The authors described three central components to achieving patient-centered care, with sub-components in parentheses, as follows: effective communication (sharing information, compassionate and empowering care, sensitivity to patient needs), partnerships (relationship building and inter-professional collaboration) and health promotion (effective case management and efficient use of resources).

Of the models described, the Patient-Centered Clinical Method (PCCM) is perhaps the most applicable to public health medicine because of the context in which it was developed. As a model of primary care practice, it is applicable to a significant breadth of medical practice. As a generalist model, it may be particularly suited to the breadth of practice seen by public health physicians who are responsible for populations. The PCCM is also unique among other models of care for setting out an explicit process of care rather than just establishing the dimensions of that care. The
PCCM has four components: Exploring Health, Disease and the Illness Experience; Understanding the Whole Person; Finding Common Ground; and Enhancing the Patient-Clinician Relationship. The following sections describe the importance of these process steps to the care of patients and their potential applications to the care of populations.

2.5.1 Exploring Health, Disease and the Illness Experience

The first component of the PCCM involves an exploration of the characteristics of the patient's symptoms and conditions while understanding the meaning of those conditions that are unique to the patient. Four key dimensions of the illness experience are explored in a patient encounter—the patient's feelings and fears, ideas, function and expectations. The trajectory of an illness also influences self-perceptions of health and responses to symptoms. At the individual level, an exploration of the illness and what it means to the patient plays a central role in the clinical process. The exploration of health and disease is just as significant for populations as it is for individuals. In “The New Public Health”, Baum devotes the first chapter to a discussion on ways in which health has been conceptualized: as part of a 'medical clockwork model', health as the absence of illness, health as defined by lay people, as part of a critical analytical discourse in society, as an 'outcome', and as a characteristic of a place or an environment. Definitions of health are important because using the word in different ways “carries considerable cultural, social and professional baggage” and “gives rise to particular ways of seeing the world and behaving”. Baum notes a study by Crawford in which lay people alternately viewed health as a control mechanism or as a release mechanism, and that this apparent contradiction was explained by capitalistic messages that promote restraint on the one hand as a means to ensure economic productivity while also promoting hedonism in order to secure demand for the goods produced by that system. These kinds of critiques of health and its meaning, and how the concept of health is influenced by social factors, have implications for public health physician practice, because of the need to appreciate and accommodate shifting views and perspectives on health in a population to intervene for health improvement.
The idea of a disease, as an abstraction that may point to a cause or a solution for a set of symptoms, is just as relevant to populations as to individuals. The scope of inquiry may be different (the burden of diabetes in a population vs. the burden of diabetes in an individual), but certainly public health physicians attempt to characterize the prevalence and impact of diseases on the overall health of a population through various quantitative and qualitative measures. Disease identification and characterization are important both for the treatment of individual patients as well as for the prevention of communicable and non-communicable diseases at the population level. These abstractions at the population level are used to inform both the understanding of as well as the response to health issues by the government and other sectors.

The experience of health at the level of a population is an underdeveloped area of public health practice, and one that may be crucial for the effectiveness of public health interventions on complex issues. Social epidemiologist Nancy Krieger describes how social conditions can ‘get under the skin’, impacting perceptions of illness and self-efficacy.\(^{144}\) This understanding has a strong potential to be used in the design of empowering and enabling interventions for health. Interpersonal violence, for example, has been described as an issue that has impacts at the level of individuals and also at the level of community.\(^{145}\) Increasingly, public health stakeholders are considering that communities (as units of analysis) experience and are changed by violence, so understanding the illness experience of a population may help public health physicians to intervene for the health of populations. Similarly, phenomenological accounts of illness experiences could be used to design mitigation approaches to communicable and non-communicable diseases, and a greater understanding of behaviour and motivation could be used to design more effective approaches for prevention.\(^{146,147}\) Acknowledging the complexity inherent in understanding and integrating knowledge about the multitude of fears, hopes, ideas, and expectations within a given community, the process for incorporating these into practice is not made explicit in many public health models.
2.5.2 Understanding the Whole Person

The second component of the PCCM is to understand the whole person, as distinct from the person’s current presentation of symptoms. A patient’s life course takes place within an evolving proximal and distal context. This is the component in which the connection between medicine for individuals and medicine for communities becomes highly significant for each. In order to effectively intervene with an individual, one must understand the community, and in order to effectively intervene with communities one must understand individuals. In this framework, public health physicians are positioned well as specialists in “distal context” – the impacts of community-level and society-level determinants of health. Distal context is also generally the level at which public health seeks to intervene, by changing the conditions under which health is produced and maintained in communities.

One important caution when depicting proximal and distal context is that these layers should not be interpreted as being strictly linear or staged in their impact. Krieger makes an important point that the visuals and representations we use to characterize relationships can cause factors to be labelled as “distal” when their impact is much more direct and proximal. So, this layering is not meant to imply that layers farther “away” from direct practice are “merely” distal and indirect in their effect. A notable example of the effect of distal changes is how political changes such as the rise of populism can have direct impacts on the perception of the value of medical expertise. This can result in dramatic shifts in the perceived status of professions in society and create debate about the role of experts in government and society. How well, and in what ways, are public health physicians expected to “know” the whole community that they serve? And how do they go about arriving at this knowledge? Although this component of the PCCM has significant linkages to public health, it is unknown if or how this component is directly translatable to the practice of public health.

The PCCM authors describe that, “as knowledge of the broader social determinants of health has evolved, . . . primary care professionals will question whether society at large, the health care system in general, and the local community provide individual patients with the options they need for optimal health”. This is
an important area of overlap between public health and primary care practice, with the key distinction that while there may be some interventions at the individual level that can mitigate the individual impact of these determinants, broader structural and political changes that alter the determinants of health are primary intervention targets for public health physicians.\textsuperscript{94,154–156} Recall that intervention along social and structural determinants is necessarily a political exercise, and though physicians and their organizations have a history of political action, there are significant differences between political action taken by physician advocates with respect to physician interests, the interests of individual patients (or diseases), and the interests of the population as a whole.\textsuperscript{157–160}

2.5.3 Finding Common Ground

The PCCM approach describes the need to find common ground with patients as mutual agreement on three considerations: “(1) defining the problem, (2) establishing the goals and priorities of treatment, and (3) identifying the roles to be assumed by both the patient and the clinician”.\textsuperscript{161(p108)} Finding common ground has also been suggested as a strong predictor of patient outcomes, including recovery from discomfort, better emotional health, and fewer diagnostic tests and referrals.\textsuperscript{162} Brown and colleagues write that the “patient’s world is understood as a dynamic situation that varies with each patient at different points in time and with each health care issue. The practitioner’s aim is to find the best fit with the patient’s world”.\textsuperscript{161(p127)} This is equally true of communities – they are dynamic and different at each point in time. The complexity of working with communities is that even within a community there are multiple and sometimes competing values, interests, and needs. This makes the process of finding common ground potentially an exercise of longer duration, requiring transparent processes and acknowledgement of differing value sets and preferences within the same population. In translating this concept to public health, the findings from the literature point toward community-oriented and empowerment models, as well as rights-based approaches to public health practice that may be particularly relevant to this practice component. Equally true about communities is what the Patient-Centered Clinical Method authors
write about the pitfalls of not finding common ground: “A plan rejected by the patient (even silently) is no plan at all”.\textsuperscript{161(p117)}

### 2.5.4 Enhancing the Patient-Clinician Relationship

Finding common ground between patient and physician is described as a “complex process” that “is accomplished through collaboration between clinician and patient based on trust, caring and mutual respect”.\textsuperscript{161(p107)} Undoubtedly, the therapeutic relationship is the foundation upon which trust is built and the context within which decisions about care are co-produced. This component is perhaps the most challenging to translate to the field of public health practice, because in many cases it would be impossible for a public health physician to have a direct personal relationship with each individual in a population for whom the physician is responsible. However, a physician can have a relationship with (and an understanding of) one or more communities and their needs and behave in ways that generate trust and demonstrate caring and mutual respect.\textsuperscript{163} Certainly, physicians can enhance relationships with community representatives, such as elected officials, and with representatives of stakeholder organizations, such as school principals, business leaders, advocacy organizations, and the media. However, the relationships with representatives of the community may be a poor proxy when the interests of those communities are in conflict with the interests of the individuals who represent them. Indeed, “no claims to support exist in isolation. They must always compete with rival claims and even those who lack a voice do not lack rivals purporting to speak for them”.\textsuperscript{164(p146)}

Stewart and colleagues mention some of the dimensions of the patient-physician relationship – trust, caring, feeling, power, and purpose.\textsuperscript{165(p143)} Some additional dimensions can be found in the literature on community engagement. For example, Wilkins offers some strategies to engender trust – balance power dynamics, be transparent about goals and motivation, create infrastructure and policies to community stakeholder meaningful involvement, develop cultural humility, equitably distribute resources, effectively communicate in all directions, establish pattern of fulfilling trust, and share decision-making among partners.\textsuperscript{163}
One way in which this relationship can be examined is through the lens of social accountability – the professional responsibilities of physicians with respect to the community and society. A grounded theory study from South Africa investigated the social accountability of physicians with respect to the community and found that though community participants were “unable to articulate a definition of social accountability”, consultation with a physician was “characterized as a place of love and respect at the heart of the relationships amongst people and systems” [italics in original]. Though social accountability as a responsibility of physicians is gaining traction in the training and development of medical professionals, this lens may not accurately reflect the components of the relationship between a physician and the population when the population is considered as a patient, and there has been little to no academic exploration of this topic to date.

2.6 The Need for Theory in the Practice of Public Health Medicine

In discussing theories of practice, some theorists use the word praxis, which can be defined as “the exercise or practice of an art, science, or skill”, “customary practice or conduct”, or “practical application of a theory”. To other scholars, though, praxis is more. It is “not simply action based on reflection; it is action that shapes the world and is grounded in ethical and moral principles”. This nicely encapsulates a practice ideal for all physicians – to shape the world for better health through our actions and efforts which are grounded in ethical and moral principles – but how should we go about achieving these goals? The reason for the need to focus on characterizing physician practice and its corresponding ‘ways of doing things’ is that, as Freidson writes, “the ultimate practical and moral reality of human society lies in what concrete people do and how they interpret their problems in the settings of everyday life”. So, if we can reach a common understanding of processes of care for populations by physicians, we can better describe the roles of physicians with respect to patients and populations.

As Stewart and colleagues suggest, practice models are useful in several ways: “first, they guide our perceptions by drawing our attention to specific features of practice; second, they provide a framework for understanding what is going on; third, they guide our actions by defining what is important”. There are two additional reasons why models of practice for public health are needed and could be helpful. First,
like the PCCM and other models of practice, they can create a common frame of
reference and vocabulary to describe, investigate and improve the process of care by
physicians. Second, they can help to shape practice between and among practitioners
by enabling systematic, focused discussion using the structure of the method of
practice. None of the models of public health practice identified in the literature review
were specific to the roles, responsibilities and practice of public health physicians. Few
of those explicitly placed the community or population as the center of focus or activity.
Although some of the models may apply to the public health physician practice, it is
unclear to what extent they reflect the actual process by which physicians care for a
community or population. Yet, public health physicians describe their work as taking a
population-centered approach without having consensus on what steps or actions
constitute that approach.

In the following three recent examples, a method of practice for public health
physicians could have been helpful for the field to structure its conversations around
diagnosis and intervention. The United States has seen an increase in vaping-related
illnesses, as cigarette manufacturers have found a technological innovation to
circumvent years of public health efforts to lower rates of tobacco use and nicotine
dependence in our populations. As a new frontier in substance use, vaping presents
an issue for public health practice, with some arguing that it is a safer alternative to
cigarettes, while others argue that it is a gateway to nicotine addiction in stronger doses
and at earlier ages. When a case of potential vaping-related illness was discovered in
London, Ontario, the local Medical Officer of Health was very pro-active about warning
the public about the risks of all vaping – subsequent investigations have pointed to
Vitamin E acetate as an ingredient that may be causally linked to vaping-related
illness. At that time, discussions among Medical Officers of Health were focused
on how to respond and how much should MOHs use their powers to declare health
hazards and ban certain products. A method of public health practice may have enabled
practitioners in the field to discuss this issue in a structured way and to arrive at
solutions that incorporate the observed data on vaping-related illness along with social
constructions of vaping to better address the issue among people who use vaping
products.
The second example concerns Eastern Equine Encephalitis (EEE), a vector-borne disease that most commonly affects horses (hence its name) but occasionally affects humans. It is a rare disease (an average of 7 cases per year in the United States) that can cause systemic self-limited disease or encephalitis, but up to 30% of people who are infected can die from EEE. In September 2019, Michigan state recorded an elevated incidence of EEE – 8 cases were confirmed and there were 3 deaths. In response, the Michigan Department of Health and Human Services (MDHHS) issued a statement “encouraging local officials in the affected counties to consider postponing, rescheduling or cancelling outdoor activities occurring at or after dusk, particularly activities that involve children. This would include events such as late evening sports practices or games or outdoor music practices”. The letter from the public health physician noted that the recommendation was being made out of an “abundance of caution to protect the public health” and would apply until the first hard frost of the year, which is typically considered the end of the season for vector-borne diseases. The letter did not describe the risk assessment of the problem, and it is unlikely that state officials considered the potential harms from reduced physical and social activity in children for a period of several weeks to avoid a risk that, while elevated, was still low in absolute terms at the population level. A standard approach or method of public health medical practice would have enabled a systematic analysis of the issue along with its context to determine a set of solutions that would be acceptable and feasible for the population while also addressing the emergent risk.

Finally, as the COVID-19 pandemic has reached almost every part of the world, Medical Officers of Health across the country have been placed under a sudden and intense spotlight (and scrutiny) as to how they make decisions to protect the health of the population. A process of care for public health physicians and their populations (patients) would help to clarify the nature of the engagement between public health physicians and the population while highlighting the importance of the population-physician relationship. A process of care model might also help to explain how physicians may arrive at different clinical decisions or outcomes when faced with a similar set of circumstances or evidence, because of contextual or relational factors.
A practice model for physicians with populations as patients would have significant implications for all physicians, including family physicians working with patient populations and public health physicians who have responsibilities for populations as patients. An ideal model for this purpose would have the following minimum attributes. First, it would account for the unique roles and responsibilities of physicians with respect to their populations as patients. Second, it would explicitly include the relational element of interactions between the physician and the population. Third, it would explicitly place the population at the center of physician intent and action. Fourth, it would consider the population as the unit of analysis and intervention. Finally, it would contain clearly described process steps, although these would not have to follow a linear progression.

2.7 Research Questions

It is evident from the literature review that there are no practice models for physicians who are responsible for the health of populations, whereas there are available and validated models for the care of individuals as patients such as the Patient-Centered Clinical Method\(^\text{37}\) or the biopsychosocial model of care\(^\text{36}\). These models attempt to explicitly characterize the processes or domains involved in the practice of medicine between an individual patient and a physician. Developing such a model for public health physician practice would move the medical and public health fields toward a greater understanding of how physicians can improve patient and population health through medicine.

Though each of the categories of public health practice models may have some degree of application to physician practice in public health, none of the models are complete or comprehensive with respect to the roles and responsibilities of physicians or the relationship between a physician and a population as a patient. Similarly, though the PCCM is a recognized method of practice for physicians with respect to individual patients, no empirical evidence has yet demonstrated its application or applicability to the care of populations. A model of care that explicitly considers populations as well as patients could serve to strengthen the practice of family physicians and public health physicians for population health. Research toward greater conceptualization of this model will be described in the following chapters.
Specifically, subsequent chapters will detail the methods and findings of two studies aimed at understanding and developing a theory of practice for public health physicians. The third chapter addresses the research question of “How is care enacted by public health physicians?” by examining discourse in public media briefings by Chief Medical Officers of Health during the COVID-19 pandemic in Canada. The fourth chapter addresses the research question of “How do public health physicians care for populations?”, using Grounded Theory methodology to build a Population-Centered Medical Model of care by physicians for populations. The fifth and final chapter offers a synthesis and discussion of the knowledge generated from studies contained in this manuscript.
Chapter 3
A version of this chapter has been published as:

doi:https://doi.org/10.1016/j.ssmqr.2022.100208
Enacting Care by Being Experts and Managing Relationships: A Discourse Analysis of Chief Medical Officer of Health Media Briefings During the Covid-19 Pandemic

3.1 Context

This paper explores the actions of Chief Medical Officers of Health (CMOHs) in Canada during the COVID-19 pandemic through analysis of their discourse at media briefings. As public health physicians, CMOHs practice at the intersection of medicine and public health, and each of these is an evolving and changing domain. Over several decades, the ‘model’ for physician practice has progressed from the traditional biomedical model to the ‘biopsychosocial’ model, leading to the current paradigm of patient-centered medicine. Patient-centered models of care share certain core features – the sharing of power and expertise between patient and physician; the importance of understanding values and goals and contextual factors that affect the presentation, diagnosis, and treatment of illness; and the importance of the relationship and relational elements between patient and physician.

Similarly, public health practice has also gone through conceptual developments from its original focus on hygiene and sanitation (structural), to the control and prevention of infectious diseases (biomedical), to the control of chronic diseases related to lifestyles (clinical), and finally to the recognition of social and cultural determinants of health (social). As the field has evolved, the practice of public health is conceptualized as a collaborative exercise, in which expertise is negotiated, shared, and created as capacities are built for greater overall health and wellbeing. In Canada, public health expertise is described as existing at the nexus of research evidence, community health issues and local context, community and political preferences and actions, and public health resources. Since public health physicians are trained in medicine and in public health, evolutions and developments of each of these fields have shaped practice for all public health physicians, including CMOHs. CMOHs may also have managerial roles within government, though formal training in public administration is not a prerequisite qualification for CMOHs in Canada.
Public health and preventive medicine is “the medical specialty primarily concerned with the health of population” in which a public health physician specialist “monitors and assesses the health needs of a population and develops, implements and evaluates strategies for improving health and well-being through interdisciplinary and intersectoral partnership”. Public health physicians in Canada occupy a liminal position in the fields of both medicine and public health. Although trained in medicine, these specialists inhabit a unique position within the larger array of medical specialties because of their small numbers and population-based orientation. In terms of absolute numbers, they occupy a marginal space within the field of public health practice but within the public health sector (and the public sector in general) they typically hold positions of authority and/or influence. Historically, the development of the medical profession within public health has been layered with tensions related to the role of medical professionals in community health, the role of public health physicians vis-à-vis other physicians, the role of physicians in government, and the value proposition of public health itself vis-à-vis society.

In Canada, public health and health care are the responsibilities of provinces and territories (sub-national jurisdictions). While the first CMOH-like appointment in the UK was John Simon in 1855, Ontario was the first Canadian province to create a provincial Board of Health in 1882, which included a Chief Medical Officer of Health. The Canadian and UK public health systems have evolved along similar lines and, since the late 1800s, each province and territory in Canada has appointed a CMOH (official titles vary in each jurisdiction) and many also have local and/or regional Medical Officers of Health (MOHs). In Canada, CMOHs have legislated responsibilities that can involve the use of significant powers that enable them to intervene to protect public health when indicated. However, they also occupy a role within government and are formally or informally accountable to their deputy minister, ministers and, in some cases, to the provincial legislature. There can be challenges when these roles (physician and government agent) intersect with respect to CMOH autonomy, independence and legitimacy. Though some argue that this is a natural consequence of scientific and political interactions, perhaps at no other recent time have these roles and boundaries become so explicitly discussed as during the COVID-19 pandemic. There
have been public demands for CMOHs (and other MOHs) to abandon their obligations to the political processes or systems and to use their statutory authorities to intervene. At the same time, there have been demands for CMOHs to relinquish those powers in deference to political decision-making systems. The COVID-19 pandemic is therefore an opportune moment to examine further the role of CMOHs and the relationship between CMOH discourse and the practice of medicine, as well as their publicly articulated intentions of caring for populations as patients.

3.2 Research Question

The key connection between “doctoring” for individuals and “doctoring” for populations is the notion of caring for a patient. In an interview with Dr. Sanjay Gupta about his pandemic experiences, Dr. Anthony Fauci said: “I don’t mean to be melodramatic at all, Sanjay, but I’m a physician and a scientist and when I entered into the arena of global health, the country became my patient. And I just want to be remembered as I really took good care of my patient.” In the Canadian province of Alberta (AB), Dr. Deena Hinshaw has said: “I care deeply about the health of AB. It remains my hope that AB understands & respects every conversation I have, put their health & a holistic consideration of all aspects of their health, 1st.” The idea of caring for a population as a patient has been similarly echoed by other public health physicians, yet to date there have been few attempts to understand the ways in which that care is enacted and performed from a medical perspective. This leads to the following research question: How does a public health physician enact care of a population?

There are a number of means by which the enactment of care can be examined. In clinical encounters with individual patients, conversation analysis can yield insights into patient-physician interactions, critical theoretical analysis can uncover power dynamics and hierarchies, and sociological analysis can establish pathways by which patients and physicians construct social identities through participation in health care. Given the nature of the pandemic and the heavy involvement of most public health physicians in the COVID-19 health emergency, it would have been both challenging and insensitive to seek individual interviews with public health physicians during this time to
observe their enactments of care. Similarly, gaining access to internal meetings at public health agencies during a time of emergency to conduct ethnographic or other observations would also not have been successful, even though these are also settings in which a public health physician might enact care. One opportunity that was available for observation and analysis was the appearance of public health physicians in media briefings during the pandemic. The appearances by Chief Medical Officers of Health across Canada offered a window into the public face of the role and a starting point for inquiry into how care is enacted by public health physicians. So, for this study the research question was narrowed and restated as: How does a public health physician enact care of a population through public discourse?

3.3 Methods

Discourse analysis is a way of understanding how socially constructed identities are exhibited through communication, and it is a method that allows for multiple analytic perspectives on discourse. Jones characterizes three ways of understanding discourse: formal, functional and social. Formal approaches consider grammar, syntax and linguistics, functional approaches consider ‘language in use’ and social approaches consider ‘language as a social practice’. This study specifically uses a functional approach in order to yield insights for the practice of medicine and public health by physicians. Similar to a study that sought to understand the discursive features of media briefings held after meetings between international leaders, this study was designed to explore practice-level (rather than social or institutional) insights from a medical perspective for the role of CMOHs through public discourse, using both the content of the text as well as the context and communicative action as analytic parameters.

Five Canadian provincial and territorial jurisdictions were selected for geographic and demographic diversity. These jurisdictions ranged in population from under 50,000 to over 8 million by 2020 estimates and geographic representation of jurisdictions included eastern, central, western and northern Canada. Although CMOH communications appeared in a number of media formats, from print journalism to social media clips, full media briefings were selected to transcribe because they represent the
most direct form of communication from CMOHs, rather than pieces of dialogue that are filtered through media channels into sound bites or shorter content forms. Among all of the media options, full press briefing transcripts allowed for more dialogue to be analyzed to gain a more fulsome account of the content-in-context of CMOH communications. Transcribed media briefings from these jurisdictions included a total of five provincial and territorial CMOHs, as well as two additional (non-Chief) MOHs present at one of the briefings—CMOH is used here to refer to all participants. A total of nineteen transcripts representing five jurisdictions and seven CMOHs were analyzed for this study. Each CMOH was assigned an arbitrary number from one to seven for anonymous attribution. Although these events were public and these remarks were publicly available, CMOHs were identified by number rather than name to enable the data to be interpreted by the reader without being influenced by knowledge or perception of the speakers. CMOHs ranged in tenure from two to thirteen years in the role. The total time of the set of transcripts was just over fifteen hours in length.

Media briefings from each jurisdiction were selected to coincide with three phases of the COVID-19 pandemic between March and November 2020. In the early phase (Time 1 – March-April 2020), media briefings describing sentinel events, namely the first cases of COVID-19 and the first fatalities (where these occurred in the time period) from COVID-19 in each jurisdiction were selected. In the middle phase (Time 2 – July 2020) media briefings were selected in each jurisdiction at a time when COVID-19 cases were generally low across the country, and in the late phase (Time 3 – November 2020) media briefings were selected as COVID-19 cases were increasing in each jurisdiction. The frequency of briefings in each jurisdiction changed over the course of the pandemic, and the team attempted to ensure that the briefings within each of the second and third time periods were clustered closely in time (within 1-2 weeks) as there were no common sentinel events (such as the first case or the first fatality) that could have been used to select a specific briefing. Briefings were collected through publicly available websites (e.g., cpac.ca, cbc.ca and youtube.com) and transcribed using a transcription service. Research Ethics Board approval was not required, as these were publicly available at the time of their transcription. NVIVO (Version 1 for Mac) was used in the initial stages of content coding and development, and for keyword
queries during the analytic process. The research team included four researchers – two with expertise in public health and two with expertise in family medicine. Three members of the research team had prior experience with a range of qualitative research methods. One member of the team was directly involved in the pandemic response as a local (not provincial or territorial) MOH. Analytic discussions included considerations as to how team member expertise biased, situated and bounded the analysis, and focused the analytic process toward practice-level insights for medical professionals.

The analytic frame was aligned with the use of discourse analysis to investigate studies of occupation and membership in occupational groups, and conducted in a manner consistent with the process of discourse analysis outlined for use in family medicine. Two reviewers (SR and JBB) analyzed a transcript line-by-line to develop an early sense of potential codes. A shortlisted codebook was developed for subsequent coding, which was then used in the preliminary analysis of two transcripts by the full team. Each transcript was reviewed by at least two members of the research team. Subsequent discussions led to further refinement and revisions of the codebook, which was then used for successive rounds of coding and analysis by the team. Codes were continuously refined, expanded, or integrated as indicated by analysis and discussion. As content codes reached a level of sufficiency (that is, both a reduction in new codes obtained from further data and a gain in information power and analytic insight being produced), the team shifted discussions to focused rather than exhaustive learnings from successive transcripts. Data were assessed for comparisons between different CMOHs at the same time points as well as for each CMOH over the series of time points in the data. Data were coded both for content and communicative action, and relational and contextual components were analyzed and validated by team discussion. Analytic memos were used to refine and record the research team’s discussions and insights. Immersion-crystallization techniques were used to refine the characterization of CMOH actions as they emerged, with particular attention to the relevance of the data for medical practice.
3.4 Findings

Briefings followed a specific and consistent structure. They began with opening remarks from one or more speakers, one of whom was the CMOH. CMOH opening remarks were formal rather than conversational, and they were continuous and uninterrupted with no explicit time constraint. These were followed by a time-constrained question-and-answer (Q&A) session, where there was a limited dialogue between members of the media and one or more speakers including the CMOH. The Q&A sessions were used by the media to seek detail or clarification, to ask opinions, to inquire about issues not raised in the opening remarks, and to establish narrative connections between various aspects of the pandemic situation. Media representatives were allowed one or two questions each, and individuals were called upon to speak by a moderator using a process that was not identified in any of the briefings. CMOHs achieved their articulated goal of enacting care by being experts and managing relationships, and the components of these categories are described below.

3.4.1 Being Experts

CMOHs demonstrated expertise in four ways. First, the content of CMOH speech was very recognizable as biomedically oriented, involving description of the COVID-19 disease and its characteristics (e.g., epidemiology, diagnosis, prevention, treatment). Second, CMOHs used expertise to assess evidence and risks related to COVID-19. Third, they framed evidence and risk related to COVID-19 in their presentations to the public. Finally, CMOHs made judgments about interventions (and exemptions) for the prevention and treatment of COVID-19 at the individual and population levels.

3.4.1.1 Describing Disease Characteristics

CMOHs provided information about the disease itself – its pathogenesis, its local, regional and global epidemiology, and transmission risks associated with the disease:

We also know through studies now done on tens of thousands of cases in China and Italy and other places that transmission happens through close contact, not airborne and transmission happens when people are symptomatic. People may have very mild symptoms. You know, you may have a dry cough, a slight fever
which you didn’t measure and that’s where transmission can happen… [CMOH 2, Time 1]

CMOHs described the diagnosis and assessment of the disease – symptoms, degrees of severity of disease, and the kinds of diagnostic and screening methods that were available and how they changed over time:

We have since learned from our own experience and from the experience of other provinces that for mild cases where [...] after 14 days of the onset of symptoms where people are totally symptom free for several days, there’s no need to swab. So now, many cases will be cleared just through a health assessment and may not require swabbing. [CMOH 2, Time 2]

CMOHs offered information about interventions to prevent and treat disease, as well as the anticipated effects of those interventions:

That’s the main thing that all of us can do, and to take those precautions that we need to take every day to prevent transmission of infections and it wouldn’t be a day gone by where I don’t say, you know, cleaning your hands regularly, covering your mouth, coughing into your sleeve and staying away from others if you’re sick. [CMOH 1, Time 1]

3.4.1.2 Assessing Risk and Evidence

CMOHs assessed risks and benefits in multiple ways. First, they assessed the risks and benefits of interventions themselves. Second, they assessed risk and benefits between or among interventions. Third, they assessed risks and benefits of strategies to achieve adherence to interventions. Finally, they sought to balance the distribution of benefits to the population against the risks to individuals from population-level interventions.

CMOHs both described explicitly and alluded to the importance of balancing risks and benefits when deciding upon interventions:

Everything we do is all about the appropriate balance, knowing that all of our interventions actually have significant impacts, so it’s really important that we
work through those impacts and what the potential benefits are, and when is the right time when the balance of benefits actually outweigh some of the potential negative impacts. [CMOH 6, Time 1]

CMOHs described the need for balance among approaches designed to achieve adherence to interventions by enabling self-efficacy of individuals (via education and reduction of barriers) as compared to enforcement against nonadherent individuals. Efforts to educate and enable were rhetorically linked to trust in others and confidence in the outcomes of self-efficacy:

We’ll be working in many different scenarios to make sure that we can encourage and educate and do compliance checks in a way that support people to do the right thing. But I do still believe – and I see it every single day – in the decisions that are being made by young people that I'm involved with in my life and via others around the province, that if we tell people what we need them to do, we reinforce it when we see things like this and we give people the means to do that, that the vast majority of people do do this. [CMOH 1, Time 2]

In contrast, efforts to enforce were rhetorically linked to emphasizing risks and the importance of protection against disease:

And I would also like to submit that the time for education is now mostly over. Any immediate non-compliance will and should be met by thorough fines and other measures. [...] If you look at ways to circumvent them, then I'm afraid we will be heading into dangerous territory, both for the healthcare system and potentially for a full lockdown. [CMOH 2, Time 3]

CMOHs sought to balance the benefits of interventions to protect the public against harms that might accrue to individuals, especially in the domains of privacy and the prevention of stigma. While the media were frequently seeking as much information and detail as possible, CMOHs attempted to delineate boundaries specifically around the privacy and health information of specific individuals:

Media: Can you share that primary care facility?
CMOH: No, that information should not be shared. That’s confidential information both for the person and also for the providers […]

Media: Can you clarify the gender of the first positive case? Man, woman –

CMOH: It is not really useful for, you know, for Public Health purposes, but we generally try to avoid that and we have to be mindful that, you know, we are talking about individuals […] In future, there may be individuals in small communities and we’ll have to be very mindful about even naming if individuals test positive in future from small communities. I think we do need to protect from our side privacy and confidentiality of people… [CMOH 2, Time 1]

Efforts by CMOHs to set boundaries around the disclosure of personal information involved suggestions that the publication of specific information was not necessary for public protection and may cause harm to individuals. CMOH attempts to define disclosure as a matter of professional judgment were often met with concern or resistance from the media:

Media: … in the case of a pandemic, shouldn’t personal privacy take a little back seat to overall safety of the community? […]

CMOH: We would have to look at the community and look at the population and balance privacy and risk to the public when we make those decisions. In [large city name], it was quite clear we could identify [large city name] and be able to maintain anonymity. […] But in specific communities where there’s a small population, we have to make that judgment. [CMOH 5, Time 1]

CMOHs also referenced the need to prevent or reduce stigma, and the connection between that objective and those directives or regulations that might reinforce stigmatizing behaviours toward others:

I think we need to come at this from a positive, constructive approach: work to support people, and one of the ways we’re doing that is taking some steps, as I outlined, to make sure that their access to masks is not an issue, is not a reason why someone can’t wear a mask. The other piece is that if people see somebody
who’s not wearing a mask, don’t make a judgement. [...] We need to all support each other in a positive way. [CMOH 6, Time 2]

3.4.1.3 Framing risk and evidence

Evidence on all topics related to COVID-19 evolved throughout the pandemic. Though CMOHs may have been routinely updated on emerging evidence, each CMOH presented the medical characterization of risk of disease as well as the risks, benefits, and impacts of interventions against the disease in their respective jurisdictions. This framing of risk and evidence formed one component of the demonstration of expertise by CMOHs in this study:

With daily case spikes as high as 6,100 cases across Canada we are in uncharted territory and in recent weeks [jurisdiction] has seen how quickly the second wave can wash up on our once calm shores. Reducing our risk requires collective action from everyone across our [jurisdiction]. [CMOH 5, Time 3]

In the example above, the CMOH framed the risk of COVID-19 exposure as both widespread and focal. CMOHs routinely framed the risks of COVID-19 disease but given the rapidly changing state of information and the political context, there were a number of instances in which the risk framing appeared to conflict. For example, at one point in time two CMOHs expressed differing opinions about the value of asymptomatic testing:

This asymptomatic testing in the next week to two weeks is critically important. We believe there’s a large pool of people out there that are infected and may not even know it themselves. [CMOH 6, Time 3]

…it is for symptomatic people so they’re not doing asymptomatic […] tests on an ongoing basis. Our NAT tests […] are excellent and they work really well but the rapid tests and the serology tests have not been as useful as we had hoped. [CMOH 1, Time 3]

In the first instance, the CMOH used this framing of the benefits of asymptomatic testing to encourage people in a specific area to visit pop-up testing centers in a
neighbourhood where exposure was thought to have occurred. In the second instance, the CMOH used the uncertainty of benefit in response to a concern that other jurisdictions were making more use of rapid tests on asymptomatic individuals. It is important to remember that the overall evidentiary basis of the properties and uses of rapid COVID-19 tests would have been the same at Time 3, so these physicians appear to have made different assessments on the basis of the same extant evidence and have framed this evidence in ways that support their assessments and recommendations.

3.4.1.4 Making Judgments about Intervention and Exemption

CMOHs in this study either actively used their own legislated powers or contributed to intervention by recommending government actions to restrict public movement and gatherings, to require isolation of individuals, to require the use of masks, to require capacity limits, and to require other actions by the public or organizations to prevent or reduce disease transmission. The propensity to intervene varied by jurisdiction, and CMOHs differed in their stated preferences for gradual or aggressive approaches to intervention:

…right now I do not believe there is sufficient community spread that we are at that point where [intervention], which is a rather heavy-handed approach, is needed. [CMOH 1, Time 2]

If we just let – did nothing and let COVID-19 blaze through our communities, it would be over soon, but we would have hundreds and hundreds of preventable deaths […] It’s why we are putting in place […] very tough public health measures… [CMOH 6, Time 1]

The propensity to intervene also changed with changing assessments of risk and the need for interventions, which was described in terms of the outcome rather than in terms of the processes used to arrive at the outcome:

…this is part of their expertise when they make a judgment that there’s a – when it’s low risk that’s when we use the notification it’s just that you may have been exposed but it’s low risk that you were so just watch your health, your symptoms.
We’re actually going to stop doing those because they’re no longer effective.
[CMOH 6, Time 2]

In this segment the CMOH implied that decisions were tied to a process of risk assessment without further explicating the decision-making process or the evidence base for the decision. CMOHs delineated an important characteristic of the interventions – the ability to offer or recommend exemptions to those interventions – on the basis of compassion (“that compassionate exemption would be sent to my office for review and approval” [CMOH 5]) or practicality (“if we do that, we would have one-third of […] residents staying home for no reason” [CMOH 5]).

3.4.2 Managing Relationships

CMOHs actively managed relationships with the public, with the media, and with government and other stakeholders. They achieved this by self-regulating their emotions, by acknowledging the emotions of others, by seeking adherence and collaboration, and by setting expectations and boundaries around their roles.

3.4.2.1 Self-Regulating Emotions

Emotions were used in very controlled ways, especially in the opening of media briefings, to express emotional attachment to the population (condolences for deaths, support for protecting the vulnerable, recognition of public hardships):

I would also like to express my condolences for the two deaths […], this is kind of a sad milestone in our fight against COVID-19. [CMOH 2, Time 1]

This virus is putting a strain on all of us which is why now, more than ever, we need to think about compassion and care for ourselves, for our families, and for others. [CMOH 1, Time 3]

In this dataset, CMOHs rarely admitted to their own stressors or emotional status. In one instance a CMOH admitted to personal distress, but quickly recovered toward a self-regulated stance:
This isn’t easy, it’s not easy for me. I had a very hard last few days, just, this is, this weighs on me heavily. […] It’s hard for everybody and we’re feeling, feeling that. But just because it’s hard doesn’t make it impossible. [CMOH 6, Time 3]

In another instance, a CMOH apologized for a prior media briefing in which that CMOH’s tone was perceived as abrupt or short-tempered, suggesting a baseline expectation of equanimity of the CMOH.

### 3.4.2.2 Acknowledging Emotions of Others

CMOHs managed relationships with the media by attending to others’ emotions and maintaining professional tones and language. CMOH responses to questions appeared to satisfy the media more often when they were emotionally attuned, and conversely, questions were more likely to be repeated or revisited when emotional subtexts were not attended to by the CMOH. This generated an emotional “mismeeting” of question and response. CMOHs may have been implicitly expected to attend to the emotional needs of the audience, as evidenced from the example below:

Media: Can you tell us what city they came from? I mean it seems odd that you wouldn’t be able to tell us much. It seems like you’re actually holding back information; and I know it’s all new to you as well but you’re talking –

CMOH: No, it’s not new.

Media: - about a flight with hundreds of people […] with a virus that is killing people. Do you understand why people are really apprehensive?

CMOH: What we do know is he took a flight from […]. The details are still forthcoming.

Media: So, what is your message to the public then at this stage in terms of, you know, […] how do people know whether they have come into contact with this?

[CMOH 4, Time 1]

Because the CMOH in the above example did not explicitly engage with the core emotional undertone of the question, the interviewer was left either uncertain or
unassured in these instances as compared to situations in which CMOHs openly acknowledged emotions in their responses.

### 3.4.2.3 Seeking Adherence and Collaboration

CMOHs sought adherence to public health interventions from the public. Typically, they tried to accomplish this in their opening remarks. More effective opening remarks made use of classical persuasive rhetorical strategies (ethos, pathos, and logos) (Appendix 3-A). Impassioned appeals to collective values of solidarity and safety (pathos) were backed by the reason (logos) and credibility of the speaker (ethos) to persuade the public of the desirability of adherence to public health measures:

> I can’t emphasize enough the importance of us all working together to make sure these measures, some of which are directive, some of which we are requesting […] We have a chance to get out in front of this. It’ll be the combined impact of everybody adhering to the personal protective measures […] This is all about us doing what we need to do collectively. [CMOH 6, Time 1]

CMOHs also managed relationships by seeking collaboration – specifically by expressing a desire to collaborate, by describing ways in which partners were collaborating with each other and by helping partners to ‘save-face’. One example of this was in the discussions around policy interventions to enable disease containment, such as paid sick leave (which are government policy decisions that may be influenced but are not directed by the CMOH).

> Media: And also, I’m wondering how many sick days do care workers at the center get? […]

> CMOH: Yeah, so I think when we take public health actions and we ask people to be away from work for the protection of the public and where we ask people to be in quarantine for protection of the public, we are looking at the measures that can support them to be able to do that effectively regardless of the sick time. [CMOH 1, Time 1]
CMOHs were openly candid and supportive of the multi-level collaboration between governments and sectors:

But the other message that I would like to give to all […] is that we are working all systems of government, municipal, provincial and federal. We’re all working together, we are all communicating. […] We are collaborating, we are working in cooperation, and we are doing everything that we can at the various levels responsible to make sure that we protect all […] and all Canadians. [CMOH 4, Time 1]

This quotation from early in the pandemic overtly refers to the extent of collaboration between different levels of government, in order to build relationships with those agencies and also to build a relationship with the population through reassurance of collaboration.

3.4.2.4 Setting Boundaries and Expectations

Finally, an important part of managing relationships was the ability to shape expectations and set boundaries around roles and responsibilities, as well as what is outside of the sphere of control or influence of a given position or role. CMOHs actively set these boundaries and expectations through their discourses by delineating limitations of the position, asserting responsibility over an issue or referring responsibility for action to others. In many jurisdictions, there were ongoing media discussions about the level of collaboration occurring between the CMOH and others in government.

It’s very clear and the command table is chaired by the Minister […]. That’s the way it’s laid out. […] I really appreciate all the input and especially the ongoing leadership and receptiveness of the Minister of Health, Deputy Minister, Deputy Premier, and the Premier […]; I find my advice is easily and readily accepted. [CMOH 3, Time 3]

Here the CMOH helped to set public expectations by delineating one role of CMOH as an advisor as compared to a decision maker. In the following example, media inquired about possible conflicts between the CMOH and the government.
Media: [...] you emphasized personal responsibility here today but I'm wondering if public health has been given all the resources that you've been asking for. Are you of the opinion that the government has done enough to prepare for the second wave?

CMOH: Yeah, well you know, I think we’re all wondering that. None of us knew what the second wave would look like. [...] we don’t make these decisions in a vacuum – and it was looking at what had happened, looking at what happened around the world that we made our plans for our healthcare surge and that is holding true. [...] You know, there’s so many things, so I don’t think we’re at the point where we can say we should’ve done one thing or another thing; we’ve tried a whole bunch of things. [CMOH 1, Time 3]

In contrast to the previous example, the CMOH was asked a question about the government’s level of preparation and used the first-person plural “we”, first to refer to the CMOH as a member of the public and then to refer to the CMOH as a participant in the activities of government, loosening the boundaries and discursively aligning the CMOH with both government and the public. The findings are summarized as a diagram in Figure 3-1 below:

![Figure 3-1: CMOHs enact care by being experts and managing relationships](image-url)
3.5 Discussion

The findings of this study illuminate the discursive work of CMOHs in media briefings during the COVID-19 pandemic. CMOHs demonstrated medical expertise and managed relationships as a way of enacting care of their populations. Their recognition of the need to avoid stigmatizing behaviour, to protect individuals from harm while also protecting the population, and to exempt individuals from restrictions based on compassion and practical wisdom, were all expressions of care that were likely guided by their professional perspectives and experiences as physicians. Their attempts to regulate their own emotions and to connect to the emotions of others, to engage audiences toward adherence and to foster collaboration were similar to the professional behaviours expected of physicians in clinical settings with individual patients. In doing so, CMOHs adopted a socially recognizable physician role, and they used that role and its attached credibility to shape the discourse of the media briefing to achieve the broader goal of caring for a population.

These findings have important practice-level implications at three levels of discourse – text, genre and practice.\(^\text{212(p5)}\) First, in terms of the text itself, the findings reveal key aspects of the role of CMOH as enacted in media briefings. Second, in terms of genre, the findings point to connections between media briefings as a genre of CMOH practice and other medical practice genres. Finally, with respect to practice, the findings suggest connections between the professional practices of physicians who care for individual patients as well as those who care for populations as patients.

3.5.1 Text

The display of biomedical expertise in media briefings points to the specifically medical nature of the role of CMOHs, one that is aligned with a traditional conceptualization of physician expertise. There were no explicit articulations of what could be considered patient-centeredness in terms of the exploration of values, significance and meaning at the level of the population (but a briefing may not be a suitable forum for such exploration). The display of this traditional, recognizable role is one that physicians are trained to enact as part of their profession and may reinforce the perceived significance of the position of CMOH (and therefore of medicine’s role in that
expertise). It may also enable the recognition of CMOH expertise within and among the physician community, which creates professional reinforcement against the backdrop of liminality of public health physicians to the medical field.

The relational aspects of care identified in this study offer interesting parallels to the study of patient care by physicians. In clinical care, making a connection with patients involves weaving back and forth between objective observation and empathic identification, toward achieving an integrated understanding of a patient’s health concerns. From a theoretical perspective, relationships are foundational to the delivery of care in many contemporary models of medical practice (as well as care by other health professionals), and CMOHs discursively managed multiple relationships (with the media, the audience, and with others in government) at once in order to demonstrate care. There remain important questions about the roles of CMOH in government, the degree of autonomy and authority that they have in legislation, and the ways in which their many roles and relationships conflict or coalesce, as well as the processes by which they make assessments and decisions. However, this analysis suggests that physician roles taught in medical training programs in Canada (medical expert, communicator, collaborator) are also identified in the content of media briefings by CMOHs and that the identified technical and relational aspects of caring are at least part of the enacted role of CMOHs.

3.5.2 Genre

As a genre, there are similarities between a media briefing and the structures and dynamics that take place in more familiar medical settings, such as the patient consultation. Here, the media could be considered as a proxy for the population as patient, notwithstanding that media has its own set of goals occurring in the context of mediatization that creates expectations of its behaviours. Media asked questions of the evidence presented by CMOHs in favour of their diagnostic assessments, which created a discursive movement to negotiate toward a shared understanding of the problem as well as its causes and solutions. This is analogous to patient encounters in which “the primary way for patients to express their reservations toward the diagnosis is to offer additional observations discrepant with the diagnosis.” Similarly, media
fulfilled an interrogative role to understand the CMOH’s discourse with respect to boundaries of information sharing, which creates tensions similar to those seen in patient encounters where “the doctor’s authority and the patient’s knowledgeability in the medical consultation are in a ‘dilemmatic’ relation: in spite of their incompatibility, both ideas seem to have some truth in them”.219(p215)

Structurally, the power dynamics of information exchange in a media briefing tended to reflect more biomedically oriented versions of a patient encounter in the ways that information was shared and time was controlled. The sequence of information in media briefings favoured information provided by the physician over information provided to the physician. CMOHs were granted an unlimited opening sequence, which enabled them to set the frame and tone of the discussion, as well as to be the first to suggest information, evidence, priorities and key messages for discussion. Media questions were time limited and controlled compared to the freedom of time granted to CMOHs in their ability to reply. Media responded to this imbalance, as patients sometimes do, with their own strategies to express opinions and confront the diagnostic or other positions taken by the CMOH. Although the structural elements of a media briefing don’t lend themselves to the development of mutual relationships in the same way as a patient-centered clinical encounter, CMOHs directed the flow of dialogue while also maintaining relationships with the participants (media and government) and rhetorically engaging their direct (media) and indirect (public) audiences.

3.5.3 Practice

For CMOHs, a successful media briefing involves a combination of technical and relational skills, only some of which are taught in medical curricula. The ability to perform effectively within professional genres has been linked to the overall performance of professional practice.212 Successful performance of a genre requires understanding the nature of the genre, its rules, and the ways in which to use the genre to achieve specific objectives and is a prerequisite for the ability to achieve successful outcomes of practice.203 At least some of these technical skills, especially those around conveying expertise through communication, may be learned in medical training programs and applied in this genre. However, this study suggests that there are also
relational features of media briefings that indicate the need for specific training in media, communications, and rhetoric for CMOHs, and perhaps for other physicians working in public-facing settings.

Conceptually, a physician has a primary relationship with a patient, and it is challenging to determine which, if any, is the primary relationship in the media briefing. Is it between the CMOH and the media, who provide a counterpoint to the dialogue and raise issues and questions on behalf of the public? Managing the emotional needs of the media while self-regulating emotions suggests that the treatment of media may resemble ways in which physicians behave with patients. Or is the primary relationship the one between the CMOH and others in government? First, CMOHs routinely emphasized government collaboration in their media briefings. Second, they discursively aligned themselves with government (by using “we” to refer to government activities). Finally, CMOHs offered ‘face-saving’ opportunities for government when asked questions about policy choices (such as paid sick leave) or the sufficiency of government responses. However, each of these may be more directly attributable to the employment relationship between CMOH and government rather than a patient-like construction of that relationship. Or, as has been stated by CMOHs and public health physicians, is the primary relationship between the CMOH and the population as a patient? By acting like physicians, the discursive features of CMOH public communications seem to imply the existence of a patient, which aligns with the expressed perspective of public health physicians that the population is their patient. This analysis suggests that CMOHs may have multiple ‘patient-like’ relationships, each requiring technical and relational skills to manage. This study supplements contemporaneous work identifying the advisory, communication and managerial roles of CMOHs in Canada. By examining CMOH discourse in the performance of public-facing duties, it adds insight into the “lived reality of a CMOH” and helps to inform theory development for the medical (rather than social or political) aspects of the role as it is performed. The study provides support and characterization of a role construction proposed by Sheard and Donaldson, that “techniques may have changed and the issues broadened since John Simon’s time, but the underlying principles remained the same: risk assessment and considered advice, delivered with care…”.
This study was conducted in Canada and may have limited transferability to other countries or systems in which CMOH positions are structured differently. Discourses produced by parties other than the CMOHs and the media (such as government officials) were not analysed in this study. Because the analysis did not extend to the media reports that came out of these briefings, messages that were communicated to the public by the media were also not assessed. This is an important limitation, because many audiences may have only received pieces of CMOH communication through the media rather than viewing the full briefing. Reassuringly, there are some areas of overlap between the categories identified in this study as compared to those from a study of media reports following CMOH communications in Canada, notably in the areas of issuing recommendations and mandates, expressing reassurance and encouraging the public, and promoting public responsibility.\textsuperscript{220} The analysis does not include data outside of the transcribed texts, nor does it assess pre-event or post-event communications from the CMOH. Though rich in information, the dataset was based on a subset of Canadian jurisdictions, and on a limited subset of the overall number of media briefings that occurred during the first year of the pandemic. The dataset did not allow for an analysis of differences between types of media briefings (i.e. those that only had a CMOH alone compared to those that had a CMOH and elected government officials).

The examination of the role of CMOHs occurs within a broader context toward the politicization of science and the scientification of politics\textsuperscript{186,187}, the mediatization of discourse\textsuperscript{217,218} and even the reframing of the notion of populations themselves\textsuperscript{221,222} and these are important areas for ongoing research. As this study was focused on the physician, it did not examine the multitudes of other communications produced during the pandemic. Instead, it is a part of what could later constitute a broad historical investigation into the set of discourses during the pandemic and how they shaped lived reality around the globe. This study points to the need for additional research into the roles of CMOHs, both from the medical perspective of this study and from other (social, political, legal) perspectives. From the perspective of CMOH practice, it would be valuable to compare the discourse of CMOHs in pandemic and non-pandemic briefings, though pre-pandemic media appearances by CMOHs in Canada were rare. This study
also points to the need for greater theoretical specification in the practice of medicine for populations, similar to that which has occurred in the practice of medicine with individuals. There is room for empiric inquiry into the ways in which (and purposes for which) technical and relational skills are exhibited by CMOHs in non-public settings, as well as the non-medical roles (such as public administrator or government employee) that may also be components of the CMOH position. Further research could also consider to what extent CMOHs consider competing or conflicting values, evidence, and contextual factors to arrive at diagnosis and intervention plans to address the health of populations – essentially, to supporting inquiry into the process by which CMOHs care for populations as patients, and the utility of this perspective in public health physician practice.

3.6 Conclusion

In media briefings, CMOHs sought to enact care by demonstrating their expertise and by managing relationships. They are afforded structural opportunities in the setting that enable them to manage the flow of information and to voice a medical perspective on substantive issues. There are expectations of their behaviour that match those that are expected of physicians in other settings. The technical and relational aspects of CMOH discourse in pandemic media briefings are strongly aligned with the expectations and observations of physicians in other genres. CMOHs enacted their care of populations by being medical experts and managing relationships, just as other physicians are expected to do in their encounters with patients. Finally, the similarities between the discursive features of caring for populations and those of caring for patients suggest a connection meriting exploration between the processes of care by physicians for individual patients and the processes of care by physicians for populations. These connections will be explored in the chapter that follows.
Chapter 4
4 The Population-Centered Medical Model: A Method of Practice for Public Health Physicians

4.1 Introduction

As has been demonstrated in the preceding chapter, public health physicians commonly ascribe to the notion that populations are their patients. They also act publicly in ways that reinforce the social production of a physician identity, further supporting that they may view populations as their patients. Lewis contends that public health medical practice has suffered from a ‘silo’ between academic theoretical developments and practice development, and that this ‘silo’ has diminished the ability of public health physicians to characterise their work and its links to medicine and public health. These silos have resulted in the lack of concomitant expression of a theory of practice for public health physicians that: a) accounts for the breadth and scope of their work with populations, b) connects to their professional identities as physicians, and c) enables the systematic analysis and development of public health physician practice over time.

As the literature review in Chapter 2 described, theories of practice for clinical medicine are not entirely transferable to practicing medicine with populations. Nor are public health practice frameworks sufficient to account for the specific roles and responsibilities that public health physicians assume in the field of public health. As a liminal practice on the edges of both public health and medicine, public health physicians have unique qualities in their practice that necessitate theories specific to them. The following section describes the empirical development of a theory of practice for public health physicians.

4.2 Research Question

How do public health physicians care for populations?

4.3 Methods

This study used a Constructivist Grounded Theory (CGT) approach, which is a qualitative methodology that can be used to study social processes. With roots in ethnography and ethnocultural observation, in its inception Grounded Theory (GT) was
used to study the care delivered to dying patients and it has since been applied widely within health and health care to understand social processes in these settings. Crucially, GT is both an approach and a set of methods for conducting qualitative inquiry. It places emphasis on “examining processes, making the study of action central, and creating abstract interpretive understandings of the data”. In terms of qualitative research methods, GT is unique in its focus on theory construction, and particularly suited to this research question because of this focus as well as its emphasis on social actions and processes. CGT is used in this study because of its recognition that meaning is co-constructed by the interactions between researchers and participants, and between researchers and data.

4.3.1 Participant Recruitment

Recruitment of participants was conducted by sending a Letter of Information and Consent (Appendix 4-A) for participation via the Public Health Physicians of Canada, which is a professional association for the field of practitioners. Eligibility for inclusion in the study was determined by the following parameters – those who are currently or were recently practicing as a public health physician in Canada with responsibilities for a defined population. This definition of eligibility included physicians working in various levels of the formal public health system in Canada, but excluded public health physicians who were working outside of the public health system, such as those in primarily academic or research settings or those who engage in work outside of public health. It also excluded public health physicians practicing in Canada but without jurisdictional responsibility for a specific population. Eligible participants expressing interest in the study were asked to review a letter of information and to sign a letter of consent to record the interviews.

4.3.2 Data Collection

Interviews were conducted on Zoom or by telephone and the audio was digitally recorded and sent securely for transcription. Interviews were conducted by the principal researcher [SR] using a semi-structured interview guide (Appendix 4-B). In the initial interviews, content was guided by the interview guide and prompts and clarifications were initiated if indicated. As theoretical concepts were developed through data
analyses, the interview content would shift to one or another area of the guide or the data for reflection by the participants. A total of eighteen (18) interviews, each lasting up to one hour, were conducted with participants between February 2022 and February 2023. Demographic questions asked of participants included the following: self-identified gender, province or territory of practice, practice tenure, population size, postgraduate residency training, and level of jurisdiction of practice.

4.3.3 Data Analysis

Transcribed statements were analysed iteratively as they were obtained, with constant comparison between and among interviews occurring during the coding process, during debriefings, and between meetings independently by the research team. Coding proceeded according to the CGT protocol as outlined by Charmaz.40 First, line-by-line coding was performed, specifically attuned to Charmaz’s guidance around the use of gerunds for coding actions in the participants’ own words.40 This was followed by higher-level focused coding to establish, test and refine the categories as well as the emerging theoretical model.224 Finally, theoretical coding was conducted to establish theoretical categories and their relationships, and to “tell an analytic storyline that has coherence”40(p150) through the data and categories.

As interviews were conducted and data was gathered, constant comparison of data with data, data with categories, and data with theory occurred. The research team met routinely to code and review each transcript, and to engage in analytic discussion of emerging categories and their relationships. Memo writing was used after each interview and between analytic sessions to clarify connections between data, to inquire about emerging themes, to raise additional questions and ideas, and to develop the theoretical categories as they emerged from the data. Theoretical sampling was conducted, to saturate categories with data “until no new properties emerged”40(p192), including efforts to be “self-critical about saturation at multiple levels of conceptual development”.40(p215) As the theory emerged, test cases from the data were used to confirm that elements of the theory were present in a variety of examples. NVIVO (for Mac) was used to store transcripts, codes and memos, as well as to facilitate comparison between codes and categories during the analysis.
4.3.4 Credibility and Trustworthiness

GT research quality has been described in three parts – researcher expertise, knowledge and skills; methodological congruence with the research question; and procedural precision in the use of methods.\textsuperscript{224} For this study, the research team was composed of four researchers – two with expertise in public health and two with expertise in family medicine. One researcher had specific expertise in GT methods, and one researcher was a practicing public health physician at the time of the study. The team engaged in reflexive exercises with respect to the data interpretation and analysis. There were ongoing efforts to “stay close to the data”, and to ensure multiple checks of interpretations against data from the same participant (intra-interview interpretation), data from different participants (inter-interview interpretation), and data from discordant perspectives across the dataset. With respect to methodological congruence, CGT is an appropriate methodology for inquiry into processes and actions, as well as for building theoretical models through data. In terms of procedural precision, the steps related to CGT have been outlined above. In addition to procedural precision, a number of rigour-enhancing measures were used in this study. First, the findings are reported using thick description and, though only exemplar quotations are included in this manuscript, multiple data points supported each concept or category presented. Finally, team discussions on reflexivity and consciously setting aside preconceptions in data analysis and interpretation enabled the theory to emerge from the data as it was collected and analysed.

4.3.5 Ethics Approval

This study was approved by The Western University Health Sciences Research Ethics Board, project identification number 120188 (Appendix 4-C).

4.4 Findings

Characteristics of the participant sample are given in Table 4-1 below. The sample had balanced representation in many of its demographic categories. In terms of
Canadian geography, there was greater participation from Ontario and British Columbia than from the other provinces and territories. Practice tenure was distributed with a wide range, though most participants were in their middle years of practice (5-20 years). There was a broad range of populations served, and most participants had a population size of 100,000-499,999. Finally, most participants worked in local or regional levels of the public health system.

Table 4-1: Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Self-Identified Demographic Characteristics</th>
<th>Category</th>
<th>Value (N=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender Identity by Desired Pronoun</td>
<td>She/Her</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>He/Him</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>They/Them</td>
<td>1</td>
</tr>
<tr>
<td>Province/Territory</td>
<td>Atlantic Provinces</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Quebec</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ontario</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Saskatchewan</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Manitoba</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>British Columbia</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Territories</td>
<td>2</td>
</tr>
<tr>
<td>Practice Tenure (years)</td>
<td>Under 5 years</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5 – 20 years</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Over 20 years</td>
<td>4</td>
</tr>
<tr>
<td>Population Size</td>
<td>Under 100,000</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>100,000 – 499,999</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>500,000 – 999,999</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Over 1,000,000</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td>Canadian Postgraduate Residency Training</td>
<td>FRCPC</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>FRCPC + CCFP</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td>Jurisdiction Type</td>
<td>Local/Regional</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Provincial/Territorial</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>
4.4.1 The Population-Centered Medical Model (POP-CMM)

The information that was offered by participants was rich, dense, and full of pertinent examples that enabled understanding of the breadth and depth of public health physician practice. When used to support categories in the model, exemplar quotations follow the labelling convention “Px”, where P denotes “Participant” and “x” denotes the assigned participant number within the study. The analytic findings yielded a model of practice for public health physicians – the Population-Centered Medical Model (POP-CMM). Figure 4-1 (below) is a conceptual diagram of the POP-CMM, intended to demonstrate the interrelationships between concepts.

As reflected in the above figure, Public Health Physicians bring values, knowledge, and stances to the practice of Public Health Medicine. As public health issues are identified, the process of caring for populations as patients involves diagnosis and intervention. They focus on systems and prevention (as compared to a focus on individuals and treatment), and the process relies on knowledge sharing and relationship building between the physician and the population.

POP-CMM is population-centered because of the evidence which emerged from the data that public health physicians care for populations as their patients. It is medical
because it is specific to the practice of public health physicians (as compared to the other professionals working in public health) with respect to their populations and it acknowledges the breadth of medical work and the actions of physicians in caring for populations. All parts of the model are connected to each other, reflecting a fluidity in practice that is evident as participants talk through examples, but may be lost when the components are seen or taken in isolation. The model contains elements suggesting a breadth of technical skills that are required for practice, from medical knowledge (“without medical training I would not be qualified to do the work” ~ P1), to systems thinking (“I spend a lot of time in the back end understanding systems” ~ P16), to concrete actions such as causal assessments (“part of the way we think as a specialist is doing that root cause analysis” ~ P8). It also suggests the critical importance of relational skills and relationships, in terms of being open (“being seen to be open and aware of different cultures” ~ P3), understanding multiple perspectives (“to be able to hear the perspective that is presented, to really seek to understand it because there’s value in that” ~ P17), and reaching outcomes through relationships (“you want to achieve results but you can’t achieve them without the relationship” ~ P4). These technical and relational elements weave throughout the model, suggesting that they are embedded in the practice of public health medicine.

4.4.2 Values: Humility, Integrity, and Ethics (including Social Justice)

Participants offered examples related to three core values – humility, integrity, and ethics (including social justice). Participants expressed that humility was a key value that they held in their practice, and that it was important to deconstruct the egotistic elements of practice that are built through professional training (“public health works if you’re […] willing to be humble” ~ P1), as well as to share credit with others. Participants reported the importance of having a sense of individual integrity in their professional work, and this was a way of providing self-support during challenging periods in public health work (“I got through that by leaning on my own sense of integrity, in particular, […] that they can play politics but I don’t have to” ~ P12). Across the sample of participants, there was a strong sense of ethics and justice (especially social justice) as part of the values contributing to both their interest in and their
motivation for public health medicine (“anything [in] public health, it’s to be an activist. We have to change the way that the society is built” ~ P6). Participants felt very strongly about the ethics of their practice, that public health ethics is different from the ethics of medical practice with individuals, and that justice and equity in health were important values in their public health physician practice:

There’s a group […] that you’re trying to benefit, and […] it’s another group somewhere else […] that’s making the decisions. And the ethics of that are really different. ~ P13

The values of humility, integrity, and ethics (including social justice), as described above were considered to be important elements of public health physician practice.

4.4.3 Knowledge: Medicine, Public Health, Leadership & Management

Participants reported three areas of knowledge required for the practice of public health medicine – medicine, public health, and leadership and management. One participant succinctly synthesized these as follows:

My role, is […] bringing together three areas. So, the medical expertise and background; the population health; and then also the management leadership role within […] the Department of Health. ~ P13

The importance of medical knowledge in the practice of caring for populations was explored in detail by participants. Although medical training was a prerequisite for all of the job positions that participants held, they explored the ways in which medical knowledge and skills are relevant to their practice. They identified that their medical background was essential in six ways. First, it gave public health physicians a strong focus on health (“at the end of the day you’re going to do what you think is right for health” ~ P2). Second, medicine was seen as an important knowledge base for practice (“it’s built upon a solid foundation of understanding medicine, and understanding disease and illness and wellness” ~ P13). Third, medicine was seen as a proxy for credibility (“generally being a physician here is, benefit of the doubt that you’re a credible person, in terms of your knowledge as it relates to health issues” ~ P3), although this came with cautions (“sometimes that can actually be a handicap when they go into the room as a physician and people are like, ‘Well I don’t want to hear from
the doctor” ~ P17). Fourth, medical training enabled professional judgments and risk tolerance (“we have to be comfortable with accepting that decision-making, and physician training is really helpful for that” ~ P13). Fifth, medical training was considered as an analytic skill set (“what medical officers leave their training with […] is that capacity to synthesize multiple frameworks into a concrete decision that addressed at least partially a complex problem” ~ P12). Finally, medical training resulted in a set of specific ethical obligations as physicians which were thought to be important for practice (“none of these interventions would make sense unless you have the different components of it and specifically the ethical professional component of a physician” ~ P10).

Public health residency training was a facet of many but not all of the participants’ educational backgrounds. Those that did not have specific public health residencies still considered their additional training in public health to be important for the work of public health physicians. One participant articulated the importance of public health residency training as follows:

And so to me the public health residency training allows that same graduated responsibility in the practice of public health […] You get a taste of all those different levels and so when you graduate I think you are more equipped to practice public health medicine at that point than someone who simply has again some kind of clinical training […] and then they’re spit out to kind of practice public health medicine. ~ P17

In addition to medical and public health training, participants described the importance of training and knowledge in leadership and management for practice (“being able to manage four ways. Manage laterally, manage up, manage ourselves, manage those that report to us” ~ P13). Many positions occupied by participants were those of formal leadership in organizations, including being CEOs of local public health agencies. One participant suggested that management training offered in residency training alone was insufficient to prepare residents for the leadership and management skills needed for practice and that additional certification (specifically in administration and management) would be beneficial for practice. These knowledge areas were seen as important precursors to practicing public health medicine.
4.4.4 Stances: Being Patient, Open, Strategic, Realistic, and Responsible

Five stances, or approaches to care, emerged from the data: being patient, being open, being strategic, being realistic, and being responsible. Being open and being patient were strongly connected to the foundational value of humility as described above, and many of the examples given by participants described the importance of sharing power with others and attempting to impact social and structural determinants of health. The identified stances of care are all significantly expressed in the data though they are not mutually exclusive.

Being patient was seen as important to practice because of the time horizon of public health interventions and outcomes, and because of the complexity of public health issues and populations (“you have to play the long game […] because you question yourself. Am I doing the right thing? Am I on the right track?” ~ P14). Participants described an experiential and epistemological openness - being open to the perspectives of others (“we had to do it right or it never would be successful. And right means pausing and stopping and listening, and maybe hearing things that I didn't want to hear” ~ P7) and to different cultural ways of knowing and being (“being very open and supportive of traditional spirituality, and traditional healing practices and health in that relationship” ~ P3). Participants reported being strategic in the sense of having an overarching vision and goals, in the sense of identifying who is in the best position to advance an objective, and also in the sense of taking advantage of opportunities for change within systems and organizations in order to achieve public health objectives (“the MOH […] lands in the middle, both with the medical expert knowledge on what needs to be done, as well as the strategic thinking approaches […] as well as their operational and practical experience to bring it all together” ~ P8). Though participants had ambitious goals for population health, they reported a need to adopt the stance of being realistic because of the resource limitations and the time horizons required for outcomes (“you have to have expectations for what is realistic […] and pragmatic in what is actually going to happen” ~ P8). Participants expressed a stance of being responsible for the health of their populations either by legislation or by their ethical obligations as physicians (“I think there’s […] a fiduciary responsibility, or an obligation
or an ethical kind of responsibility, that my practice covers that entire population I’m responsible for” ~ P13). Taken together, these five stances of care constitute the approaches that public health physicians take as they work to address public health issues in populations. Collectively, the values, knowledge and stances characterized above are elements that public health physicians bring into their practice, and that are shaped over time with training, experience and reflection in practice.

4.4.5 Populations as Patients (“The Population is my Patient”)

Participants generally ascribed to the idea that populations are their patients, and this idea emerged strongly as a focus on populations as compared to a focus on individuals:

Yes, it's the idea of just like a family physician, you have your relationship with the family or with the patient. A medical health officer, a public health physician needs to get to know the community and develop a relationship with that community. And be there for that community. And to understand the community and listen to the community. ~ P3

The study data contained examples of public health physicians working with individual patients (in the case of communicable disease control) and with smaller groups of people (families in the case of some public health services) up to the level of populations. Most participants reflected that the population was really the focus of care and that, even if they conducted clinical management of individuals, that work is often to try to prevent outcomes at the level of the populations rather than solely for the purpose of individual-level care. One participant suggested medical work with individuals would not meet a threshold for active public health physician involvement, or that such work only would if there were spillover impacts to other people in a population:

I’m not interested in anything that makes individuals sick, full stop, but if it makes them sick in groups or has the potential to make them sick in groups, it is the job of the medical officer of health to stand in the way of that. ~ P12

Because of the complexity and richness of this information, and its overall relevance to the practice of public health medicine, this section will describe the ways in which
participants considered populations as patients, as well as the limitations they perceived in the population-as-patient analogy with respect to practice.

Almost all participants reported agreement with the notion that public health physicians consider populations as their patients. When explored further, participants reported that the consideration of populations as patients had three benefits in terms of conceptualizing the role of public health physicians. First, the analogy reflected ethical obligations that public health physicians consider that they have with regards to the population (“We have our ethical framework to deal with things and it’s definitely ethically married […] to that concept that that’s my patient” ~ P10). These obligations were considered to be independent of specific knowledge of individuals, and also independent of whether a person or group seeks out such care. Participants reinforced their obligations to their populations as distinct and as taking precedence over their relationships with others:

I said ‘I don’t represent the government, I am a physician, my patient is the community’. […] I report to the Board of Health […] but regardless my loyalty and my first priority is taking care of my patients. ~ P11

Second, the analogy reinforced the medical diagnostic and therapeutic nature of public health physician work (“Q: How is your work similar to that of other physicians? A: […] in pretty much every way. Because […] we diagnose the problem and we prescribe treatment. It's just we don’t do it on an individual basis” ~ P8). Participants described having different tools compared to physical exams and laboratory tests to produce a diagnosis, as well as tools other than prescriptions and surgeries to intervene, reflective of the difference in magnitude of assessment and intervention activities that are required with populations as patients. They described the importance of combining subjective and objective elements in diagnosis, as well as the significance of relational and supportive therapeutic actions. Participants also connected the focus on the population as patient to the focus on prevention – that the work of public health physicians is focused on reducing and preventing risk factors for disease in ways that impact many people rather than one person. Finally, the analogy was useful as a communication tool that enabled public health physicians to help others understand and conceptualize their work:
… a public health doctor, their patient is a community, or a group, or a population. So instead of seeing one person in my office, or on my operating table, or seeing one case, like one x-ray or something, I have a group of people, or a community” ~ P1

Effectively, this communication is aimed at linking the work of public health physicians both to the work of medicine and also to the work of the public health field, to explain the value that physicians add in public health and to explain the value the public health physicians add to medicine in general.

Analogies are not perfect descriptions, and though the population as patient analogy was reported to have many strengths and uses by participants, some expressed the limitations of the analogy itself. One limitation was that the scale and complexity of working with populations raises ethical and decision-making issues that may be different from those a physician faces when caring for individual patients:

 […] obviously when you’re talking about an individual you still have to take into account their values, beliefs, perspectives, priorities in your kind of individual care. When you’re talking about a population you have always a diversity of values, priorities, and perspectives. ~ P17

The second limitation was that public health issues themselves are more complex and layered than diseases diagnosed in individuals, which makes it challenging to conceptualizing a group of “at-risk” people as a patient (“you’re thinking about risk factors or […] more nebulous exposures that are a little bit harder to conceptualize” ~ P5). The third limitation was the difficulty of communicating directly with or knowing “the patient” or for “the patient” to know the physician (“it’s difficult to kind of get to know your patient […] the nature of the relationship is kind of indirect a lot of the time” ~ P11).

Despite the limitations of the analogy, participants felt that their work with populations was very much driven by their role as physicians and the ways in which they considered populations as patients.

4.4.6 Focus on Systems and Prevention

In addition to considering populations (rather than individuals) as patients, participants described a practice focused on prevention (as distinct from treatment of
disease), and systems (as distinct from a specific setting within health care).
Participants expressed clearly and uniformly that their focus is to work as “upstream” as possible from the end outcome of interest, to prevent diseases as well as risks and exposures that could harm the health of the population. This was a primary distinguishing feature from the work of other medical professionals, especially those providing acute or end-stage treatments for preventable conditions:

I’m trying to move the focus away only from a very tertiary and very downstream indicator, like an overdose or an overdose death, to more upstream. [...] And I keep saying it to everybody, that when one overdose happens it’s a medical problem. When you have hundreds of systemic societal problems you can’t [...] prosecute or prescribe, you can try to prevent this crisis. ~ P4

The focus of participants on prevention involved a broadened conceptualization of time as compared to its usual conceptualization in medical practice. First, participants went far back into the past to look for causes of public health issues (“you have to understand the history, right? You have to understand the story that got you there” ~ P16), including intergenerational traumas, colonialism, systemic racism, and economic globalisation as factors involved in the causative path:

[...] at the end of the chain it was something like the impact of the industrial revolution [...] such that the men had to leave their rural communities to go find jobs in the cities and this left the woman alone and the men exposed to sex trade workers and sexually transmitted diseases that they brought back to the communities… ~ P12

Participants’ attempts to intervene on public health issues with both immediate and historical causes shaping the present required them also to consider that prevention takes effect far into the future (“if we can do all things that’s probably going to take a generation to really have an effect” ~ P14) and requires more time than medical interventions that are focused on treatment:

Every layer deeper that you go is going to have a greater long-term impact if you can get there but takes a lot more time and resources to do it in a meaningful way as well as those sorts of trusting relationships to make a difference. ~ P17
In focusing on prevention, participants reported that they needed to manage multiple time horizons in their interventions. While keeping long term horizons in mind, participants acted in the short-term to address public health issues. This is tied to the stance of being patient, because many recognised that the work of public health physicians lacks the immediate gratification or success story of intervention that is afforded to physicians in other specialties. It is also tied to the stance of being strategic, in the sense of having a broader vision for health and keeping an eye on the long-term goals while working in present. In the example below, the participant described the need to demonstrate activity and effort in the immediate situation while also attending to longer term objectives and outcomes:

So you know all the general major stakeholders that they’re still very much acute focused. [...] there’s a great deal of pressure to demonstrate activity as against achieving longer-term outcomes. And so I try to have demonstrable activities in mind and ready to show in a way that they contribute to longer-term outcomes.
~ P4

Participants reported a focus of practice on systems, and this was evidenced in many references to the importance of systems-thinking in practice (“I spend a lot of time in the back end understanding systems, understanding [...] what is that [...] 10,000, 50,000, 100,000 feet. And, you know, can I get access to that enough to understand how it works?” ~ P16). Participants clearly worked to consider the system that was at play in a given situation and sought to make changes to how systems work (“trying to effect change at the system level [...] , which then ends up being sustainable” ~ P7). Public health physicians work in and between multiple systems and sectors – health and health care, education, and infrastructure among others. Within these systems they work to advance systems themselves in order to achieve health related goals:

And similarly, around working with education systems. You know, again, I think many of my clinical colleagues come to that with an orientation around, “Yes, we should absolutely put health education into the curriculum,” and I say to them, “no, no, no, actually, the major determinant of health is graduation from grade 12 in the language of your choice and with a high-degree of math literacy.” So, the
work of public health to support students to stay in school is critical, not because of students’ education outcomes, but because it’s a major determinant of health outcomes. ~ P12

Through their practice of public health medicine, participants demonstrated working as bridges within, between and across sectors of society and acting as direct and indirect connectors within multiple systems to advance health. In terms of their focus on systems, participants worked between parts of different sectors, such as with the municipal sector (“they were really interested in this idea, so we worked with them, and they introduced a by-law […] that restricted smoking in cars” ~ P9), and within the health sector (“I think as MOHs we can serve as a link between the public health and healthcare sides of our systems” ~ P13). Participants’ focus on prevention and systems guided and shaped their diagnostic and intervention processes, which are described below.

4.4.7 Diagnosis (“Seeing the Bigger Picture”)
Implicit in the model of public health physician practice is that a public health issue must somehow come to the attention of a public health physician. In this study, participants described that their awareness of a public health issue or concern comes from multiple sources including politicians, media, community members, organizations, data reports, public health surveillance, other jurisdictions, and other public health agencies. This is evidenced by the following quotation:

So sometimes it’s from media that are raising a particular issue. Sometimes it’s from politics are bringing the issue to the attention, you know, and obviously they are hearing from their constituents and that’s often where things get raised. […] So sometimes the data flags the issue and you go to the community, sometimes the community flags the issue and you go to the data. ~ P17

The relevance of multiple sources of information ties into a later diagnostic theme related to uncertainty, in which participants describe recognizing limitations in data and in issues as they are initially presented. Participants explained an important consultative role of probing into the presentation as well as the data to achieve greater understanding of public health issues:
where you see something in the data, [it is] really critical then to dig in with the technical people and understand OK tell me more about this data? How is it collected, what are the patterns, is this different from historical? Are there any changes in the way that we test and the way that we collect and analyze the data that might explain this? Is this an anomaly of some kind? ~ P17

The diagnostic process involved eight steps. These are not linear in sequence, and it is likely that many of the steps are conducted concurrently while seeking to diagnose an issue. The steps are: 1) Triage - Assessing Risk and Urgency, 2) Looking for Causes (and Causes of Causes), 3) Keeping a Broad Perspective on Health, 4) Staying Grounded in Data and Evidence, 5) Understanding Multiple Perspectives, 6) Synthesizing Information and Perspectives, 7) Addressing Uncertainty, and 8) Contextualizing Understanding of the Issue. Collectively, these steps are part of the diagnostic theme of “Seeing the Bigger Picture”, whose purpose is to gain broad and deep understanding of a public health issue (“you work them up but you also try to understand the bigger picture, the bigger context so you can do a better job at doing your diagnosis” ~ P17).

4.4.7.1 Triage - Assessing Risk and Urgency

Participants described assessing urgency as part of the diagnostic process, which led to decisions about how to intervene in shorter timeframes than other examples where the problems and solutions were either more complex or required more time. In the following example, a participant described on two different actions that were part of a response to the same communicable disease (in this case COVID-19). In the first instance:

One I think significant decision I made – I guess this would be fall of 2020 – was around doing a Section 22 order on restaurants and food premises in our region because we were seeing infections going up at the time. We were seeing a clear pattern of lots of spread going on within food premises and it felt that this was an area where we needed to act [...] ~ P2

As compared to:
We were seeing very low numbers of infections at the time and things were stable so I didn’t feel the urgency to necessarily act, and that there is perhaps more time that we could give to voluntary measures or perhaps then going down the road of doing some sort of incentive ~ P2

The urgency assessment in the first instance led to an order to close restaurants, whereas in the second instance the context and the urgency had changed, leading to a different decision by the same physician about the same public health issue, which can be explained by the difference in assessment of risk. Urgency and risk are closely tied to each other, and where physicians detected an urgent issue they prioritized the response to that issue. Physicians also managed a multitude of risks in decision making, and because these require greater consideration of issues and potential solutions, addressing (rather than assessing) uncertainty and risk is described later in the diagnostic process.

4.4.7.2 Looking for Causes (and Causes of Causes)

Participants described a causal analysis as being an important part of the diagnostic process. As physicians focused on prevention, many participants noted that they sought to understand both immediate causes as well as distant or remote causes, and causes that have their roots in systems, structures, histories and cultures:

[…] so you can use communicable disease as an example. Why does this group have that STI and this group does not have that STI? But why? But why? But why? Oh, we didn’t realize that that thing over there was happening that was creating this […] outcome over here, right? And then you intervene at that point that you have now illuminated because you’ve done that serial asking why. ~ P12

4.4.7.3 Keeping a Broad Perspective on Health

In attempting to understand and diagnose the presenting issues in a community, participants reported keeping a broad, holistic perspective of health and what constitutes health. They articulated well known public health perspectives on health as a
resource for living, on health being intertwined with other parts of society, and on health as a positive concept rather than the absence of disease:

And the whole, I guess, point of that is that you work with people, not at them, or on them [...] and that you let people define things for themselves. So I don’t tell you how to be healthy. I ask you what health is to you, and what you need to achieve that health. [...] taking that more holistic approach, or the more positive approach rather than just seeing deficits. ~ P1

4.4.7.4 Staying Grounded in Data and Evidence

Participants spoke of staying grounded in data and evidence as part of the diagnostic process. Data and evidence were important both for understanding the issue, for considering causes, and for examining options for interventions:

What we’ve tried to do is actually do a deep dive into our health data, try to classify it and come up with a set of, you know 25 health issues or so which are top priorities, and from there we looked at what are the evidence-based interventions [...] finding something with a nexus of what does the evidence show are the biggest causes of ill health and what are the areas where we have evidence-based approaches that could reasonably actually result in some impact. ~ P2

4.4.7.5 Understanding Multiple Perspectives

Connected to the stance of being open, participants described actions seeking to understand public health issues from multiple perspectives. This was congruent with their broad view of health and also their focus on populations that may have a diversity of views about any given issue:

So sometimes the standardized approach that is universal across [location] for instance, needs to be fine-tuned. And so getting an understanding and listening better, is important I think. So, really it’s that concept of knowing the issue and understanding the issue from various sides, before acting. ~ P3
4.4.7.6 *Synthesizing Information from Multiple Sources*

Participants reported synthesizing information from multiple sources and approaches in order to arrive at a diagnosis of an issue:

Nobody else has that training. I can’t think of anybody, and to the depth we have it. And then I think what has come out [...] is that synthesizing information succinctly and accurately from all different sources, I think that is specific to our physician training. ~ P14

Participants described the synthesis of evidence, data, opinion and even frameworks and models related to a particular topic as part of this step in the diagnostic process.

4.4.7.7 *Addressing Uncertainty and Risk*

Participants emphasized the importance of acknowledging uncertainty in data and evidence:

And the operating in uncertainty; like we are comfortable with uncertainty; physicians need to be, and public health physicians even more so because we oftentimes lack the data, right? We don’t have our lovely lab list that we just tick our serology test and we’re fine with that. ~ P14

They also noted that they managed and accepted responsibility for the risks of decisions made in the absence of certainty:

You certainly take grey, make it black-and-white and make a decision and move on. That's what you do. [...] And that decision carries with it a risk that you shoulder [...] that is valued and is valuable. ~ P16

4.4.7.8 *Contextualizing Understanding*

Participants articulated a diagnostic process that drives toward contextualized understanding of an issue (“[the] art of the practice of medicine in general and public health in particular is really understanding” ~ P17). Participants considered a broad perspective on health, and integrated that with knowledge of the medical and public health dimensions of an issue as well as the community context which might influence their decisions about recommended actions:
We as public health physicians have the training [...] of integrating local regional, national, international contexts [...] I think it’s the awareness of context that matters” ~ P14

Public health physicians engaged in these diagnostic steps in iterations of analysis and synthesis, going back and forth between multiple sources of information and frameworks of thinking to achieve an integrated, contextualised, broad and deep understanding of a public health issue and its causes. This diagnostic approach, “Seeing the Bigger Picture”, informed participants’ approaches to intervention, which will be described below.

4.4.8 Intervention (“Safeguarding Health & Building Bridges for Health”)

Based on their contextualised understanding of a problem, participants made decisions about how to proceed, either via a consulting-collaborating path or an authority-directive path based on urgency:

What does it mean to have good practice? I think it means [...] on the medical side it means being comfortable with the decision-making and drawing on that part of our medical training and expertise, and [...] while we may often use collaborative leadership styles, also being able to use more authoritative leadership styles, when appropriate. ~ P13

Most of the examples in this study were of consulting-collaborating, and there was a recognition that this is generally the approach that public health physicians take unless urgency or context dictate a different type of response (“it’s my responsibility for the health and wellbeing of these people and you are not fulfilling this so I have to take action” ~ P8). Interventions by public health physicians were guided by their assessment of risk, understanding of evidence, and application of contextual information that they built in the diagnostic part of the process. Decisions about interventions for health were also based on a timeframe guided by the risk assessment, uncertainty, context and urgency. The authoritative interventions were categorized as “Safeguarding Health”, while the collaborative interventions were categorized as “Building Bridges for Health”. 
4.4.8.1 Safeguarding Health

Participants’ preferred approach was to work collaboratively and on a flexible or permissive time frame where possible, because enforcement-based approaches can harm relationships that are critical to achieving future outcomes that may require collaboration. However, issues judged as urgent or time-sensitive required a more directive approach to intervention:

[…] in the times where I have exerted my authority it’s been in situations where the public is at risk and other actions have not been sufficient to reduce that risk.

~ P5

Some public health physicians cautioned against resorting to the authoritative powers at their disposal, because of the harm to relationships that could result from their actions:

So using the authority as and when needed, […] keeping in mind that using the authority can have the inadvertent consequences of breaking that relationship, so I’m trying to maintain both. ~ P4

Many public health physicians expressed that they work to enable outcomes before resorting to direction or coercion, especially to avoid the harms of intervening by force. The following quotation, though it alludes to the ability to use authoritative methods, ties in to the more commonly used intervention type - building bridges for health:

If you find a home, or an apartment or whatever that is unsuitable for living, you condemn that property, through the public health act […] But we would not go in and placard a home until we could arrange that we wouldn’t be putting them in a much more difficult circumstance. […] So we really end up […] working together […] with the community […] and trying to find a good fit, or a good solution to that circumstance. ~ P3

4.4.8.2 Building Bridges for Health

Though physician participants noted occasions in which their directive powers were used to intervene, the majority of examples and situations were ones in which they worked collaboratively with communities and other partners for health. This is the basis for the most common intervention theme, “Building Bridges for Health” (“You need to be
an advocate and a scholar, and a medical expert, and a communicator. [...] But in a less formal way, a lot of the time what we are is connectors in the system” ~ P8).

Participants built bridges for health in two ways: 1) Knowledge Sharing and 2) Relationship Building, and these are reflected in the conceptual model (Figure 4-1). In building knowledge bridges, participants acted as translators of science and evidence into usable recommendations with many partners (“the role of the medical officer is to be [...] the knowledge translator around that so that folks can see it clearly and then start to identify remedies” ~ P12). This included translating public health knowledge and concepts to advise medical and non-medical colleagues and organizations (“as an expert consultant, to be good at what I do, [...] is to be able to provide information in an appropriate way, in an appropriate context, to help the people who can or need to make those decisions” ~ P1). Participants described bringing together knowledge of health issues that were perceived to be unrelated to each other and highlighting the connections between them, such as between climate change and overdoses, or as in the quotation below between social determinants and health outcomes:

Like connecting it to, why is it important from a public health perspective to talk about poverty, to address poverty, to bring it on the agenda with our community stakeholders, our partners to say this matters because it has a direct effect on the health of our community ~ P14

In the above example, the close connection between the knowledge translation work and the value of social justice can be seen. While the knowledge translation from the physician is a key component of intervention, it is evident from the data in earlier sections that the physician also depends upon knowledge from the population in order to understand multiple perspectives on health issues, and to understand the context and the impact of specific issues and interventions on the population as a patient.

Relationships were vital to the work of public health physicians, and participants offered the importance of relationships at many levels of the systems in which they work, internal and external to their organizations, and with groups ranging from individuals to organizations to systems and populations:

[...] certainly the professional knowledge and expertise in those competencies, of course, is critical. But if you can't action those [...] either through your team and
the work that they do, or with our partners […] And I do think that a lot of that comes down to relationships. […] we need to work through people, be it within our organisations or within our communities. ~ P7

Key strategies used to build and develop relationships included “meeting them where they are at” (“find ways to connect your concerns about their health to their concerns” ~ P11), “finding common ground” (“getting another individual to verbalise what a common goal is, so that then […] it’s really having a conversation or a meeting to figure out […] how best to do it” ~ P1), “earning trust” (“people start trusting you more and more as they know you more and more, and demonstrating that through the work, […] through actions and activities” ~ P4), and “sharing power” (“we […] systematically share power and expose ourselves to other perspectives, especially when it comes to socially marginalised groups” ~ P11). This relational work was, in the views of some participants, the most contributory to successful outcomes of practice. It included not only building direct relationships between the physician, but also brokering relationships between parties using the trust earned by the physician:

I was able to facilitate connection between the communities and the university. […] So I’d explain to people, […] “Look, you’re in new to this relationship with this community or these communities, […] and today you’re likely going to be criticized and be yelled at” or whatever, “but respect that, deal with it, respond to their questions. And they’ll either come around later that day or the next meeting you come, things will be remarkably different. ~ P3

These technical and relational components of intervention were key features of successful interventions in practice and, when viewed in entirety, the POP-CMM indicates that the work of public health medicine is complex and nuanced. Participants reported that they consistently faced a lack of understanding of public health (“I think there is lack of understanding from the public sometimes between the difference between public health and healthcare” ~ P2). They reported barriers with respect to navigating politics and political spaces (“when partisanship is at play, I feel like everything becomes part of the partisan game […] and it becomes a little bit more difficult to have an actual […] trusting relationship in that environment” ~ P12). Finally,
as with other physicians and caring professionals, they reported a burden of caring that they carried in their practice (“in public health people often care very, very deeply, which is a huge strength [...] and we can sometimes end up in these kind of saviour mentalities that lead us to forget that we can do better by the work and the people if we have more balance” ~ P13).

The challenges of practice were offset by a number of benefits, first among them the relationships formed during the practice of public health medicine. Relationships were so critical to practice that “being valued in and valuing relationships” was cited by participants as being one of the main benefits of practice (“just some of the things that the mayor […], community members or the chief […] said it was really positive. So those personal connections, it’s that personal relationships and sort of deep understanding of each other I think is really positive” ~ P3). Participants also suggested that their practice enabled them to have a significant impact on health (“I can look back over a 32-year career and look at some of the things that got accomplished and the changes that have been made that actually make a huge difference” ~ P15) and that their practice improved and refined over time, enabling them to better navigate systems and structures:

I knocked on all doors all the time consistently for five straight years. And I was able to see which ones were worth the effort just to move an inch and then which ones, you know, were a lot of effort for a pretty small gain […] I’ve learned to be able to reflect and not waste energy on the wrong door, and that’s taken a lot of experience. ~ P16

The Population-Centered Medical Model that emerged from this study is an empirically grounded model of public health physician practice. It incorporates the values, knowledge and stances that public health physicians bring to their practice. It holds populations as patients, with attendant responsibilities and ethical obligations that are held by the physician. Public health physicians focus on prevention and systems. They perform diagnosis and intervention on public health issues, using a set of skills and tools that are unique to public health practice and involve populations as the level of
both analysis and intervention. This process relies on knowledge sharing and relationship building between the physician and the population.
4.5 Discussion

This study is the first of its kind in the field of public health medicine. To date there has been no specific model of practice for public health physicians, and this study establishes a basis for practice that can be refined over time through ongoing observation and analysis. In order to explore the implications of these findings in a fulsome manner, the discussion below is organized in four parts: the domains of the model, the model as a whole, the strengths and limitations of this study, and areas for further research and inquiry. The domains as outlined in the conceptual model are Values, Knowledge, Stances, Population as Patient, Focus on Systems and Prevention, Diagnosis & Intervention, Knowledge Sharing, and Relationship Building. These are discussed in turn in the following sections.

4.5.1 Values

Three foundational values of public health physician practice emerged in the framework – humility, integrity, and ethics (including social justice). These values are connected to the professional identities of public health physicians as practitioners of medicine and of public health. The findings in this study related to values demonstrate good “fit” with the scientific literature on values in health care professionals, but there are important nuances with respect to values in the medical profession.

Research in values has a long tradition in social and psychological studies, so it can be challenging to compare the findings in this study to others that study values when values themselves can be defined along multiple taxonomic spectra.\textsuperscript{225} However, a recent study attempting to develop a set of values for healthcare practitioners identified altruism, equality, and capability as the three most common values.\textsuperscript{226} The authors suggest that these values “are synonymous with those of healthcare practitioners in general—selflessly promoting the wellbeing and dignity of the patient, their families and communities”.\textsuperscript{226(p277)} The value of altruism is signalled in the POP-CMM by the strong support for the notion of population as patient, with its attendant obligations to act with the interests of population health as a priority. The value of equality is evident in the participants’ expressed commitments to ethics as a foundational value of their practice. In the model referenced earlier, “capability”
comprised achievement, excellence, competency and knowledge. In the POP-CMM, the importance of competency and knowledge is also explicit.

Also of interest is how the values identified in this current study compare to values of other medical professionals, as well as to other public health professionals. Some values have been expressed as important to the practice of public health in Canada – including a commitment to equity and social justice\textsuperscript{131}, however values are not explicitly mentioned in the Canadian guidance document specifying minimum competencies for Medical Officers of Health in Canada.\textsuperscript{134} In 2004, US-based researchers validated a value scale for physicians and identified six core values: Prestige, Service, Autonomy, Lifestyle, Management and Scholarly Pursuits.\textsuperscript{227} Although the researchers noted that those medical students who were more interested in non-primary care specialties were more likely to score highly on prestige and scholarly pursuits, of these values only service would compare favourably with the values identified in this study, suggesting that public health physician values may significantly differ from the values of physicians who work in non-primary care specialties, and also that they may align well with those who choose primary care specialties for practice. Out of the remaining values Management, though not a value \textit{per se} in this study, does connect to the identified importance of management and leadership knowledge for public health practice.

As in the field of medical ethics, the field of public health ethics is also contested and evolving in terms of its scope and linkage to clinical biomedical ethics.\textsuperscript{176,228} The Nuffield Council model of public health ethics proposed a stewardship model of public health ethics that is highly reflected in the data in this study.\textsuperscript{229} This report describes an ethical approach that values participation and inclusion, avoids coercion and is open about the evidence that is used for making decisions – all concepts which were brought forward by participants in this study.

Humility and integrity, identified as values in this study, are often cited as virtues when describing physicians and the practice of medicine. It is significant that these were explicitly identified by participants in this study, given the resurgence in the interest of hidden curricula in medicine and the values that are transmitted through medical and organizational cultures during training.\textsuperscript{230} A Canadian qualitative study demonstrated
humility as a core characteristic of peer-nominated “excellent” physicians. As long ago as 1906, Sir William Osler is reported to have described the importance of humility to medical students:

In these days of aggressive self-assertion, when the stress of competition is so keen and the desire to make the most of oneself so universal, it may seem a little old-fashioned to preach the necessity of humility, but I insist … that a due humility should take the place of honor on your list [of virtues].

Coulehan further develops the notion of humility in medical practice by proposing four constituent components: unpretentious openness, avoidance of arrogance, honest self-disclosure, and modulation of self-interest. Of these components, this study provides support for the openness Coulehan describes through the stance of Being Open, as well as empirical support for the importance of humility in the practice of public health medicine.

With respect to integrity, Pellegrino offers two important facets of this virtue – the first is that of integrity (of a patient, physician, and community) as a moral claim inherent to the entity being described, and the second is that of integrity as a moral habitus acquired by practice in our relations with others. Of these, it is this second interpretation that is highlighted in this study. Participants described several instances in which they felt that had an obligation to act with integrity in order to do what was ‘right’ or to protect the wellbeing of their populations and to fulfil the fiduciary role that Pellegrino writes is “never entirely eradicable from the medical relationship”. The first interpretation, integrity as a claim to wholeness, is perhaps better connected to the sense of justice and ethics that participants described in the study, and it may make them inherently disposed to consider issues of health equity as integral rights to be claimed by patients and communities and to be worked towards by public health physicians.

Taken together, the interconnected values of humility, integrity, and justice/ethics are consistent with the work on understanding virtues in the medical profession, and the explicit evocation of these virtues as a component of the practice of public health medicine provides empirical grounding for the model with respect to this domain while
strengthening the overall connection between the practice of public health physicians and that of physicians in general.

4.5.2 Knowledge

Knowledge of medicine, public health, and leadership & management were all considered essential precursors to the practice of public health medicine by study participants. The critical importance of both public health training and medical training reflected by participants in this study has important implications for the field. First, training in medicine alone is likely to be insufficient for the practice of public health medicine, because of its focus on prevention, systems, and populations as patients. Second, training in public health alone is likely to be insufficient for holding positions of responsibility in public health, because of the fiduciary and ethical mindset of physicians, as well as the analytical skills, professional judgement and decision-making skills that seem to be gained through training in medicine.

The Objectives of Training in Public Health and Preventive Medicine of the Royal College of Physicians and Surgeons of Canada include a statement that “unique among the medical specialties, upon certification Public Health and Preventive Medicine specialists are expected to be competent to function in administration, management and leadership roles within public health service delivery organizations”. This is an important distinction between the leadership competencies as they are described in the CanMEDS model, which are leadership of a clinical practice and managing work-life balance.

In this study when participants described the importance of leadership and management, they referred to leading organizations and systems and managing people in organizational relationships. Their descriptions concur with Collins-Nakai’s reflections on leadership in medicine:

Save for a handful of specialties such as public health and epidemiology, medicine focuses on decision-making at the individual physician-patient level. Leadership necessarily involves stepping away from the individual physician-patient relationship and examining problems at a systems level, requiring the ability to view issues broadly and systemically.\(^{235(p68)}\)
The knowledge of management and leadership is reflected in the POP-CCM by the systems thinking focus expressed by participants, as well as in their interventions to bridge systems and sectors for broader health goals. Participants in this study suggested that the training in leadership and management provided during residency to fulfill the objectives of training may be insufficient for the practice of public health medicine, given the focus of public health physicians’ work on systems as well as the positional authority which public health physicians occupied in their settings of work.

Because of the liminality of public health physicians, there are increasing pressures to justify a) the importance of public health physicians to other physicians, b) the importance of medical training in public health practice, and c) the importance of physicians with public health training in leadership roles in public health systems. This study corroborates well with data obtained in Australia and a statement offered in a report on the ‘uniqueness’ of public health physicians knowledge/skill combinations across medicine, public health and leadership & management:

Both the literature and managers suggest it is the broad combination of the skills from training as a medical practitioner and then completing public health training that promotes a competence set that is difficult for any other form of public health practitioner to replicate. It is a rare combination of skills, which in all probability will make public health physicians more likely to be credible experts with the community in most areas of public health, potentially the best ‘champions’ of public health (and health system reforms), to be able to motivate the medical community and gain cooperation and commitment at times of need (for instance a disease outbreak), and to be able to provide a leadership role and galvanise groups around a course of action. This is not to say that other public health practitioners or clinicians cannot **see the big picture**, cannot **analyse and develop solutions**, cannot **understand and rapidly assess risk**, are not **comfortable with making decisions in data poor situations**, cannot **lead and manage ideas, teams or projects**. It is rather that public health physicians are [much] more likely to have this ‘package’ and deliver the value that these attributes can provide. [boldface added]
Several participants in this study also described the uniqueness of this combination of knowledge sets, the importance of each for the practice of public health medicine, and the low likelihood that such training could be acquired through other routes besides the PHPM residency. Indeed, the graduated responsibility and exposure to systems and management gained through public health residency training was thought to greatly assist in the preparation for practice in public health medicine in the same way that residency in other specialties is geared to building the knowledge and skills needed for practice.

4.5.3 Stances

The POP-CMM includes five stances that are connected to each other and to the other domains in the model: Being Patient, Being Open, Being Strategic, Being Practical, Being Responsible. These stances roughly correlate to what are sometimes described as attitudes in the literature on medical education, and they form an interconnected constellation of approaches to practice. They are dynamic stances, not static ones, and they are akin to “ways of being in practice”. Participants reported the use of many of these stances in their examples of diagnosing and intervening on public health issues.

4.5.3.1 Being Patient

Being patient, strategic and practical seemed to emerge as natural consequences of the scale and complexity of public health issues, and the time horizon between preventive interventions and resultant health outcomes. Moulton and colleagues describe how “slowing down when you should” is a mechanism in the exercise of professional judgment by surgeons, switching them from “automatic” to attentive, intentional practice. The diagnostic work of a public health problem in medicine requires gaining broad and deep understanding of an issue-in-context, and so it is possible that the need for patience expressed by participants in this study reflects a practice that is more intentional than it is automatic, one that requires time and effort to understand and respond to a given concern. In this study, being patient is a stance of accepting that public health issues take time to resolve, and accepting the time needed
to achieve results rather than patience as an inherent moral virtue or character trait as treated by scholars of virtue ethics.\textsuperscript{238} As an attitude or stance, patience has not been extensively reported or researched in the literature on physician training or practice, and the results of this study suggest the opportunity to investigate the phenomenon of patience across a range of medical practices.

4.5.3.2 Being Open

Conceptually, being open (to new ideas, to new perspectives, and to new information) is linked to the foundational value of humility\textsuperscript{239}, to curiosity\textsuperscript{240} as well as to critical thinking.\textsuperscript{241} Within the POP-CMM, this stance is linked to values of humility and integrity and within the process of care it is linked to understanding multiple perspectives, keeping broad perspectives on health, and gaining contextualized understanding of an issue. The identification of this stance suggests a highly reflective, intentional practice by public health physicians. It may also be a self-selecting characteristic of public health physician’s personalities, as a Finnish study of physicians indicated that those that were more open were more likely to demonstrate divergent thinking and to choose specialities in which they had lower clinical contact with patients.\textsuperscript{242}

4.5.3.3 Being Strategic

Because of public health physician’s open attitudes, every issue is one that could be better understood, given a more fulsome characterisation, or revisited in the context of new information. However, at some point decisions need to be made and issues acted upon (or consciously not acted upon), which leads to the more action-oriented stances of being strategic and being practical. Strategic thinking is better specified in the literature of management and administration than in clinical medicine, which suggests some part of why specific knowledge in leadership and management was deemed to be foundational for public health physician practice. However, an important difference is that strategy in the business literature is often defined in terms of competitive advantage\textsuperscript{243}, a goal that is often at odds with the purpose of public health activities. So being strategic is understood here as having an eye on overarching
visions and goals for a population’s health, while working in multifaceted ways to achieve those goals.

4.5.3.4 Being Practical

Being practical is understood here as recognizing the limitations of available resources (including time, human and financial capital, effort, and political will) in order to narrow the field of the possible into the field of the achievable. It conveys that the practice of public health medicine is not solely about ideals and is rooted in working to achieve outcomes given real constraints. Participants described this as an element of practice that is refined over time and experience, especially as it relates to effecting change in complex systems and situations. In particular, this stance will be explored later in the discussion as it relates to practical wisdom or phronesis.

4.5.3.5 Being Responsible

The stance of responsibility was mirrored in the foundational value of justice/ethics, as well as in the fiduciary obligations that were reported by participants in their professional perspectives as physicians who have populations as patients. Rogers writes that physicians do have responsibilities to patients, to communities and to societies, and that responsibility holds two preconditions:

- Usually to be accountable or responsible for an action, two conditions must be met. First, the person must have control over the act in question. The act must be voluntary in that they desired to perform it or could have chosen to act otherwise.
- Second, there is a knowledge condition: to be held responsible the person must have had the relevant knowledge to act.\(^{244}\) Public health physicians do have the relevant knowledge to act, and the foundational knowledge components of the model have been described above. In terms of the control over the act, examples in this study reveal a wide range of actions which are to varying extent controlled by the physician. More commonly, as the “reaching outcomes through people” category of relational bridging suggests, public health physicians find themselves in situations where the actions that need to be taken are within the control of other systems, sectors, or organizations.
4.5.4 Population as Patient, Focus on Systems and Prevention

Taken together, POP-CMM is a method of practice that is heavily influenced by public health precepts (prevention, systems and populations as units of intervention) with the addition of a medical perspective because the population is not just a unit of intervention, but also a “patient” which implies a set of relationships and obligations flowing between the caregiver and the recipient of care. Increasingly these are viewed as bi-directional rather than one-way responsibilities, though there are no specified obligations of communities or populations as patients the way there have been attempts to construct the responsibilities of patients in patient-physician relationships.245,246 This study expands further on the notion of populations as patients that has been developed in early thinking on community nursing28,29 but has not been empirically put forth in either models of medical practice or of public health practice.

With respect to the population as a patient this study establishes that, despite the challenges of the analogy itself, the practice of public health and preventive medicine is rooted in the “physician identity”, which was implied in the findings of the study in chapter 3 and is further supported by the current chapter (4). The consideration of populations as patients reflects ethical obligations connected to physicians’ expressed values and physician obligations to patients from their medical training and their professional/physician identities. Participant comparisons to diagnosis, intervention, and therapeutic relationships show that public health physicians see themselves as “doing the work of doctoring”, but at a different scale and with a different care focus than other medical clinicians.

The focus on populations as patients also delineates important limitations in the ability of non-physicians AND of physicians not specifically trained in public health to perform the work of public health physician practice.247 For example, the complexity of working with systems and populations demonstrates the value of having graduated responsibility in supervised settings in public health residency, similar to those gained in other multi-year specialties of medicine. And the importance of the public health aspects of working with populations as patients for prevention suggests that clinical training in medicine with individuals is necessary but insufficient for practicing public health
medicine with communities and populations. Viewed through the lens of systems, the analogy here is that a physician specialising in one organ system may be not as well versed at looking after the needs of the whole person in whom the organ resides, hence the need for family medicine as a specialty. Similarly, a physician well versed in looking after individuals may not be as adept at looking after the needs of the community and population in which the individual resides, hence the need for (formerly) community medicine and public health medicine as a specialty.

4.5.5 Diagnosis and Intervention

The process of care is inherently medical – presentation, diagnosis, and therapy/intervention.\textsuperscript{31,248} Although they occur at the level of populations and systems rather than individuals, their medical training has clearly influenced the way in which public health physicians describe their processes of care. The process describes physicians working among multiple sources of information and using multiple synthesizing frameworks to achieve broad and deep understanding of a public health problem in context, and working toward actions that achieve health in that context. The process of care also explains how two different clinicians facing the same “problem” in different contexts could arrive at different actions or solutions. It also helps observers to understand how two different clinicians facing the same “problem” in the same context might arrive at different actions or solutions on the basis of their assessments of urgency and risk, thus toggling between health-protecting and health-promoting actions. An unexpected finding in the process of care is the therapeutic “toggle” between interventions aimed at standing in the way of harms as compared to those aimed at building bridges and supporting health. Acuity-dependent leadership styles have been documented in clinical practice\textsuperscript{249}, so it is reasonable that these would exist in public health medicine as well with respect to the style of practice and the interventions that are chosen for the population as patient. In both patient-centered and population-centered medicine, more research could help to understand the nuances of these risk assessments, and to what extent they are determined by the patient or population-level characteristics, physician characteristics and the subjective and objective information being presented in a given situation.
4.5.6 The Model of Care, Phronesis and Wisdom in Practice

POP-CMM, the model that has emerged from synthesis and contextual interpretation of the data from this study has ties to both ancient philosophical thinking on virtues and current thinking on wisdom. Pellegrino describes Aristotelian accounts of phronesis as the “virtue of practical wisdom, the capacity for moral insight, the capacity, in a given set of circumstances, to discern what moral choice or course of action is most conducive to the good of the agent or the activity in which the agent is engaged”. Phronesis is the virtue that links intellectual virtues with moral virtues in a way that “recognizes the anxiety of choice in complex circumstances” and enables the practitioner to “assess the complexities as accurately as possible and to approximate, as closely as the circumstance permit, what would be right and good, and what would not jeopardize the good or frustrate the virtues”. In essence, wise practice is the use of knowledge-in-context toward the fulfillment of a moral purpose.

Current thinking on wisdom from Grossmann and colleagues arrived, through a process of expert deliberation, at a model that describes common wisdom as perspectival meta-cognition grounded in moral aspirations and socio-cultural contexts and experiences. In their theory, perspectival meta-cognition has four key elements – balancing different viewpoints, epistemic humility, context adaptability, and multiple perspectives. Practitioners who display this type of wisdom are “stepping beyond formal operations and rule-based logic to balance abstract thinking with an understanding of the nuanced meaning of the situation at hand”. Notably, each of the key elements of perspectival meta-cognition that comprise common wisdom can be seen in the POP-CMM. When physicians describe exercising their professional judgement in complex situations, they are alluding to the need for practical wisdom in medicine. There is evidence that professionals display the components of wisdom along a spectrum, as well as limited evidence that training and reflection can result in movement along that spectrum in practice. There is also evidence that phronesis holds a central role in the general practice of medicine, so further integrative work may help to establish the place of phronesis in a general practice model for medicine.
4.5.7 Strengths and Limitations

One strength of this study is its breadth – the theory of practice that has emerged from the data begins with values, knowledge and skills and flows to practices within one model, an approach that is both empirically grounded and practice-relevant. This study adds to the literature on the practice of public health medicine that has to-date been dominated by non-physician perspectives. It also establishes the complexity of public health physician processes and provides support for the need for specific training in public health medicine. The sample size (n=18) was reasonable for this type of study and (though not specifically necessary for this methodology) there was sufficient balance between self-reported gender identities, geographies, and tenures to inform the grounded theory. In addition, the data provided by participants was rich and enabled thick description of the concepts in the theory, data triangulation supporting each concept in the theory, as well as saturation of conceptual categories. This study describes the work of public health physicians from their own perspectives, and clearly aligns the work of public health physicians with the fields of medicine as well as public health. Finally, the strength of the model that was developed here is that, while many other theoretical approaches in public health are conceptual but unempirical, this model is empirically grounded in data from practitioners and is therefore closer to the experience of practice ‘in situ’.

As with any study, this study has its limitations. Those limitations that are part of this study alone and cannot be amended or resolved through future inquiry are listed here, while those related to further research are indicated in that section below. The first limitation is that study participants were limited to those who were interested in participating. This could have biased the findings towards those practitioners who have spent more time thinking about their own practice (which is a strength of the study) and toward viewpoints that are more supportive of public health physician practice in general (which is a limitation of the study). The second limitation is that the data represent a snapshot of points in time, rather than a longitudinal series of interviews with the same participants to assess changes in practitioner’s views of their practice. The third limitation is that only participants who had responsibility for specifically defined populations were included, so public health physicians who practice in other ways
(occupational health, for example) were not captured in this analysis or the resulting theory of practice.

4.5.8 Areas for Further Research

There are opportunities for further research as a result of this study, and they fall into three categories – expanding and refining the existing theory, connecting theory to practice, and moving toward a generalised model of medical care for patients and populations.

This study had a limited sample size yet was filled with rich data and yielded conceptual clarification into the practice of public health medicine in Canada. Over time, there may be further opportunities to expand the dataset and the analysis to refine the model by including observations from public health physicians in other countries. First, adding in-field observations of practice to document the actions-in-practice that were expressed by public health physicians would provide additional observations for the development of theory. Second, adding data on how the actions of public health physicians are perceived by partners, public health stakeholders, and communities would enable corroboration of some elements of this theory and it may also call for critical reflection in other domains of the model (for example – are actions expressed as humility by public health physicians perceived as humility by others?). Third, adding data from public health physicians who practice in other settings and ways (for example, occupational health) may add to the theory of practice.

As a theory of practice, there are opportunities to connect the theory to practice. Following the example of the Patient-Centered Clinical Method, there may be opportunities to develop assessment tools to use in the training of public health physicians, or to assist with reflective inquiry in current practice. There are also opportunities for research into the knowledge translation elements of this work, and how it can be used in the review and development of competence by design in public health and preventive medicine training.

Lastly, there is a significant opportunity for theoretical synthesis between the practice of medicine with individuals and the practice of medicine with communities and populations. Although there may be some clear differences based on the complexity of
individuals and the complexity of populations, there are also some similarities in the relational and foundational skills in both types of medical practice. Since there are practice models in each, there is now the possibility of theoretically bridging the two toward a general theory of practice for medicine that could be used for the ongoing theoretical development of the profession as well as for training, practice and research in the field of medicine.
Chapter 5
5 Conclusion

5.1 Overview of Findings

The investigations above have established the following key findings. First, to date there were no published theories of practice that pertain specifically to the work of public health physicians. Second, public health physicians act publicly in ways which support a medical (or at least biomedical) model of practice, with the concurrent implication that they see themselves as physicians who are acting on behalf of patients. Finally, a model of caring for populations by physicians (the Population-Centered Medical Method) was developed using a grounded theory approach and interviews with public health physicians. The findings of this model support the conceptualisation of populations as patients (for the purpose of public health medical practice), and they establish that the practice of public health medicine is tied strongly to both of its constituent fields. This empirically derived model is a first of its kind in the field of public health medicine, and can form the basis of practice, training and development for its practitioners.

5.2 Relevance to Medical Practice

Having a theory of practice achieves a number of objectives in a field or profession. As Stewart and colleagues point out, models of practice “guide perception by drawing attention to specific features of practice”\textsuperscript{105(p8)}, they “provide a framework for understanding what is going on”\textsuperscript{105(p8)}, and they “guide our actions by defining what is important”.\textsuperscript{105(pp8-9)} The theory of practice elucidated above can help to achieve all of these objectives in the field of public health and preventive medicine. In addition, the model provides a common language and framework to measure, monitor, and advance practice. Given the contextually liminal position of public health medicine – on the edges of medicine and public health – the POP-CMM solidly grounds the practice of public health medicine in each space while establishing specific roles and abilities necessary for practice. Interestingly, as much of the work of public health physicians is described as bridging in the theory of practice, it seems the liminal position of public health medicine either suits the practice well or has shaped practice into one in which this skill is critically important. More likely, there is a mutual interdependence which evolves over
time. Though this “chicken-or-egg”-type question may never be answered completely, the studies contained in this manuscript imply at least a good fit between the work of practice and way in which the practice is situated in its shared fields.

For public health physicians, though there have been many treatises on the substance of public health and preventive medicine, there have been fewer if any on its form. This middle-range, grounded theory of practice enables public health topics and issues to be considered through the lens of practitioners – turning the “what” of public health into the “how” of public health medicine. It firmly grounds the practice of PHPM in that of medicine and public health, and establishes the unique overlay between the two in practice at the intersection of each. The model can now be used to inform both reflection in current practice and training of future practitioners. The model may also be able to help practitioners to describe and understand actions taken by their colleagues by supporting a common language of practice. Importantly, as there are currently no common “diagnostic codes” or documentation templates for PHPM, the POP-CMM may provide the basis for the development of these systems in practice as needed.

The POP-CMM makes evident some similarities in the practice of public health medicine with that of medicine in general - ethical obligations to patients and communities, analytical and decision-making processes, and relational strategies are highly comparable to practicing medicine with individual patients. The theory shows important distinctions from the practice of medicine – notably the level of complexity of the “patient” and of the health issues which are being addressed, the focus on systems and prevention rather than individuals and treatment, and the importance of being involved outside of the health system with multiple sectors in society for the public health side of medical practice.

When combined with the findings of the discourse analysis, one can observe dual and equally important aspects of the practice of medicine – the caring processes which constitute the core of practice itself, as well as the genres in which both technical and relational expertise are enacted. This is an important and novel conceptualization of practice in public health medicine and in medicine. It implies that competence and reflection (and therefore training and professional development) should be linked back to the core processes of the field and also to technical and relational expertise among
the genres that comprise practice. The corollary in public health practice is that POP-CMM comprises the core processes of a public health physician, and these are enacted through the technical and relational skills exhibited in the media briefing as a genre. The same processes may be enacted differently in other genres of practice – such as chairing a meeting of public health managers, working with community stakeholders and partners, or working with physicians in the health care system. Similarly, the corollary to the practice of family medicine with individual patients is that there should be a set of core processes that occur around the care of a patient (such as those described in PCCM), which are discursively enacted with different technical and relational skills depending on the genre of practice – such as a patient-physician encounter, a family meeting, a discussion with allied health professionals, or a consultation with a specialist about a patient.

Exploring this research question connects directly to facets of family physician practice and training that have received little attention to date. Specifically, there are elements of family medicine practice that require an understanding of communities and that highlight an obligation to groups of people rather than individual patients. For example, out of the four “pillars of family medicine” (the family physician is a skilled clinician, family medicine is a community-based discipline, the family physician is a resource to a defined practice population, and the patient-physician relationship is central to the role of family physician), two directly reference the community.\textsuperscript{258} The second pillar is that family medicine is a community-based discipline that is “significantly influenced by community factors”.\textsuperscript{258} The third pillar is that the family physician is a resource to a defined community and “views his or her practice as a ‘population at risk’”.\textsuperscript{258} Taking this 1:N relationship to its conceptual limit, a public health physician views the whole population as a patient, so a greater understanding of population-level practice can inform the ways in which family physicians can consider their practices as populations, as well as the ways in which family physicians can deliver “community-adaptive” care.\textsuperscript{7(p2)}

There are also family physician training competencies which can be furthered by a greater understanding of how physicians work with populations. For example, under the
family medicine expert role of CanMEDS-FM, the seventh competency is that the family physician:

Contributes generalist abilities to address complex, unmet patient or community needs, and emerging health issues, demonstrating community-adaptive expertise:

7.1 Assesses and adapts practice based on community needs, anticipating and planning for emerging health issues in the community
7.2 Demonstrates clinical courage (rational risk taking) and comfort with uncertainty in approaching novel and/or complex patient and community challenges. \[italics added\]. \(^7(p6)\)

As a Health Advocate, the second CanMEDS-FM competency statement requires that:

As a resource to their community, assesses and responds to the needs of communities or populations served by advocating with them as active partners for system-level change in a socially accountable manner

2.1 Works with a community or population to identify the determinants of health that affect them

…

2.3 Assesses community needs and identifies assets in the community or population served and contribute to a process to improve health and equity \(^7(p13)\) [italics added].

Clearly, there is an expectation that family physicians in training and practice must be able to understand and address health at the level of the community, so POP-CMM could be applied to family physician activities as they relate to the level of communities and populations.

5.3 POP-CMM and the Patient-Centered Clinical Method (PCCM)

PCCM and the POP-CMM are both phronetic models that aim to generate “right and good healing actions” to foster health and wellbeing. This is reflected in the importance of understanding values and goals of the patient, whether the patient is an individual or a population. It is also reflected in the importance of contextualised understanding. As Pellegrino describes:

A right and good healing action is the aim of both the doctor and the patient. The right […] correct action is what is scientifically and technically appropriate. But
the action must also be morally good, that is, it should be in the interests of the patient. “Interests” include not only the medical good, that which medical knowledge dictates, but also the good as interpreted by the patient in terms of his own values, lifestyle, aspirations, religious beliefs, and so on. The medical knowledge to which Pellegrino refers is reflected implicitly in PCCM and highlighted explicitly in the POP-CMM.

The history of PCCM is well documented and has some of its roots in the process of inquiring what makes for a successful patient-doctor encounter. As such, communication is a key component of the theory and it supports and is supported by other research into patient-doctor communications. The model described by PCCM is situated at the patient-physician interface, with the clinical encounter as the space in which the model is enacted in care. It is highly focused on relational skills and presumes a set of technical medical skills which are described in terms of how those technical skills are brought into conversation with the patient. POP-CMM, in contrast, is situated with the physician rather than at a specific interface between the physician and “a patient”. This is partly due to the complexity of the nature of the patient in public health, but also a limitation from the data sources and there is potential to develop the model further by situating it at the interfaces between the clinician and other actors in public health including those representing the population.

The advantage of POP-CMM being situated at the level of physician is that it has enabled a recognition of a spectrum of activities as described by physicians themselves, many of which are beyond the context of a patient encounter. Similarly, it is recognized that a substantial portion of the work of medical practice with individual patients occurs outside of the patient encounter – with other physicians, with other health care professionals, and with technologies. Including an analysis of these interactions in a model of care would add to the comprehensive characterisation of the work of physicians for patients in settings that are with a patient (the clinical encounter) and in settings where work is conducted on behalf of a patient.

With respect to underlying philosophies, PCCM attempts to shift the focus away from a biomedical model of care and toward a more holistic conceptualisation of illness and health. There are strong ethical foundations in PCCM related to patient autonomy,
and POP-CMM takes a similarly holistic, ethics-driven view of health in populations and society, acknowledging the need for specific public health ethics with respect to practicing medicine with populations. Both PCCM and POP-CMM share a social constructionist epistemological perspective. The models acknowledge the socially constructed nature of knowledge and acknowledge the importance of investigating meaning as perceived by participants – PCCM through exploring the illness experience of patients and POP-CMM through understanding multiple perspectives on public health issues.

PCCM and POP-CMM share similarities in their emphases on relationships (and relational skills); knowledge and technical skills including the synthesis of information and perspectives; and medical decision-making. Enhancing the patient-physician relationship is an overarching theme of PCCM\textsuperscript{105(p8)}, one that could also reasonably be interpreted as the goal or purpose of the method itself, because of the importance of the therapeutic alliance for achieving health outcomes. In POP-CMM, this is also reflected in the relational bridges built between public health physicians and a number of different partners and sectors in society, with a goal of achieving population health. “Reaching outcomes through relationships” is not a catchphrase in this model – it is a reflection of the critical importance ascribed by participants to working with others and maintaining collaborative relationships in the practice of public health medicine. Similarly, the relational strategies used by participants in the CGT study – finding common ground, meeting them where they are, and earning trust, and sharing power – are also found explicitly in PCCM.

With respect to knowledge and technical skills, in POP-CMM these are described in terms of the diagnostic processes as well as the therapeutic/interventional processes. Seeking, analysing and synthesizing information, perspectives, and theories, and having medical and public health knowledge to inform assessments of urgency, cause and intervention are all technical skills required of public health physicians. Technical skills alluded to in PCCM are also related to diagnosis (knowledge of disease and disease processes) and therapeusis (knowledge and skills in treatment). Though technical skills are more directly addressed in competency-guided training programs in both family medicine and public health and preventive medicine\textsuperscript{2,7}, it is important that
these be placed directly into theories of care to recognize the technical aspects of care provision that require training and demonstrated competence for practice.

PCCM emphasizes patients and physicians working collaboratively toward treatment decisions, though there are also emergent events in clinical practice that may necessitate a temporary bypass of relational processes related to finding common ground. POP-CMM suggests a toggle between physician intervention on behalf of public health (“Safeguarding Health”) and a more collaborative and negotiated process of decision making (“Building Bridges for Health”). Of note, the examples in which public health physicians intervened in more authoritative ways were much rarer than those in which collaborative models were used and were reflective of both a physicians’ judgment in a given situation and their legislated duty to act to protect public health. In both models, it is evident that the decisions made by physicians with patients and populations are evidence-informed, context-guided and involve acceptance of risk and uncertainty.

Just as a physician trained in family medicine looks at a patient-in-context to assess, diagnose and treat, a physician trained in public health looks at population-in-context to assess, diagnose and prevent. There are important differences between PCCM and POP-CMM that can be connected through the lens of systems and ecologies. Recognizing the tremendous diversity and uniqueness of individuals, the “unit of analysis and intervention” in PCCM is one patient at a time, and the “unit of analysis and intervention” of POP-CMM is a population. POP-CMM adds additional systems and prevention (as opposed to treatment) as additional foci of care in public health. These differences in focus then lend themselves to different methods and tools of presentation, diagnosis, and intervention, as well as different ethical principles applied in practice. POP-CMM includes both the processes involved in practice as well as the foundational precursors of public health medical practice as described by public health physicians. POP-CMM also highlights the importance of additional training in public health, and in leadership and management for the practice of public health medicine.
5.4 Relevance to Public Health Theory and Practice

The POP-CMM has some important implications for the practice of public health. First, it helps to establish the unique value proposition of physicians in the space of public health professionals. Key processes performed by physicians – achieving broad and deep understanding of public health issues and accepting responsibility for decisions taken under conditions of uncertainty and risk, are perhaps unique compared to the processes performed by other professionals in public health, and do not appear in existing models of public health practice that are for a variety of practitioners. Second, the theory offers the opportunity to add to the inter-professional dimensions of public health practice theories, by identifying commonalities in the practice of physicians and other professions in public health. Finally, it offers insights into why PHPM-trained practitioners may be particularly suited to leadership roles in public health, because of their knowledge and their ethical professional obligations to the public.

POP-CMM compares favourably with a number of consensus or expert-guided attempts to characterise the work of public health physicians, adding support for the both the role and the training required to practice it. As described in the previous chapter, it also encapsulates elements of what others have proposed to be core features of the practice of medicine (knowledge in service of a moral purpose, practical wisdom, technical skills, and so on) as applied to the practice of public health medicine.

When considered in light of the models presented in the second chapter (the literature review), elements of each category of public health model are contained in POP-CMM. The literature review identified six main types of public health models: Structural, Critical, Humanist (with Integral Models as a special case), Ethico-legal, Translational, and Practical (Practice-Focused). Structural models connect to the POP-CMM focus on systems, and to the process elements of working in multiple systems to achieve health. Critical models are not explicitly represented in POP-CMM, though they are implied by the importance of justice/ethics as a value held by practitioners, and in the idea of understanding multiple (including critical) perspectives on a public health issue. Humanism is featured in POP-CMM through its emphasis on relational bridges and viewing ‘health’ through a broad lens. Ethico-legal concepts are linked to POP-
CMM through its emphasis on justice/ethics, and on the professional obligations that public health physicians hold with respect to populations as patients. Translational models are connected to the knowledge bridging feature of POP-CMM ("translating science into usable advice"). Practical models share with POP-CMM some of the process steps involved in the practice of public health, though further specific inquiry could map out these connections comprehensively. Of note the profession-specific practice models, such as the public health nursing practice model\textsuperscript{139} contain similar activities (assessment, diagnosis, etc.) as well as a focus on systems and populations. POP-CMM adds to these practice models elements that are specific to public health physicians, such as decision-making under uncertainty, and ethical obligations to populations as patients.

In the second chapter it was posited that the Integral theory, as a special case of humanism, could form a theoretical substructure for the practice of medicine. On further examination, based on the results of the studies above, phronesis (practical wisdom) may be the core action of a general model of medical care, one aspect of which is the bridging between collective subjective and objective information for public health physicians and between individual subjective and objective for physicians who care for individual patients. More research is needed to specify the underlying conceptual characteristics of the general practice of medicine, including the role of phronesis.

5.5 Conclusion

The POP-CMM described in the study above advances knowledge in the field of public health and preventive medicine. As a liminal field joining medicine and public health, population-centered medicine combines elements from the practice of each (as well as leadership and management knowledge and skills) to care for populations as patients. The analogy of populations as patients in public health and preventive medicine, though sometimes challenging to conceptualise, is critical in understanding the ethical obligations physicians perceive toward their populations and communities. These studies have highlighted key differences between the medical clinical ethics used in encounters with individuals as compared to the broader public health ethics that are considered in fiduciary relationships with populations. Medical knowledge and public
health knowledge are each necessary but insufficient by themselves for the practice of public health medicine, which involves a medical diagnostic and therapeutic process that is guided by precepts of public health and broad conceptualisations of health, wellness and values in society. This model can be used to further develop the practice and training of public health physicians, as well as to explore the connectivity between this model of practice and those in each of the contributory fields of medicine, public health, leadership and management administration. The model may also encourage research toward a general model of caring for patients (from n=1 to n=N) by physicians.
Bibliography

   doi:10.7208/chicago/9780226300610.001.0001


   doi:10.1111/1467-9566.12214

   doi:10.1016/S0140-6736(13)62341-7


Pakes B. Ethical Analysis in Public Health Practice: Heterogeny, Discensus and the Man-on-the-Clapham Omnibus. Published online 2014.


Borrell-Carrió F, Suchman AL, Epstein RM. The biopsychosocial model 25 years


60. Bentley M. An ecological public health approach to understanding the


71. Kenny NP, Sherwin SB, Baylis FE. Re-visioning public health ethics: A relational


83. de Souza R. Local perspectives on empowerment and responsibility in the new


88. Smithies J, Webster G. *Community Involvement in Health: From Passive Recipients to Active Participants.* Routledge; 2018.


151. Shaw J. The real reason that we don't trust experts anymore. The Independent. Published July 8, 2016. https://www.independent.co.uk/voices/the-real-reason-
that-we-don-t-trust-experts-a7126536.html


172. Dubinski K. Ontario teen was on life-support after respiratory illness linked to vaping. CBC. Published 2019. https://www.cbc.ca/news/canada/london/vaping-respiratory-illness-london-1.5288065


204. Cotter C. Discourse and Media. In: Tannen D, Hamilton HE, Schiffrin D, eds. The


232. Osler SW. *Osler’s A Way of Life and Other Addresses, with Commentary and Annotations.*; 2021. doi:10.1515/9780822383147


238. Murphy AC. Wandering Virtues: Modesty, Patience, and Loyalty in Clinical Medicine. Published online 2016.


252. Jameel SY. Enacted phronesis in general practitioners. Published online 2022.


Appendices
## Appendix 2-A: Table Comparing Public Health and Medicine

Adapted as a table from [www.hsph.harvard.edu/about/public-health-medicine/](http://www.hsph.harvard.edu/about/public-health-medicine/)

<table>
<thead>
<tr>
<th>Category</th>
<th>Medicine</th>
<th>Public Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Focus</td>
<td>Individual</td>
<td>Populations</td>
</tr>
<tr>
<td>Service Ethic</td>
<td>Personal service ethic, in the context of social responsibilities</td>
<td>Public service ethic, as an extension of concerns for the individual</td>
</tr>
<tr>
<td>Emphasis</td>
<td>Disease diagnosis, treatment, and care for the individual patient</td>
<td>Disease Prevention and Health Promotion for the Whole Community</td>
</tr>
<tr>
<td>Paradigm</td>
<td>Medical paradigm places predominant emphasis on medical care</td>
<td>A spectrum of interventions aimed at the environment, human behavior and lifestyle, and medical care</td>
</tr>
<tr>
<td>Certification</td>
<td>Uniform system for certifying specialists beyond professional medical degree</td>
<td>Variable certification of specialists beyond professional public health degree</td>
</tr>
</tbody>
</table>
| Lines of Specialization | Organized by:  
    - Organ system (cardiology, neurology)  
    - Patient group (obstetrics, pediatrics)  
    - Etiology and pathophysiology (infectious disease, oncology)  
    - Technical skill (radiology, surgery) | Organized by:  
    - Analytical method (epidemiology, toxicology)  
    - Setting and population (occupational health, global health)  
    - Substantive health problem (environmental health, nutrition) |
<table>
<thead>
<tr>
<th>Central science</th>
<th>Biological sciences central, stimulated by needs of patients, research moves between laboratory and bedside</th>
<th>Life sciences central, with a prime focus on major threats to the health of populations, research moves between laboratory and field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essential features of analysis training</td>
<td>Numerical sciences increasing in prominence, though still a relatively minor part of training</td>
<td>Population science and quantitative disciplines</td>
</tr>
<tr>
<td>Social Science features</td>
<td>Social sciences tend to be an elective part of medical education</td>
<td>Social and public policy disciplines an integral part of public health education</td>
</tr>
</tbody>
</table>
# Appendix 2-B: Search Strategy and Results

<table>
<thead>
<tr>
<th>Database</th>
<th>MEDLINE</th>
<th>CINAHL</th>
<th>EMBASE</th>
<th>Scopus</th>
<th>Web of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of Articles Found (N = 9894)</strong></td>
<td>2084</td>
<td>2164</td>
<td>818</td>
<td>3775</td>
<td>1053</td>
</tr>
<tr>
<td><strong>Number of Articles Selected</strong></td>
<td>365</td>
<td>792</td>
<td>191</td>
<td>883</td>
<td>50</td>
</tr>
</tbody>
</table>
for Review (N = 2281)

<table>
<thead>
<tr>
<th>Number that Fulfilled all inclusion criteria</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes:

1. The CINAHL and Scopus searches include only 2 of the 3 primary search domains. Whenever the third domain was included in the search the number of articles became less than 20, and I wasn’t sure that I could rely on what was excluded to not be of significance, so I returned to 2 domains and attempted to narrow manually from there.

2. Wherever a database had keywords, such as MESH terms, the search strategy was built to make use of those terms.

Full inclusion criteria:

1. Article must be specific to physician practice
2. Article must be specific to public health or preventive medicine practice
3. Article must contain (rather than discuss the need for) a theory of practice
Appendix 3-A: Examples of Persuasive Rhetoric in CMOH Briefings

The most effective communicators in our data tended toward active engagement of the audience through rhetorical devices that included each of the three rhetorical components.

Example 1:

“Where these measures are necessary, if we hope to avoid what we’ve seen in other places and flatten the curve as we combat COVID-19, we are counting on your support to adhere to these recommendations. We are all in this together for the good of our communities, our elders and our most vulnerable. We need to listen, stay safe, be kind and work together.” [CMOH 5, Time 1]

Here, the emotional appeal to collective values (solidarity and safety) is backed by the credibility of the speaker to persuade the public of the desirability of adherence to public health measures.

Example 2:

“So as you’ve just heard from my colleagues we have the first presumptive case of this novel coronavirus here […]. We […] just learned about this case earlier this afternoon. And as I’ve indicated in the past there is a public health system following up on cases of infectious disease [which] is exactly what do in Public Health each and every day. So in this particular case once we were notified of the presumptive confirmed case of Coronavirus we started our actions in terms of Public Health. And as I’ve mentioned before to members of the press and through public communications what this looks like is understanding where the case was and what the circumstances were under which the person became ill. And our focus then is also making [sure] that we understand who might have been exposed to this individual and in what sorts of settings the individual has
been so that we can determine who else might have been [there] and who might be at risk for further illness. But again this is something that we do on a regular basis in Public Health and this is in fact what my staff are actively doing now having heard of this particular situation earlier this afternoon. As I’ve promised to the public as more details emerge and as we have information to provide we will continue to provide you with advice on what the situation is here in […]. I would like to say that I do appreciate very much the collaboration from our partners. We did hear from them very quickly and that allowed us […] to get on the case and to start our work as early as possible.” [CMOH 7, Time 1]

In this segment, a public health physician describes the advent of the first case of coronavirus, as well as the steps being taken to investigate and contain the disease. The physician moves intentionally from expressions of fact, to the provision of context, a description of the intervention (case management, followed by contact investigation and tracing). The physician articulates the goal of the public health intervention (to determine who else may be at risk) and expresses a commitment to informing the population on new developments. This segment is a good example of the use of ethos (the speaker’s credibility) and logos (via explaining the steps that are being taken in response to the first case) to persuade the population that the situation is being well managed, to build relationships with partners and the public, and to demonstrate care for the population. The pathos component is less obvious here, but the tone is reassuring and that level of reassurance complements the other two rhetorical pillars in this instance.

Example 3:

“This disease, today’s tragic news, is a stark reminder that this is a serious disease. [...] we need at least 80% of us – ideally 100% - but at least 80% of us doing the public health measures that help protect each other, and doing that extremely well. [...] If we can do this over the next few weeks, we will have a substantive impact and we will together be able to look back and say, […] we
came together and saved a lot of loves in our community. If we don’t, then we have a different story to tell. So I’d like to tell the first story.” [CMOH 6, Time 1]

The segment above came from a media briefing in which the first death from COVID-19 was announced in a province. In this powerful segment, the speaker combines three rhetorical tools (logos, pathos, and ethos) to inform the public of the seriousness of the situation, to advise them on what needs to be done, and to engage them in a collective effort to achieve a goal.
Appendix 4-A: LOI and Consent Form

Letter of Information and Consent

Project Title: Medical Officers of Health and Populations as Patients: A Grounded Theory Study of the Process of Caring for Populations

Principal Investigator:
Name: Dr. Amardeep Thind
Address:
Phone:
Email:

Co-Investigators:
Name: Dr. Judith Belle Brown
Address:
Phone:
Email:

Name: Dr. Tom Freeman
Address:
Phone:
Email:

Name: Dr. Sudit Ranade, PhD Student

1. Invitation to Participate

You are invited to participate in this research study about the processes by which Medical Officers of Health (MOH) care for populations. If you are a licensed physician working as a MOH (or similar title) in a Canadian municipal, regional or provincial jurisdiction you are eligible to participate. Your participation is entirely voluntary.

2. Why is this study being done?

The COVID-19 pandemic has put MOHs in greater view of the public, and this has led to important questions about their roles and responsibilities with respect to their populations. Although there are process models for how physicians care for individual patients, there are no comparator models to describe how physicians care for populations. The purpose of this study is to understand, from the perspective of MOHs, how they care for populations and to describe a process of care that can be used to train public health physicians and contribute to the professional development of practicing physicians who are responsible for populations.
This study is being conducted in partial fulfilment of PhD degree requirements for Dr. Sudit Ranade.

3. How long will you be in this study?

It is anticipated that you will be in the study for up to six months. There will be 1 interview, lasting approximately 1 hour.

4. What are the study procedures?

The study will involve interviewing MOHs using a virtual platform (Zoom). These interviews will be audio-recorded and transcribed verbatim by Transcript Heroes for analysis. In the process of transcription, any identifying information will be removed. We will ask you demographic questions, such as how long you have been in your role, your training background, and the size of your jurisdiction. We will then ask you questions related to your work with your population and the processes by which you conduct your work. We will use a grounded theory analysis to construct a model from the data that describes how MOHs work with populations for health.

5. What are the risks and harms of participating in this study?

There are no known anticipated risks or discomforts associated with participating in this study. However, given the challenging nature of the pandemic and its impact on MOH professional lives, the research team will offer each participant a list of wellness resources that are available in case they are needed following the interview.

There is a potential risk of participation in any virtual platform that information could be intercepted or shared by accident. This risk cannot be completely eliminated, but we will be using the Western-approved Zoom site with appropriate security features enabled (e.g. meeting passcodes). Please note that because we are collecting personal identifiers, there is always the risk of a privacy breach. If this occurs, the research team will follow institutional protocols to make you aware of the breach and its impact.

6. What are the benefits of participating in this study?

You may not directly benefit from participating in this study, but information gathered may provide benefits for public health physicians and other physicians who work with populations. This still will help to build a stronger theoretical foundation for the practice of public health and preventive medicine.

7. Can participants choose to leave the study?

Interview participants may terminate the interview at any time, and if this happens the research team will ask the participant about consent related to the information collected up to the point of termination. Once transcribed, interview transcripts will
not contain directly identifiable information. Once the transcribed interviews are added to the general dataset, it may not possible to remove them or to disentangle the codes and other data generated from any individual transcript.

8. How will participants’ information be kept confidential?

Only members of the research team and Western University Health Sciences Research Ethics Board (HSREB) will have access to participants’ information. Each participant will be assigned a numeric code, and information linking demographic data to participants will be stored securely. Other data accumulated in the interview will be assigned the participant code and kept securely but separately from the identifying data. The research team will keep this information in a secure and confidential location for 7 years. Confidential information will then be permanently destroyed according to institutional protocols.

You will not be named in any reports or publications that may come from this study. However, it is possible that, due to a small sample size, identifiers in the study may be triangulated to identify a participant. The research team will attempt to control this in the reporting of the study, but it may not always be possible.

We will be using third parties for data collection and storage. Transcription data will be de-identified and stored on Western OneDrive. As with any cloud-based information storage there is the potential for unintended privacy breaches beyond the investigator control. We will follow Western University’s institutional protocols if we are made aware of such an incident, to inform you of the scope of the incident and its impacts. We will also be using NVIVO qualitative analysis software. The NVIVO (QSR) privacy policy is located here. NVIVO is based in the US. Interview transcripts will be stored in an NVIVO data file to enable analysis by the research team.

9. Are participants compensated to be in this study?

There will be no compensation for participation in this study.

10. What are the rights of participants?

Your participation in this study is voluntary. You may decide not to be in this study. Even if you consent you have the right not to answer individual questions or to withdraw from the study at any time prior to or during the interview. You do not waive any legal right by consenting to this study.

11. Whom do participants contact for questions?

If you have questions about this study please contact Dr. Sudit Ranade at [   ].

If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics (519) 661-
3036, 1-844-720-9816, email: ethics@uwo.ca. The REB is a group of people who oversee the conduct of research studies. The HSREB is not part of the study team. Everything that you discuss will be kept confidential.

12. Consent.
See next page
This letter is yours to keep for future reference.

Consent Form

1. Project Title: Medical Officers of Health and Populations as Patients: A Grounded Theory Study of the Process of Caring for Populations
2. Document Title: Consent Form - MOH
3. Principal Investigator: Dr. Amardeep Thind
4. Co-Investigators: Dr. Judith Belle Brown, Dr. Amardeep Thind, Dr. Tom Freeman, Dr. Sudit Ranade
5. Main contact: Dr. Sudit Ranade

I have read the Letter of Information, have had the nature of the study explained to me and I agree to participate. All questions have been answered to my satisfaction.

My participation in this study is voluntary and I understand the purpose of this study, as well as the potential risks and benefits,

By signing, dating and printing my name below, I consent to:
- participating in the interview and having it audio recorded,
- the use of unidentified quotations obtained during the study in the dissemination of this research.

_________________________
Printed Name of Participant

_________________________
Signature of Participant Date

INTERNAL USE ONLY

This study has been explained to the research participant and, if applicable, all questions have been answered to the satisfaction of the participant.

_________________________
Principal Investigator Date
Appendix 4-B: Semi-Structured Interview Guide

POPCARE-GT Semi-structured Interview Guide
The interview will proceed according to the following steps outlined below: Introduction and Confirmation of Consent, Demographic Questions, Guiding Questions, Closing and Debrief.

1) Introduction and Confirmation of Consent

Interviewer will:
- Introduce self and other members of research team in attendance
- Thank the participant
- Outline the time commitment of the interview (60 min)
- Remind the participant that participation is voluntary, and that the participant does not have to answer every question
- Remind the participant that information will be kept confidential
- Ask if the participant has any questions prior to the interview
- Confirm consent to recorded interview and to the use of unidentified quotations in dissemination

2) Demographic Questions [recorded manually in confidential matching document]

Participant will be asked to identify:
- Name
- Title
- Practice setting (municipal/regional/provincial)
- Province
- Tenure as MOH
- Population size
- Gender – “Do you currently identify with a gender? [If yes] With which gender do you currently identify?”
- Training Qualifications – “Can you describe your educational training and credentials?”

*Beginning of Recorded Interview*
“We will now begin the audio-recorded interview.”

3) Guiding Questions

Relationships and Expectations:
First, I would like to ask you about your professional roles and relationships.
   a. Can you describe your role as [title]?
   b. What does it mean to be a “good” [title]?
   c. Who is your patient or who are your patients?
   d. What is the relationship like between you and your patient?
      i. Can you remember a time or an event that highlights this relationship?
   e. What other relationships are important in your work?
   f. What are some of the expectations that you think your population has of you?
   g. What expectations do you have of the population?
   h. Can you describe a time when you had to navigate through different values or expectations about a public health issue?

Decision-Making and Context
Next, I would like to ask you some questions about how you make decisions in your work.
   a. Can you describe your approach to a public health issue?
   b. How do you decide what health issues are important to the population?
   c. Can you describe a significant decision you made for the health of the population?
      i. What was the situation?
      ii. What was the decision?
      iii. How did you make the decision?
      iv. What factors influenced your decision?
      v. Were there times where you re-evaluated or revisited the decision?
   d. How would you describe your population?
   e. How does the context of your population influence your decision making? [Prompt: Can you give an example?]

Responsibilities and Boundaries
I would like to ask you some questions about the scope of your work.
   f. Can you tell me about a day in your job that stands out to you?
   g. Can you remember a time or event that highlights a boundary of your scope or role?
vi. What happened?

vii. How was the boundary around your role defined?

viii. What did you do in terms of working with or around the boundary?

h. Can you describe a situation where you exerted authority?

i. Can you describe a situation where you exerted influence rather than authority?

j. What made these two situations different?

Outcomes
  k. Can you remember a time or event that you think of as a successful outcome of your work?
     ix. Can you walk me through how it unfolded?
     x. [prompt] Can you describe what you did to achieve this outcome?

l. Can you remember a time or event that you think of as an unsuccessful outcome in your work, or a time when things didn’t work out as you had intended?
   xi. Can you walk me through how that unfolded?
   xii. [prompt] Can you describe what you did along the way?

Training
  m. How do you think your training as a physician influences your work?
  n. How does your non-medical training or education influence your work?
  o. What is something you wish people had told you about this work?
  p. What would you tell a new professional about this work?

Wrap-up
  q. Is there anything else you would like to share with me?

4) Closing
Interviewer will close interview by:
  o Thanking participant
  o Requesting consent for follow-up (clarification or verification) if indicated
  o Outline next steps in study process

5) Debrief
I/We recognize that the pandemic has had a significant impact on many people’s personal and professional lives. Public Health Physicians of Canada has compiled a list of resources for public health physician wellness. Would you like us to share that with you after this interview as well?
Appendix 4-C: Ethics Approval for Grounded Theory Study

Date: 27 January 2022

To: Dr. Amurdeep Singh

Project ID: 120188

Study Title: Medical Officers of Health and Populations as Patients: A Grounded Theory Study of the Process of Caring for Populations

Application Type: HSREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 08/February/2022

Date Approval Issued: 27/Jan/2022 07:07

REB Approval Expiry Date: 27/Jan/2023

Dear Dr. Amurdeep Singh,

The Western University Health Science Research Ethics Board (HSREB) has reviewed and approved the above mentioned study as described in the WREM application form, as of the HSREB Initial Approval Date noted above. This research study is to be conducted by the investigator noted above. All other required institutional approvals and mandated training must also be obtained prior to the conduct of the study.

Documents Approved:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Type</th>
<th>Document Date</th>
<th>Document Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPCARE-GT Email Script V2 Jan 21 2022</td>
<td>Email Script</td>
<td>21/Jan/2022</td>
<td>2</td>
</tr>
<tr>
<td>POPCARE-GT Protocol V2 Jan 21 2022</td>
<td>Protocol</td>
<td>21/Jan/2022</td>
<td>2</td>
</tr>
<tr>
<td>PIPPC Scan_prevent_burnout_33Jan2021</td>
<td>Interview Guide</td>
<td>13/Jan/2021</td>
<td>1</td>
</tr>
<tr>
<td>POPCARE-GT LOI and Consent V3 Jan 25 2022</td>
<td>Written Consent/Assent</td>
<td>25/Jan/2022</td>
<td>3</td>
</tr>
</tbody>
</table>

Documents Acknowledged:

<table>
<thead>
<tr>
<th>Document Name</th>
<th>Document Type</th>
<th>Document Date</th>
<th>Document Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>POPCARE-GT Method Diagram</td>
<td>Flow Diagram</td>
<td>11/Nov/2021</td>
<td>1</td>
</tr>
</tbody>
</table>

No deviations from, or changes to, the protocol or WREM application should be initiated without prior written approval of an appropriate amendment from Western HSREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University HSREB operates in compliance with, and is constituted in accordance with, the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2); the International Conference on Harmonisation Good Clinical Practice Consilium Guidelines (ICH-GCP); Part C, Division 5 of the Food and Drug Regulations; Part 4 of the Natural Health Products Regulations; Part 3 of the Medical Devices Regulations and the provisions of the Ontario Personal Health Information Protection Act (PHIPA 2004) and its applicable regulations. The HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

Please do not hesitate to contact us if you have any questions. Sincerely,

Ms. Nicola Goepfert-Morphet, Ethics Officer on behalf of Dr. Emera Durrer, HSREB Vice-Chair