THE SOCIAL CONSTRUCTION OF TELEMEDICINE IN ONTARIO

THE SOCIAL CONSTRUCTION OF TELEMEDICINE IN ONTARIO: A HISTORICAL NARRATIVE ANALYSIS

By

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LAY ABSTRACT

Telemedicine delivers health care at a distance by letting doctors talk to patients or other doctors via video, email, or text messages. However, as simple as this idea is, researchers, physicians, policy-makers, and entrepreneurs have speculative, overlapping, and conflicting views about what it should be. These differing views create ambiguity and often confuse the aims of health policy decision-makers and end-users limiting telemedicine's development.

I intend to clarify telemedicine's shared and diverging understandings of what telemedicine should be by analyzing how stakeholders in Ontario have told and tell stories about telemedicine's future over the last three decades. I view stories of the technology's future as persuasive policy arguments that stakeholders adopt to shape and use telemedicine according to their visions and goals. These findings will help researchers, policy-makers, doctors, and businesspeople understand what telemedicine is (and is not) to help them define policies and guidelines for its adoption and implementation.

ABSTRACT

The term telemedicine is broadly defined as the use of information and communication technology to deliver health care at a distance. However, the concept of 'telemedicine' still lacks consensus both in the literature and in practice. Generation of telemedicine knowledge and evidence for clinical practice is still controversial within the telemedicine scholarship and among decision-makers as telemedicine objectives remain ill-defined and outcomes vary in time. In Ontario, despite the fast pace of information and communication technology change and the increased interest in its health applications, telemedicine is not a mainstream model of care delivery within the medical system.

This study empirically investigates the social construction of telemedicine technologies to understand how telemedicine expectations shaped telemedicine in Ontario (Canada) from 1993 to 2017. Drawing from the Social Construction of Technologies framework (SCOT) and historical narrative analytical techniques, it identifies the shared understandings of what telemedicine is (and is not) and what role telemedicine plays in the health care system. I used grounded theory methodology to develop a narrative theory of how the future of telemedicine in Ontario has been constructed over the last 24 years from national newspaper articles, stakeholder documents, service provider websites, and semi-structured interviews with relevant telemedicine stakeholders. Findings show that the development of telemedicine narratives in Ontario is a multi-storied process of conflicting and overlapping visions and expectations among stakeholders and interests. Telemedicine expectations focus mostly on the process of innovation, the provider-oriented approach to telemedicine, and the advantages and risks of adopting consumer-controlled telemedicine in a publicly insured health care system. The telemedicine visions result fragmented among different stakeholders and practices, overall inhibiting telemedicine's future agenda. These findings intend to help researchers, policy makers, private vendors, and health care providers to create a vision of telemedicine that accommodates competing expectations among the clinical, technical, political, and commercial worlds.

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LIST OF ABBREVIATIONS

ADSL	Asymmetric Digital Subscriber Line
BNR	Bell-Northern Research
CCAC	Community Care Access Centre
CAE	Canadian Aviation Electronics Ltd.
CHF	Congestive Heart Failure
CANARIE	Canadian Network for the Advancement of Research, Industry, and Education
CHIPP	Canada Health Infostructure Partnerships Program
COPD	Chronic Obstructive Pulmonary Disease
CPSO	College of Physicians and Surgeons of Ontario
EHRs	Electronic Health Records
EMRs	Electronic Medical Records
EOTN	Eastern Ontario Telemedicine Network
FHT	Family Health Team
FMRAC	Federation of Medical Regulatory Authorities of Canada
HSCR	Health Services Restructuring Commission
IT	Information Technology

IHAC	Information Highway Advisory Council
IP	Internet Protocol
ISDN	Integrated Services Digital Network
LHIN	Local Health Integration Network
MOHLTC	Ministry of Health and Long-Term Care
OHA	Ontario Hospital Association
OHIP	Ontario Health Insurance Plan
OMA	Ontario Medical Association
OCFP	Ontario College of Family Physician
OHA	Ontario Hospital Association
OTN	Ontario Telemedicine Network
PHIPA	Personal Health Information Protection Act
SCOT	Social Construction of Technology
SSHA	Smart Systems for Health Agency
STS	Science and Technology Studies
VoIP	Voice Over Internet Protocol
VPN	Virtual Private Network

LIST OF APPENDICES

DECLARATION OF ACADEMIC ACHIEVEMENT

The following is a declaration that the research in this thesis has been completed by Francesca Brundisini, who led all components of the project, including the development of the research objectives, data collection and analysis, interpretation of findings and preparation of the written document. It also recognizes the contributions of Drs. Mita Giacomini, Jillian Kohler, Michael Egan and Lydia Kapiriri in providing guidance and feedback throughout the research process.

CHAPTER 1: INTRODUCTION

Telemedicine definition(s)

Telemedicine, which etymologically means "healing at a distance," dates back to the beginning of the XX century (1, 2). Pioneering physicians successfully used telephone communications to send clinical information and health data across long distances (1). Telemedicine today encompasses a broad set of information and communication technologies (hereafter, "information technology") and computer technologies applied to a variety of health conditions, health care services, and practices, for clinical, administrative, and educational purposes (3-5). As shown in Table 1, telemedicine applications include the use of video-conferencing systems (synchronous, two-way video interaction), or asynchronous, store-and-forward interactions (such as email exchange or the use of databases for storage and subsequent retrieval of images and data) (3). Both synchronous and asynchronous modes of transmission can be performed between patients and health care professionals or among health care providers only (3). Telemedicine applications include but are not limited to Video-conferencing, Telemonitoring, Telehomecare, Telestroke, Teleradiology, Teledermatology, Telepathology, Telemental health, and Teleophthalmology to name a few (3, 6).

Table 1 Telemedicine transmission modalities and applications

Mode	Interaction	Transmission*	Examples and definitions of telemedicine applications
Synchronous	Two-way interaction	"Real-time" transmission through video conference, i.e. through video monitors and telephone or internet lines	*Telemonitoring* is the automated transmission of a patient's health status and vital signs data from a distance, through the use of audio, video, and other telecommunication technologies (7).
			Telehomecare is a home-based communication system that enables the interaction of voice, video, and health-related data for remote monitoring and for supporting patient's self-management (8, 9).
			Telecardiology/*Telestroke* is the application of telemedicine technology to stroke care that delivers remote audio-visual access to a neurologist for remote treatment (10, 11).
			Telepsychiatry and telemental health are the provision of mental health care through video conferencing - i.e. through electronic video and audio communication systems (12).
Asynchronous	"Store-and-forward" interaction (that is, the transmission of data and information to an intermediate station and later sent to the final destination)	Not "real-time" transmission, telemetry of data via email, Internet, cell phone, and automated messaging systems	*Teledermatology* is the practice of providing skin care at a distance using video imaging, digital image archiving, and electronic communications (13).
			Teleradiology is the digital archiving and electronic transmission of radiological images from one location to another for remote radiologist consultations (14, 15)
			Telepathology is the practice of pathology at a distance by using video imaging – i.e. "whole slide imaging" and virtual microscopes - and electronic communications (16-18).
			Teleophthalmology is the exchange of ophthalmic information from one site to another via electronic communications to provide secondary specialist advice in the diagnosis and management of eye care at a distance (19).

* Interaction and transmission between a patient and a health care professional; or between two or more health care providers.

For the purpose of this study, I define "telemedicine" exclusively to refer to clinical applications of information technology (and when possible, focusing on video-conferencing and telemonitoring applications). I exclude educational and administrative applications (for example, video conferencing for continuing medical education and administrative tools such as the Electronic Health Records (EHRs) and Electronic Medical Records (EMRs)). This definition deviates from other definitions that conventionally include clinical, administrative, and educational aspects of telemedicine all together (20-22).

However, as basic as the idea of telemedicine may be today – that is, the use of communication technology to deliver health care services at a distance – the word "telemedicine" still lacks international consensus, both in the literature and in practice (3, 22-24). Sood et al. (3) presented an extensive literature review of the multiple definitions of telemedicine. They identified 104 peer-reviewed definitions that varied according to the context of use, highlighting the complex and heterogeneous nature of the technology (3). Other reviews, including bibliometric analysis (21, 22), and taxonomy studies (20, 23), identified and addressed this multitude of definitions as well. The rapid development and state of flux of communication and computer technologies have broadened – and is still expanding – the scope and domains of telemedicine applications as well as the terminology used to address this kind of health care services, including terms such as "telehealth", "ehealth", and "virtual health" (3, 22, 23). Different actors, such as researchers, developers, commercial firms, health care providers, and decision-makers still often use the terms "telemedicine," "telehealth," "e-health," and "virtual health"

interchangeably. This lack of consensus reflects the multidimensional nature of the technology and the different meanings telemedicine acquires in various contexts and according to different actors who design, produce, and implement the technology (3, 23).

This lack of clarity and consensus in the definition of telemedicine is reflected within telemedicine policy discourses as well. Greenhalgh et al. (25) provide an example of how the lack of clarity in the evaluation of e-Health programs leads to program failures in the British health care system. In Ontario, the existence of a not-for-profit telemedicine corporation funded by the Ministry of Health and Long-Term Care has promoted the development of telemedicine programs, representing a model of relative success compared to other provinces and countries (1, 26). However, the definition of telemedicine technology still results fragmented among different settings and practices even in Ontario, inhibiting policy decision-making to keep up with the pace of technological change.

As outlined in the following section, my research interest lies in the social processes by which actors attach different interpretations to the telemedicine technology and thus reveal the meanings that lie within the technology. This broad definition of telemedicine guides this research without limiting the understanding of the various meanings and interpretations that vary according to the different actors involved in the field.

A qualitative approach to the study of telemedicine

Over the last two decades, the constant development of information technology has encouraged growing expectations for improved quality and safety of care as well as

concerns about the future of the established health care system (27-29). Telemedicine proponents view telemedicine as an innovative solution to better respond to patients' needs and safety (27, 30-36). They also regard telemedicine as a measure to tackle ongoing problems that affect health care systems, such as the growing health care expenditures, ageing population, increasing prevalence of chronic conditions (therefore the need for long-term and ongoing chronic disease management services), as well as the unequal distribution and access to health care services (27, 30-36). However, despite the fast development information technology and the increased interest in its health applications, telemedicine today is not a mainstream model of care delivery within the medical system (4, 23, 26, 29, 34, 37-39).

Telemedicine still generates concern among advocates and opponents, because it is technically evolving, economically undefined, as well as socially and politically indeterminate (23, 28, 30, 38, 40-42). Production of telemedicine knowledge and evidence for clinical practice remains contentious within the telemedicine community as telemedicine goals are often undefined, and outcomes shift quickly in time (25, 43, 44). Reasons for methodological considerations are due to a set of factors that characterizes telemedicine research. Among such factors I identified the lack of a defined terminology, the complexity and heterogeneity of the technology (including the broad scope of different technological components and applications), the lack of acknowledged and shared research standards that can be applied to all the spectrum of telemedicine applications, and the narrow focus of telemedicine research, such as, telemedicine's technical feasibility, clinical and cost effectiveness and user satisfaction (patient, and to a

lesser extent provider satisfaction) (3, 21, 23, 30, 38, 40-42, 45). Traditional evaluative methods do not provide timely and conclusive evidence for telemedicine implementation, as the emergent nature of telemedicine fails to fit within the constraints of evaluative standardization (43, 44).

Researchers and decision-makers tend to rely on evaluative methods as they generate widely respected and conventional "evidence" for policy making (25, 29, 44). However, telemedicine is a constantly evolving technology still in its formative stages – and we are at the stage of determining what it can and should do, and how (3, 38). Evaluative research cannot shed light on these issues (25, 44, 46). Evaluative studies generate answers to the question of "whether it works" – but such answers only make sense when the goals are clear, and metrics of success are quantifiable (44, 47).

Alternative approaches to evaluative methods based on qualitative, single "n-case" studies can reduce technology's uncertainties by placing these evaluations within the socio-political arena (25). By acknowledging that technological innovations occur in social and political contexts, I agree with Greenhalgh and Russell (44), Greenhalgh et al. (25), and Lehoux (48) that technological innovations are also "social practices." Qualitative investigation can, by exploring the way various goals are defined and constructed, identify points of agreement and disagreement among stakeholders, and identify their goals as well as the values that guide their actions. In this study, by taking a constructivist and interpretivist stance, I explore and explain the social construction of telemedicine technology to illuminate how the different actors involved in the telemedicine field construct and frame the idea of telemedicine (49-51). This approach,

informed by the social constructivist perspective, does not conceptualize technologies as deterministic actors that shape social action and social realities (49). Instead, from this perspective, I address telemedicine as a complex intervention based on contingent values and meanings (30, 41, 52-54). I acknowledge technologies as artifacts embodying stakeholders' values and moral choices (55, 56). These moral choices, in turn, reflect the social processes in which the interconnectedness and power relationships of multiple actors shape through their narratives the knowledge and the shared understanding of telemedicine and its role within the health care system.

Research objectives and questions

In particular, this research aims at understanding how social, policy and moral visions have shaped telemedicine clinical applications over the last 24 years in Ontario (Canada). The two overarching research questions ask: *What narratives have been used in promotion, debate, and discourse concerning the introduction and envisioned "future" of telemedicine over 24 years?* And, continuing, *in these narratives, how are the stakeholders or relevant social groups defined, and what roles are they given to play?*

In answering these questions, I will explore and identify the typical "storylines" of telemedicine visions, and how such narratives of the future have evolved according to each stakeholder. Locating these narratives in time allows us to identify which stories have emerged, how they emerged, and how they have changed over time. I will analyze these stories to reveal how stakeholders' different expectations have shaped telemedicine over the last two decades in Ontario, and what roles these stakeholders have played and play today.

In the remainder of the chapter, I review and explain the epistemological foundations and the theoretical framework adopted in this dissertation, and how I used this approach for the study of telemedicine. Finally, I will present the outline structure of the thesis.

Epistemological foundations and theoretical framework

As mentioned earlier, methodologies play an important role in approaching the study of complex health technologies such as telemedicine. The epistemological perspective and theoretical framework define and inform the methodological and foundational tools of this study (57, 58). Moving away from the standard notions of technological determinism and embracing social constructivist ideas developed within the Science and Technology Studies (from hereafter referred as STS), I consider technologies as socially shaped and as situated in socio-political contexts (48, 49, 51, 59-61). This approach adopts a social constructivist perspective and organizes this study according to the Social Construction of Technologies theoretical framework (from hereafter referred as SCOT) (49, 51, 62, 63). The SCOT model is grounded in the idea that different social groups can have different interpretations of the same technological artifact (49-51).

The following sections aim to clarify the foundational tenets that guide and shape this research (57, 58). I first introduce the fundamental principles of social constructivism, and then I outline how Science and Technology Studies adopted a social constructivist perspective leading to the development of the SCOT framework. Finally, I describe the SCOT framework and its workings, before I explain in the final part of this chapter how I will adopt this framework for the study of telemedicine technology.

Social constructivism

Social constructivism is a specific worldview or paradigm. A worldview is a "set of beliefs" (64) that defines which lens (ontological, epistemological, and methodological) the researcher puts on to view the world (57, 58, 65). In particular, as set forth by the influential work of Berger and Luckmann (in their 1966 work *The social construction of reality*), social constructivist worldview considers the subjective meaning-making of reality, that is, the categorization and organization of reality as a means to know reality (62). Social constructivism posits reality as cognitively constructed by individuals in a socially contingent context (62, 64). What is defined as "reality" is the result of a negotiated and consensual agreement among the multitude of subjective meanings in a localized social context (57, 58, 62, 64). Accordingly, reality is comprised of ideas (idealist) as opposed to objective, fixed or universal "truth," as advanced to the contrary by realist ontologies (57, 58, 64). However, as Phillips carefully highlights, the literature on the social construction of reality can vary following different research programs (63). Without delving too much within the nuances of different constructivist research programs and how such programs understand "social construction" (which is not the aim of my discussion here), the social construction of reality can be interpreted as residing within the "internal cognitive process" of the individual or as a result of "sociopolitical processes", or both (63).

By taking a more socio-political stance, I conceptualize "social construction" not only as the individual's development of subjective meanings but primarily as the socially constructed meanings that are shared through the interaction among individuals, that is,

the social negotiation of what is considered to be "reality" (62-64). I acknowledge groups as the unit of analysis, thus departing from a more individualistic perspective of other social constructivist programs (63, 66). The social construction of reality, as I understand it, is the result of an "active process" within an "interactive dialogical community" (63, 66). In this study, the social construction paradigm relies on the meaning-making process through categorization, and the context within the shared meanings are developed as these groups are situated in particular interactive relations (64).

Science and Technology Studies (STS) and the Social Construction of Technologies theoretical framework (SCOT)

Hereafter, I will explain how the social constructivist paradigm has been integrated within Science and Technology Studies (STS) and, in particular, how the Social Construction of Technologies (SCOT) theory provides a heuristic approach to open the "black box" of technology.

Science and Technology Studies (STS).

For decades, researchers have attempted to design approaches to explore technological artifacts, that is, to open the "black box" of technology (48-50, 67, 68). Scholars have developed different methods over time and across various disciplines (such as sociology of science, innovation studies, history of technology, and more recently philosophy, anthropology, economics and political science), ranging from technological deterministic perspectives to social constructivist orientations (50, 51). Today, most of these studies fall within the Science and Technology Studies (STS), in particular within three of its main bodies of work: Sociology of Scientific Knowledge, Actor Network

Theories, and the Social Construction of Technologies theory (50, 51, 67).

Among these bodies of work, the Social Construction of Technology emerges in the early 1980s to understand the complexity of the social and policy processes involved in the technological innovation process (50, 51, 68, 69). In particular, social constructivists investigate technological artifacts' structures, functioning and dynamics of change (68, 70), rather than conceiving technological innovations as inherently technical, linear, and independent from the "social world" (48, 49, 51).

During the late 1970s, studies within the field of sociology of scientific knowledge began to question the nature of scientific "facts" by looking at "the process by which the scientists make sense of their observation" (p.32) (71). This promoted what Barnes (1982) defined as a crucial "intellectual development," i.e. the acknowledgment that "knowledge does not have inherent implications" (p. 168) (72). That is, the sociology of scientific knowledge started to reject the implicit notion that "science discovers, and technology applies" (72). With this shift in perspective, researchers do not view technology and science as "monolithic structures" anymore; rather, as two separate forms of "culture" (51, 72). That is, both scientific knowledge and technological artifacts are socially constructed (51, 71, 72). As Pinch and Bijker (1984) argued, "In this view the boundary between science and technology is, in particular instances, a matter of social negotiation, and represents no underlying distinction" (p.404) (51).

The acknowledgement of such foundational assumption has led scholars within the sociology of technology (in particular Pinch and Bijker with their seminal work *The Social Construction of Facts and Artefacts: or How the Sociology of Science and the*

Sociology of Technology Might Benefit Each Other, 1984) and history of technology to approach technological artifacts as scientific knowledge (50, 51, 69, 70). Thus, borrowing the methodological stance used within the sociology of scientific knowledge and applying it to technological artifacts these scholars developed the new integrated Social construction of Technologies (SCOT) approach (49, 51, 70).

The Social Construction of Technologies theoretical framework (SCOT).

The Social construction of Technologies (SCOT) theory recognizes technologies as socially shaped, that is, open to more than one interpretation, offering an alternative model different from the linear model of technological development (51). This "interpretational flexibility" of technological artifacts defines a new "multi-directional model" of technological development, which evolves through *variation*, *selection, stabilization and closure* (51). Various "relevant social groups," such as policymakers, researchers, producers, and end-users, interpret the artifact in different ways according to the meanings attributed to the object (*variation*). For example, in the early 1990s telemedicine's interpretative variation ranged from commercial firms' interpretation of telemedicine as a tool to create new market opportunities, to telemedicine clinical champions regarding this technology as a device to improve access to health care services in remote areas. It is the identification of the problems and solutions related to the technology in particular moments in time that leads to the artifact's survival or death (*selection*) (51). This selection process, in turn, is defined by the relevant social groups, which identify the controversies that are relevant according to the interpretations that each group attributes to the artifact (49, 51). According to Pinch and Bijker, the identification

of conflict and controversial mechanisms reveals the interpretative flexibility of an artifact (51).

There are two important observations to highlight here. First, a relevant social group is a group of individuals that shares the same meanings of a technology (51). By shared meanings I mean that these groups attribute the same goals to the technological artifact, as well as a common symbolic value to it (49, 51, 70). These groups then share the same values and purposes for the particular artifact. For example, Pinch and Bijker's foundational work describes the development of the bicycle by highlighting the tension between the different meanings young male users and women attached to the same artifact (49, 51). Young males viewed the bicycle as a "macho machine"; women, on the other side, considered the bicycle as the "unsafe machine" (49, 51). As this example highlights, these groups are not predetermined, nor hierarchical, but "relevant" because the members of these groups share the same meaning of a particular artifact (50, 51). Second, the variation and selection processes connect both the content of a technology and its external context (50, 51). Both the meanings attached to an artifact and its "sociopolitical milieu" contribute to the social relevant groups' definition of a problem, and consequently its solution (50, 51). The connecting element is what Bijker, later on, has defined as "technological frame", a mild reconciliation of the SCOT approach with technological determinist perspectives (50). These technological frames, which are built around an artifact and within a specific social, economic, and political context, influence social actors' behaviours, actions and interpretations (50). In particular, the concept of "technological frames" explains why a distinct social construction process develops for a

particular technological artifact (50). That is to say, the interpretations attributed to the artifacts, and its related controversies and solutions, develop from a combination of content and context factors mediated through these technological frames (50, 51).

Returning to the interpretative flexibility process, this concludes when the social groups consider a technological solution as socially acceptable (49, 50). This entails a two-step process: *stabilization* and *closure* (49, 50) of the interpretation of the technology. *Stabilization* indicates the stage in the process in which the various interpretations of the technology reach different levels of "consensus" (a word that I cautiously borrow from the sociology of scientific knowledge), as different groups can accept different solutions (49, 50, 73). *Closure* represents the point of no return, that is, the stage in which a specific interpretation of the technology is widely socially accepted and embedded within the society, i.e. there is no longer the need to deliberate alternatives definitions of a technology (49-51). A solution being socially acceptable, however, does not imply that a problem is solved; instead, it means that the different social groups have found a shared and agreed solution (49-51). As such, this closure can be achieved in two different ways, that is, by the rhetorical closure (the group considers the problem as solved) and closure by redefinition of the problem (the group frames the problem in a different way) (49-51). By reaching the point of closure, then, a shared solution emerges, the problem disappears, and the artifact will survive (or die) the developmental process ceasing to be a source of controversy (49-51).

The social construction of technologies approach offers several contributions to the field of science and technology studies, first of all by being one of the first endeavours

of opening the "black box" of technology (70). Its heuristic approach allows researchers to examine the technology closely and to reveal the social shaping of the technology (49, 51, 70). Second, it portrays technological innovation as a multi-centered model of change, rather than as a linear progression of development (70). Moreover, it has emphasized the contingency and scope of alternative technological options, highlighting the importance of choice and selection within a "micro-politics" of different actions and interactions among groups (70, 74, 75). By mapping the interpretational flexibility of the socially relevant groups, as well as the controversies and the converged solutions that emerge, the SCOT approach reveals the social processes by which technological artifacts develop and survive (or die).

Opening the black box of telemedicine: expectations, narratives, and policies

As outlined in the previous section, SCOT's interpretative flexibility exposes the multi-directional technological process by showing how multiple actors play distinct roles and define meanings upon a set of different choices and alternatives (51, 70, 75-77). In the following section, I introduce how I adopt the SCOT framework in this study to "un-black" the black box of telemedicine technology. Here, by "un-blacking" I mean to analyze retrospectively how social groups' alternative expectations – in the form of typical narratives – have shaped telemedicine's development in Ontario over the last 24 years. My approach rests on SCOT's central idea - that is, technology's interpretative flexibility - and on narratives' symbolic representation of expectations (51, 78, 79).

SCOT's interpretative flexibility as competing expectations

The disclosure of the foundational social interactions that shape technological artifacts reveal the *social* and *political* nature of technologies, as opposed to viewing technologies as independent from society and thus totally *apolitical* and *neutral* entities (my emphasis) (48, 50, 75, 77). Accordingly, I focus on SCOT's interpretative flexibility as it exposes the social groups' competition to attach alternative expectations to telemedicine technology (51, 70, 75-77). I understand expectations as defined by the sociology of expectations discipline (79-82), that is, as "wishful enactments of a desired future" (80).

In this study, I consider expectations for two reasons. First, telemedicine is a multidimensional, complex, and continuously evolving technology. It is a concept that is not a given and does not pre-exist in itself, rather it continues to exist and evolve as an idea of the future that carries potential for (or threats of) change (80, 83). For this reason, I address expectations as they provide and describe the images of the 'wishful' interpretations of telemedicine (79, 80). Second, expectations are not only descriptive images of the future, but they are also performative and normative ideas (79, 80, 82). Visions and expectations are performative as they guide and legitimize actions by defining stakeholders' roles and by creating mutually binding commitments (79, 80, 82). In particular, they create a "rhetorical space" for social actors to voice their competing claims about telemedicine's future, which allows them to legitimize their positions, persuade audiences and mobilize their interests (79, 84). In the following section, I will explain how these expectations are voiced through narratives and what role these

narratives play in the social construction of telemedicine.

Expectations, narratives, and policies

Even though we do not usually think of technological creation and development as a literary enterprise, when technology expectations are voiced, they do have narrative structures (79, 85). In this work, I focus on narratives and their storylines because they represent a way to organize, and make sense of the world through sequencing and temporal change (as I explain in greater detail in Chapter 2) (56, 78, 86-90). Narratives are symbolic devices that represent expectations, as well as ideas and value positions – that is, stakeholders' unspoken and taken for granted normative assumptions (55, 56, 75, 91, 92). I consider narratives as performative acts, and to actively contribute to the social construction process, as narratives regulate knowledge and inform action by legitimizing what can be said and what cannot be said, and thus, what can be done or not done (56, 86, 87, 90). In other words, like Rip and Deuten (85) point out, narratives' "infrastructures" (what I identify as typical storylines) define and orient action and interaction as the "infrastructure of roads and signs enables and constrains" (p. 71).

The point here is to recognize that narratives carry both possibilities and constraints. How narratives frame technology's expectations affect what can be thought about the telemedicine technology and acted upon in the future. By the use of specific storylines and the construction of events in time, narratives can be used as political devices (56, 86, 90). Stakeholders can craft narratives to persuade distinct audiences by promoting specific meanings and discrediting others (56). Narratives become symbolic devices of influence, control, and persuasion – that is, narratives represent the arena in

which social groups' technological expectations are contested and negotiated (56). The multiple telemedicine narratives that emerge from the data collected in this study reflects these power struggles within and between the different social groups (56). Narrative structures represent and describe stakeholders' competing telemedicine expectations. They also reveal the normative assumptions and goals that limit or legitimize the alternative interpretations that shape the technological artifact. In the results chapters, I will illustrate how these ideas and social groups have changed and influenced telemedicine expectations through time.

In the field of health policy, researchers have used narrative analysis to generate insights into the social processes that construct and define health technologies, and to suggest implications of research for policy in practice (25, 48, 83, 93-95). As Russell et al. argue, the "[narrative analysis] emerging (but still marginal) research tradition in health care has begun to highlight how policy-making in practice depends crucially on what is said, by whom, and on whether others find their arguments persuasive" (96). Narrative frames can powerfully influence and shape stakeholders' expectations and decision-making processes regarding innovative technologies and health policies. For example, in Hedgecoe & Martin's study of the development of pharmacogenetics, research advocates shaped pharmacogenetics' bioethical discourses to depict technology's visions as "problem-free" (93). Translated into practice, "problem-free" pharmacogenetics visions removed the technology from controversial ethical debates, thus "winning the public's support and how it should be regulated" (93). This way, popular and government support would have curtailed possible regulatory restrictions and

facilitated its integration into clinical practice (93). Moreover, it would have eased the production of pharmacogenetics technologies, thus promoting new clinical research and shaping new markets (93). As Hedgecoe & Martin argue, the bioethical "discursive space" plays a key role in shaping technological expectations that attracts and enrolls social support and mobilizes resources (93).

The current study contributes to this growing body of narrative analysis scholarship in health. Approaching the social construction of telemedicine as a literary enterprise – i.e., in terms of its narratives – allows analysis of the social meaning-making process that has defined and continues to shape telemedicine's development. This study generates a narrative theory about the historical progression of expectation narratives that define what telemedicine is and is not over time. By focusing on the narrative strategies of stakeholders' visions over time, beyond "just facts" of telemedicine's history (97, 98), we can see how stakeholders assemble and operationalize characters and storylines in such a way that they serve as compelling policy arguments for shaping and using the technology. As such, I contribute to the theory of how expectation narratives mobilize actors, define power relationships, and ultimately shape what telemedicine is and is not, in terms of its ultimate physical design.

This study provides a heuristic framework for understanding both telemedicine technology's development as well as the underlying ideas about the technology that informs the policy decision-making process. The findings of this study contribute to the theory of how health technologies are socially situated and how the narratives presented by the different stakeholders are essential in understanding technologies' successes,

challenges, and future trajectories (25, 28, 82, 83, 93, 95, 99). By providing an understanding of "what is going on" in the black box that comprises "telemedicine," I wish to reduce the degree of uncertainty and ambiguity that still characterizes this technology today. A clearer picture of what telemedicine has been hoped to be, over time, can inform and support the policy, organization, and clinical decision-making process.

Thesis outline

This thesis is comprised of six chapters. In the next chapter, I outline the study design and describe the research methods and rationale for the methodological approach adopted in this study. In this chapter, I describe the decisions I made throughout the process, including the explanation of how I operationalize the narrative analysis approach to the stories telemedicine stakeholders tell about the future of telemedicine.

The historical arc of telemedicine expectation narratives unfolds into three characteristic periods, presented respectively in chapter 3, 4, and 5. In the first era, from 1993 to 2000, expectation narratives about telemedicine centre on the broad innovation discourse informed by the latest advances in ITs, offering path-breaking solutions to policy and economic problems. Telemedicine clinical champions joined these narratives pulling these visions of change into the health care sector. They depicted telemedicine as a proof-of-principle revolutionary technology for the delivery of specialized health care services in remote and rural areas, solving the access to health problem in underserved areas. However, clinical profession's cautious and skeptical narratives led to a new provider-centered approach to telemedicine.

In the following period from 2001 to 2008, proof-of-principle and skeptical

narratives slowly reconciled presenting telemedicine as an integrated part of the mainstream health care service. These narratives broadened telemedicine's apprehension as part of the government's agenda, stressing telemedicine's potential benefits for the health care system and winning over physician's buy-in by negotiating telemedicine's role as a regulated, secure, and easy-to-use application, asserting telemedicine again as a provider-oriented technology.

Finally, in the third era, from 2009 to the present (2017) telemedicine expectation narratives depict telemedicine as a mobile, consumer-controlled device-based technology which can both empower and exploit patients as well as challenge physicians' and government's integrity. To assert ownership and control over telemedicine and overcome undesired consequences of consumer-controlled unmediated access to care, governmental stakeholders and the clinical profession ultimately defined telemedicine as a means to provide affordable, accessible, and high-quality care.

Chapter 6 concludes with a summary of the findings in the context of health policy analysis and presents implications for future telemedicine implementation. Notably, how visions' lock-in effects rule out the introduction and development of future alternative telemedicine solutions; and how the misalignment of expectations between the provincial government and the clinical profession constrains telemedicine's development agenda. The findings of this study also identify telemedicine as a set of alternative solutions that are either socially accepted or refuted among the groups of relevant stakeholders. Shared understandings of telemedicine envision this technology as a solution to the access to care problem in rural and remote areas, as a provider-to-provider

consultation service, and as a direct-to-patient home health care delivery service. Conflicting expectations rule out instead the vision of a consumer-controlled telemedicine application that allows unmediated access to care. Finally, in this chapter, I also present an outline of the future trajectory of telemedicine competing visions and directions for possible future research.

CHAPTER 2: RESEARCH METHODS

Study design

This chapter outlines the research strategy and methodology I used to study the development and social, political, and moral aspects of telemedicine technology in Ontario over the last 24 years (from 1993 to 2017). Guided by a constructivist perspective, I used constructivist grounded theory methodology as developed by Charmaz (100). In addition, this grounded theory approach was informed by the sensitizing concepts drawn from the social construction of technologies framework (as illustrated in the previous chapter) and historical narrative analytical techniques (51, 58, 88, 100-106).

With an approach founded on constructivist epistemological grounds, I explore and explain the social construction of telemedicine, i.e. the process by which different social actors attach meanings and interpretations to telemedicine technology, by looking at the narratives that various stakeholders have developed over time. In particular, I analyze past and present ideas of the future of telemedicine in the form of narratives (80, 81, 104). As White and Rüsen both argue, historical narration is a sense-making enterprise (78, 104). The form of historical narratives, that is, their plot structures indirectly represent the interpretation and explanation of the future in light of the present and the past (78, 88). The symbolic nature of historical narratives allowed me to inductively analyze the structures of the narratives that constructed and defined telemedicine over the last 24 years. In other words, this approach revealed the meanings and interpretations of the telemedicine narratives that defined the technology and oriented present and future actions (51, 78, 100, 104, 107).

The chapter is organized as follows. First, I describe grounded theory and its foundational tenets. Then, I discuss a constructivist approach to grounded theory as developed by Charmaz (100). Following this discussion, I focus on sensitizing concepts, historical narrative inquiry, and the rationale for using the Social Construction of Technology theory (hereafter, SCOT) and historical narrative as analytical sensitizing concepts. Subsequently, I provide a detailed account of the data collection and analysis procedure of this study. Finally, I discuss the reflexivity issues of this constructivist research, the interdisciplinary nature of this thesis work, and the trustworthiness aspects I considered as I developed and conducted this study.

Grounded theory

Grounded theory emerged as a reaction to the quantitative positivistic approach notable in qualitative research studies published in the early 1960s (100). Glaser and Strauss's foundational work, *The Discovery of Grounded Theory* (1967), brought renewed attention to inductive theory making processes in qualitative studies (100, 108). This work challenged the deductive, theory-testing research methods within the qualitative field (100, 108). In response to frequent critiques against undefined and unsystematic qualitative research, these authors provided for the first time clear and systematic methodological strategies for conducting qualitative research (100). Grounded theory moved beyond the realm of descriptive studies, enabling researchers to inductively and abductively build explanatory theories empirically grounded in data (100, 108). By engaging systematically with data, that is, by starting with the analysis of words, lines, and incidents, and slowly increasing the conceptual level of the analysis by creating larger

conceptual categories and themes, researchers were able to develop abstract explanatory frameworks of actions and processes (57, 100, 108, 109).

Classic grounded theory, as outlined in Glaser and Strauss' first work (108), involved several specific methodological strategies. These include: concurrent data collection and analysis, systematic coding grounded in data, constant comparative methods, memo-writing for conceptual refinement and advancement, ongoing theory construction, theoretical sampling, and literature review conducted at the end rather than the beginning of the analysis process (100, 108). In particular, Glaser, and Strauss only at first advised researchers to stay as close as possible to the data and limit any predetermined knowledge to guarantee the emergence of theoretical categories from the data without forcing preconceived ideas in the analysis (100, 108, 110-112). However, future developments of grounded theory departed from this assumption by acknowledging the role of pre-existing knowledge and disciplinary background, defined as sensitizing concepts (57, 100, 109, 111, 112). I will address this in detail later in this chapter.

Over the years, grounded theory's success has generated a wide variety of approaches underpinned by different philosophical and epistemological assumptions (57, 100, 113). As Charmaz points out, grounded theory is a "constellation of methods" (p.14), providing a guiding set of principles that researchers can "adopt and adapt" to their research objective and problem (100). Throughout this study, I follow Glaser and Strauss's original invitation to use grounded theory's strategies flexibly by embracing Charmaz's constructivist approach (100, 108).

Constructivist grounded theory

Understanding the epistemological foundations of grounded theory's differing approaches enables researchers to solve most of the tensions that developed within grounded theory over the past decades (112). By moving beyond both Glaser's objectivist stance, and Corbin and Strauss' post-positivist orientation, Charmaz introduced and advanced a constructivist approach to grounded theory (57, 100, 109, 114, 115). Falling within the interpretative tradition, the constructivist grounded theory approach acknowledges reality as socially constructed – that is to say, research participants and researchers construct the meanings of reality (100).

As Charmaz highlights, constructivist grounded theory conserves basic grounded theory strategies (100). However, it stresses the flexibility of the method and its interpretative stance, placing particular emphasis on the action, processes, multiple realities, and situated knowledge of both the participants and the researcher (100). Hence, constructivist grounded theory emphasizes relativity and subjectivity, strongly promoting the researcher's reflexivity (100). Based on these assumptions four conclusions seem to be apparent. Firstly, subjective values and perspectives shape the meaning-making process of reality. Therefore values and facts are inherently linked. Secondly, participants' and researchers' meaning-making endeavours are locally contextualized. Thirdly, the constructivist analytical approach makes the link between the micro and macro level of analysis visible, revealing the underlying assumptions that construct networks, structures, and relationships of power from within. Finally, constructivist grounded theory dismisses the neutral and value-free observer, since Charmaz (100)

points out, "conducting and writing research are not neutral acts" (p. 240).

A constructivist approach, therefore, is highly subjective, relativistic and calls for greater reflexivity as it invites researchers to think actively about their decisions and procedures during the research process (100). Its distinctive feature is the idea that both data and analysis are socially constructed (100). Therefore, it acknowledges the interpretative nature of both the analytical process as well as the final theoretical outcome (100).

The role of sensitizing concepts in constructivist grounded theory

As mentioned earlier, one of the main divides among objectivists and constructivist regards the use and role of predetermined knowledge in grounded theory (100, 106, 107, 111, 116). Whereas objectivists invite researchers to avoid the use of preconceived ideas that could contaminate the objective emergence of analytical categories, constructivists acknowledge the role of previous background knowledge as "sensitizing concepts" (100, 107). Sensitizing concepts are "tentative tools" used to initiate the analysis, as well as to stimulate and develop new theoretical ideas (100, 107). Even though grounded theory is inherently inductive, sensitizing concepts are commonly accepted among constructivist grounded theory scholars (100, 107). Constructivists acknowledge the researcher's subjectivity and relativity within the research process and, therefore, their disciplinary background and research interests as driving factors of their research projects (100, 107). These scholars consider sensitizing concepts as "tentative" devices (107). They only provide general guidelines and suggestions for approaching the data, to open up inquiry, without imposing or prescribing specific analytical lens (107).

As Patton (109) points out, "some way of organizing the complexity of experience is virtually a prerequisite for perception itself" (p.359).

However, there is one caveat with the use of sensitizing concepts in grounded theory. Researchers must be aware that sensitizing concepts can limit the analytical scope of the researcher, by concealing important aspects to the researcher's analytical eye (100, 107, 116). Therefore, when using sensitizing concepts, the researcher should always remain open to all the possibilities that can emerge from the data, without forcing the data into predetermined conceptual categories (100, 107).

In this study, I considered two different kinds of sensitizing concepts as departure points for the research. First, the Social Construction of Technologies framework (SCOT), which guided the data collection, as well as data analysis, to "open the black box" of the technological artifact (51). Second, informed by the SCOT theory, I used historical narrative analysis concepts and techniques to begin the analysis and gain greater theoretical sensitivity (100, 104, 105, 117, 118).

In the following section, I first discuss in greater detail the nature of historical narrative analysis and the plot typologies I used as sensitizing concepts in the study. Finally, I will conclude this part of the chapter by outlining the role of the SCOT framework and historical narrative emplotment structures as sensitizing concepts for this study.

Narrative analysis and definition of narrative

Narrative inquiry is a research tradition commonly used in the study of social processes, institutions and structures (119). It is well suited to exploring the variety of

social perspectives attached to telemedicine technology since it uncovers the implicit and subjective meanings and interpretations embedded in the language of different social actors. Narrative analysis also lends itself to a constructivist analysis and will be useful in this study when examining the social construction of telemedicine.

Narrative inquiry encompasses a broad set of methods and analytical techniques. It stems from different research traditions and disciplines, such as sociology, phenomenology, history, sociolinguistics, education, anthropology, psychology, with analytical techniques ranging from thematic, to structural, to linguistic (117, 120). As different as they can be, all these traditions and methods share a common understanding of the term "narrative" (101, 117, 121) as, "a sequence of events, experiences, or actions with a plot that ties together different parts into a meaningful whole" (p.148) (101). Narratives are not the events themselves; rather they are the telling of the events tied in a specific thread. It is the art of selecting, sequencing, and connecting events in a specific order and structure that defines a narrative (78). The configuration of the sequencing of events imbues narratives with a specific form of intelligibility. The Oxford American Dictionary (122) defines narrative as "a spoken or written account of connected events," which derives from the Latin verb *narrare*, which means "telling a story" and "knowing." As the historian Hayden White (78) points out, narratives can also provide solutions to the problem of "translating knowing into telling" (p.1), as narratives always involve an interpretation and explanation of something that is known (123, 124). By locating the events in a specific narrative structure, the narrative then reveals the events' characters and functions (125). Narrative inquiry, then, focuses on the form and not only

the content of the text (88). Compared to other textual analytical techniques—such as discourse analysis, content analysis, and conversation analysis—narrative analysis primarily focuses on the interpretation of the form and representation of the stories.

For the purposes of conducting narrative analysis, not all accounts qualify as "narratives." For example, as Riessman, I consider annals and chronicles, that is simple lists of dates and events, non-narrative texts (78, 117). It is the presence of a "story," with a plot structure and a beginning, middle and end, which distinguishes a narrative from a non-narrative text (78, 109, 117, 118, 121). However, the boundaries between what is and is not a narrative, as well as the distinctions between the terms "narrative" and "story" can be at times obscure, unclear, and "used interchangeably" (p. 149)(101, 117, 121).

In this study, I define narratives as the "larger stories," formed by the interpretations of the smaller stories (101). I examine how the many small stories fall into patterns of larger stories, that is, how typical stories emerge and form a larger narrative plot. This working definition of stories and narratives allows me to operationalize the analysis procedure by considering the story as the unit of analysis and the narratives as the interpretative findings that emerge from the stories.

Historical narratives

Following White and Rüsen's example, I approach historical narratives as linguistic and figurative forms of the sense-making process of the experience of time, and not as the recollection of chronologically ordered events (104, 118). Historical narratives are the ways in which individuals represent the contextual interpretation of events in different moments in time, as well as a way in which they communicate ideas about hopes

and intentions (101, 104, 105, 118, 124). Historical narratives are both figurative interpretations of experience in time, and therefore "meta codes" (78), as well as orienting principles that serve to orient moral and practical life (104, 118).

Historical narratives are metaphorical accounts that mediate between the descriptions of the events they recount and the figurative plot structures that endow unfamiliar events with meaning (124). In other words, historical narratives are "symbolic structures" in which the representation and configuration of "story-elements" (i.e. events, agents and agencies) confer events with meanings by categorizing them within a particular "story-type" or plot structure (78, 124).

Historical narratives are "meta codes" that orient action and practical life (104, 118). They are the linguistic representation of the "historical consciousness," that is, the moral interpretation of events through temporal change (104). Namely, the content, form, and function of historical narratives grant moral values a temporal dimension, by mobilizing past experiences to guide present and future intentions and actions (104, 126). Moral values, then, are mediated by the experience and interpretation of time, and as such, they acquire meaning and guide actions (104, 118).

In the following sections, I will illustrate in greater detail these two aspects and the historical narratives emplotment typologies.

Literary emplotment typologies.

In this study, the identification of these figurative emplotment typologies reveals the different social groups' interpretations of the telemedicine technology as well as the rhetorical roles that these different actors play in policy discourses concerning

telemedicine. According to White (88), story plots are archetypal constructs that represent the interpretations and explanatory "effects" of the stories. As narratives, historical accounts are constructed using the literary forms of representation—that is to say, literary story-type plots (78, 88).

By drawing from the literary emplotment typologies, Hayden White identifies four types of generic plot structures that represent the interpretation of events in time: Romance, Comedy, Tragedy, and Satire (88). The romantic plot structure depicts the consecration of the hero's rise and victory over the world (88, 127). Good is tested and the hero triumphs, thus transcending the evil world (88, 127). For example, a romantic story portrays the telemedicine as a "hero" by tackling and defeating crucial hardships – such as geographical distance – eventually succeeding delivering health care services in remote and underserved areas. Satire is diametrically opposite to Romance, a story-type about damnation, a drama of resignation and defeat in which the hero succumbs as a prisoner to destiny (88, 127). There is no redemption, only capitulation to the meaningless and amoral experience of time (88, 127). A typical example of a satiric storyline is the latest story of inevitable change from provider-focused to consumer-centred telemedicine brought by commercial information technology development. It is a story of resignation to the consequence of the adoption of consumer technology in health care delivery, which will inevitably lead to a two-tiered public and privatized health care system.

As opposed to romantic and satirical plots, which encompass eternal temporization of cyclic returning and inevitable recurring of events in different situations, both comic and tragic archetype plot structures are modes of representing temporary

reconciliations – between men and other men, men with society, or men with the natural world – that emerge in the experience of the world (88, 127). Both comedy and tragedy encompass reconciliation, that is, the main character's potential liberation and chance for redemption (88, 127). However, whereas comic plots focus on the reconciliation of events as a temporary solution to the initial tensions set at the beginning of the story (as they will be solved only in the long run), tragic story plots depict the fall of the hero as he struggles against the conflicts and perils of the world, where good can never truly win (88, 127). Tragic stories consider reconciliations in the manner of their main characters succumbing to destiny, but also learning about the inescapable limits of his actions (the character as well as the readers). Tragic emplotment may seem similar to satirical plot structures. The key difference lies in the understanding of fate. Satire envisions destiny as inevitable and uncontrollable, with only chance prevailing. Tragedy, on the other hand, describes the characters as resigned to the limits of their will and actions learning to live within such limits, and thus acknowledging it as a mild form of reconciliation (88, 127). In this study, a typical tragic story portrays telemedicine as a technology that has betrayed consumers' expectations due to institutional barriers and to the medical establishment's conservative approach to new technologies. The result is that today telemedicine is "still health care ugly" rather than "digital, designer-y Apple stuff, as people expect" (Participant #14). With this story, telemedicine service providers have outlined the limitations of the revolutionary change promised by the early telemedicine visionaries, acknowledging the slow pace of technological change within the health care system instead. On the other hand, comic storylines are stories that move through inevitable complications between

flawed characters of good intention, to a resolution and happy ending for the satisfaction of all (127). Comic narrative strategies acknowledge the common purpose shared by diverging visions, accommodating contradictory points of view (88, 127). For example, in this study, comic stories celebrate the temporary reconciliation of forward-looking telemedicine visions with traditional health care delivery practices by aligning telemedicine to the health care system's priorities and needs.

Overall, as poetic constructs, historical narratives are constructions that use fictional means belonging to western mythical knowledge, to interpret and explain real events in time (88). They are the figurative manifestation of the interpretation of the experience of time through the use of different plot strategies (78). Moreover, as these illustrative examples show, these stories highlight the character and function of the events in defining the technology as well as distinguishing the rhetorical role that the actors played in these stories.

Historical consciousness typologies.

The form of the historical narrative manifests the historical consciousness' meaning-making endeavour that transforms past experience into a comprehensible present and shapes present and future actions (104, 118). According to Rüsen, historical consciousness gives meaning to the present "actuality" by means of four different orientations in time, affirmation, regularity, negation, and change (104). Rüsen identifies at least four different historical narrative plot typologies that represent different ways of constructing historical consciousness and orienting practical life: traditional plots, exemplary plots, critical plots, and genetical plots (104, 118).

First, traditional narrative structures affirm and repeat traditional practices by recalling the validity of the original set of values, as well as the obligations to the preconceived patterns of cultural life (104, 118). For example, a typical traditional story affirms predetermined medical practices, in this case primarily the in-person face-to-face consultation as opposed to virtual video conferencing care, therefore challenging and denying change. For example, health care providers present such narratives when confronted with the idea of using telemedicine technologies in their practices. Second, exemplary plots go beyond traditional narratives to uphold and validate past rules and principles as legitimate ways of conduct for action in different moments in time (104, 118). The comparison between telemedicine and online banking represents a typical exemplary story. The past success of online banking validates the use of information technologies for health care services. It extends the legitimacy of the technology from one domain (banking) to another (health). Third, critical plots represent a radical break with the past, demonstrating through counter-narratives the inconsistency and untruthfulness of past events (104, 118). For example, by criticizing past health care services, these stories celebrate telemedicine as a better solution to the health care system's problems. Finally, genetical plot structures advance change. Thus, they affirm change as the means for meaning-making in both the present actuality and future orientations (104, 118). For example, stories about the introduction of new information technology devices (such as tablets and smartphones) describe telemedicine as naturally becoming a mainstream service.

By recalling the past, story elements and their structures reveal the meaningful

patterns of time to understand the present and make the visions and expectations of the future intelligible (104, 118). Therefore, expectations and visions become performative by mirroring the individual's moral meaning-making process in time, which is then translated into historical narratives.

In this study, by recollecting past narratives of expectations and visions related to telemedicine technology in different moments in time, I understand these narratives as the way in which different social actors render something unfamiliar, such as the new telemedicine technology, into something familiar through the portrayal of actions and intentions through time, thus, legitimizing and orienting present and future actions and intentions.

Therefore, historical narratives play an important role in identifying the structures and meaning-making processes of past stories about the future of telemedicine technologies in different moments in time. Subsequent analysis of the historical narrative typologies reveals the underlying expectations and intentions of the stakeholders involved in these narratives. In other words, historical narratives typologies are figurative devices that disclose stakeholders' normative aspirations and interests, revealing the role of structured power relationships in the social construction of telemedicine process.

SCOT framework and Historical Narrative typologies as sensitizing concepts

As outlined before, Charmaz (100) argues that constructivists acknowledge researchers' preconceived ideas and knowledge, especially as points of departure for the analysis. In this section, I describe how the SCOT framework and historical narrative typologies informed the data collection and analysis as sensitizing concepts in this study.

First, SCOT theory provided the framework to "open the black box" of the telemedicine technology (51). As outlined in the previous chapter, the SCOT framework considers the social construction of technologies as a multidirectional process (51). Technological social constructivism acknowledges the interpretative flexibility afforded by a technological artifact by dismissing the linear developmental process of technological determinism (51). This interpretative flexibility stems from the various meanings that the different relevant social groups attach to the same technological artifact (51). It is only after a process of *variation*, *selection*, *stabilization*, and *closure*, that the relevant social groups create a final accepted interpretation of the technology (51). This means that that the definitive meanings attached to the technological artifact are contingent on the historical context, the flexible interpretation given by the different social actors, and the interactions between these different interpretations.

In light of this theoretical framework, I then considered historical narrative analytical techniques, in particular, White and Rüsen plot typologies, as sensitizing concepts to explore the different contexts and interpretations attached to the telemedicine technology (88, 100, 107, 118, 126). Doing so allowed me to develop an understanding of how the temporal sense-making process oriented the intentions and actions of the different social actors.

Overall, these sensitizing concepts guided the initial data collection and analysis of this study, enhancing rather than limiting theoretical sensitivity. They are departure points to construct specific telemedicine narratives that reveal the underlying interpretations and meanings attached to the technology, and therefore the overall social

construction of this technology.

Data collection

Data collection in grounded theory is iterative, flexible, and emergent (100). It is flexible and iterative because researchers gather interviews, documents, and observational data, sequentially or in combination while performing simultaneous analysis (100). Its emergent properties come from the development of data collection strategies throughout their research, differentiating between initial data collection and theoretical sampling (100). As Charmaz (100) points out, "initial sampling gets you started; theoretical sampling guides you where you want to go" (p.197).

Therefore, the initial data collection in this study was informed by the sensitizing concepts, as well as the research objectives and questions of the study that they helped develop. As mentioned earlier, sensitizing concepts provide points of departure, reflecting the researcher's interests and disciplinary background (100).

In this study, both the SCOT theory and historical narrative analysis techniques guided the definition of the initial criteria for the selection and collection of data. First, the SCOT framework guided the collection of documents including the potential social groups that shaped and continued to shape the construction of telemedicine. The SCOT framework also informed the initial criteria for identifying and selecting interview participants. This framework emphasizes understanding the roles and perspectives of diverse actor groups involved with the technology, so I targeted interviewees belonging to a wide range of different relevant social actor groups. Second, historical narrative inquiry implies the retrospective study of evolving expectations and interpretations of

telemedicine over time, and so informed the collection of data over a 24-year period in the development of telemedicine in Ontario, from 1993 to the present (2017). This timeframe examines the development of telemedicine stories as a multi-actor process in which particular turning points and temporal watersheds reveal the underlying normative assumptions attached to telemedicine. I selected the year 1993 as the starting date of this study for three reasons. First, Ontario's earliest telemedicine agenda emerged within the early 1990s broader Canadian visions for information technology. Second, in Ontario, early telemedicine narratives emerged within telemedicine clinical advocates' visions of health care innovation. Accordingly, I chose 1993 as the starting date to study which visions lead early telemedicine clinical champions to design in 1995 and then implement in 1998 the first telemedicine pilot project in Ontario. Third, I selected the year 1993 as this year precedes the beginning of the Internet era of the mid-late 1990s. This selection allows comparing telemedicine visions and expectations before and after the Internet era, considering the Internet advent as one of the major watersheds in information technologies' evolution.

Historical narrative analytical methodology also informed the collection of data that displayed stories. Historical narratives reveal the sense-making process through time. That is the goal-oriented visions of the future, based on past experiences and present lifetime events, that orient actions in time (128). Finally, both the SCOT framework and the historical narrative inquiry concepts aided in the design of the interview guide by supplying key topics (e.g., identifying the telemedicine champions and skeptics through time, and asking what the participant's visions and roles were, and what were the most

important telemedicine milestones). Both were also used to identify stories about telemedicine from a variety of perspectives that addressed the past and present expectations of the future development of telemedicine.

I collected data from a wide range of sources including documents, semi-structured interviews, field notes (if and when allowed by the interview participant), and memos developed during the analysis. I gathered data until I achieved theoretical saturation (100) – that is when the key analytical categories were solid enough, and no new theoretical properties were found from the information retrieved from the interviews, document review, and observations (100). Data were managed and analyzed using NVivo® v.10 qualitative analysis software.

As grounded theory is iterative, data collection advanced following data analysis. In the following sections, I provide a detailed description of this process.

Documents

I collected documents by purposively sampling and searching stakeholders' website pages, newspaper articles, and other documents such as policy briefs, annual reports, and strategic plans. In some cases, stakeholder participants also provided documents for analysis. All the documents were available in the public domain.

Initially, I gathered data from website pages and media articles. Then semi-structured interviews with study participants guided the collection of additional relevant documents. Finally, the conceptual and theoretical development advanced during data analysis provided additional guidance for theoretically sampling additional documents.

In this way, I iteratively collected documents in different stages. Firstly, I began

with the retrieval of past and present web pages from the telemedicine networks that have operated in Ontario. Secondly, I systematically collected newspaper articles from five major Canadian national and provincial newspapers. Thirdly, semi-structured interviews guided the collection of additional relevant documents. Fourthly, I identified relevant documents in the public domain through theoretical sampling from the analysis of the data and the interviews with the research participants. To conclude the process, I considered the memos I wrote as I proceeded with the analysis. Document data collection ended when the analytical categories reached theoretical saturation.

Media data

In the following subsections, I illustrate the data collection procedures used for web pages and newspaper articles. I selected media data because these materials are constructs that reflect and shape social reality (129-131). In particular, as constructs, media materials can inform, set agendas, frame issues, and persuade their audiences (132). As a result, they often influence the way the public thinks about the issue at hand, (130), as well as inform about the context, due to the specific historical, social, cultural, and economic contexts surrounding their construction (129).

By giving salience to particular events and voice to specific stakeholders, as well as omitting other actors and stories, media sources frame and persuade, as well as set public agendas (132). These sources, the printed news media, in particular, are often the tools of interest groups and elites in powerful positions with easy access to public relation agencies (131, 132). As such, media devices reflect the way influential groups think about the issue at hand, mediating among the different perspectives, ideas, and interests of such

groups (132). Therefore, by collecting media data, I was able to learn about the context of telemedicine in different moments in time, as well as identify both the stakeholders involved and those excluded from the stories. Finally, then, I could also identify the telemedicine devices themselves, and then analyze the interpretative flexibility attached to telemedicine as a whole that emerged from such stories.

Telemedicine websites sampling.

I retrieved and analyzed website pages of the four main telemedicine networks active in Ontario between 1993 to 2017, namely the VideoCare network, CareConnect network, NORTH Network, and, more recently, the Ontario Telemedicine Network, resultant from the merger of the three previous networks. To access the web pages at different points in time, I employed the *waybackmachine* database (133), a digital archive of the World Wide Web and part of the not-for-profit organization *Internet Archive* based in San Francisco, USA. This archive allows users to view archived websites and web pages across time.

For this analysis, I collected only the web pages available on the *waybackmachine* server (133). The *waybackmachine* allows one to select specific dates to view the content of past homepages of the selected website. The web pages available for each year provided about 187 accessible homepage web pages (i.e. of all the days of the year only some dates were available to retrieve). The information provided on the web pages are useful for this study as they present narratives introducing the telemedicine technology, characterizing the stakeholder's role in telemedicine development, and outline predictions for the future of telemedicine. Hereafter I provide an illustration of typical narratives

collected from a webpage retrieved from the *waybackmachine* archive that provides narrative data useful for this study (see Figure 1). The illustrative webpage presented here was published online by the telemedicine service provider Ontario Telemedicine Network (OTN) on November 29, 2006 (134). The narratives presented on this webpage illustrate who the main stakeholders are, in this case, telemedicine, health care professionals, institutions, and the telemedicine service provider. The narratives also define the roles of these stakeholders, that is, telemedicine enabling physicians to deliver health care remotely, eliminating time and distance barriers, and "enhancing coordination of care" (134). The narratives also present the telemedicine technology, in this case video conferencing technology and information technology. Finally, the web page presents the service providers' narratives about its telemedicine mission and vision for the future.

Figure 1 Ontario Telemedicine Network webpage 29 November 2006 (133)

Newspaper articles sampling.

I collected newspaper articles culled from LexisNexis (135), a worldwide academic database part of the Reed Elsevier group that provides full-text news, legal, and business data coverage searched for English newspaper articles published in five major Canadian newspapers, both national and specific to Ontario, between1 January 1993 and

July 2017. Specifically, the newspapers selected were The Toronto Star, The Globe and Mail, The National/Financial Post, The Ottawa Citizen, and Hamilton Spectator. I used the search terms "telemedicine," "telehealth," "ehealth" and "e-health" and circumscribed the search to Ontario. Duplicates were excluded using a LexisNexis feature that identifies and excludes exact duplicates. In total, the search found 1717 newspaper articles. Newspaper articles provide narratives about announcements of "breakthroughs" in technology, predictions about telemedicine's uses and impact, and interviews with relevant stakeholders involved with telemedicine:

> The app Dr. Semple helped create and used to diagnose Ms. Rouhi is one part of a technological revolution poised to reshape the health-care industry in Canada. With the federal government holding fast to a per-capita funding model for the provinces, it's innovation, not cash, that will save overcrowded hospitals struggling under crushing budgets and charged with improving the experience of patients like Ms. Rouhi. […] Peter Adams, senior health-care IT adviser for Toronto's MaRS Discovery District, described Dr. Semple's app as the "tip of the iceberg," saying that technology and others like it are capable of saving the health-care system millions in unnecessary hospital readmissions, needless suffering and potential deaths (136).

Finally, news media has its particular perspective and agenda (131, 132). It has the particular ability to give salience to new or existing issues, as well as the matching degree of importance the public ascribes to these issues (132). By selecting specific types of events as news, that is, by covering some issues and omitting others, the news media sets these events on the public agenda to assign importance to specific issues to be debated (131, 132).

Relevant emergent documents sampling.

These extant documents were collected in tandem with the ongoing analysis and

collection of interviews. Several of these documents were retrieved at the explicit suggestion of interview participants. In general, these were mostly policy briefs, strategic papers, as well as brochures and website pages. However, I collected the majority of these documents by using theoretical sampling, as the ongoing conceptual analysis highlighted relevant documents to consider. Concurrently, I also tried to retrieve documents from each stakeholder group identified using the SCOT theory during the analysis. As I identified these materials, I added them to the NVivo® v.10 database as well for analysis.

Memoing

From the beginning of the analysis, I started to take memos. Memo writing allowed me to stop and think about the data, as well as develop reflexive analytical thoughts. As Charmaz (100) says, memos are the sites where the constant comparison among data, codes, and categories refines analytical thinking, making the researcher's stances and inductive thoughts clear. Memos guided and moved the analysis forward (100). As such, by holding to the grounded theory's tenets, memos were included in and analyzed with the data collected (100).

Interviews

I used semi-structured interviews to collect data from different stakeholders involved with telemedicine. As Charmaz (100) suggests, semi-structured interviews are tools that elicit information from the participants, since they favour the interviewee's perspectives when they tell their stories. In this case, these perspectives relate to their visions and expectations of telemedicine in different moments in time. As Charmaz (100)

says, interviews should be used "to explore, not to interrogate" and to draw out the participant's point of view.

Interview sampling and access to participants

I used purposive sampling to identify and recruit the participants for this study. Informed by the SCOT theory, which guided the identification of the relevant social groups involved in the social construction of telemedicine in Ontario, I recruited research participants belonging to the following telemedicine stakeholder groups: physicians; telemedicine nurse practitioners; telemedicine coordinators; hospital administrators; decision-makers at the local level (LHINs), at the provincial level (MOHLTC), and at the federal level (Canada Infoway); private industry stakeholders (information and communication technology companies); not-for-profit service provider (Ontario Telemedicine Network); medical professional associations; and researchers. More detailed role descriptions are not possible due to informant confidentiality. It is important to notice that the participants interviewed for this study did not belong to a single stakeholder group as defined in the inclusion criteria, but to more than one group. For example, a physician was also a researcher, and thus spoke as a physician and as a researcher, and in another case, a nurse was also a telemedicine coordinator. Considering this overlapping of categories, I interviewed one to two informants for each stakeholder group (not for each organization).

The selection of the participants was guided by information provided by any of several means: (1) an initial key informant, representative of one stakeholder group, with access to a number of other stakeholders; (2) snowballing techniques; or, (3) iterative

document review and analysis. I recruited these participants principally via email, resorting to phone calls when no contact could be made over email.

Accessing potential interviewees was not always possible. Some respondents did not answer the emails. Others explicitly declined to participate because they were too busy, not interested in the research, or they believed themselves to be a poor fit for the study. Most of these subjects belonged to elite groups, such as those of policy decision-makers, the CEOs of public and private companies, civil servants, and professionals. As Duke (137) highlights, accessing elites can be problematic. As such, the connections and "personal sponsorships" provided by the previous participants I interviewed were crucial for gaining access to these individuals (137). Despite the challenges, many of the participants were easy to access and get hold of, supportive, helpful, and in some cases, excited about the project.

Obtaining participants' opinions and perspectives was also challenging. Most participants were reticent about their personal opinions and provided facts and stories in line with the official policies and rhetoric of their organizations, thus releasing information already available in the public domain and avoiding mention of themselves. During interviews, I strove to appear knowledgeable, but not too much, as this proved a good strategy to encourage respondents to disclose their deeper thoughts, revealing interesting insights and information.

Trying to win the trust of the participants and negotiate access to their personal opinions was a difficult process. The difficulty varied according to the work and cultural context, as well as according to the personal characteristics of the interviewees. For

example, candour and accessibility seemed somewhat lower among participants of lower organizational power, experience age, and possibly by gender. More powerful participants, on the other hand, sometimes capitalized on the interview as a forum to endorse programs or products, steering the interview topics away from the interview guide and toward their own or the organization's current agenda.

Overall, I interviewed 17 participants. When possible, I conducted the interviews in person, usually in the respondents' offices or the meeting rooms of their institutions or organizations. Otherwise, they were interviewed by phone. The semi-structured interviews lasted for about approximately 30 to 60 minutes. The interviews were digitally recorded, with the participants' consent, then transcribed verbatim. Immediately following each interview, I also wrote an analytic memo about the ideas and theoretical connections that emerged during the interview. Grounded theory's theoretical sampling guided the recruitment of additional participants, as I started to analyze the data and new questions emerged (100).

Interview guide

Following Charmaz's recommendations (100), the interview guide (Appendix A) emphasized a balance between focused attention on the topic and the emergence of the participant's insights and stories. To achieve this goal, I adopted semi-structured interviews, which allowed me to focus on the topic, informed by the sensitizing concepts and research objectives and questions, as well as ask open-ended questions for theoretical and conceptual emergence. In particular, informed by historical narrative inquiry, I designed the interview guide to encourage responses in the form of narrative

constructions, to elicit past and present expectations for the future of telemedicine (88, 104, 138). Asking questions related to the sequencing of the events, then, allowed me also to emphasize and focus on process and action, which are central to the conceptual development of this study (100).

The SCOT framework helped me identify the "relevant" stakeholders in the field of telemedicine and the roles they saw themselves as playing in their stories (51). Therefore, specific questions addressing the stakeholders involved in such stories and their relevant characteristics – whether they were champions or skeptics of telemedicine technologies, for example – were included in the interview guide. Later, as I analyzed more data, I started to revise the interview guide, as the data theoretically led me to new questions and areas to explore. As Charmaz (100) argues, theoretical plausibility is an initial guide, that helps interesting ideas start to take form. As the analysis moves forward, theoretical direction and centrality lead to more compelling ideas and categories, while final interviews address questions and probes to questions that will improve the theoretical adequacy of the study. Assessing the theoretical adequacy, then, guided the theoretical sampling procedures in the later stages of the research.

Constructivist grounded theory interviews also consider the interactive relationship, both verbal and non-verbal, between the participant and the researcher (100). In light of this relationship, I took a reflexive stance in the behaviour and interview style, taking note of them while preparing the interview guide, as well as after the interviews. One aspect I considered as I designed the interview guide was the language used to ask questions, including the style, tone, and terms used. As I was writing the questions, the

heterogeneity of the stakeholders made the interview design process somewhat challenging.

Finally, as suggested by Charmaz (100), before designing the interview guide and beginning the study, I researched some basic knowledge about telemedicine, focusing on video conferencing and telehomecare monitoring devices. Additionally, since telemedicine is closely related to information technologies, I also retrieved some basic information about such technologies to learn how telecommunication networks work, how Internet networks work, as well as about the different technological devices used to communicate, and their technical capabilities. Knowing this information and the specific jargon of this field helped me to follow the interviewee's answers and be more responsive during the interviews.

Data analysis

As previously outlined, constructivist grounded theory data collection and analysis is iterative, inductive, and comparative (100). It is iterative because data analysis and data collection occur concurrently; I began to analyze the data as I continued to collect documents and transcribed interviews. The analysis subsequently continued to inform the data collection, until the categories reached theoretical saturation (100). It is an inductive and not a theory-driven method as emergent analysis grounded in the data informs the construction of codes, categories, and, ultimately, theory (100). It is comparative because of the comparisons between data, codes, and categories that develop the conceptual understanding of the phenomenon under study, and thus advance the researcher's theoretical sensitivity, moving the analysis forward (100). In particular, the constant

comparative method is the central analytical procedure of grounded theory, as it fosters the production of abstract constructs that are still grounded in the data (100). It is performed at each level of the analytical process, comparing data and data, codes and data, codes and codes, codes and categories, and categories and categories as well (100). Memos are the locus of such comparisons, enabling the researcher to spontaneously delineate, define, and elaborate on the data, codes, and categories, defining their properties and relationships (100).

The first step of the iterative analytical process involved a visual display; I created a word cloud of the initial collected newspaper headlines and articles as a preliminary exploratory analysis. Then, as recommended by Charmaz (100), I analyzed the documents and interview data in two analytical stages: first, through initial coding, and second, through focused coding. I used NVivo® v.10 qualitative analysis software to code all the data that I iteratively collected. In the following sections, I detail more specifically the analytical procedures used in this study.

Initial visual display of the data

As Miles, Huberman, and Saldaña emphasize, exploratory visual displays are "'first drafts' (…) at making sense of qualitative analysis" (p. 122) (139). They are considered to be heuristic devices to look at a voluminous amount of data and quickly identify preliminary general themes and patterns within the text (140). Applying Wordle online software I used a word cloud to provide a visual display of the frequencies of words that appear in newspaper documents collected from 1993 to 2015 (140). Word clouds provide a "quick and dirty" visual form of content analysis and offered one point

of departure for the analytical work by surfacing key jargon, imagery, and ideas in popular telemedicine discourse.

Initial coding

As Charmaz (100) indicates, coding in grounded theory involves "making analytical sense of stories, statements, and observations" (p. 111). Coding describes what is happening in the data and enables the researcher to examine the hidden and overlooked meanings and assumptions that lie within it. Codes are constructs that describe, interpret, and explain the data (100).

Initial coding engages closely with the data. By constantly comparing data, it starts to shape the study's analytical frame (100). I initially broke down the text of collected documents and transcripts into codes by descriptively and interpretatively analyzing them on an incident-by-incident basis. In this study, I consider incidents to be the stories embedded within the texts. Stories, as I defined earlier, are sets of events tied into a meaningful whole, with a beginning, middle, and end. I coded these stories descriptively by identifying the main characters, including the different stakeholders involved, as well as the various telemedicine technological devices, actions, and contexts in different moments in time (from 1993 to 2017). As I descriptively analyzed the data, I also started writing memos about the stakeholders and the technologies, all the while slowly raising the conceptual level of the analysis.

I then coded the same data interpretatively by analyzing the different plot structures that emerged from the stories. This process was initially informed by the sensitizing concepts drawn from the SCOT framework and White and Rüsen's historical

narrative typologies (51, 78, 88, 104, 141). As previously discussed, sensitizing concepts are analytical points of departure and conceptual schemes that raise the level of abstraction during the initial coding stage. They do not limit the researcher's analytical scope; rather, they enhance the researcher's theoretical sensitivity (100). First, the SCOT framework guided the initial analysis through the consideration of technology as socially constructed instead of technologically determined. This opened my analytical eye to the meaning-making process shaped by the various interpretations held by the different stakeholders involved. As I compared the different narratives presented in the data, the application of the SCOT theory enabled me to focus and identify which stakeholders shared similar interpretations of the technology, which stakeholders had opposing visions, and which voices were excluded from these narratives. By applying these sensitizing concepts from the SCOT theory, I was able to define the function of the telemedicine technological artifact with respect to each group. For example, the identification of the early telemedicine service providers group revealed the function they attached to the telemedicine artifact. This stakeholder group defined telemedicine as a physician-oriented rather than a patient-driven technology. Their vision then focused on technical solutions – for example, the need to build secure local internet networks connecting clinical sites - and policy solutions – for example, redesigning physicians' reimbursement schemes to facilitate physicians' adoption of telemedicine. As illustrated by this example, this kind of heuristic approach elicits a set of conflicting interpretations which brings out the different meanings attached to the technological artifact, operationalizing the relationship between the social processes and the actual content of the technology (51).

Second, historical narrative typologies guided the analysis of the stories' formal structure as the symbolic means of the meaning-making process through time. As sensitizing concepts, historical narrative typologies provided the initial means to start the development of telemedicine story types. These story types are particular telemedicine plot structures that encompass the interpretative flexibility of the technology as well as the dimension of historical consciousness that guided the actor's actions and intentions over time.

In addition, both the SCOT framework and historical narrative typologies facilitated the analytical procedure by enhancing the focus on processes, rather than themes and topics (100). As grounded theory focuses on processes, using historical narratives as sensitizing concepts highlights the sequencing and meaning-making process through time, reconstituting the codes into a meaningful whole – in other words, the emergent plot structures of telemedicine stories. In particular, the coding of the story plots allowed me to code the actions and sequences defined through time. I did not only code the actions included in the stories but also how the actions expressed within the plot structures revealed the dimension of historical consciousness, pertaining to intentions and orienting principles developed over time. To interpretatively analyze the data, I broke down the stories identified in the text into their components, separating out the tensions, turning points, resolutions, and endings. By using the constant comparative procedure, I then coded these parts according to White and Rüsen's typologies. For example, I coded the following narrative excerpt as romantic by following White's typologies and as critical by following Rüsen's typologies:

> "We once had a horse and buggy health care system in which the only way to get help was to go there," Brown says [Ontario Telemedicine Network CEO]. "Now we have the technology [telemedicine] to support high quality health care over distance and managed to find the right place for it. In doing that we are improving health care while reducing costs" (142).

As illustrated in the excerpt above, romantic narrative strategies are statements of moral ambition. The telemedicine technology plays the role of a hero, eliminating geographic barriers, overcoming institutional barriers by finding "the right place" in the health care system, while overall improving health care in a cost-effective way (142). The romantic hero represents the best traits of society, in this case the best technology for health care delivery, by conquering the corrupt side of the health care system. The action of the narrative is clearly romantic, as romantic narratives strategies unfold in a dichotomous action, which defines clear alternatives of good versus evil, of virtue versus vice, and of justice versus injustice.

Additionally, I identify this excerpt as critical. By focusing on the sequence of the events that unfold in the story, the narrative conveys a vision of radical rupture with the past, "we had once horse and buggy" and then "now we have the technology" (142). By differentiating the two periods – before and now, and into the future – the narrative strategy conveys expectations of radical change. The new technology provides evidence that denies the validity of the "horse and buggy" system establishing the validity of the new substitute technology. As illustrated in this example, by using the constant comparison method I was able to discern this type of narrative strategy from the other types adopted as sensitizing concepts for this study.

As I moved forward with the constant comparative method, new codes and

categories emerged. This allowed me to analytically sort and further abstract the level of the analysis through focused coding.

Focused coding and memo writing

Focused coding is the second major coding step in grounded theory. It guides the conceptual analysis of the initial codes, enabling the researcher to conceptually raise the analytical level of the codes and categories (100). Through focused coding, the researcher determines which of the codes that emerged during the initial coding are the most significant (100). The most significant codes are those that have stronger analytical power. They make more explicit the hidden and overlooked meanings embedded within the stories, and can account for the data from where they emerge (100). Focused coding then allows the researcher to conceptually organize and synthesize the initial set of analytical codes. As I moved into this stage, by using the constant comparison method, I began to compare codes with data, categories with data, and categories with codes to determine the codes' conceptual adequacy and theoretical centrality. In other words, I compared the plot typologies that started to emerge and began to conceptually link them, while describing their properties and relationships. Through this theoretical sorting process, I could raise both the theoretical level and the level of abstraction (100).

Memo writing is crucial during this phase (100). Memo writing enables the researcher to think about the analytical process by making the underlying assumptions of the analysis explicitly clear (100). This is done by sorting and integrating the memos on a theoretical basis (100). By comparing and highlighting the variation within and among categories, theoretical sorting serves to refine categories and their relationships (100). In

addition, to sort and integrate these conceptual categories I used tables as visual representations of the analysis and its findings. The visual display of the analytical process enabled to raise the interpretative and abstraction level, that is, to identify connections and interactions among the codes and categories, and their relative strength (100).

Finally, as discussed in the following sections, writing memos enables the researcher to maintain its reflexivity, as s/he stays alerted for their analytical thoughts and questions the assumptions behind the construction of the codes (100).

Acknowledging reflexivity

Constructivist grounded theory invites researchers to be aware of their perspectives, preconceptions, and interpretations of the studied phenomenon (100). This is a reflection of constructivist's ontological relativism, the idea of multiple realities and perspectives. It also considers constructivist's epistemological subjectivism by considering the researcher as an integral part of the research process (100, 143).

Constructivists often adopt reflexivity to improve or maintain the validity of their work (100, 144). Reflexivity entails the researcher's intention and ability to identify its subjective role in the research, and thus reveals the inherent assumptions that may guide and influence the research process (100, 143, 144).

To improve the validity and rigour of the studies, constructivist researchers commonly engage in the following practices. They first identify personal values, interests, and issues that may be taken for granted to acknowledge their subjective worldview. Secondly, they define the potential roles and power conflicts that could influence their

approach to research participants and data analysis. Finally, they address and question any surprising or strangely unsurprising results, as well as any analytical blocks, by taking a step back from the data and trying to think about it afresh (144).

By taking a reflexive stance when considering this study, the first aspect that I consider relevant to highlight is the interdisciplinary nature of this work. This study spans across the fields of policy, science and technology studies, and historiography, all enclosed within the field of health studies. Interdisciplinary research work is possible but susceptible to incoherence (58). Acknowledging my reflexivity means that I consider all these aspects during data collection, data analysis, and report writing. Thus, a major goal is to maintain the validity of this study by mediating among different disciplines, proving this work to be coherent in all its parts and innovative, as opposed to *tragically* (my emphasis) "disorienting" (58, 145).

As seen in chapter one, I have illustrated the ontological and epistemological foundations of this work, in which I clarify the rationale of this project, as well as my perspectives, values, and beliefs.

Grounded theory memo-writing practices also provide an effective means to engage in reflexive thought throughout the study, allowing me to localize my role and position within the research process, as well as to enhance the study's confirmability (100, 144, 146). In particular, as I analyzed the data and wrote the memos, I realized that two personal qualities could influence the analysis. First, I acknowledged that today information technologies are part of our everyday life. This approach helped me take a step back and think about my perspective, compelling me to be aware of potentially

making assumptions about the accessibility and ease of use of communication technologies. Second, I may view telemedicine as a patient in addition to as a researcher. Overall, by taking this reflexive stance and systematically questioning the analysis and thoughts, I explored the nature of my perspectives on technology and their influence on the analysis. Finally, through memo-writing, I kept track of the reflexive thoughts about the power relationships exhibited by the research participants, especially during interviews (100). Most of the study participants I interviewed were in positions of power. As discussed earlier in this chapter, power cleavages, and power inequities emerged during the interviews, precluding in some circumstances the disclosure of information, or the discussion of specific topics. As I conducted the interviews for this study, I learned to address these cleavages by trying to gain the trust of the interviewees.

Quality and rigor in grounded theory

Discussions of quality standards in qualitative studies have always been a thorny issue, as qualitative research offers an extensive set of evaluation criteria that vary with different disciplinary fields of inquiry, as well as with the researchers' differing ontological and epistemological assumptions (139, 146-148). As Lincoln and Guba (146) highlight, there is no straightforward way to operationalize trustworthiness criteria. Different assumptions address different standards for research quality (146, 149). Considering my constructivist stance, which is ontologically relativist, epistemologically subjectivist, and methodologically naturalist (64), I consider the following criteria to operationalize and establish trustworthiness: *credibility, transferability, dependability, and confirmability* (146). Such criteria roughly parallel the quantitative positivist

standards of internal and external validity, reliability, and objectivity (57, 146, 147).

Using grounded theory's research methods allowed me to attend to most of these criteria (100). Credibility is reminiscent of quantitative internal validity (146, 148), referring to the accuracy of the data in reproducing the multiple realities of the phenomenon under study (146, 148, 150). Grounded theory's memo-writing technique allowed me to attend to the credibility criteria by maintaining persistent observation throughout the study, remaining engaged for a long period of time, and providing thick descriptions of the data and context. I collected and analyzed documents and observations gathered during interviews, thus triangulating information gathered from different sources. The constant comparisons performed at different analytical stages helped me to identify relevant codes, and discern trivial information. I continuously engaged with the data by writing memos to explore the codes, categories, and themes developed during the analytical process. As discussed earlier in this chapter, memos also foster reflexive analytical thought within researchers. Accordingly, throughout the study, I engaged in reflexive practices to pay attention to how I built and refined my constructions.

My Ph.D. supervisory committee, as an external auditor, systematically examined my research process and methodological choices, verifying the establishment of the dependability criteria. In particular, my Ph.D. supervisory committee examined design induced factors, such as the type of data sources, type of interviewees, and data analysis methods, checking for consistency of the data across time and research participants (146, 148). Finally, transferability, similar to external validity, emphasizes the transferability of the findings to similar situations but without aiming at generalizations (146, 148).

However, transferability is not established by the researcher (148). Rather it is the audience and peer researchers that personally judge to which extent which results of this study are similar enough to their situations (148).

Overall, grounded theory's rich data collection and analytical techniques enable me to provide a detailed, "thick" picture of the phenomenon under study, and, through that, to attend to most of the recommended criteria for guaranteeing trustworthiness.

Ethics

This research protocol was reviewed and approved by the Hamilton Integrated Research Ethics Board (HIREB) [project number: 14-377]. All the participants in this study provided informed, voluntary consent to participate. Confidentiality of data was ensured using standard data protection practices as recommended by the REB.

CHAPTER 3: TELEMEDICINE – A PROOF OF PRINCIPLE

Introduction: Telemedicine as breakthrough

Since the early days of telemedicine, from 1993 to 2000, telecommunication and computing industry stakeholders, research organizations, clinical champions, hospital administrators, and governmental officials (both at the federal and provincial level) envisioned telemedicine as a harbinger of future technological revolution. As stakeholders' many ideas of radical innovation diverged, telemedicine emerged as a set of various applications over the 1990s decade. In this chapter, I will describe how the various stakeholders involved with telemedicine development envisioned this technology's *future*, which visions they shared (or not), and how expectations of telemedicine evolved from 1993 to the year 2000.

Forward-looking stakeholders adopted literary "romantic" narrative strategies (88). Forward-looking stakeholders included governmental officials at the federal level, such as the Federal Industry Minister John Manley, telemedicine clinical champions, such as specialist physicians and hospital managers, and researchers at clinical research institutes. They are forward-looking as they envisioned telemedicine as a technological breakthrough. They adopted "romantic" narrative strategies to convey the belief in telemedicine's triumph over past geographic, time-related, and economic barriers to health care access. These linguistic strategies prefigured telemedicine as a "mythical" innovation, better than human "touch" (151). The romantic narrative acknowledges formidable challenges, problems, and barriers but assures the audience about the inevitability of triumph and success by the hand of a hero (in our case, telemedicine

technology itself). Even though a few conservative stakeholders, such as physicians and health care planners approached telemedicine more cautiously than most, ideas about the technology largely resisted most forms of skepticism such as the devices' high costs, its experimental status, and the lack of regulatory guidelines for its adoption and use in the clinical setting, telemedicine would have transformed the delivery of health services and improved medical practice. Telemedicine's champions also viewed the adoption of telemedicine as an organic and natural process (152). Evolutionary narratives highlight the temporal variations between past and present, temporalizing telemedicine visions as a dynamic process of progress (104, 141, 152). Stories of this type interpret the course of time as natural development, acknowledging the past and bestowing upon it "another future" in an interpretative framework of change (104, 141, 152). In these telemedicine narratives, telemedicine champions viewed telemedicine's development as natural and evolutionary by linking their telemedicine visions of future change to validated criteria and current needs for implementation, such as real-time instantaneous access to care in underserved areas, patient satisfaction, and cost-effective use of health resources.

In these early years, Ontario telemedicine technology was being actively pushed forward by national and provincial agendas far beyond health care, in particular those promoting information technology infrastructure investments such as Canada's "Information Highway" (153-155). The "Information Highway" represented the merger of computing and telecommunication technologies into an "interconnected and interoperable network of networks" (154, 155). The federal government action plan *Building the Information Society: Moving Canada into the 21st Century* (155) set the

expectations to apply the "Information Highway" for commercial, education and health services reducing costs for the government and promoting industrial development (155). At the same time, telemedicine was eagerly pulled into the health sector in particular, by clinical and policy entrepreneurs as a potential breakthrough solution to some of the Ontario health systems most intractable problems of access, efficiency, and quality. Together these push and pull dynamics fed the organic image of telemedicine as an inevitable force of nature or progress, as well as the romantic idea that telemedicine would triumph where past solutions had failed.

Telemedicine push: A new information technology era

Ontario's early telemedicine agenda was cultivated within a broader Canadian vision for information technology (hereafter IT). Canada's 1990s fiscal constraints, due increasing national debt and federal and provincial deficit cuttings (156), coupled with the broader shift towards a knowledge-based economy, that is, the investment in the production, distribution, and use of knowledge for economic productivity (157), triggered a growing interest in the development of information systems and internet applications.

Industry Canada's Federal Information Highway Advisory Council (IHAC) described the shift as: "The [knowledge-based economy] change is so fundamental it has been compared to ... the Industrial Revolution of the 18th and 19th centuries" (158). In this era of expected radical change, the federal government's Information Highway Advisory Council defined the "digitized, high-capacity, interactive" communication and information networks as the "Information Highway" (158). These visions evoked in a romantic way revolutionary images of fortunate change entrusting the organization and

improvement of service delivery to the new telecommunication's technology (159-161).

The Canadian Ministry of Industry, as well as some academic and governmental research organizations and private telecommunication industries (including telephone and satellite communication companies), considered health information systems, and in particular, telemedicine, as part of this revolutionary technological advancement. Driven by the shared hope of developing a nation-wide electronic information system – that is, a computer network for the exchange and management of data – these stakeholders viewed telemedicine as a beneficial communication and internet application that would help legitimize the construction of the electronic data network, and, thus, of a broader new information economy. Telemedicine visions grew out of belief in the information technology's promise of future change in the delivery of services. These stakeholders maintained that central to the information highway vision – and thus to telemedicine – was the technology's ability to connect people and places, reaching remote locations and overcoming time barriers due to the large geographical distances:

> Right around the first dotcom boom. That's where people were really seeing technology, and the internet, with an ability to connect, right? (Participant#10).

In their words, these stakeholders viewed IT and its infrastructure as an opportunity to share and deliver resources across great distances – in particular knowledge and information – and as an opportunity to leverage new growth opportunities for information and communication markets, overall supporting the productivity and economy of the country.

In 1993, Canada's Ministry of Industry, in collaboration with industry and federal

and academic research organizations, mandated the non-for-profit Canadian Network for the Advancement of Research, Industry, and Education (CANARIE). This industry-led public-private partnership aimed to construct a national internet broadband network for computer-based research, education, and business applications. Four-year government funding would "help the private sector build high-speed computer networks and applications, such as distance learning, home shopping and banking, telemedicine and movies-on-demand" (162).

Crucial for this envisioned technological development was collaboration with the research sector. In 1997, the National Research Council, a federally funded research organization, set up an experimental network to develop, test, and support the private commercialization of IT applications. Research organizations pointed to telemedicine, among other applications, to justify investment in new fibre-optic internet:

> It [fibre-optic] is considered the first stretch of electronic highway in Canada and researchers have formed task forces to study the requirements of telemedicine, education, video-on-demand and electronic newspapers (159).

In these visions, IT replaced old service delivery systems – such as poor and long roads as well as costly air transportation and shipments – by virtue of the network's ability to connect and "stretch" across geographically large distances (159). Clinical research institutes aligned with such visions and envisioned telemedicine as a cost-effective way to provide specialized care in remote and rural areas by connecting specialists with physicians in local rural communities and saving public travel money (163-165).

As among federal government officials and research institutes, visions for the

shape and future feats of telemedicine grew among cable, telephone companies, such as Bell Canada, satellite communication companies, such as Telesat, internet service providers, as well as simulation software firms and data and voice networking businesses.

Similarly, these stakeholders related telemedicine technology to the connectivity component of the new information highway technology, including both hardware and software applications. In 1994, the Stentor consortium, the major Canadian telephone companies' alliance, announced a new $ 8.5 billion initiative, called Beacon, to build a national broadband internet infrastructure to offer "interactive voice, full-motion video and data services" (166). The initiative aimed at providing universal access to communication services and support the information system's development and economic growth, as well as to overcome competing satellite and cable companies' share in the information highway's market. Among the stated benefits, they highlighted the opportunity for community doctors to have "immediate and interactive access to the best medical minds in the nation" (167). Stentor's vision statement outlined a romantic futuristic vision of the technology as not only revolutionary but also beneficial for Canadians. The Stentor consortium expected the information highway's prowess to transcend its exclusive information communication role, penetrating new markets and sectors, including the health care sector (167). Other software and equipment companies, such as Northern Research Ltd. (later acquired by Nortel), Canadian Aviation Electronics Ltd., Newbridge Networks Corp., Siemens AG's medical systems division, Sun Microsystems of Canada Inc. and 3M Canada Inc., also viewed telemedicine as an opportunity to explore new markets and to justify their changing production agendas. For

software businesses, telemedicine provided a means for companies to enter the health care sector, as the firms attempted to redefine their products and their role in the market, e.g.:

> The medical market offers 'excellent potential' for the extensive capabilities CAE [Canadian Aviation Electronics Ltd.] has developed (…). Another medical technology breakthrough is the company's Telemedicine system (…). It links medical specialists with patients in remote areas, allowing examination and diagnosis through video conferencing, and also has teleradiology capabilities (9).

In search for new markets and pushed by the desire to promote the "information highway" infrastructure, private businesses often compared and combined telemedicine with online education, online banking, and e-shopping services (166, 168, 169).

The so-called "*dot-com boom*" period of the mid-1990s created high expectations because it demonstrated success in so many areas for IT (Participant #10). Telemedicine visions were shaped by the general hype surrounding IT advances, and expectations focused on telemedicine technologies themselves. Whereas telemedicine in the early 1990s was part of the growing IT economy, legitimizing the broadband information highway, by the mid-1990s the visions began to change as the concept of the fibre optic technology and the information networks started to mature. Stakeholders – including telemedicine clinical champions, hospital managers, and private commercial telecommunication and computing companies, which develop multimedia hardware and software products for health care applications such as computer network servers and storage infrastructure products, projected the information highway's envisioned opportunities and benefits onto the health care sector:

> MDS Capital, based in Toronto, said it invested in Starvision because "telemedicine will be a large market within the health care industry over the next decade." Starvision develops broadband clinical telemedicine solutions (170).

Expectations began to transition from the idea of telemedicine as part of the communication and information electronic network to a dedicated and provider-centered health care delivery service for remote and rural care. In these visions, telemedicine embodied the belief that by connecting places and people and by sharing resources within the networks, the government and the health care providers had the opportunity to improve the efficiency of the health care system by ensuring access to care in remote and underserved areas and reducing health care costs.

In the report published in 1995, the IHAC Council identified health as one of the main areas for strategic action. According to the Council, the creation of health information systems and the opportunity to provide timely remote diagnostic consultations would improve the quality of care, reduce travelling costs, provide home care, and serve remote and underserved communities. Overall, the advisory council recommended the government to encourage and support "telemedicine via computer and network hook-ups to cut health care costs" (160, 171).

Similarly, CANARIE's 1997 report *Telehealth in Canada: Clinical Networking, Eliminating Distances* described telemedicine as an "agent of change," providing new opportunities to improve the efficiency of the health care system. This report described stories of success, envisioning telemedicine as redeeming the health care system from the adversities afflicting it:

> Canada's health care system is changing. In part, this is because provincial governments are trying to control the costs of their health systems; in part, it is because new technologies and applications are presenting alternatives to traditional practices, in some instances alternatives that improve access and quality of care for Canadians as well as reduce costs.

Telemedicine would have reduced the health care costs in a time of budgetary constraints and provided access to care in a geographical challenging country, leading the way to "maintaining the benefits of one of the most efficient health care systems in the world" (172). This report provided a detailed description of what CANARIE, as the government and industry's proxy, meant as remote telemedicine services, that is, a service aimed "to dramatically improve access to the highest quality of care" by "providing the right information to the right person at the right time" (172). By providing community health care professionals with remote and timely medical information for diagnostic and decision-making practices, integrated health information systems would have improved access and quality of care (172). Moreover, this governmental and industry-led council also highlighted the added value of telemedicine. That is, telemedicine would have enhanced the effectiveness of the health care resources across the province by saving, for example, the government's health travel subsidies.

In the Ontario Ministry of Health 1998 *Rural and Northern Health Care Framework,* telemedicine embodied the concept of providing "the right care, in the right place, at the right time" (173). As this last excerpt illustrates, telemedicine was not an information exchange service/system, but rather a health care delivery service.

These visions encompassed commercial knowledge and database services that promoted and shaped health information networks as well as applications for medical

education, clinical, and administrative uses at a distance – such as clinical video conferencing and teleradiology services (174). By connecting, transferring, and sharing information and knowledge within an integrated information and computer network, electronic communications network's vision, that is, of an "information highway," triggered broad expectations that went beyond the commercial communication industry (158, 160).

Like the federal government advisory committees, private telecommunication and computing companies promoted telemedicine as an internet application legitimizing the development of the broadband network. It also likewise envisioned telemedicine as a legitimate technology to improve access to health care services at a distance. Commercial stakeholders explicitly linked their telemedicine visions to supporting "state-of-the-art" applications networking, video hardware, and software equipment, and thus to technological progress (152, 175). Telemedicine would spontaneously be ready to provide real-time, fast, and efficient solutions to the provision of remote medical services. This view identified IT as a solution for problems affecting the health care system, in particular focusing on reducing access discrepancies among urban areas and rural communities. In other words, the commercial stakeholders were "preparing to take a leap through space, and in the process, mark a new milestone in the delivery of remote medicine, an area in which Canadians are considered pioneers" (175).

Early governmental, research and commercial stakeholders interested in telemedicine in the 1990s shared a telemedicine vision as part of the overall information highway project aimed at connecting and enabling universal access to communication

services across the province. Within this information highway vision, these stakeholders "romantically" anticipated telemedicine's success in connecting people and places through its communication services and enabling access to health care services in underserved remote and rural areas. Technological "breakthroughs", "leaps into space", and the "first stretch of the information highway" are all examples of how these stakeholders' used futuristic and "romantic" language to convey the hopes entrusted to IT and telemedicine applications as champions of the promised revolutionary change (159, 172, 175). These stakeholders, including the federal government, commercial stakeholders, and research industry highlighted IT's and telemedicine's information processing and connectivity ability – reaching everyone, everywhere by stretching across large geographical distances, and across education, commercial, business, recreational, and health sectors – to express the belief in IT's success to reach distant locations and overcome persistent barriers to service delivery. By providing high-performance, high-speed and real-time services from anywhere and anytime, telemedicine was expected to improve health care providers' efficiency by accessing educational tools and expertise at a distance, as well as offering opportunities to improve rural residents' access to care, and reducing health care costs.

Solving the health care access problem

The vast geographical size of Ontario affects the delivery of health care services. Distance, isolation, weather conditions, and transportation barriers limited access to health for patients living in remote and rural areas of the province. Patients living in remote and rural areas had to travel great distances to reach specialized services in major

clinical centres, "if you need to see a physician, you need to travel for 4, 6, 8 hours, so that's the difference there [compared to urban areas]" (Participant#12). Telemedicine was widely accepted and adopted in northern, remote areas of Ontario, where physicians and hospitals welcomed telemedicine. They shared the vision of telemedicine as a way to bring medicine to isolated patients in remote and areas, starting to define telemedicine as a niche area for health care services.

Providing rural patients with access to specialized care had been one of the earliest "major driver" visions for telemedicine (Participant #2, #14). For example, telemedicine would "drastically reduce" long-distance travel for surgical check-ups by connecting primary care clinicians (including nurse practitioners) to cardiologists (176). In the case of the NORTH Network, Ed Brown served as its primary champion who developed the program through the 1990s. He overcame the program's obstacles, such as the technical, economic, and administrative barriers, and promoted the vision of telemedicine as an educational and clinical tool for health care providers. In 1997, NORTH Network linked Sunnybrook hospital in Toronto with physicians in rural district hospitals in Timmins with remote video conferencing. With the Ontario Medical Association (OMA) first and then with the Ontario Ministry of Science and Technology funding support, he slowly cultivated an expansive vision of eventually connecting more Southern urban specialists with clinicians across northern remote and areas. The expansion was stoked by surprisingly strong demand by northern providers who "begged" for expansions beyond NORTH's two-year pilot sites (Participant #3).

Some advocates for access, however, saw the long-distance video consultations as

a "second-best option" solution to the larger problem of inadequate and remote services, and a failure to achieve the "best care" that could be provided (Participant #6). It provided nevertheless an incremental improvement over the status quo "…it's either you do telemedicine or you do nothing. People were more accepting [of] this" (Participant #15). Certain services were more amenable to remote consultations than others, e.g., dermatology, "where visual contact was important, but not necessarily physical contact," whereas "abdominal pain is awfully difficult to diagnose over telemedicine" (Participant #16). Thus, telemedicine improved access for only certain health conditions.

However, from an industry perspective, meeting needs was the primary driver of telemedicine diffusion in U.S. states as well as Ontario at the time, and telemedicine's champions in Canada had faith that the technology would develop beyond the specialty-care niche to become a universally institutionalized service for most conditions. Ed Brown's goal was "to make telemedicine a mainstream channel for health care delivery and education" (Participant #2). This romantic vision of telemedicine as fundamental to all aspects of health care guided the search for funds for localized experimental enclosed networks. Securing economic support represented the first step for testing the technology and concurrently for advocating its adoption among practicing physicians unfamiliar with such technology.

Providing care closer to home

Hospital managers played an active role envisioning telemedicine during the 1993-2000 period. They provided infrastructure crucial to develop computer networks among clinical sites, which comprised the first telemedicine pilot projects. Hospitals

viewed telemedicine as a wide range of applications, including and beyond patient care, such as physicians' use of electronic health records in the clinical workflow. They saw telemedicine as an outgrowth of emerging electronic information network technology. This positioned telemedicine as a promising means to share expertise and information, evolving with the expected transition to electronic health records. Telemedicine would be a tool for electronically exchanging patient health records and information using the new "information highway." A report of a new electronic network just for Ottawa hospitals (except Ottawa General) predicted that eventually it would:

> … one day connect every health-care provider in the region… It will immediately allow hospitals to communicate through electronic mail and shared access to the Internet. The network will also be linked with the Ontario Ministry of Health to provide instant validation of Ontario Health Insurance Plan cards. The region's bed availability system, which tells ambulance dispatchers which hospitals have free beds, will also be transferred to the network. The goal is to eventually connect every doctor, lab and hospital in the region to give instant access to patient records, tests and X-ray results…Eventually, the network will also allow patients in remote or areas to get sophisticated medical advice through tele-medicine. And it will set up a World Wide Web server for hospitals and local community agencies to provide information and services for the community (177).

These stakeholders used a romantic visionary language to depict telemedicine as an all-encompassing communication technology connecting and reaching "every health care provider," thus enabling physicians to provide patients immediate access to health services across the region. Additionally, these visions also reflected the belief that telemedicine supported the rationalization of complex systems by redistributing bed allocations among hospitals and community sites.

As connections would grow among providers, borders between health care

providers and even between clinical and home care would slowly dissolve. Provincial policymakers and hospitals had struggled to reduce hospital use, control costs, and improve access by shifting care to outpatient and home sites (173, 178, 179). Telemedicine seemed to provide a promising solution by extending the reach of clinicians into the home, and of patients to their providers. Telemedicine would replace the need for transportation to health facilities, and allowing patients to stay in the community and out of hospitals: "The value added is we will be able to support our patients in our own community. We will be able to transport the expertise to our site as opposed to transporting our patient to the expertise at the Ottawa Hospital' [Ray Timmons, CEO of the Almonte General Hospital in 1998]" (180).

Indeed, "tele-homecare" became a phenomenon of its own in health services planning discourse. Tele-homecare embodied the vision of remotely monitoring both young and elderly patients at once enabling hospitals to provide care to all of its patients conveniently from their homes. Sick Kids hospital's metaphorical strategy of a "hospital without walls" conveyed the expectation that hospitals would become more integrated with and accessible to their local communities, as well as extend to meet remote needs (161). Telemedicine and tele-homecare offered a way to help realize this vision (161), and to some heralded a vast "new age of health care," e.g.,

> The Hospital for Sick Children ushered in the new age of health care yesterday when it launched an effort to care for Sick Kids gives doctoring at a distance a try; Pilot project uses two-way audio-visual systems; telephone, vital-sign monitoring devices; to follow patients' progress at home (181).

Integrating cost-effective solutions in health services reform

Health care was a politically sensitive and economically challenging problem for the provincial government through the 1990s. Chronic provincial and national deficit spending and federal cutbacks in transfers to the provinces lead to concerns about the fiscal sustainability of the public health care system (182). During this time of reform, the provincial government applauded urban hospital-based telemedicine projects as "cutting edge," demonstrating an interest in telemedicine but not involvement. Telemedicine was still a very novel idea, a proof of principle more than a real technology. The novelty and lack of clinical effectiveness evidence kept the government distanced from telemedicine funding acknowledging the technology's novelty:

> Health Minister Jim Wilson, who says his ministry provided 'no direct (financial) assistance' to the telemedicine clinic, is pleased with the project. 'Sick Kids has always been on the cutting edge of technology' (160).

The Ministry of Health (after 1999 named the Ministry of Health and Long-Term Care) maintained a conservative stance towards telemedicine, showing interest but not getting involved in the development of early telemedicine projects. According to the Ministry of Health, it was clinical champions' early growing telemedicine networks that "attracted" their attention (Participant #8). As this clinical champion highlights:

> The province found itself with actually 3 regional networks, one that I was riding which was sort of central Ontario, northern Ontario, one in the east and one in the west. Up until this time the Ministry of Health had nothing to do with these projects, really, they came Energy Science and Technology, from the federal government. And so they suddenly had a problem, they had these sort of vibrant networks, and, you know, they were all going to die unless they, you know, did something about it. And so they kind of did something about it. They kind of found some money (Participant #17).

Whereas this clinical champion viewed the Ministry of Health as an outsider, uninterested and uninvolved in the development of telemedicine in Ontario as it did not fund the initial pilot telemedicine projects, the Ministry did include telemedicine visions in the health delivery reform and hospital-restructuring program, shaping its own vision of telemedicine.

However, by the late 1990s, the Ministry of Health promoted telemedicine as a part of a set of health strategies (173, 183). The shift from interest to the active promotion of telemedicine grew within a framework of rural health care delivery service during the health reform and the hospital rationalization reform aimed at reorganizing acute care facilities and promoting long-term and home care (184-188).

During the fiscal crisis of the 1990s, both federal and provincial policy changes stoked the health care rationalization reform in Ontario. At the national level, in 1995, the federal government introduced the Canada Health and Social Transfer to provide a single lump sum payment to the provinces to cover education, health care, and social programs. This policy change granted more power to the provinces to define the availability and quality of local social programs (189). The new Canada Health and Social Transfer eroded federal conditions and regulations on how provinces had to spend their welfare money. At the provincial level, the New Democratic government "Social Contract" (190) as well as the Conservative government "Common Sense Revolution" (191) made efforts to restrain public spending on health care, which was the largest of any government program in the province (192). In response to increasing health care system expenditures in a time of fiscal restraint, the provincial government, the "Social Contract" first and the

"Common Sense Revolution" later reduced staff and closed hospitals and emergency rooms in Ontario communities (184, 185, 193). The 1996 Health Services Restructuring Commission's (hereafter, HSCR) called for reinvestment strategies aimed at transferring acute-care services form hospitals to alternative sites of care, including long-term, home and community care, rehabilitation, sub-acute, and mental care (185-188, 194). The HSCR envisioned a health services "system" based on an integrated and coordinated health service delivery system, which prioritized accessibility, affordability and quality of care (186-188). The HSCR report generated dissent over how best to organize health services in communities (195) and raised fears about how people, especially in emergency situations, would cope without local hospital care (184). Telemedicine seemed to offer solutions without costly hospital services.

Some physicians saw it as a welcome relief from burnout and a source of shared expertise as well as continuing education. As published in the Ottawa Citizen, telemedicine would provide "the extra support and education necessary to convince doctors to stay in remote areas… 'They have to stop telling people where to go,' Margaret Kruk (former executive member of the Professional Association of Interns and Residents of Ontario) said, 'and give them what they need to actually do the job there'" (196). To address provider shortages and turnover (and pre-empt threatened job action), the Ontario government in 1997 responded with a promise of telemedicine relief, in addition to closing emergency rooms rather than hospitals in some areas (173). The envisioned system would provide "24-hour coverage" of "doctors communicating with larger hospitals by teleconferencing and teleradiology, where X-ray images are sent using

telephone lines" (184). Telemedicine would indeed be required to make the reforms work, as the model centred on regional teams who would need new, "non-traditional" ways of collaborating via telemedicine (173). In this way, telemedicine served to placate fears about service withdrawal and helped to legitimize the government's controversial program of health care cutbacks. The idea of delivering care "as close to home as possible" became the *leitmotiv* of the government's policy action for the health care reform.

In 1999, the provincial government also started testing a new, province-wide nurse-based phone Telehealth Ontario tele-triage service (197-200). Both the Ontario College of Family Physician (COFP) and the Ontario Hospital Association (OHA) proposed this new teletriage system as an alternative to the current hospital closures (195, 198-200). Direct to patient phone medical advice prevented patients from overflowing Emergency Rooms (197-200). They envisioned this new tele-triage service as "health care as it will soon be delivered," that is, "just a phone call – or Internet connection – away"(200). This vision reflected telemedicine's expectations of reaching out to patients and providing health services close – and directly in – their homes. Similarly to telemedicine, Telehealth Ontario would have kept patients out of the hospitals saving money in a time of cutbacks and hospital rationalization policies. By endorsing OHA's teletriage recommendations, the Ministry of Health envisioned teletriage as a viable compromise between cost-effective and new, cutting-edge ways of delivering health services and supporting the hospital restructuring reform as promised, making Telehealth Ontario one of its own flagship new services.

Telemedicine reflected the creation of these networks and centralization of resources, authorizing the governments' cutbacks on hospital wards and hospital beds, concurrently satisfying health care providers' requests. For now, it is clear that the provincial government used telemedicine to legitimize and "sugar-coat" other controversial policies implemented during the period, such as the health policy reform and the hospital system reform. Telemedicine would have "sugar-coated" the government's austerity measures that lead to hospital restructuring, which lead to the reduction of inpatient hospital stays by ordering the reduction of beds and the average length of stay. In these visions, telemedicine promised to satisfy patients by providing care "closer to home," as well as to solve the shortage of physicians in underserved areas, and to support remote and rural community and family physicians in the delivery of care.

The telemedicine pull: Practicing medicine anytime and anywhere

Health care stakeholders including clinical champions, health care providers, and hospitals further romanticized telemedicine as the hero capable of delivering health services at a distance where all other efforts had failed. These telemedicine pioneers began to adopt, adapt, and integrate telemedicine into their own parts of the health care system.

Clinical champions, in particular, physicians together with research centres (which included universities, teaching hospitals, and government-run research institutions), were the key telemedicine advocates. Initially, the forward-looking clinical champions were a small and varied group and stood as visionary and ambitious voices removed from the rest of health care profession. These "entrepreneurial" clinical champions (Participant

#11), both physicians and nurses, were:

> Very visionary people that are sometimes very ahead of the camp by far. People that were the pioneers, but the extent of telehealth was very limited. They were the exceptions in their organizations, the kind of, the weird guys with the weird ideas that tried to do something new, while most of the people were very skeptical and so on (Participant #15).

Their visions defined telemedicine and its clinical role within the health care delivery system. Clinical champions shared the overall vision that telemedicine had "great potential for reducing patient travel and empowering the staff in district hospitals" (174), as well as enabling specialist physicians to provide diagnosis at a distance (151, 161, 163, 165, 174, 180). Telemedicine, in fact, would have enabled specialists in the southern urban regions of the province to provide care to patients – direct provider-to-patient telemedicine consultations – and/or professional provider-to-provider support in northern underserved and isolated areas of the province (151, 161, 163, 165, 180).

The essential components constituting "telemedicine" evolved over time. In the early days, proponents considered electronic *data transmission* and *connectivity* to be telemedicine's foundational building blocks (165). The network and connectivity components of the technology responded to specialists' needs to provide care in a timely and real-time fashion. In particular, cardiologists' viewed telemedicine as responding to their need of transmitting real-time, synchronous information for emergency cardiac interventions:

> Yet cardiologists at the University of Ottawa Heart Institute are using telemedicine to treat patients with the gravest of life-threatening emergencies. They have begun testing a new fibre-optic network … [which] essentially widens the lanes of the electronic information highway and offers a fourfold increase in capacity compared with current telecommunications networks. "It is designed to move

> information at gigabit (billions of bits a second) speeds," Mr. Lok of BNR [Bell-Northern Research] said. Cardiologists need a superfast network to transmit angiograms - video images taken by catheters inserted inside the tiny blood vessels of a beating heart (161).

The above passage is clearly romantic, with its "epic" narrative style conveying the extraordinary nature of telemedicine and its potential ideal role as a communication and health delivery service. This also illustrates well the language clinical champions used to magnify telemedicine's super-heroic capabilities to treat the "gravest life-threatening emergencies" by providing information on the "superfast" electronic networks that carry "billions of bits a second" (161).

The virtual visual and auditory experience transmitted through peripheral equipment –such as the electronic stethoscope or digital cameras – on screens and speakers connected through the "superfast" electronic networks (159) represented the revolutionary trait that inspired clinical champions' radical shift towards new virtual diagnostic tools for physicians to bring specialized care to patients in remote areas (176). Their forward-looking stories conveyed the romantic vision of telemedicine as a service that would have "re-engineered the delivery of health care" (6) to transcend old geographical barriers by providing timely care to patients (Participant #14).

However, as this basic idea was common to all of these stakeholders, different underlying interpretations emerged within the health care community. In these early days, these pioneering stakeholders did not envision telemedicine as a single type of technological application. Instead, they devised a broad range of telemedicine applications – including real-time diagnostic video conferencing services, follow-up consultations, telemonitoring and telehomecare applications, remote robotic tele-surgery

operations, telestroke emergency interventions, as well as asynchronous store-and-forward telemedicine, such as teleradiology and teledermatology. These various visions entailed different combinations of the available technological pieces: the video component (the screen), the peripheral electronic devices (such as the electronic stethoscope), the electronic communication network, and the electronic virtual databases.

All these different combinations of technological devices shared a ground-breaking vision of mobility and ubiquity – which enabled physicians to practice anywhere and anytime – combined with the idea of providing traditional face-to-face, in-person consultations. Both the video and the peripheral equipment components enabled physicians to preserve traditional clinical practices while providing care over the electronic network, that is, at a distance:

> A camera and monitor at each end not only allowed the doctor and patient to see one another, but let Dr. Keon zoom in on Mr. Ellis's body to look for any irregularities. A microphone and speaker at each end allowed the two to chat about symptoms, and a special stethoscope-microphone let the good doctor listen to his patient's heartbeat (165).

These visions combined the ordinary face-to-face clinical consultation practice with the new revolutionary technological tools for remote consultations. These stakeholders viewed the adoption of telemedicine in the clinical workflow as an organic and natural transformation. In other words, telemedicine physicians mediated their radical narratives of future dramatic technological change with the vision of a device nevertheless easy and comfortable for practicing physicians to pick up and use in their practice. As one forward-looking physician explained, clinical champions envisioned the introduction of telemedicine as a "turnkey operation [with] not much planning required,

[being] able to just jump into this [clinical telemedicine session]" (Participant #4).

According to these visions, clinical tools were destined to change the delivery of care – as the "special stethoscope" suggested – whereas the doctor's role and practice endured unaffected by the change. Forward-looking physicians viewed the electronic stethoscope as a device that conciliated past clinical procedures with the innovative aspects of telemedicine. The "electronic" or "digital stethoscope" was a traditional stethoscope equipped with a special microphone intended to record and relay the patient's heartbeat over the electronic network to the physician's headset located in another clinical site (151, 161, 165, 201). It allowed physicians to diagnose a patient without being physically present in the same room (151, 161, 165, 201). This "special" stethoscope enabled physicians to practice at a distance, and it improved the physician's diagnosis. The electronic stethoscope - "more highly tuned than the human ear" (151) – allowed physicians to filter out undesired sounds and identify any anomalies in the patient's heartbeat. As Dr. Davies, a cardiologist at the Ottawa Heart Institute, affirmed: "it is actually better than a conventional stethoscope" (161).

Some pioneering physicians dismissed and downplayed traditional diagnostic practices as out-dated practices and praising telemedicine as the "wave of the future" (160) of diagnosis at a distance:

> The only thing missing is touch, Dr. Filler said, but he added that touch, as a diagnostic tool, is inaccurate and primitive compared with modern technology (151).

However, clinical champions also expected that telemedicine applications would preserve traditional forms of clinical practice, and to convey this feeling of continuity

with traditional practice shifted the narrative to a more "genetical" form (104, 141, 152). Genetical narrative strategies suggested telemedicine as the natural next step in the evolution of medical technology, and that adapting to this change would be as easy as adapting to other technologies in recent memory. For example, they associated the use of this innovative device to the familiar and easily accessible TV screen, "the medical treatment will soon be as easy as turning on a TV screen" (160). Media stories reported patients' satisfaction with the technology, replicating and supporting the clinical champions' visions of success and familiarity with the new technology (151, 161, 202).

Both health professionals and industry stakeholders recognized that the romantic expectation of filling the remote care gap in the health care delivery system via telemedicine faced financial challenges, as well as technical and policy barriers. By providing health care services at a distance, clinical champions expected telemedicine to have the potential to save money otherwise committed to travel costs for accessing health care services. Clinical advocates paralleled the technological and economic direction of the federal government and private industry's romanticization of telemedicine. Their expectations embodied a radical vision of telemedicine integration within the clinical workflow through the network's growing data transmission, connectivity, and resource sharing capabilities (152, 163). Better integration meant higher efficiency:

> "This is a giant step forward in the integration of medical services," says Heart Institute director Dr. Wilbert Keon, who adds that this is the most cost-effective way to provide some forms of cardiac care (163).

Clinical advocates envisioned telemedicine's ideal role and outcomes by magnifying what telemedicine may have been, that is, a revolutionary cost-effective tool

for the delivery of health services.

Doctor Ed Brown, NORTH Network's founder and CEO, early feasibility study funded by the Ontario Medical Association envisioned telemedicine not only as a tool to provide remote care but also as a money saver for both the patients and the health care system (203). The study estimated that telemedicine consultations would have saved the province over 30 million dollars in travel subsidies for specialist check-ups or initial visits (203). Additionally, patient satisfaction surveys showed high levels of satisfaction with telemedicine consultations (203). Some patients reported similar stories in the media, echoing clinical champions' visions:

> Lisa Holdt [mother of patient] says her family has received more than $45,000 in travel grants from the Ministry of Health and Easter Seals. Filler predicts telemedicine will be a money-saver in the long run, although it has been expensive to set up the service. He says it costs about $1,500 for transportation and a hotel room for one parent and a child to travel from Thunder Bay to Toronto for a medical consultation (202).

However, the high capital costs of telemedicine still threatened the telemedicine programs' survival, in the absence of major government or industry investments. At the time, the equipment was costly – around 30.000 to 40.000 CAD dollars per piece of equipment – and required substantial funding for providing access to the technology and for its implementation. A participant estimated 50.000 dollars per month budget to keep the pilot project going (Participant#3). Funds were needed to cover hardware components such as computers, video devices (the monitors and cameras), diagnostic peripheral tools (for example, the electronic stethoscope or the blood pressure cough), electronic transmission infrastructures, such as the IT equipment and the dedicated telephone lines

for the network, and finally, human resources for the coordination of the data transmission (151, 161, 174).

At the time, private and government funding opportunities provided only one-time seed grants, such as $150,000 CAD from BELL (204), threatening the continuity and sustainability of the initial pilot projects. This point of tension in telemedicine's plotline could have presaged a "tragic" ending, with the demise of the technology and its promises as funds ran dry. However, the "romantic" trajectory in telemedicine rhetoric continued as clinical champions successfully "shopp[ed] around" for economic support (Participant #3).

Clinical champions sought support from specific hospitals, which already took an interest in the connectivity, resource sharing, and efficiency visions of telemedicine (Participant #3). Some hospitals, such as Sick Kids, Sunnybrook, the Ottawa Heart Institute, and Sudbury Regional Hospital in major urban centers and Timmins & District Hospital, Lady Minto Hospital in Cochrane, Kirkland & District Lake Hospital in Kirkland Lake in rural areas, had already played a crucial role by providing resources to set up early telemedicine programs. Hospitals provided their phone line infrastructure, the rooms for telemedicine hardware and video technologies, and human resources to run telemedicine sessions. Telemedicine provided an opportunity for hospitals to enhance their infrastructures with the collaboration of the private telecommunication industry (163). Moreover, hospitals viewed telemedicine as an additional means for economic revenue by outsourcing their services in other jurisdictions, as this narrative illustrates:

> But Dr. Filler has even grander ambitions for telemedicine at Sick Kids to extend the reach of Canada's leading pediatric hospital to patients in

> other countries. "Health care is also a business, and in an era of diminished budgets, it makes sense to consult abroad," he said. A telemedicine link between Massachusetts General Hospital in Boston and Saudi Arabia, for example, has enabled the U.S. hospital to earn extra income from a radiology consulting contract (161).

This narrative highlights another economic angle to the romantic expectations that clinical champions entertained at the time. The extension of telemedicine's capabilities could reach other far-distant countries providing an opportunity for new sources of revenue in a time of budget cutbacks.

Hospitals also responded to telemedicine's need for "bricks and mortar" investments of physical space (Participant#8, #15). These institutionalized hospital resources also shaped early visions of telemedicine as a "room-based" system that would mirror conventional face-to-face medical consultation. In 1997 the NORTH Network (originating in Sunnybrook hospital and connecting with Timmins' hospital in the north), launched a "room-based" telemedicine service (Participant #3). This room-based system required health care providers to provide telemedicine services only in designated telemedicine clinics, where the equipment and network connections were set up. In this way, the technology was not as pervasive as many had envisioned – that is, providing care "anywhere and anytime." It was physically embedded within traditional clinical – and especially hospital – infrastructure.

This hospital- and room-based telemedicine model replicated the traditional clinical event scheduling system as well as the in-person encounter between patient and physician. It required well-institutionalized human relationships between those who knew how to use the system, as well as the recruitment of new practitioners, e.g.:

> It was also very personal. Like, it really was a small number of people trying to connect individuals together to do events, so it was, it was really, felt like you were knitting relationships together one-by-one, and proselytizing doctor-by-doctor. And it was that real focus with those women in Timmins […] they were telemedicine, they were the ones who were actually pushing people into doing it, and setting it up, and doing whatever it took to make an event go. And every event kind of felt like we were bagging something, you know? Like we were doing hundreds, and hundreds felt like a lot. Really, it felt like a lot. Now, we do hundreds of thousands. It seems impossible that we've gotten that bit (Participant #14).

As this participant highlighted, almost unexpectedly the human component was part of the technology together with the computer, the video devices, and the electronic network. The continuing need for the human side of the technology translated into the introduction of a new role: the telemedicine coordinator, who played an important role adapting conservative and technology-resistant clinicians to telemedicine's interface and operations.

Physician-oriented telemedicine

Ed Brown, who collaborated with Robert Williams to develop the NORTH Network, worked relentlessly to find economic support and to continue the telemedicine program. A clinical champion describes Ed Brown's search for funds and how he ran into one of the first institutional barriers:

> Then (he) shopped around and got it funded, through, a now defunct Ministry of the government, Science and Technology, and they gave him a couple of million dollars, research grant, to implement. But they said that it must be led by a physician from Northern Ontario, that they did not think that (he), as being a Southern Ontario, Toronto physician would have the credibility to engage physicians in the North, to embark in this change, that it needed to come, that that sort of adoption initiative needed to come from a peer, a remote peer (Participant #3).

During the second half of the 1990s, the federal government, the Ontario Ministry of Science and Technology, the Ministry of Economic Development, Trade and Tourism, the Ontario Ministry of Health, and private telecommunication companies (such as Northern Telecom, Bell Canada, and Siemens) provided one-time funds for the development of telemedicine networks and pilot projects (160, 204, 205).

Government funding opportunities came with conditions intended to demonstrate the credibility of the technology and help legitimize governmental interests and investments in telemedicine. The first requirement was to set up and support telemedicine networks between urban and rural hospitals. With the hospitals' collaboration, clinical advocates readily connected urban to remote and clinical sites.

The second requirement was to engage with health care providers working in the northern regions through a peer who advocated for telemedicine. This was more challenging, as it required fostering health care professionals' acceptance of telemedicine technology. Concrete objectives included ensuring telemedicine's adoption by the remote providers and integrating it within the clinical workflow. This anonymous federal spokesperson explains the medical profession's view of the task as follows:

> It's [video conferencing] set up more, usually, out of the IT shop, so it was like a part of the IT programs, and that ignored the technology to be deployed, and there was a lot of administrative support required. And it was always noted, right from the start, that they had to do, pay special attention to workflow of the providers, so there was a lot of analyst work required, and engagement of the providers required, to be able to see how the systems could be set up in their practices that, so that their workflow wasn't disrupted. So, in an ideal situation, an administrator would have everything set up, like a video set up, there would be a patient sitting on the other end, and then the doctor could just walk into an exam room that had a screen, versus a person, and they would be able to do a consultation (Participant #11).

The government, as did the forward-looking physicians, considered physicians as the major telemedicine end-users, and wanted broad buy-in from practicing physicians. Initially, physicians tended to see video conferencing as an *information* technology rather than a clinical technology per se. Some envisioned telemedicine more generally with skepticism – as a source of new problems rather than a revolutionary technological solution to existing ones (193):

> So, it's, you know, they'll only give you one shot with this, and if it doesn't work, that's hard for the champions. I'm not gonna leverage it. I don't wanna miss my patients, it's not respectful, it's not, it's not best practice (Participant#13).

Telemedicine sessions raised technical issues and added administrative tasks, which made physicians hesitant to use the new technology:

> You've got these older physicians who say "well it ain't broke, why fix it," whereas, so they're not adopting the technology to help them, right? They still got, all of their forms are paper-based, they're still faxing everything to each other, and when something leaves their office, they fax it manually, right? They have their secretarial staff do all of this stuff for them, and they don't mind that (Participant#10).

Whereas clinical advocates encouraged telemedicine's development and integration, based on an optimistic, revolutionary vision, practicing physicians who were not familiar with IT nor with telemedicine adopted a cautionary view. Physicians not interested in telemedicine included both specialists and community physicians in urban and rural areas. These physicians saw electronic communication networks and electronic data transmission as outside the scope of their profession, belonging instead the to the IT sector. They also did not share the champions' fantasy of eventual care at a distance and electronic tools as important medical advancements, "it was just like nobody ever thought

of that" (Participant #3). Indeed, physicians still considered the fax and the photocopier as innovative IT technologies. Thus, one source of clinician skepticism with telemedicine was simple lack of familiarity or comfort with state-of-the-art communication and information technologies in general.

Health care professionals also hesitated to use telemedicine because of their concerns about using the technology properly and avoiding inadvertent harm (193). There was discomfort at the idea of taking medical practice outside the "room" containing the conventional clinician-patient interactions:

> I mean, the idea of putting a piece of technology in the, in people's hands is very foreign, uh, and even room-based systems were the only systems, like, Skype kinda was around, but doctors weren't using it, certainly not using it for telemedicine. So it was very room-based, and uh, hospital based (Participant #14).

Physicians as a professional group were inherently conservative. They viewed telemedicine as a threat to their professional role and expertise as they would have had to use their professional judgement not only to diagnose and provide care to the patient but also to determine case by case whether a telemedicine session was an appropriate way to deliver care. However, with the lack of clinical evidence and clear guidelines for the appropriate use of the technology, physicians as a professional group maintained a skeptical stance.

Clinical champions and industry stakeholders recognized the physicians' guarded and sometimes suspicious attitude to telemedicine. Carried by their romantic visions of inevitable success after overcoming obstacles, clinical champions responded by recruiting health care providers through peer networking and by leveraging their professional

authority by identifying and offering early specialist adopters the opportunity to become a telemedicine consultant and encouraging primary care physicians interested in tele-consultations to issue telemedicine referrals. They directly engaged with practicing physicians to overcome technical and clinical workflow barriers helping them "creatively understand how video might play a role in that [in their practice]" (Participant #3). Some physicians responded to the clinical champions' engagement strategy becoming early telemedicine adopters themselves (206).

However, as the first pilot projects took off, telemedicine was not easy to use, as the clinical advocates expected. First, initial technical barriers emerged. Electronic transmission proved to be a complicated process. As it was considered still "pre-internet," this transmission "took six phone lines to connect any two sites together, and you can imagine like bundles of wire, and just how technically complicated video conferencing and telemedicine were" (Participant #13). The elaborate hardwired telephone system required extensive efforts to set up the video connection for telemedicine. Technical problems to install the telemedicine equipment and link clinical sites became a barrier to health care delivery rather than a facilitator. Technical support was needed to assemble and work the technology to initiate and conduct telemedicine sessions, making the telemedicine consultation more hand-operated than expected.

Second, telemedicine was not coordinating well with the clinical workflow. Creating an electronic network and providing the hardware equipment to establish the telemedicine connections was not enough to make telemedicine work. Clinical advocates identified missing support of other technological components, such as the electronic

transmission of the patient's personal health data and the computerized scheduling system. Without such instruments, telemedicine sessions required extensive human work, as this telemedicine coordinator describes:

> To make one telemedicine appointment happen is way more time-consuming than an in-person consultation, because an in-person consultation, you just phone the patient and say "please come to this hospital on a such-such day, such-and-such a time, and then directions to the hospital, and that's all. With telemedicine, you have to get the approval of a health care professional to take on the case. You have to get their date, the time that they're available. You have to make sure that the technology at their site is available at that time, you have to secure the use of the technology (Participant #9).

This drawback implied that to set up the telemedicine sessions, all the scheduling, and the patient's information transfer had to be done by hand and on paper, sending faxes or mailing the patient's information from one site to the other. In other words, it required more administrative work. Work that potentially would have burdened the physicians' workload making telemedicine less attractive.

Clinical champions advocated for dedicated staff to schedule the telemedicine sessions, which hospitals provided from current or dedicated human resources. This solution worked for pilot projects. However, not all the hospitals were willing to support longer-term investments in telemedicine staff, as this early adopter described:

> So that was an example of a community that had the equipment, had the connectivity, but the local hospital had not agreed to hire staff to do that, to be the clinical coordinator at the other end (Participant #4).

This problem would be solved later, during telemedicine's second "era" in the 2000s, by moving the management of the services out of the hospital and improving scheduling technologies.

Physicians' reimbursement, liability, and security policy issues

New legal, administrative, and economic questions fed the medical profession's skepticism of telemedicine. First, the Ontario Health Insurance Plan (hereafter, OHIP) billing regulations and procedures for telemedicine sessions were ambiguous and ill-defined, a problem which concerned physicians and vendors alike (161, 174). Economic incentives were lacking before telemedicine services were reconciled with the physician fee schedule because remuneration models were "designed for in-person care" (Participant#3)(174). The Ontario Health Insurance Act (1990) (207) – did not address billing for telemedicine consultations. Clinical and governmental stakeholders described that the "classical interpretation" of the act held that a health care provider must have been physically present with a patient to bill OHIP for a service, yet the purpose of telemedicine was to allow interaction without physical presence. The potential inability to bill fee-for-service presented an economic disincentive to practice telemedicine.

By the end of the 1990s, as the telemedicine networks grew and developed their pilot projects, telemedicine network advocates addressed this problem by negotiating telemedicine billing codes that mirrored face-to-face billing codes, "as if they [physicians] were billing OHIP" (Participant#3). Further, they added a premium above the usual face-to-face fee to encourage physicians to adopt telemedicine technology in their practice. The Ministry provided one-time seed grants without formal funding opportunities in place during the 1990s. Each network paid for telemedicine services through special, one-time seed budgets outside the OHIP pool. Telemedicine network advocates, each for their own pilot project, negotiated and implemented their

telemedicine remuneration and billing scheme, including the fee premiums, for physicians practicing within their networks. These networks maintained their independent, differentiated payment schemes until they merged into one single network in the following telemedicine "era."

In the absence of regulatory guidance and protection from liability for aspects of the technology they could not control, physicians also resisted telemedicine on legal grounds. Vendors flagged the issue of liability for technological malfunctions, for both telemedicine companies and the physicians who practice telemedicine:

> "If something happens during transmission, who's to blame, the physician or Bell Canada?" As well, when medical services are provided over jurisdictional boundaries, the question of who gets the bill arises (208).

Health care providers echoed these concerns:

> And then the response from the system was very negative, "how could you do that? Did you ask for a signed document? What if something goes wrong? What if you get sued? What if this, what if that? (Participant #1)

Seen through the lens of literary theory, these narratives portray a *quasi*-tragic story of fear in which the physicians faced an uncertain and almost catastrophic future in the case telemedicine technology would have failed.

Indeed, many types of necessary regulations were lacking. At the federal level, the Federation of Medical Regulatory Authorities of Canada (FMRAC) – the national association of provincial and territorial medical regulatory authorities – provided no guidelines regarding licensing authorizations for remote telemedicine services across jurisdictions. Similarly, at the provincial level, the College of Physicians and Surgeons of

Ontario (CPSO) – the body that issues statutory medical regulations to regulate physicians' rights, duties, and medical practices – did not dispense telemedicine consultations protocols for physicians to use in a remote clinical session, as the first telemedicine policy appeared in 2007 (Participant #7).

Existing liability law posed burdens for physicians who might practice telemedicine. The Public Hospitals Act (1990), which regulated individual hospital credentialing, was not prepared to credential services in which the physician and patient were in separate hospitals and the locus of responsibility for quality would be shared (209). The existing rules suggested that for telemedicine, each site involved would require a parallel credentialing process, duplicating – and in the eyes of some, "wasting" (Participant #3) – the credentialing burdens on hospital resources. The Ontario Hospital Association firmly contested duplicate credentialing. With the help of telemedicine's clinical pioneers, the Hospital Association generated an informal policy that analogized telemedicine to family physicians' referral for specialist consultation. Understanding telemedicine as a consultation procedure required credentialing of only the physician's hospital and not the remote hospital of the patient in the encounter.

Health care providers raised concerns about patient privacy about telemedicine. The College of Physicians and Surgeons of Ontario recognized not only the potential violation of patient privacy posed by insecure internet connections but also the possible loss of patient trust and confidence in the clinical encounter if patients imagined such breaches.

Related was the concern about technological reliability, i.e., risks posed by a

connection or data transmission possibly going awry. During this early era, multiple stakeholders – health professionals, clinical champions, hospital officials, and eventually the provincial government – began working together to secure the privacy and security of the telemedicine network by adding phone lines and starting to build enclosed electronic network infrastructures for secure and fast exchange of information.

While solving reliability and security problems by creating local and enclosed internet networks, telemedicine's proponents also promoted the technology by criticizing the health care profession's conservative holding back the technology's advancement (141, 193). They portrayed doubters as falling behind other professions in the use of state-of-the-art tools, e.g.: "In many respects, health care hasn't embraced technology the way the rest of the world has," says Mike Inkster, national director of marketing for the health care industry sector of Stentor (193). Commercial stakeholders compared telemedicine to the introduction and development of online banking and online travelling services to emphasize how the health care sector was protracting the adoption of telemedicine in the clinical setting.

Clinical champions and the medical profession located telemedicine's billing and liability problems in need to update policy and regulatory frameworks for telemedicine practice. The problem was not located in technology per se and did not cloud proponents' "romantic" faith in telemedicine's future promise. As "heroes" on an archetypal "hero's journey," telemedicine's champions worked together with policymakers, administrators, hospital and physician associations to overcome each economic and legal barrier that arose. The overall vision of telemedicine's future remained "romantic," with the

technology expected to prevail and flourish in the end.

Conclusion

Romantic telemedicine narratives characterized the first telemedicine "era" which lasted from the year 1993 to the year 2000.

Telemedicine champions' romantic stories expressed the desire and hope for telemedicine's success without actually proving it with measurable outcomes. "Proof of principle" stories dominated this period, trying to legitimate the adoption of the novel telemedicine technology in the health care setting. These stories emphasized imaginary and Utopian goals rather than accessible objectives and outcomes, glossing over the uncertain and unfamiliar aspects of the technology. These stories envisioned the "mythical" future benefits that telemedicine promised, such as access to care in underserved and remote areas, the introduction of community and home care, improved clinical practice and efficacy, and cost-effective use of health resources, without evaluating whether telemedicine accomplished any of these promises or not. During a time of fiscal restraints and as the provincial government's health care reforms aimed at reducing hospital inpatient hospital stays, telemedicine visions also served to mitigate public dissent and concern for service withdrawal.

However, technical barriers and high technological costs for the telemedicine equipment threatened telemedicine champions' romantic visions of telemedicine adoption and success, proving that telemedicine was not cost-effective as envisioned as well as not easy to implement. Physician buy-in and policy gaps also represented barriers to telemedicine adoption. Physicians as a professional group adopted a cautionary

perspective on telemedicine. They opposed telemedicine adoption due to the lack of physicians' reimbursement policies, the lack of clinical evidence and telemedicine guidelines, and the lack of licensure and liability policies. Additionally, physicians viewed telemedicine as adding work to their already busy schedule, as telemedicine required additional technical expertise to work the telemedicine equipment.

For these reasons, several stakeholders, practicing physicians and government officials alike, will consider the emergence of telemedicine only starting from the following 2000s decade. As this clinical champion emphasized, "telemedicine, [came] out of, out of thin [air], it appeared probably for real […] in a significant way in Ontario in probably around 2000" (Participant #13).

CHAPTER 4: TELEMEDICINE TAKES ON THE SERVICE ROLE

Comedy joins romance as telemedicine becomes a service

At the end of the 20th century, telemedicine champions had established a romantic proof-of-principle vision of telemedicine as an archetypical heroic figure that would overcome geographic, time, and economic delivery barriers to health care access in rural and remote areas. In the early 2000's, the narrative began to blend this romantic optimism with more "comic" narratives. Comedy typically conveys a story of rising tensions from missteps between flawed characters of good intention, resolved happily in the end to the satisfaction of all, achieving "integration of elements formerly at odds with themselves and with one another within a higher form of community" (88) (p.176).

The archetypal function of comic narratives involves the creation of a new ideal state through the apprehension and reconciliation of contradictory perspectives that are resolved with a renewed understanding of social unity (88, 127, 210, 211). These diverging perspectives emerge from opposing visions among two main characters: the comic hero and the comic blocking character (127). The comic hero is an ordinary character who sets the settings of the narrative by aspiring to fulfill a desire; the blocking character is typically an authoritative figure who obstructs the comic hero's aspirations (88, 127). The blocking character is not a villain or an antagonist as in a romantic literary sense. Rather its actions are benevolent – like a father to a son – but this character lacks a fundamental understanding due to its traditional routines and practices (127). Even if equipped with good intentions, this type of character blocks the hero's visions and places the initial harmony at risk (127). As comedic plots always resolve with happy endings,

the comic action forestalls the dissolution of the hero's desires by the hand of the obstructing character as the characters come to terms with their divergent visions and the comedic action reaches a point of reconciliation (127, 212).

In telemedicine's comic narratives, telemedicine advocates envisioned telemedicine to revolutionize the health care system by overcoming past insuperable problems of access to care in underserved and remote areas, the introduction of community and home care, improved clinical practice and efficacy, and cost-effective use of health resources. However, the government threatened this desired expectation of change. Both the federal and the provincial government played the role of the blocking character. Governments at both levels took responsibility for shifting telemedicine from pilot programs into coherent evidence-based strategic plans and models, citing the driving rationale as enhancement of the health care system's efficiency. Indeed, the early 2000's narratives of telemedicine map well onto the narrative typology of the "comedy of duty and obligation" (88) (p.190) which demonstrates the primacy of the common good over the interests of a single individual or single group (88).

While the 1990s romantic vision understood telemedicine as locked in a romantic fight against health access problems, with ancillary battles related to economic sustainability, physicians' resistance, and policy roadblocks, the comic narratives of the 2000s portrayed telemedicine's key challenge as negotiating its complex places and functional roles in actual health care delivery systems. To do so, telemedicine stakeholders accommodated and aligned their proof-of-principle visions with health care system's expectations, and adapted telemedicine's role to federal and provincial

governments' priorities, hospitals' and medical health professionals' practices.

Governmental and telemedicine champions' comic narratives both aligned telemedicine visions to health care delivery priorities, and thus, to the need to provide measurable evidence for telemedicine's efficiency and cost-effectiveness in the delivery of care. This alignment however occurred gradually over the 2000s decade. When telemedicine's value was difficult to prove, telemedicine champions still relied on romantic proof of principle narratives to assess and demonstrate telemedicine's benefits to both governmental stakeholders and physicians.

However, telemedicine advocates expressed telemedicine's good intentions to align to the government's rationale trying to reconcile proof of concept visions with the governments' demand for evidence-based evaluations. At the time, government's narratives of telemedicine's performance assessment emerged as part of the growing attention to evidence-based decision-making (213, 214). The early 2000s evidence-based decision-making turn supported the government's rationale for allocating funds to telemedicine projects based on measurable outcomes. While telemedicine champions could not evaluate or compare telemedicine's success due to a lack of evaluation frameworks, they started to define telemedicine as satisfying government's performance demands of efficient and cost-effective health care delivery. To do so, they described telemedicine as enhancing physicians' and nurses' efficiency in delivering health care to underserved patients. Telemedicine would enable physicians and nurses to visit a greater number of patients thanks to the elimination of travel, and by supporting knowledge exchange among physicians and by improving the quality of physicians' consultations.

Additionally, they envisioned telemedicine to be cost-effective as it would have saved the health care system's money, by reducing hospitalization and ER visits rates.

Telemedicine comic narratives conveyed the apprehension of contradictory telemedicine visions among opposing characters as part of the overall process of health care system transformation. As such, clinical, governmental, and commercial stakeholders envisioned telemedicine as part of the development process of the health care system. Yet, they followed a conservative and top-down approach to telemedicine's role and implementation. They conveyed this vision of medical evolution through the combination of genetical and traditional narratives (104, 152). Genetical narratives portray events as unfolding in a natural and inevitable process of improvement or adaptation (152, 215). Such narratives depict telemedicine as part of the inexorable evolution of health care technology. Further, genetical narratives portray telemedicine as building on top of and expanding the current health care system's patterns and practices, adapting to the health care system priorities and enhancing care. These narrative plot structures emphasized telemedicine's different temporal "eras" showing how the change was supported and accomplished before and after technological, funding, and policy milestones. Traditional narratives, on the other hand, emphasize the continuity of fundamentals over time and the reassuring endurance of the most important things despite more superficial change and upheaval. Traditional narratives served to strengthen the genetical narratives' idea of natural change by emphasizing telemedicine's continuity with past-predefined health care delivery models, priorities, patterns, and sources of authority within the health care system. In this way, telemedicine's role in the 2000s was

to situate itself within the existing system and ideally improve the system, but not to revolutionize its institutional structures or goals.

During this decade, stakeholders' visions shaped and consolidated telemedicine as a possible option for the delivery of specialized care, as well as an option to deliver remote emergency care for stroke patients, in particular, in underserved areas. Alongside telestroke, telemedicine advocates envisioned telemedicine applications for specific – but not all – specialties for non-urgent care. Key telemedicine programs spanned from asynchronous store-and-forward diagnostic applications such as teleradiology, teledermatology, and teleophthalmology to synchronous video conferencing applications such as telemental health, as well as for postoperative follow-ups, and telesurgery. Telesurgery distinguished itself from other telemedicine applications as telesurgery visions thrived in the early 2000s. Telemedicine advocates abandoned these visions by the mid-2000s. However, early visions contemplated telesurgery as both a video conferencing session to offer specialized advice and mentoring to remote surgeons in small and community hospitals as well as a remote surgery procedure performed by a surgeon at a distance. Remote surgeons, with the aid of endoscopic cameras directly inserted into the patients' organ and with auxiliary robotic arms controlled at a distance, had the opportunity to perform remote minimal invasive surgeries – such as laparoscopic surgeries, which work through small keyhole incisions to treat a range of health conditions – or by simply visualizing the surgical procedure through the endoscopic camera they would have provided remote expert advice to the performing surgeon.

Over the 2000s decade, telemedicine visions began to expand beyond the rural

and remote specialized care niche to diversify and broaden telemedicine's applications. As the focus of health care planners started to shift from an acute to a disease management based model (214, 216), telemedicine adapted to offer remote monitoring and coaching tools for patients' self-management across the entire province.

The comic, genetical and traditional narrative strategies presented telemedicine visions as achieving common goals valued by all of the health system stakeholders. Telemedicine, as a part of a whole, then became an enabler or catalyst to improve the health care system's accessibility, efficiency, and quality of care. Comic narratives reconciled telemedicine's earlier romantic visions with current clinical practices, models of care, referral, and administrative practices.

Telemedicine hype

In the early 2000s, telemedicine "did still feel like early days" (Participant#14). Telemedicine stakeholders described the beginning of the 2000s as a watershed moment, signing a new telemedicine "era" that would have moved telemedicine on from the "proof-of-principle" stage to the mainstream era. To do so, telemedicine champions adopted narratives of hope to depict telemedicine as an organic and integral part of the health care system's modernization and renovation process. The narrative shift described telemedicine not as an end in itself – that is, as the solution to the health care problems – but rather as one of the tools to incrementally carry out the traditional expectation of health care system transformation, renewal, and progress.

Telemedicine advocates welcomed the Federal government's funding and the information technology (hereafter, IT) technical advancement as crucial for reinvigorating

and strengthening prior romantic visions of telemedicine success. Telemedicine champions, which included mainly hospital managers, telemedicine service providers[1], and commercial telecommunication, software and hardware companies continued to envision telemedicine as romantically vanquishing distance, time, and economic health delivery barriers to solve the access to care problem in remote rural areas becoming a phenomenon of its own (134, 183, 190, 198, 200, 217-225).

The more expansive and effective Internet connectivity coupled with the broadened variety of available peripheral devices – such as video monitors, digital stethoscopes, otoscopes (for patient ear examination), endoscopic equipment (mostly for patient digestive tract or generally internal organ examination), handheld cameras, digital imaging systems, and portable carts – further promoted telemedicine's and video conferencing's successful romantic and organic visions of overcoming distance-related barriers to health access (183, 186, 187, 190, 191, 198, 199, 217, 224-229). Telemedicine service providers also used traditional narrative strategies to depict telemedicine as just being new technology. These narrative strategies served the idea that "new" technology has always been a part of health care and as such telemedicine was simply part of the health care system's natural technological evolution:

> Videocameras, monitors, and remote controls are becoming as much a part of medicine as the stethoscope (224).

The development of the Integrated Services Digital Network (ISDN), the

[1] In 2004, the Ontario's Personal Health Information Protection Act (PHIPA) defined a "Health information network provider" (HINP) as a "Provider to Custodians," which is "a person who provides goods or services for the purpose of enabling a health information custodian to use electronic means to collect, use, modify, disclose, retain or dispose of personal health information shall comply with the prescribed requirements, if any.2004, c. 3, Sched. A, s. 10 (4)."

Asymmetric Digital Subscriber Line (ADSL) broadband communication network (230), the Internet Protocol (IP) and the Voice Over Internet Protocol (VoIP) technology (169) supported telemedicine advocates' expectations for successful telemedicine implementation. The digital Integrated Services Digital Network (ISDN) – a circuit-switched based voice network – allowed the transfer of electronic data over standard telephone copper lines, therefore enabling the transmission of both voice and data. The ADSL enhanced the broadband information networking capabilities with faster connections and greater data transmission capacities. Moreover, finally, the Voice Over Internet Protocol (VoIP), a set of standard rules to first convert and then transfer digital voice and data, transmitted voice and data packages over the digital Internet Protocol (IP) network bypassing the more costly circuit-switched standard telephone networks. This new broadband information networking technology enhanced both the connectivity and data transmission capacity, transferring greater amounts of electronic data in less time. It secured higher image/video transmission quality, enhancing the overall video conferencing experience. As this clinical champion highlights, "conceptually stepping forward to having the technology, the internet connectivity that makes it possible, that was a big thing" (Participant#4).

Telecommunication and IP video software and hardware systems stakeholders shared this view. Commercial companies – such as Mitel, Newbridge Networks, March Networks, Emergis Inc., and Cisco – expressed this renewed hype with romantic and genetical plots legitimizing and promoting the growing broadband infrastructure and IP/VoIP applications' markets (188, 231-233). They evoked space imaginary to highlight

the cutting-edge features of the technology of overcoming great distances:

> Telemedicine, for example, where doctors can collaborate and work remotely through multimedia links. Cisco's IP multicasting technology allows NASA doctors to view medical procedures being performed live by using three-dimensional medical image streams of up to 23 megabits per second that are transferred in real time through a multicast-enabled internet (232).

Genetical narratives remarked the moment of change as vendors tried to appeal and prove Internet's value to the Federal Industry Ministry to continue to invest in broadband infrastructures at a time in which the government's economic support declined (188, 231-233):

> He said the government investment would help March and Mitel create new broadband applications, such as tele-health, for Canadians. Canada is one of the most connected countries in the world. The broadband pipes of the Internet's backbone are in place. The time is now to seize that opportunity (234).

For all the romantic and genetical visions they had, they also viewed telemedicine as tragically destined to fail or to ironically experience very slow growth, as "people believe hospitals are much further ahead than they actually are" (235). Commercial stakeholders viewed health care planners and professionals to be the real barrier to telemedicine uptake, a field "hard to penetrate" (191, 235, 236).

The beginning of the 2000s decade marked a shift in telemedicine stakeholders' expectation narratives. This narrative shift positioned telemedicine within the traditional ideal of health care modernization and renewal. To do so, telemedicine advocates depicted telemedicine as a natural – thus, suitable and valuable – part of the health care system's technological progress. These narratives anchored telemedicine within traditional imageries belonging to the health care system, therefore something that

couldn't have been dismissed nor ignored, especially by health care stakeholders. Hence, this type of narratives aimed at mobilizing support from governmental stakeholders by appealing to the health care's traditional imagery of progress, and thus to the health care administrators and decision-makers voice that at that moment was still not clearly positioned within the telemedicine narrative scenario.

Telemedicine extending and enhancing care

Building upon earlier telemedicine visions, Health Canada, Canada Health Infoway, Ontario's Ministry of Health and Long-Term Care (hereafter, MOHLTC), and the Local Health Integration Networks (hereafter, LHINs) all clearly envisioned and expanded telemedicine within their policy agendas (221, 224, 237-240).

In 2000, Health Canada, in agreement with the provincial and territorial governments, launched the Canada Health Infostructure Partnerships Program (hereafter, CHIPP), a two-year, $80 million "incentive program, aimed at supporting collaboration, innovation, and renewal in health care delivery through the use of information and communication technologies" (220). The CHIPP grant represented a milestone in providing the economic "impetus" to the telemedicine pilot project stage (Participant#8). Around the same time, the 2000 and 2003 First Ministers' Accord on Health Care Renewal committed to the development of an electronic network to exchange health information (216, 241, 242). The 2000 First Ministers' agreements led to the creation of Canada Health Infoway (hereafter, Infoway), a federally funded not-for-profit organization with the mandate to help accelerate the adoption of modern information technologies to provide better health care (242). Infoway embodied Canada's

intergovernmental vision and commitment to advance standard IT infrastructures and electronic protocols across Canada, including both electronic health records and telemedicine (242).

In 2003, at the end of the federal government's CHIPP funds, both MOHLTC and Infoway stepped in the telemedicine space by providing economic support to the newly established telemedicine network providers (224). Infoway and MOHLTC were both interested in merging the regional telemedicine network provider organizations into a single provincial organization. Independently, the telemedicine networks had developed different telemedicine clinical programs, consultation procedures, and scheduling standards from one another. Regional telemedicine networks envisioned telemedicine applications and management strategies based on different goals, that is, telemedicine for specialized clinical services in rural and remote areas, or telemedicine for physicians' capacity-building and continuing medical education at a distance, or both.

At the time, telemedicine service providers viewed the ministry as a blocking character. In comic literature, these blocking characters temporarily lack a fundamental apprehension that risks placing harmony at risk (127). The government played the role of the "boastful or ferocious rival" (127), as telemedicine service providers viewed the integration of the three legacy networks with concern:

> So, the province said "enough is enough, you guys have no, you're not gonna settle this amongst yourselves, you have to become one organization, you have one year to do it. Go." […] And that was, it was a big deal, and we had to integrate 3 different organizations, 3 levels of technology, there was a lot of duplicate people (Participant#14).

Whereas telemedicine service providers had depicted telemedicine as a

revolutionary technology solving the most intractable problems of the health care system, the MOHLTC viewed telemedicine as a "stand-alone" program, "almost like a curiosity" (Participant#8), that is, something odd, uncertain, and separated from the health care system. Governmental executives viewed the technology's novelty with skepticism addressing telemedicine as a marginal item in the governmental agenda: "It was hard to kind of get the, the kind of executive sponsorship of this as a, as a priority" (Participant#8). A comic misstep in telemedicine advocates' comedic narratives, this misalignment of visions threatened telemedicine's future agenda. With this misalignment, telemedicine champions' visions would have lost momentum and the capacity to attract approval and mobilize resources that would have supported their idea of telemedicine.

The tensions among the comic characters resolved in a happy ending. Infoway, MOHLTC, and local telemedicine networks worked together to create a single telemedicine organization for telemedicine's integration in the health care system. In 2006 the three existing telemedicine networks (NORTH Network, VideoCare, and CareConnect) merged and launched the provincial Ontario Telemedicine Network (OTN) (221, 243, 244).

After the integration of the networks, Infoway and MOHLTC provided continuous operating funds to OTN (221, 244, 245). Infoway operated through a gated funding model, that is, providing project funding to the jurisdictional partners only when agreed-upon targets were met (246). The MOHLTC did not insure telemedicine under the Ontario Health Insurance Plan. Rather, the government funded OTN through a global budget fund under the provincial telemedicine program. Since the integration, OTN

expanded across the province and adopted a membership and subscription-based business model to create an additional source of revenue for the organization (198, 245, 247, 248). Moreover, OTN adopted the membership and subscriptions based business model as an institutional arrangement to ensure the standardization of technical, business, and privacy practices within the provincial network (249). This business model facilitated collaboration among telemedicine end-users, including physicians, nurses, hospitals, and LHIN accountable organizations (such as Community Care Access Centres and mental health organizations) (198, 249).

Telemedicine service providers (after 2006, all a part of the Ontario Telemedicine Network) and governmental stakeholders viewed the merger as an opportunity to solve the lack of physicians' remuneration policies for telemedicine services. Before the integration of the three legacy networks, telemedicine service providers tried to define how to pay doctors as they viewed the lack of a physician reimbursement model as a shortcoming seriously compromising telemedicine adoption within the health care system:

> People [physicians] would volunteer but you get kind of tired of that after a while. You're working, you're seeing patients, people need to be paid, so I [telemedicine service provider] kind of snuck that into the budget, made it unobvious, because nobody wants to pay doctors (Participant#17).

Traditional in-person fee-for-service schemes for telemedicine consultations dramatically inhibited physicians' adoption; it represented a "financial disincentive" to virtual clinical encounters (Participant#3). Rather, telemedicine service providers suggested capitation or salary-based remuneration policies for all physicians. They

advocated for "a huge re-think" around physician remuneration models to promote telemedicine adoption and use in the clinical setting (Participant#3). However, the professional body traditionally responsible for negotiating physician remuneration fees with the government, the Ontario Medical Association (OMA), did not advocate for telemedicine reimbursement schemes in its negotiations with the government. As telemedicine remained an uninsured service, the OMA did not "worry" about remuneration fees for telemedicine practices (Participant#3). Pushing for remuneration schemes suitable for telemedicine services would have questioned and threatened to change the overall established remuneration mechanisms.

Even though telemedicine service providers' desire to reform traditional physicians' remuneration models remained unattended by the Ontario medical professional organization agenda as well as by the 2007 the College of Physicians and Surgeons of Ontario newly drafted telemedicine policy, both the government and telemedicine service provider stakeholders agreed upon a point of resolution to facilitate telemedicine's adoption. In 2008, the government supported the introduction of OHIP telemedicine billing fee codes, however, continuing to maintain telemedicine an uninsured service. The telemedicine billing codes were an administrative change to facilitate the billing process for doctors (247). These billing fee codes enabled telemedicine physicians, registered as OTN members, to directly bill OHIP and thus to adopt telemedicine in their practices (142):

> The new common administrative approach is fair and encourages the use of telemedicine across Ontario (142).

Seen through the lens of literary theory, these stakeholders' narratives conveyed

such resolution in a comedic form. Although the MOHLTC continued to be rooted in its institutionalized routines preventing telemedicine from becoming an insured service, it finally restored harmony with the telemedicine service providers by agreeing to include telemedicine bill codes into the OHIP billing system (245, 247). Doctors were now able to submit telemedicine OHIP bills as other insured medical services facilitating telemedicine's adoption in the clinical workflow.

During the 2000s decade, the economic incentives offered by the CHIPP funds, together with the subsequent MOHLTC's and Infoway support, promoted a progressive alignment of telemedicine visions that nurtured telemedicine clinical champions' mainstream expectations. In light of the networks' merger, the growing partnership with the MOHLTC encouraged telemedicine champions to consider and explore in more detail the technology's role in the overall health care system. They started to align their visions and objectives to evaluating telemedicine's capacity to deliver efficient and cost-effective care. Since the 1990s, telemedicine champions tried to provide clinical, technical, and cost-effective evidence of their telemedicine plans. One of the first feasibility studies, drafted by Ed Brown, founder of one of the legacy telemedicine networks and CEO of OTN, in the mid-1990s, tried to assess Northern and rural needs addressing "issues of access and health professional shortages" to identify the potential role of telemedicine (Participant#17) (250). This study identified telemedicine as a possible solution to alleviate the provincial travel subsidies (203). Additionally, clinical champions also conducted patient satisfaction surveys to assess patients' acceptance, which showed "over 90% satisfaction, suggesting that the video conferencing was as good, if not better than

face-to-face assessments" (Participant#3).

Whereas in the 1990s telemedicine champions romantically demonstrated telemedicine's potential role as a proof of concept proving telemedicine's feasibility and success in principle without providing clear standards for evaluation nor measurable outcomes, in the 2000s they faced the need to provide evidence of "technologies' specifications, such as its principal end-users, its cost-effectiveness, clinical safety, and technical feasibility" (Participant#14). The government, playing the part of the comic skeptical blocking character, intervened to inhibit telemedicine's romantic proof-of-principle visions (88, 127):

> So, yeah the government really started to fetishize measurements […]. They started to measure things like wait times, and that really did crystallize a lot of our rationales, too, right? (Participant#14).

Telemedicine champions began to align their rationales to the MOHLTC's requests for evidenced-based outcomes (218). Telemedicine advocates recounted in a *quasi*-tragical way how providing evidence and best practices for telemedicine proved to be more challenging than expected, "those were tough questions to answer" (Participant#13). The lack of established evidence and evaluative standards represented a barrier for telemedicine's assessment, "given that there really hasn't been as much in terms a blueprint somewhere else to compare and contrast" (Participant#13). In fact, in 2005, Health Canada published the CHIPP Evaluation Report which officially acknowledged these evaluation barriers, identifying the need for further research (251).

Even though challenging, telemedicine champions viewed technology's cost and efficiency evaluation as part of their overall telemedicine vision. As opposed to the earlier

romantic telemedicine era, MOHLTC's provincial, regional, and local administrative stakeholders together with telemedicine champions shifted narratives. They did not portray the technology and its power as a "hero" vanquishing obstacles nor substituting current health care services, practices or touch. Rather they comically envisioned telemedicine as an integrated health care tool aimed at "supporting," "extending," and "enhancing" the health care system's "caring capacity", that is, the accessibility, quality, and efficiency of care (Participant#13) (134, 169, 191, 198, 228, 251, 252):

> It's meant to enhance care. It certainly doesn't mean patients will never see anyone again. We're never going to replace that human touch (169).

These narratives described telemedicine as naturally becoming an "enabler," a "catalyst" tool to organically and seamlessly improve the health care system's performance (Participant#5, #7) (169, 183, 186, 244, 251). Focusing on telemedicine's electronic connectivity and health information exchange, these stakeholders envisioned telemedicine as supporting specialists', rural physicians', and nurses' capacity building to deliver better, more efficient health care services along the continuum of care (135, 183, 186, 187, 224, 228, 240, 245, 252, 253).

The increased connectivity and cooperation enhanced specialists', rural physicians' and nurses' health care delivery efficiency in three ways. First, by redirecting specialists' time from travelling to direct patient care increasing the number of specialized visits through video conferencing and thus increasing access to care in rural and remote areas (221, 224, 228, 254):

> So, giving a way to, for specialists to, you know, triple their effectiveness by just, you know, "next, next, next," and the pictures go

> past, much like a, a radiologist does, and, and opening up resources like that (Participant#14).

Second, by redirecting nurses' travelling time from home-visits to remote monitoring of patients' vital signs from a clinical site or video conferencing for wound care, therefore increasing the number of monitored patients per nurse (228, 240, 253). Third, by providing professional support to remote physicians and nurse practitioners for appropriate diagnosis – that is, providing more accurate and reliable assessments and expert opinions for timely interventions and treatments, as well as support to isolated health care professionals and their retention in rural areas (183, 186, 187, 198, 217, 228, 255-258). Among the improved service, telemedicine champions highlighted the convenience of providing timely access to expert advice as reducing "door to needle time" for emergency stroke patients in the acute care settings (186, 217, 256, 257).

Improved cooperation and coordination of care meant increased access to health care services. Telemedicine enabled a different host of health care professionals and not only specialists to provide medical care or remote monitoring – such as registered nurses, nurse practitioners, or other allied health professionals – expanding patients' and providers' access points that both had access to.

The difficulties of proving telemedicine's value for money and role as a tool to deliver health care services still inspired telemedicine champions to envision romantic proof of concept narratives. By increasing providers' health delivery efficiency – that is, enabling them to provide more services in the same amount of time – telemedicine not only solved the access to health problem but it also improved the quality of care redirecting specialists' and nurses time into direct patient care. Direct video conferencing

between patient and specialist enhanced communication and as such the overall care experience, endorsing video conferencing as Ontario's main telemedicine technology. Telemedicine was celebrated as a hero by virtue of its exceptional aspirations and promise of change. Telemedicine advocates viewed telemedicine as providing higher quality of care compared to traditional in-person appointment as it enabled patients to spend "more quality one-on-one time with the doctor" (15, 31). Patients' satisfaction measures still inspired proof-of-concept visions. Patients "felt" like receiving "special attention" (31) and more comfortable access from their community or home, avoiding long and expensive travels (15, 17, 19, 24, 30, 31, 33-35).

In light of their need to prove telemedicine's efficiency and cost-effective value, telemedicine champions and government stakeholders alike envisioned telemedicine as solving current health care delivery problems, such as health care professionals' shortages, overcrowded emergency rooms, and high hospitalization rates.

In 2001, MOHLTC launched the Telehealth Ontario phone teletriage project to save money by minimizing the use of emergency room services (259). Following through the hospital rationalization reform initiated in the 1990s and the earlier telemedicine visions (260, 261), MOHLTC envisioned this teletriage telephone "dial-a-nurse service" (262, 263) as aimed at "simply to assist people with making the choices about what service would be most appropriate. They [the nurses] are not there to make a diagnosis" (259, 264). Provincial government stakeholders, within the MOHLTC and the parliament, romantically envisioned this teletriage service as a hero solving the health care system problems:

> "Rather than going direct to (the emergency room) they can describe the symptoms to a nurse. Basically they (the nurses) will be performing a triage service," Clement [Health Minister] said. "We are trying to better manage the demands on the system. We want to give the right patients the access to the right care, so clearly if something can be handled without going into emerg that's a benefit for everybody" (263).

In these romantic visions, telemedicine eased the pressure on the overcrowding of emergency rooms reducing waiting times and providing 24/7 access to health care advice regardless of geographic and time barriers (169, 259, 263, 265, 266). For provincial governmental stakeholders, Telehealth Ontario was a means to respond to the primary care reform demands of continuity of care and improved access to care (169, 265, 266). Moreover, Telehealth Ontario answered to the shortage of health care professionals as well as a means to provide new job opportunities for nurses after the health care spending containment policies implemented due to the fiscal constraints of the 1990s (267-269). However, Telehealth Ontario faced criticism from patients, doctors, and academics alike warning that "telephone medicine is no substitute for examining your patient" (270). Academics did not see telemedicine as a cost-effective solution, but rather as a costly new service that would not address patients' needs (270).

However, both telemedicine service providers and governmental stakeholders formulated these telemedicine visions as part of the ongoing health system reforms of the early 2000s (214, 216). These visions depicted telemedicine as a natural and integral part of the health care system's renovation and transformative process, tying telemedicine within the encompassing belief of health care progress and modernization. Telemedicine did not resolve the health system burdens by revolutionizing the health care delivery system alone. Instead telemedicine supported the existing and newly reformed health care

delivery models placing telemedicine within the overall wave of primary care reforms launched by the 2003 intergovernmental Health Accords and the 2004 10-Year Plan to Strengthen Health Care (214, 216). Telemedicine had the potential to solve health care providers' shortages problem by coordinating access to specialized care in rural areas and by connecting Family Health Team professionals and allied health care professionals in the community (221, 239, 245, 255, 258, 265, 271, 272):

> Family Health Teams (FHTs) bring professionals together to organize care in new ways and to complement each others' skills. The Ontario Telemedicine Network is helping to take that care one step further by introducing telemedicine to FHTs and their care delivery partners. Together, they will create local and regional "webs of care," enabled by telemedicine (245).

Hospital managers, together with telemedicine service providers, welcomed and fostered these visions of "electronic partnerships" for better coordination of care and knowledge sharing as part of the visionary framework of efficient and cost-effective care (183, 191, 218, 221, 224, 228, 258, 273). These "webs of care" would have reduced emergency room visits and hospitalization rates, preventing patients' transfer from community to hospital settings, pre-emptively limiting to "repatriate" patients to their local communities or homes (Participant#13) (243, 274-276).

Coordinating care and providing support to health care professionals increased access and improved quality of care, but also saved the health care system's money (187, 198, 217, 225). As the MOHLTC demanded evidence for telemedicine's value for money (218, 277, 278), telemedicine advocates' focused on telemedicine's integrated role in reducing health care expenditures and overcoming the system's scarcity of health resources. To do so, telemedicine advocates depicted telemedicine as improving system

efficiencies, reducing hospitalization rates and "freeing up valuable hospital resources" (225). Remote video conferencing consultations and telephone teletriage services kept patients in their homes and in their communities rather than "having everyone with a health problem flocking to expensive, crowded hospitals" (279). Yet, telemedicine's cost-effectiveness promise was not corroborated by any clear measure and outcome. At the time, proving telemedicine's cost-effectiveness resulted difficult for telemedicine advocates, which adopted romantic proof of concept narratives again. However, even these romantic telemedicine visions slowly switched to comic and reconciliatory narratives over time. Telemedicine entrepreneurs' comic narratives conveyed a version of telemedicine that had to be proved valuable in the health care system by "paying its own way" (Participant#14), rather than just showing telemedicine as an abstract idea worth pursuing.

Comic and genetical narratives provided a sense of succession of formal agreements through which expectations moved in such a way as to suggest telemedicine's relationship with the larger health system. The comic and genetical narratives shifted telemedicine visions from eliminating barriers to access to visions empowering health care providers through the technology's connectivity. This type of vision focused on clinical professional's empowerment encouraged collaboration, skills sharing, and care coordination for better quality, accessibility, and efficiency of health care delivery. In pure comic style, the government's evidence-based approach to health services evaluation threatened to put telemedicine's future at risk by questioning telemedicine champions' proof-of-principle visions of the 1990s. However, a comic twist in the plot forestalled the

risk of telemedicine's tragic disgrace leading instead to a comedic happy ending. Rather than substituting or elevating telemedicine above traditional clinical practices as in romantic literary narratives, telemedicine's connecting capacity rendered telemedicine as an integrated part of the health care system in the form of an "enabler" that improved the efficiency, accessibility, and quality of the existing health care resources. Finally, genetical narratives defined telemedicine as construed within a process of dynamic evolvement and natural change. This narrative strategy acknowledged past proof-of-principle visions by bestowing on it a new future defined by shared purposes and common goals. As such telemedicine advocates' visions depicted telemedicine as naturally adapting to the health care system's priorities, thus, conferring telemedicine visions a new future in a framework of temporal change.

Telemedicine anywhere in the system

Advocates' veered towards comic narratives when proving telemedicine's value to MOHLTC, reconciling parts of telemedicine's visions that were at odds with the health care system priorities. To prove telemedicine's value to physicians, however, telemedicine advocates adopted both romantic-futuristic and paradoxically opposing traditional narratives to convey telemedicine's potential to empower physicians' outreach throughout the province from any location.

In the early 2000s, telemedicine champions, which included hospital managers, telemedicine service providers, and commercial telecommunication, software and hardware companies, continued to romantically envision telemedicine as a technological breakthrough to improve and ease physicians' clinical practices. By these romantic

accounts, telemedicine solved physicians' travelling problem enabling them to practice from their office and from their home. It also alleviated rural physicians' feelings of isolation as telemedicine allowed them to have access to capacity building tools and expert opinions. Finally, telemedicine empowered specialists and primary care physicians to share knowledge and best practices. Accordingly, telemedicine granted physicians with additional expertise that enhanced the appropriate assessment and course of action.

These telemedicine advocates romantically envisioned telemedicine as a tool to provide care "anywhere" overcoming space and time barriers (224). They envisioned the new broadband connections and Internet Protocol (IP) technologies as a catalyst that would have transformed what telemedicine champions envisioned as the "pre-internet" (Participant#13) complicated and bulky hardwired telemedicine into a virtual human teleportation technology through the simple merger of "the power of information technology with health care delivery" (238, 280). Telemedicine advocates' epic narratives described telemedicine as a channel to electronically transport urban health care specialists – and not only their expertise – to remote clinical sites. Not only did telemedicine substitute old roads reaching remote places, but it also embodied futuristic human teleportation. Telemedicine clinical champions, such as neurology specialists, and early telemedicine service provider champions, such as NORTH Network, Eastern Ontario Telemedicine Network (EOTN, CareConnect in 2003) and VideoCare Network, romantically viewed telemedicine as obliterating space and time by "electronically" or "virtually" transporting or "beaming" "cyber-specialists" in distant locations (183, 190, 217, 219, 277):

> Just like a scene from "Star Trek," Sudbury physicians will soon be "beamed" to distant cities in Northern Ontario to provide medical care (190).

These narratives emphasized the romantic and forward-looking aspects of the technology, envisioning telemedicine as a revolutionary way to overcome distance and time barriers to improve remote access to care and bring patients and health care providers "closer together" (183, 190, 217, 219, 277). Telemedicine service providers, clinical champions, and rural patients praised telemedicine as offering direct interaction with the specialist via video and audio devices (screens, cameras, and microphones mounted on portable carts linked between two sites), being "able to see and hear each other in 'real time'" (228). Telemedicine consultations provided better care than in-person encounters, bringing patients and providers virtually face-to-face (8, 24, 28, 31, 32):

> Using sophisticated two-way video conferencing equipment, the neurologist reviews the brain scans taken of the patient lying on a hospital bed 400 kilometres away. He asks the man to hold up his arm and to move his eyes from side to side; he talks to the patient's family members and then discusses offline with the emergency doctor how best to proceed (8).

This narrative highlighted the romantic power of technology of overcoming great, almost impossible distances, "400 kilometres away", through the use of "sophisticated" special equipment, and at the same time emphasizing the natural interaction between patient and provider who were able to talk and see each other (183, 186, 190, 223, 224, 228). These narratives also conveyed telemedicine's visions to deliver health care services anywhere, and more specifically, anywhere for physicians and anywhere on the network.

While telemedicine's entrepreneurs generally promoted telemedicine as a

breakthrough technology that would revolutionize the health care system, paradoxically they had to take nearly the opposite narrative strategy to convince physicians to practice telemedicine. For clinicians, the telemedicine narrative focussed on familiar features and analogies to established conventions of care. Telemedicine advocates envisioned a telemedicine session as familiar and took pains to make the advanced technology approachable rather than intimidating: "much like a regular check-up" (24) or "a bit like a digital doctor's appointment" (28). Mystical imaginaries from a distant past evoked this idea of continuity, defining telemedicine as a "kind of a miracle for a lot of patients" (Participant#17). Together with yet tempering futuristic and science-fiction narratives, this traditional emplotment strategy demonstrated telemedicine's continuity with the past. Telemedicine champions stressed this idea of continuity with past conventional practices recalling patient-provider direct interaction through other past legendary and mythical technologies, describing telemedicine as being "as old as the telephone" (36) or evoking other legendary imaginaries:

> Through the magic of television, patients and caregivers in any community can meet face-to-face with specialists anywhere on the network (16).

Health care providers' adoption was still an obstacle for telemedicine implementation as they were uncomfortable using the new technology. Advocates had to focus on how they were going to "make it easy for the providers to use, and if we get them adopting it, then they'll start, you know, making it available to more patients" (Participant#11).

In 2007 the College of Physicians and Surgeons of Ontario in collaboration with

the MOHLTC, OTN, and the Ontario Hospital Association, drafted the first working policy on telemedicine practice for physicians in Ontario. This policy (281) represented a milestone by providing general guidance and a framework for the regulation of telemedicine practices in Ontario. The newly drafted policy reflected the plurality of narratives voiced by the different telemedicine stakeholders to address different concerns. The policy presented romantic, traditional and genetical narratives when addressing physicians' telemedicine adoption, and comic narrative strategies when telemedicine's adoption revealed the tensions – and final reconciliation – between visions of a cutting-edge health care system and the health care system's resistance to change.

The policy romantically portrayed telemedicine's potential key role in improving access to care in rural areas, overlaid with a genetical narrative that recognized it as part of the health care system's natural evolutionary process of change, providing "endless opportunities for developing new approaches to the delivery of health services" (281). These "new approaches" would have benefited both the health care system as well as the physicians (281). It also used a comic narrative strategy to balance the tensions between its potentiality for health care delivery improvement and the need to respect traditional practice expectations (281):

> Telemedicine provides physicians with another means to interact with patients but it does not modify any of the practice expectations that apply to a physician-patient relationship (281).

The comic style highlighted the discrepancies between telemedicine's romantic quest to revolutionize health care delivery and the traditional fixed medical norms and practices that needed to be preserved. Drawing also on a traditional narrative style, the

policy conservatively envisioned telemedicine's adoption, upholding and stressing the validity of traditional clinical practice standards, technology quality requirements, and physician-patient relationship and confidentiality practices:

> Telemedicine provides physicians with another means to interact with patients but it does not modify any of the practice expectations that apply to a physician-patient relationship. This means the College expects physicians practicing telemedicine to:
>
> - Be in accord with established clinical practice standards;
> - Use technology that is of sufficient quality to enable the physician to provide quality care; and
> - Ensure that patient information remains confidential (for example, ensure the locations of the physician and patient are secure, and the lines of communication are protected from interference) (281).

Traditional licensure and liability regulations applied to physicians practicing telemedicine in Ontario (281). The policy also defined physicians' responsibilities of informing patients when practicing outside of the province. In such cases, the physicians had to comply with licensing requirements of the province/territory/country in which they were providing medical services, and the college reaffirmed its jurisdiction over its member physicians in reviewing complaints or concerns in other jurisdictions (281). Finally, to guarantee the quality of care and patients' health information privacy and confidentiality, the College of Physicians and Surgeons' policy recognized OTN's accredited sites as secure sites for telemedicine consultations (281). Comic and traditional narratives highlighted the need to reconcile telemedicine mythical desires of health care improvement and the need to preserve predetermined traditional medical and liability rules and routines within a temporal framework of continuity with past.

Telemedicine service providers discovered that change management was "a lot more than putting the technology in [the clinical practice]" (274). These stakeholders viewed physicians' skepticism to telemedicine adoption as a misstep in a comedy of tangled agendas, however, destined to successfully unravel and resolve with physicians' adoption of telemedicine. Specialists' and primary care physicians' reluctant adoption of new procedures continued to represent a barrier to telemedicine implementation. First, telemedicine's capacity of overcoming distance barriers overrode their traditional referral patterns. Northern specialists complained about southern specialized physicians consulting with patients in the north. They complained about the loss of patients due to telemedicine's connecting capacity to override traditional referral patterns. Following these complaints, telemedicine sessions respected and mirrored the existing referral system by connecting northern patients to northern specialists instead of southern. Second, telemedicine clinical champions believed that the computerization of scheduling systems, in particular, would have substantially operationalized and standardized telemedicine practices, thus, facilitating physicians' adoption. The scheduling software followed the real-life in-person scheduling system, just as the video interface resembled the face-to-face clinical consultation.

In light of physicians' enduring skepticism, telemedicine advocates continued to adopt traditional narrative strategies. Traditional narratives depicted telemedicine as a superficial alteration of dominant clinical practices, the essence of which was not affected by the contingency of the changes brought by telemedicine. To do so, telemedicine champions portrayed video consultations to be user-friendly and easy for health care

providers to integrate into their practice. Ease of use represented telemedicine's flexibility and ability to adapt to the existing clinical workflows, scheduling systems, and referral patterns and to overcome physicians' resistance to telemedicine adoption. Adapting to specialists' workflow meant not disrupting their work providing the option of using room-based, portable cart-based, or home-based laptop applications (186, 191, 217, 228, 229). In this way, telemedicine enabled specialists to practice from within and from beyond hospitals' walls:

> Whether the consulting doctor is at home or work, sophisticated computer software will allow the specialist to simply switch on a laptop computer and read the patient's CT scans (217).

Mobile pole-based video conferencing carts, such as the Dynamates® and iDocs® units, represented telemedicine's flexible and ubiquitous use in the hospital setting as it was "smaller and more maneuverable" than room-based equipment (186, 191, 217, 228, 229). Portable carts replicated room-based technical and security features securing "excellent telepresence" during the telemedicine session (186). These mobile carts resembled the original fixed room-based system with a camera mounted on top of a monitor, which was mounted on top of a mobile cart equipped "with electronic/digital stethoscopes, otoscopes, handheld patient exam cameras and document cameras" (229). Finally, even though home laptop computers and internet connectivity were still uncommon and expensive, specialists installed telemedicine equipment in their offices (217).

Province-wide, real-time access to specialists was still defined by the technological network's infrastructure. As the connectivity technology upgraded, privacy

and security concerns regarding real-time, synchronous video conferencing sessions as well as asynchronous, store-and-forward digital diagnostic data transmissions grew stronger among telemedicine champions, professional organizations, and governmental stakeholders alike (3). The College of Physicians and Surgeons of Ontario, in 2007, emphasized the confidentiality aspect of the clinical encounter suggesting to "ensure the locations of the physician and patient are secure, and the lines of communication are protected from interference" (281).

To guard against external intrusions and other risks, hospital management, telemedicine service providers, and provincial health ministry officials collaborated to connect telemedicine transmissions within an enclosed Virtual Private Network (VPN). Telemedicine service providers, guided by telemedicine clinical advocates, pushed the government to extend its new network infrastructure services of its Smart Systems for Health Agency (SSHA) to telemedicine networking and data transmission services. SSHA provided private bandwidth to all hospital sites, enabling the transmission of health information over an enclosed VPN network rather than over the public internet network (183). Additionally, in 2004, the government designed the Personal Health Information Protection Act (PHIPA) rules to "protect the confidentiality of, and the privacy of individuals with respect to, that personal health information" (6). In this way, PHIPA regulations provided a general regulatory framework – put in place for electronic health records (EHRs) rather than telemedicine – for the exchange of health-related information over the broadband telecommunication network. The advancement of the internet protocol technology's capabilities coupled with the government's SSHA network

infrastructure and PHIPA policy secured the privacy of the data transmitted over the network (7, 8):

> CareConnect partner hospitals are connected by a broadband wide area network managed by the SSHA— an Ontario Ministry of Health and Long-Term Care initiative. This network is a private and secure infrastructure network that creates a managed VPN (Virtual Private Network) between any of the hospital endpoints. All CareConnect sites are also protected against inter-hospital intrusion while allowing high quality video connections (9).

As the passage above illustrates, telemedicine service providers turned once again to traditional narrative strategies to depict visions concerning telemedicine privacy and security issues within the network. These narrative strategies appealed to the long-standing authority of the MOHLTC – and its arm length infrastructures and promulgated policies – to ensure the privacy and security of telemedicine services. As a result, telemedicine service providers and governmental stakeholders envisioned telemedicine as mapping on the established health care delivery infrastructure of hospital and clinical sites.

The telemedicine network ensured privacy and security of telemedicine consultations as telemedicine end-users practiced telemedicine services within the traditional health infrastructures and through dedicated medical grade applications. Physicians accessed the telemedicine network through specific software programs installed on computers – computers located at the hospital, clinic, or in the physician's office or home. Security at the access point – that is, the desktop or laptop computer – was ensured by a dedicated software installed on the computer device that enabled access and transmission of data over the network. Whereas physicians were able to practice

telemedicine from hospitals, or their desktop computer in their offices or homes, patients had the only option to access telemedicine services from dedicated clinical and hospital sites, unless they were eligible for the telehomecare remote monitoring programs (191, 234, 276). Eligible patients would have direct access to the remote monitoring equipment which would be delivered in their homes (234, 240). This equipment consisted of a set of peripherals used to monitor a person's weight, heart rate and blood pressure, a digital camera connected to a television set-top box linked to the internet (240). In the late 2000s, telehomecare programs substituted the camera and television set-top box with commercial wireless touchscreen tablet technology. The telemonitoring equipment allowed patients to collect their vital signs and health information through the peripherals and to transmit it to the nurse over the internet, with or without direct instructions from the nurse over the video (240). On the nurse side, nurses accessed the patients' health data through a web-based application interfaced with a web server located in the network where data sent from the patients was automatically stored. The web application enabled nurses to monitor patients' health conditions from any location as the patient transmitted the data "from the comfort of his favourite armchair" (234).

As telemedicine moved into the community and the patients' homes, the "telemedicine universe" (Participant#14) began to expand and include a greater number of applications, from video conferencing to telehomecare, and emergency applications. Governmental stakeholders, telemedicine champions, hospital managers, and commercial hardware and IP system software vendors viewed telemedicine as expanding beyond rural access to specialized care and into primary care, community, home, and long-term care

delivery. On the one hand, telehomecare represented an important telemedicine component of "bringing care closer to home" (224, 276), concurrently promoting asynchronous store-and-forward applications such as the March Network's "Health Monitoring Kit" for diabetes control (240). On the other hand, telehomecare embodied visions of direct patient/consumer health care delivery (217, 224).

In these visions, telemedicine introduced new categories of efficiency beyond spatial location or temporal redistribution of resources. This marked a significant turn in telemedicine narratives from romantic triumphing over distances no one else had conquered to the comic resolution of different tangled agendas. The comic resolution envisioned telemedicine as a tool for care coordination accommodating the health care system's need for efficiency. In particular, telemedicine would provide a solution for the so-called "frequent-flier" patients, that is, patients that represented the "top 1 or 2% of the population who, in Canada…accounts for about 80 to 85% of all of the costs of health care system" (Participant #10). During the second half of the 2000s and in particular in the following telemedicine "era," telehomecare enabled these "frequent-flier" patients and health care professionals to become "partners" in care (276). Telehomecare promised a means to support patients with chronic conditions self-management in their homes and prevent patients from visiting emergency rooms and freeing up hospital beds (276). This vision of telemedicine-based home care would grow after the 2010s when the digital consumer movement began to define a new telemedicine paradigm of virtual care. For now, telehomecare responded to the gradual transformation of the health care delivery model transitioning from acute care interventions to chronic care management services.

Conclusion

During the second telemedicine "era" which lasted from the year 2001 to the year 2008, telemedicine expectations shifted from a romantic narrative that telemedicine would solve health care's most vexing, sweeping problems to a comedic narrative that focused on the more granular tensions, missteps, and resolutions as telemedicine's advocates implemented actual telemedicine services.

Early romantic visions were recognized as "mythical" in ambition, as federal government, Infoway, and MOHLTC demanded more informed and measurable evidence of telemedicine's efficiency and cost-effectiveness. These stakeholders appealed to telemedicine advocates' traditional sense of duty to federal and provincial governments to use evidence-based information and improve measurable outcomes. Evidence-based decisions would have proved the value of the governments' investments in telemedicine, as these stakeholders envisioned telemedicine not only as a clinical tool for specialized health care delivery in remote and rural areas but also as a tool for care coordination and resources redistribution in the continuum of care. On the other hand, telemedicine advocates, such as telemedicine service providers and telemedicine clinical champions, viewed governments' intervention as lacking a fundamental understanding of telemedicine's value as a channel to overcome geographic distances and provide access to specialized care in remote areas. They viewed the governments' request as a threat to telemedicine's aspiration to become a mainstream service as proving telemedicine's value for money resulted difficult to accomplish in such early days.

However, the shift from a romantic to an overall comic telemedicine "era"

reasserted telemedicine's contradictory visions revealing the opportunity to mutually accommodate diverging expectations – that is, by negotiating telemedicine's role according to the principles and ideas that governed the health care system and not the forward-looking telemedicine clinical champions or service providers – and thus to restore harmony among the diverging parts. The common underlying idea that telemedicine enhanced the health care system's "caring capacity" was pivotal to the narrative shift. The archetypal function of comedy is to convey not the world of "mythical" desires, but the "genuine form of the world that human life tries to imitate" (127). To do so, during the 2000s, comic narratives sublimed earlier grand romantic telemedicine expectations into more realistic and pragmatic visions. In comic narratives, each story revealed the frictions among diverging expectations as inherent in telemedicine's aspiration to become a mainstream service. Yet, each resolution confirmed that the established order naturally conformed to existing health care priorities and thus was secured. Genetical plots helped comedic narratives to convey telemedicine missteps, not as defeated aspirations, rather as part of a natural evolutionary process, which acknowledged different expectations within an embracing perspective of temporal change.

Genetical and comic narratives together conveyed how telemedicine stakeholders' comic missteps added up to a drama of reconciliation, finally revealing the common purpose shared among health care and governmental stakeholders. As such, telemedicine champions began to combine the original idea of providing specialized access to care in remote and underserviced areas with the governments' idea of telemedicine designed to

enhance the efficiency and cost-effectiveness of the available health care resources. In these visions, telemedicine played a supportive part, "enhancing" and "extending" the existing health care delivery system. As a means to expand care, telemedicine connected specialized physicians with community care physicians and enabled the integration of home care with primary care. Telemedicine supported specialists, rural and community physicians and nurses to improve accessibility, quality, and efficiency of care and thus to meet health care system's priorities and needs.

As telemedicine champions still viewed physicians' skepticism as limiting telemedicine's adoption, to prove telemedicine's benefits to physicians telemedicine champions adopted romantic futuristic narratives envisioning telemedicine as a means for human teleportation. At the same time, they followed traditional narrative strategies to overcome physicians' reluctance to adopt telemedicine in their practice. Telemedicine advocates envisioned telemedicine maintaining the essence of physicians' clinical practice and workflow by depicting telemedicine as familiar and easy to use during a consultation, as well as adhering to traditional referral patterns. Hence, they depicted once again telemedicine as a provider-centered application.

At the same time, as telemedicine adapted to physicians' traditional expectations of preserving established clinical practices and referral patterns, as well as to the health care system's need for efficiency and security, telemedicine stakeholders envisioned telemedicine as improving the health system's efficiency through the coordination of care. Comic, genetical, and traditional narratives together unveiled the underlying goals shared among different stakeholders' agendas defining telemedicine as a tool for the

delivery of coordinated care. These narratives transcended telemedicine's struggles to fit in the health care system by stressing instead what was to be gained by such missteps and frictions, that is, the overall enhancement of the health care system's caring capacity. The combination of these narratives corroborated the visions of telemedicine as providing specialized care to remote and rural areas as well as a tool for patients' self-management. During the 2000s, the expectation that telemedicine would have become a mainstream health delivery service, that is, just "medicine" without the "tele-" (Participant#2) grew stronger among telemedicine champions and governmental stakeholders alike.

CHAPTER 5: PATIENT EMPOWERMENT AND "HEALTH CARE UGLY" NARRATIVES

Transforming the telemedicine paradigm

From the year 2009 to the present, shifting expectations about telemedicine's ownership and use have defined the beginning of a renewed telemedicine contemporary "era" (142, 282). This chapter illustrates how expectations of telemedicine have recently evolved from envisioning telemedicine as a tool to enhance existing health care services to becoming a tool to integrate patient/consumer expectations of autonomous access to care within the traditional health care system. Attitudes toward telemedicine's future retained telemedicine as a health care service overcoming health care system problems of the previous early 2000s era while introducing new narratives of consumerized telemedicine applications that characterize today's predictions of where telemedicine is going.

Commercial stakeholders envision a rupture between what the traditional paradigm of telemedicine – controlled centrally by providers and aligned to health care system priorities – and the newly developed consumer-controlled "bring your own device" paradigm (Participant#10). They adopt romantic, critical, and exemplary narratives of telemedicine as a solution for health system access: vanquishing space, time, cost, and institutional barriers to care. Romantic narratives are dramas of liberation in which the hero challenges the status quo in a triumphant quest over corruption and injustice (88, 127). Telemedicine's "consumerization" would enable patients to take ownership over their health and health data/information. Critical and exemplary narrative

strategies envision telemedicine reinventing health care delivery by breaking with the past and promoting patients' and health care providers' digital autonomy in care as happened already in the commercial sector.

On the other hand, the Ontario Telemedicine Network (OTN) and the government warn of a more tragic-satiric evolution, in which the consumerization of telemedicine threatens the public and universal features of Ontario's health care system. Consumer-controlled telemedicine may promote an "underground two-tier" health care system through unequal access to personal technology. This may result in unequal access to care and physicians' potential exploitation of privately paid services outside the public system.

Concurrently, governmental officials, hospital managers, and telemedicine service providers envision telemedicine in classic comic and genetical narrative terms: telemedicine will continue to evolve, overcoming problems as they arise, as part of the health system's ongoing dynamic structural change. These stakeholders adopt comic narratives to integrate elements that are at odds in a story of rising missteps ultimately resolved in the end for the satisfaction of all (88). Their predictions of the future shift from the earlier 2000s' comic narratives that telemedicine would enhance the health care system's caring capacity to a new comic story that focuses on new models of care and health care sustainability. Alongside these comic stories of the future, we also see genetical narratives that predict telemedicine will naturally transform and integrate with the health care system organically over time (152, 215). As debates about health system's future sustainability grew among governmental, health policy and health professional stakeholders, such genetical narratives portray telemedicine as a tool for improving

access, quality, and cost-effectiveness of care through care coordination across health sectors, health professionals, places and timing. Telemedicine itself represents the natural evolution of the health care delivery.

Consumer-controlled telemedicine

Telemedicine's commercial vendors since 2009 include telecommunication, hardware, software companies, mobile application designers, technology product managers, and special venture capitalists or groups providing support to innovators (such as MaRS). Vendors paint a common vision of a new patient/consumer-controlled telemedicine in the near future. In this vision, telemedicine empowers patients to become self-determined agents who actively take ownership and control over their health and access to health care services. Consumerized telemedicine enables patients to access care unmediated by institutional and traditional gatekeepers of care. To do so, they envision telemedicine performing as a liberator to reinvent the health care delivery system by freeing patients from technological, physical, temporal, and institutional barriers to access to care and by putting patients "at the helm of their own health" (283). Patients would become the new "stakeholder" and principal telemedicine user (Participant#15). Because patients expect technological autonomy – as both IT consumers and telemedicine end-users – they would drive telemedicine to become an online virtual health care service. Telemedicine would make care more convenient, easy, and accessible by providing direct care through the patients' privately owned commercial IT device. This shift would be a revolutionary transformation recasting the room-based, site-to-site health care service which brought specialized care in remote and rural areas through medical telemedicine

devices – into the new consumer-controlled, "bring your own device" telemedicine paradigm (also called the "consumerization" of telemedicine) (Participant#10, #15).

Other telemedicine advocates, including forward-looking physicians, hospital managers, LHIN and Community Care Access Centers (CCACs) officials, echo these visions, focusing on the connectivity, accessibility, and familiarity aspects of already widely used mobile IT consumer devices (284-288). These technologies take many forms, such as laptops, smartphones, tablets, smart hardware technology (such as iWatches® and Fitbits®). Technologies also include computer-based "apps" and web-based software installed on or accessed by the devices over (often public and not over private enclosed secure) internet connections (136, 282, 284, 287-297). Originally designed for distribution in the telecommunication and computer end customer market, the devices have the option to connect wirelessly – via local wireless networks or Bluetooth connections – and with USB cables to medical devices (282, 285-288, 290, 291). Together with smart hardware technology and software that use sensors and beacons to track patients' vital signs and activities, handheld IT devices can connect to handheld diabetes glucometers, handheld electrocardiogram devices and pressure cuffs, which receive, store and track the patient's data in the mobile device and in its dedicated software/app and/or remote web servers (282, 285-288, 290, 291, 298). Even without medical grade peripherals, commercial IT devices can be equipped with so-called "Health Kit" software applications, or any other type of health "apps" (296). These "Health kits" work together with the IT device's hardware – such as a heart rate sensor, GPS and accelerometer – to track a range of health data like exercise activity and heart rate across

multiple apps and devices (296, 298). Through these devices, patients would be able to "get your [you as the patient] results, send your results, talk to a doctor" through voice, video, messages, data transmission, all transmitted over the public internet from the patient's mobile personal device (Participant#15).

Romantic plots of telemedicine's future, popular with commercial and clinical champions, highlight telemedicine's quest to free all patients from physical, time, cost, and institutional barriers to care transforming access to care into a convenient, truly ubiquitous and mobile service, empowering both patients and health care providers. Alongside these romantic views, more "critical" narratives (152, 215) emphasize a radical and disruptive shift in clinical power relationships between patients and providers with the so-called "consumerization" of telemedicine (Participant#15). Consumerized or consumer-controlled telemedicine would enable patients' access to health care services unmediated by traditional governmental and institutional health care delivery gatekeepers. To reinforce this vision of change, these stakeholders adopt exemplary narrative strategies. In policy stories, this type of narratives convey the timeless validity of rules derived from individual cases, abstracted and applied to other situations to define intentions, expectations, and courses of action (215). To this end, these narratives compare telemedicine to virtual online business services in which commercial IT devices – like smartphones and tablets – had already granted consumers' digital autonomy in accessing services like online banking and flight bookings unmediated by traditional institutional and commercial gatekeepers.

During the third telemedicine "era," consumer-controlled telemedicine narrative

strategies define telemedicine as two unfolding dramas: the drama of consumer-controlled telemedicine emancipating patients and the drama of consumer-controlled telemedicine supporting health care delivery system transformation.

Consumer-controlled telemedicine: Empowering patients

Following through patients' expectations of "bring your own device" system, vendors, and clinical forward-looking telemedicine advocates cast dream-like imaginary visions of a path-breaking telemedicine revolution that would emancipate patients. Commercial stakeholders and telemedicine advocates emplot these visions as a romantic conflict in which the hero – that is, the consumer-driven telemedicine – fights to set patients free from the traditional "siloed, restrictive, exclusive, paternalistic, disempowering, hierarchical" health care delivery system and health care professionals' power (Participant#1). In these visions, consumer-driven telemedicine transcends and liberates patients from physical, time, and institutional barriers to care:

> Those tools the Apple iWatch, and the tools that are coming on that thing are crazy, so, you'll be able to, well you can today, you can put your heart rate out there, all these things that you would normally go to your physicians' office to get tests done. You'll be able to just do that from your iPhone, or your iWatch, or any of these things, and transmit that information to your care team, who may not even be in the same country as you, and they'll be able to do that consult and talk to you about what you're going to be able to do (Participant#16).

As the passage above illustrates, telemedicine becomes "truly mobile," real-time and virtual health care service (Participant#13), untethering patients from physical and institutionalized access to care. IT devices like smartphones, tablets, and iWatches allow patients to access health care services "from wherever or whenever" (Participant#12) and

from "from any of these things" to exchange information directly with the health care professionals across geographical and jurisdictional borders (Participant#16) (292, 299).

In these revolutionary visions, the changes that telemedicine brings about gives more power to the patients than before, while challenging the forms and legitimacy of the institutionalized access to care. In particular, telemedicine challenges physicians' traditional health care gatekeeping role as well as the publicly funded telemedicine service provider's (OTN) role of telemedicine gatekeeping:

> The time has come, Entwistle argued [CEO of Telus Inc.], for Canadian patients to rise up and demand electronic prescriptions, e-mail contact with their physicians, and electronic access to their treatment plans and health records. These will help patients take active roles in monitoring and managing afflictions like hypertension and diabetes, he noted. (300)

As this passage above highlights, consumerized telemedicine visions re-orient the delivery of health care services to focus on the patient as an independent individual consumer – that is, free to access health care without health care providers' or OTN's gatekeeping control. By doing so, telemedicine bestows more power on to patients, enabling them to take a more active role in accessing health care. While telemedicine empowers patients and alters the patient-provider relationship, it also undermines OTN's publicly acknowledged gatekeeping role in providing and managing telemedicine equipment and services. Patients would not visit a real physician in person to access care; rather they would have the option to visit a "virtual online doctor" (292) directly from their "pockets" or "purses" (Participant#12)(7).

Personally owned and controlled by the patients, consumer IT devices would entirely substitute health care providers to the point of becoming an automated device

supporting patients in the home (293, 298). Vendors and technology managers describe telemedicine as a futuristic medical tool for patients to virtually and automatically diagnose all ailments without the intervention of a physician, as a Tricorder in futuristic science fictions like Star Trek:

> The tricorder is a thing from Star Trek that Dr. Bones used to just wave in front of people, that he would look, and it's like "oh, he's got syphilis, or whatever," and it could do everything. […] Something that can measure 10 vitals in one device, and that's come a long way. […] I have gone through, now, several years of trying to teach people how to use a blood pressure monitor correctly when they're alone in their home, and it's hard, but if they had a tricorder, that'd be great! I'd love a tricorder! So that stuff is definitely gonna come along (Participant#14).

This narrative cues from actual science fiction and television shows that tap into cultural tropes that predate telemedicine itself. This narrative provides evidence of how visions are situated in larger cultural narratives and imageries, which anticipate and shape what people expect or want. The futuristic "tricorder" imagery appeared when Star Trek aired for the first time in the 1960s and now shapes the future of telemedicine as an automated handheld scanning, recording, and transmission device for home-based care. Vendors and telemedicine champions appeal to and align with the widespread futuristic and science fiction telemedicine imagery to open up opportunities for radical change in the health care system. That is, patients independently monitoring their own vital signs and health conditions without the in-person support of health care providers:

> The next step is to open up a new form of communication, like a companion app for patients, many of whom already come in armed with their own cellphone pictures (293).

This imagery envisions telemedicine as becoming a "robot companion" or "app companion" for cognitively disabled or elderly patients in the home (293). The "robot

companion" would automatically track the patients' activities and health status, send alerts and directly exchange information with remote physicians and nurses (Participant#14) (293).

As part of these futuristic expectations, vendors adopted exemplary narratives to compare and apply "Apple's experience" features to telemedicine. That is, the "unboxing experience […] you take it [IT device] out, you turn it on, and it's connected" (Participant#10). This way, telemedicine would automatically be ready for patients to use and access health care in an independent and autonomous way, without the support of health care providers or technicians.

Together with romantic and critical narrative strategies, exemplary narratives reinforce and assert patients' personal autonomy, their idiosyncratic preferences, and their role as active consumers in health care – initiating and accessing health care services from their personal IT devices. Exemplary plots emphasize the validity of consumerized IT in the health delivery of health by abstracting and applying the underlying rules of individual technological autonomy, along with consumer preference and service customization, to telemedicine services. Technological autonomy refers to the degree of independence with which individuals control the architecture of their own information systems[2] (22). To do so, vendors compare consumer-oriented telemedicine to retail products and to online commercial services like online banking, online flight bookings, and mobile app-based taxi booking services like Uber (283, 287, 302, 303). In these

[2] Baskerville devised a working definition of information system as a system "in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce informational products and/or services for internal or external customers".301. Baskerville R, Lee, A. Individual-organizational bindings. A design theory for bring your own system. 2013 Proceedings of the Pacific Asia Conference on Information Systems2013).

exemplary narratives, consumer-driven telemedicine empowers patients to actively control and assert their access to health care as consumers:

> "Why wouldn't have like an Uber-like application for telehealth that, 'ok, I need to see a doctor, which doctor wants to serve me now'" (Participant#15).

In the same way, vendors and forward-looking clinical advocates compare telemedicine business models in Ontario to consumer-oriented telemedicine business models adopted in other countries (283):

> So, I don't have to wait for the physician's schedule to open up, I can call them when it's convenient for me. And that's, that's essentially the US model (Participant#13).

As the excerpts above illustrate, commercial vendors envisioned consumer-oriented telemedicine to empower patients to "choose", "select", "pick" at their convenience where to access care – in-person, at the clinic, or virtually online – as well as when and the type of access, and the type of health care provider just as with any other business service (Participant#15) (283).

Together, romantic, critical, and exemplary narratives question the arrangements between patients and traditional health care gatekeepers, disputing traditional in-person and institutionally mediated health care delivery services. Praised as a liberator overcoming barriers and substituting outdated institutionalized access to care, consumerized telemedicine can then reject past rules and routines. As patients would directly access consumer-controlled IT technology for telemedicine use, these narratives re-orient telemedicine to focus on the market and on the patients as individual consumers becoming the principal driver for telemedicine. Consumer-controlled telemedicine

devices developed within the market, and not within the traditional and institutionalized health care setting, would respond to patients' expectations of on-demand, unmediated, and direct access to care.

Consumer telemedicine solving the health care sustainability problem

To promote the new consumer-controlled telemedicine vision among hospital managers, governmental health care planners, and physicians, vendors depict telemedicine as a tool to improve the quality and cost-effectiveness of health care delivery services. Vendors describe the change in IT market conditions – that is, the declining costs of commercial mobile IT devices – to transform consumer-controlled telemedicine into a cost-effective health care delivery service in the patients' home:

> Lot of these programs, if you go back 10 years, were running on […] pretty thick Windows computers, probably running Windows XP around 2001, 2005, and they were expensive, they were bulky, they were fragile, you couldn't leave that with a consumer, with a patient. But now we look at, something like the Samsung 8-inch tablets, right? […] You go into Best Buy now and you can see there's 150 dollar tablets. […] We're really very close to this notion of, take the tablet, send it to the patient, and just, it's theirs. It's a 200 dollar tablet for the health care system (Participant#10).

By virtue of their versatility, accessibility, and cost-saving features, IT consumer devices – alone or connected to handheld peripheral devices, such as pressure cuffs, pulse oximeters, and blood glucose meters – would replace outdated and expensive telemedicine equipment (290, 293). Vendors depict the past room-based telemedicine equipment designed and controlled by publicly funded telemedicine service providers as outdated and expensive. Cheap and mobile commercial IT devices give sense to telemedicine's adoption in the health care system as it supports health care system's

sustainability:

> Its deceptively simple aim is to use mobile technology to replace traditional equipment that's costly, outdated or simply not available where it's needed (293).

These narratives show the difference in costs between old medical and new IT devices to display the economic advantages of adopting consumer technology in the clinical settings:

> An adapter that connects an endoscope - just a flexible tube with a light on it - to any smart phone so procedures can be recorded and the videos reviewed or shared instantly. So far, more than 4,000 of them have been sold in 20 countries for about $500 - largely replacing cumbersome video towers that can cost as much as $100,000 (290).

Cost-saving narratives partly resonate with hospital managers, health care planners, and governmental officials, as well as with Ontario's telemedicine service provider (299). Together with private vendors, these stakeholders envision consumer-controlled telemedicine as solving current health care system sustainability problems. From a system value perspective, consumer telemedicine would save "the health-care system millions in unnecessary hospital readmissions" by shifting the delivery of care from hospitals into the community (8). This way, consumerized telemedicine represented a potential reduction in possible costly hospitalizations:

> "We must identify the problems and find solutions now," Ms. Orridge warns [Toronto Central Local Health Integration Network CEO]. The next couple of decades, until the earliest boomers reach their mid-80s, offer a respite in which to build the health-care system of the future, she says, one that goes way beyond "acute hospitals" and a "sick-care system." One potential solution that Sunnybrook is already implementing is telemedicine. […]The days of hospitals as temples in which august male physicians held court have vanished, if they ever existed (299).

Forward-looking vendors, physicians, and hospital managers also see this change as shifting medicine "left" (293), as consumer-controlled IT devices would enable a more equitable distribution of health care resources among hospital and community care services. Telemedicine would empower physicians and community health care professionals to provide care beyond the hospital settings with cost-effective, accessible, and better tools (136, 286, 293). Therefore, affordable consumer-controlled IT devices would replace old and expensive telemedicine equipment enabling health professionals in the community to provide care otherwise available only in acute clinical centers as hospitals:

> "This really is a revolution in terms of health-care technology," Bromwich said [Clearwater Clinical CEO]. For decades, health care has "shifted right." It's become more expensive and has been centralized in the most expensive place, Bromwich said: the tertiary care hospital. "What we need to do is shift left ," he said. "We need to empower the primary care, the community members, the nurses, the outreach workers, the home care. We need to empower all of those people to deliver quality care outside of the hospital (293).

To convey this vision, these stakeholders adopt romantic narratives that portray telemedicine as a hero saving health care system money. Given the high costs of hospitalization and the declining costs of commercial IT devices, telemedicine would improve the cost-effectiveness and efficiency of the health care delivery system by overcoming resource distribution disparities among hospitals and community clinical sites.

Thus far, vendors adopt romantic and critical narratives to promote consumer-controlled telemedicine adoption among government and health care professional stakeholders. To do so, they construct a vision of telemedicine that revolutionizes the

delivery of health care and the practice of telemedicine. They envision telemedicine as problem-free while empowering both patients and physicians, and solving the health care system's sustainability issues. However, as revolutionary and path-breaking these visions can be, ultimately, governmental and health care stakeholders' visions do not align with private businesses' expectations. Instead, governmental and health care stakeholders reveal the problematic "ugly" side of consumer-controlled telemedicine and the risks of institutionally unmediated access to care.

The "ugly" side of telemedicine

As opposed to businesses' and telemedicine champions' romantic visions, governmental stakeholders, OTN service providers, and skeptical health care providers – which include physicians, nurses, and hospital managers – highlight the tragic irony lying within the consumer-controlled telemedicine visions. This tragic irony rests in viewing consumer-controlled telemedicine as deviating from the desirable existing publicly funded health care system and creating a second-tier, private, and "underground" health care system (Participant#16). To do so, these stakeholders depict consumer-controlled telemedicine as becoming a barrier to affordable and equitable high-quality care. Poorly controlled and unregulated consumerized telemedicine services would enable physicians to provide privately paid services outside the public system. As a result, it would paradoxically exploit rather than empower patients, as profit-seeking physicians would favour profit-induced services over quality and access to care. As such, these stakeholders adopt tragic-satiric narratives to identify the incongruity between what might be expected and what occurs, dismissing private businesses' expectations as undesirable and affirming

an alternative and desirable telemedicine vision instead.

Concurrently then these stakeholders hold and shape an alternative telemedicine vision. They define telemedicine as part of the traditional health care system, thus, controlled and managed by government and by health care institutions. To do so, they adopt comic narrative strategies that negotiate consumer-controlled telemedicine expectations with traditional health care values of accountability, equity, and quality of care. The proposed resolution envisions telemedicine as "health care ugly," that is, as something that is cobbled together within the constraints of the health care system, and in this sense, not an ideal, efficient technology but rather a sort of pragmatic, imperfect version of telemedicine. In this way, this vision mediates consumer/patients' expectations for autonomous access to care – i.e. care delivered on their own terms through personal owned IT devices – and the health care systems' needs, priorities, and overall integrity.

Consumer-driven telemedicine exploiting patients

Governmental, health care and service provider stakeholders view consumer-controlled telemedicine as a threat to patients' affordable and equitable access to high-quality health care services. To highlight the paradox of the consumer-controlled telemedicine vision, they identify both down-stream and up-stream risk factors in accessing care unmediated by traditional government and health care institutions.

Diverging from private companies' visions of patient empowerment, downstream factors address the risk of discriminating patients' access to care based on patients' different economic access to commercial IT devices and to different levels of computer proficiency (136). These narratives describe the consumer-controlled telemedicine as

creating both financial and computer proficiency barriers to access to health care services:

> There are also questions about ensuring equitable access to these new modes of medical care, said Mark Farrow, vicepresident and chief information officer at Hamilton Health Sciences. Not everyone can afford a smartphone or knows how to use one (136).

As the passage above highlights, consumer-controlled telemedicine does not provide equal opportunities to free access to health care services, but rather it exacerbates access disparities among different socioeconomic groups of patients. As such, it benefits only those who are able to pay IT devices and those knowledgeable enough to use IT devices on their own, discriminating instead those patients who are economically disadvantaged and who lack computer proficiency. In this way, consumer IT devices become the gatekeepers to access to care based on patients/consumers' ability to pay and on their ability to use the devices, creating a separate and privatized access point to care.

At the same time, up-stream risk factors focus on physicians' misled adoption of consumerized telemedicine due to poorly controlled and unregulated telemedicine. Here, governmental, telemedicine service providers and skeptical physicians advance two central arguments to highlight consumer-controlled telemedicine's dreary consequences of institutionally unmediated access to care. First, consumer-controlled telemedicine enables profit-seeking physicians to provide demand-induced services outside the publicly funded health care system; and second, it opens the way to the delivery of potentially clinically inferior and inappropriate health care services. In the first scenario, consumer-controlled telemedicine would allow physicians to charge great amounts of money for their services and to "skim" and cherry-pick the most lucrative services within and beyond provincial and national jurisdictional borders (Participant#14):

> Like, our doctors could start making more money online than in here, they could start charging tons of money, delivering services to the US, or some other place, and then it starts to degrade (Participant#14).

As illustrated in the comment above, these stakeholders' narratives carry an accusative tone by representing the opposite vision of health care system as sanctioned by Canada's Health Act (304) (Participant#14). Whereas the Canada Health Act prohibits user charges and extra-billing for medically necessary services covered by the provincially managed insurance system, evoking values of equitable and fair access to high-quality care (304), commercial telemedicine legitimizes physicians' drive for financial profit over quality and accessible patient care. To illustrate this point, these stakeholders define consumer-controlled telemedicine as becoming the "thin wedge" between private and public health care delivery (Participant#14):

> The technology can sometimes be the thin edge of the wedge to privatize things because you create this special thing, this unusual thing, and you say "well that's not the health care system, so it's ok to charge money for this part of it," and then that becomes, increasingly becomes the norm, and then suddenly you have a two-tier medical system, right? (Participant#14)

These tragic narrative strategies emphasize how telemedicine would not be a tool or channel to overcome distance, provide services in underserviced areas, facilitate access to care to patients, or to empower patients, rather, telemedicine would be a tool for physicians to generate new and highly profitable business opportunities. In particular, telemedicine would risk subverting the original intention of providing care for patients living in underserved areas into a means for generating more business, starting from areas of care that do not fall under the publicly funded health services, such as cosmetic procedures (305). However, because it would be profitable and "so easy" to practice, it

would paradoxically enable physicians to adopt this form of telemedicine in their clinical workflow (Participant#8):

> We develop models of care through telemedicine that are not ideal. For example, maybe telemedicine is used to promote virtual walk-in clinics, which is not necessarily the direction we want to head in, but it's so easy. So there's no continuity, but you have a doctor that's just completely virtualized their practice, and they just see people in a virtual walk-in kind of a basis. […] These types of delivery models could emerge that aren't necessarily what we would consider to be best practice, ideal care for the patient (Participant#8).

As this passage above illustrates, these narratives reveal consumer-controlled telemedicine's failure in providing the best care possible in terms of potentially clinically appropriate care. The second issue then regards the ironic contrast between idealized romantic "easy" care and "best practice," clinically appropriate care (Participant#8). This scenario depicts poorly regulated telemedicine as threatening physicians' professional integrity by raising issues of malpractice. In turn, then, skeptical physicians and hospital managers narratives raise concerns about the lack of regulations, associating telemedicine to the imagery of private businesses' factory lines thriving unsupervised by the government and legal frameworks (305, 306):

> Developed to improve medical care in remote areas, telemedicine has found a lucrative new life in some Botox clinics where clients never see a doctor in person. Instead, the consultation is done by Skype or another form of telemedicine before the patient receives injections from nurses or technicians delegated to do the job. The practice, although legal in Ontario, is raising concerns. It allows doctors to see more patients than they could in person and clinic chains to employ just one doctor to serve many locations. At least one doctor thinks these "Botox mills," as he calls them, provide bad medicine and should be shut down (305).

Both skeptical physicians and hospital managers together start to voice their concerns about the lack of appropriate policies regulating telemedicine practice, pointing

at the tragic lag of the policy system, "we're not able to keep our policy environment moving at the rate that the consumer is prepared to use these products and services" (Participant#16). According to these stakeholders, telemedicine malpractice would only uphold physicians liable for adverse outcomes of medical care. They adopt tragic-satiric narratives to reveal then the paradox and contrast between the lack of updated policy frameworks for telemedicine practice and physicians' liability issues.

Telemedicine as practice of medicine

As the concerns grow among physicians and hospital managers, professional medical associations at the federal and local level have begun to close the policy gap. In 2010, the national Federation Of Medical Regulatory Authorities of Canada (hereafter, FMRAC) (307) devised and, in 2014, the provincial College of Physicians and Surgeons of Ontario (hereafter, CPSO) (308) revised their telemedicine policies, trying to catch up with the changing virtual health care delivery landscape (305, 309). Both policy statements devise general bylaws for practicing telemedicine, the FMRAC provided regulations directed to local Medical Regulatory Authorities, and the CPSO to its member physicians (307, 308).

The 2010 FMRAC policy adopts comic and traditional narrative strategies to ensure that the local Medical Authorities acknowledged the public and its members about telemedicine consultations and about the opportunity to turn to the Medical regulatory Authority to file complaints (307). Additionally, the 2010 FMRAC policy mandates the Medical Regulatory Authorities to ensure that their telemedicine services would be "subject to qualified local medical direction and control," emphasizing physicians'

traditional role in guaranteeing safe and high quality care (307). The 2010 FMRAC policy sets out a list of regulations addressing cross-jurisdictional issues related to telemedicine (307). In this list, the 2010 FMRAC policy mandates local Medical Regulatory Authorities to ensure that their members respected the licensure and liability regulations of the jurisdiction where they provided care regardless from where they provided the service (307). They also instruct the local Medical Regulatory Authorities to be informed of the existence of telemedicine services provided in their jurisdiction by physicians from outside the province or territory (307). And finally, to ensure that physicians from other jurisdictions are registered and licensed to practice only in Canada (307). The 2010 FMRAC policy also defines telemedicine, outlining its fundamental characteristics:

> Telemedicine is the provision of medical expertise for the purpose of diagnosis and patient care by means of telecommunications and information technology where the patient and the provider are separated by distance. Telemedicine may include, but is not limited to, the provision of pathology, medical imaging and patient consultative services (307).

This definition shows a tentative reconciliation in defining telemedicine as a concept between traditional health care delivery practices and the unfamiliar and stand-alone distant remote telemedicine service, a reconciliation that the CPSO policy will accomplish in 2014.

Four years later the 2010 FMRAC policy, the CPSO revised its telemedicine policy drafted for the first time in 2007 (281). For the first time, the 2014 CPSO policy acknowledges telemedicine to be equal to traditional medical practice (308). With this statement, the CPSO college acknowledges and accepts change – that is, telemedicine as part of the clinical practice – however still upholding and stressing the validity of

traditional clinical practice standards, technology quality requirements, physician-patient relationship and confidentiality practices, and the CPSO college's jurisdiction over its members and over patients residing in Ontario (308). As this passage highlights, physicians' professional obligations would not change when practicing telemedicine, as the CPSO defines telemedicine as being the "practice of medicine" (308):

> The practice of telemedicine is the practice of medicine; physicians' existing legal and professional obligations with respect to practising the profession are not altered simply because care is provided via telemedicine as opposed to in-person (308).

The 2014 CPSO policy uses a comic narrative strategy to reconcile the diverging practice modality of in-person and virtual health care delivery by abiding to the medical profession's values and legal obligations to provide patients with the best care possible (308). Together comic and genetical narrative strategies define telemedicine as a physician-oriented tool, reaffirming physicians' control over telemedicine health care practices (308):

> Physicians must use their professional judgment to determine whether telemedicine is appropriate in a particular circumstance each and every time its use is contemplated for patient care, consultations and referrals. In doing so, physicians must consider whether practising telemedicine will enable physicians to satisfy all relevant and applicable legal obligations, and meet the standard of care (308).

As opposed to the 2007 CPSO telemedicine policy, the 2014 CPSO policy accredits only physicians – and not OTN anymore – as the ultimate gatekeeper for telemedicine practice. Only physicians would be able to judge the appropriateness of the use of telemedicine based on patients' health status, clinical needs, and, in addition, the patients' IT devices (308). Physicians would be responsible for assuring the safety and

security of the patients' health information exchange over the telemedicine link as telemedicine is practiced through public internet networks and not in enclosed internet networks as in the past (308). As the 2014 CPSO removes OTN from its policy as the accredited site for securing best quality and safe telemedicine consultations, telemedicine policy accepts and integrates telemedicine within the physicians' practice and reaffirms physicians' ownership and control over telemedicine (308).

In both FMRAC and CPSO policy statements, comic and genetical narratives accommodate the ground-breaking visions of change brought by telemedicine with the need to provide publicly insurable and clinically appropriate care. These narratives accommodate diverging expectations by reminding about the common purpose of both telemedicine and traditional health care system in overall improving the health care system and benefiting both patients and health care providers. To do so, they adopt genetical narratives, which depict stories of incremental, natural changes that present little drama and no radical challenges to the status quo (141, 152). The use of genetical narrative strategies is evident in the FMRAC definition that characterized telemedicine as medicine as usual, and including familiar services that have been long practiced at a distance, such as pathology. As such, genetical narratives convey continuity with the past through a natural process of change, accepting and acknowledging the unfamiliar and making it familiar (141, 152).

In 2012, the Ontario Medical Association (hereafter, OMA) together with the Ministry of Long-Term Care (MOHLTC) of Ontario defined a first agreement on physicians' fees defining telemedicine billing codes for specific telemedicine services

(310, 311). For the first time, the 2012 Physician Services Agreement between OMA and MOHLTC endorsed dermatology and ophthalmology eReferral fee codes to enable primary care physicians to consult with remote specialists (310, 311). The agreement also notes "with subsequent expansion to other specialties," thus, encouraging the expansion of telemedicine (310). Later in 2015, the MOHLTC also instituted a fee for specific cardiac care:

> October 2015, the Ministry made the fee for cardiac-ultrasound services the same regardless of whether or not a cardiologist was physically on site. Prior to this, although a cardiologist could have supervised services via telephone or video-conference off site, a cardiologist physically present for the services would have been paid more by being on site (312).

To do so, the government would support the provision of virtual care in the northern areas, and "encourage the replacement of face-to-face visits with virtual equivalents where clinically appropriate" (18). As with the FMRAC and CPSO policies, this agreement presents a genetical narrative strategy that conveys the idea of natural change and acceptance of telemedicine becoming part of the health care system. Governmental stakeholders and OTN view the telemedicine policies and physicians' fee agreements as milestones in the transformation of telemedicine as a mainstream service and within the overall vision of providing affordable and high-quality care.

Yet, not all stakeholders agree that these new policies and reimbursement agreements provide a comprehensive regulatory framework promoting telemedicine's integration in the health care system. Technology managers, commercial vendors, venture capitalists and forward-looking telemedicine clinical champions criticize the health care system's slow pace of policy change, as "for the health care system is, [it] takes years to

say ok" (Participant#15) (313, 314). In their view, the health care system's need for "regulation and scrutiny" (Participant#15), the need to provide cost-effective health care services and the lack of an overarching telemedicine agenda constrain telemedicine's adoption (314). These stakeholders adopt tragic narrative strategies to describe the health care system as conservative and skeptical to cutting-edge innovation, limiting telemedicine's implementation opportunities. Nevertheless, as tragic as these narratives may have been, vendors and forward-looking stakeholders resolutely envision these barriers as a temporary condition, still validating after all the romantic visions of a consumerized telemedicine paradigm empowering patients to do "everything" online (Pariticipant#14).

Non-disruptive telemedicine visions

In contrast to consumer-controlled and market-oriented telemedicine expectations of radical change, the government, OTN, and skeptical physicians envision telemedicine to integrate into the existing health care system in a non-disruptive and incremental way. In this vision, government, OTN, and skeptical physicians depict telemedicine as less futuristic and more "health care ugly" compared to the "exciting, cool, consumer stuff" (Participant#14). This "health care ugly" telemedicine vision does not aim to disparage telemedicine. Rather, this vision depicts telemedicine as something cobbled within the constraints of the traditional health care values, priorities, and standards in a pragmatic and realistic way:

> We [telemedicine service providers] are the health care system trying to use these tools [consumer IT technology] to expand health care, and your doctor is implicated in that, and the health care system pays for

> that. We're trying to get you connected with services that are insured throughout of the public health system, right? (Participant#14).

Ensuring high-quality and affordable health care services are in place becomes a way to reassert governmental and health care institutions' control and authority over the technology and the delivery of health care services. As such, these stakeholders envision telemedicine in classic genetical narrative terms: to become a tool to create an "ecosystem" of integrated care (Participant#2), within and beyond hospital sites, overall aligning telemedicine to the already existing health care system priorities and values. To reconcile consumer-controlled expectations with the traditional need to provide affordable, accessible, and high-quality care, governmental stakeholders and OTN express the need "to plan it out so that we build that into our service delivery program" (Participant#8). This understanding defines telemedicine as a tool "tailored to on-the-ground challenges" of the health system (293). According to these visions, telemedicine becomes a means to "streamline the health care process" through care coordination, communication, and collaboration (315). To do so, governmental stakeholders and OTN envision telemedicine to fit within health care priorities and existing models of care, becoming both a tool for coordinating care as well as to remotely support and monitor patients in the community or at home. Telemedicine as a tool to coordinate care expands access to care, improving quality, efficiency and cost-effectiveness of care (136, 299). Care coordination among health care providers in the community, in the hospitals, and with other allied health professionals, would enable coordinated health teams to share information across health sectors and provide care to patients all at once and all in one place, limiting patients' transfers throughout the health care system as well as health care

professionals' travel. Care coordination also includes direct coordination and support to patient's self-management at home, in the form of telehomecare, also called remote patient monitoring (316). These visions envision telemedicine as a tool for patients to self-manage their care:

> We have to change our behaviour, for expecting patients to become self-managers of their chronic disease, then we have to give them tools to be able to do that', so that's his vision. His vision is really to make, you know, telemedicine or virtual care this mainstream channel (Participant#2).

These narratives shift the overall vision shaping telemedicine from being a channel and bridge to overcome geographical and temporal distances, to a tool to deliver care based on specific models of care envisioned and planned by the health care system. Telemedicine would increase the number of access points to care, from the hospital to the community and into the patients' homes:

> So, whereas before, we would have said "patient, go to your local hospital, and then the specialist will look at you from the other hospital that the telemedicine equipment is in". Now, the specialist could be in a hospital, and maybe the patient shows up to community care access centre, or to a community health centre, or one of the other opti-, so the access points are more pervasive, so that's what I was talking about, in terms of expanding settings, it, in some ways, it's expanding the access points that patients or providers can go to (Participant#8).

As such, telemedicine would support integrated care paths as devised by the Health Links programs, it would support patients' transition to care from hospitals to the community, and it would support the delivery of care in the community, homes, and long-term care homes:

> But that's where health care is going, because our system cannot sustain you know utilization in hospitals, there's way too many chronic care patients, baby booms are getting older, people are getting sicker, so we

> have to figure out how we are going to manage chronic disease. So we believe in the solutions that we offer are going to enable patients to be better cared in their homes, in their communities (Participant#2).

Telemedicine reconciles the need to keep the patients at home with patients' expectations of consumer-controlled access to care in the community with its vision of cost-effective care, "and it's, it's much more efficient, cost-wise, to care for people in their homes than it is for them to be in the hospitals" (Participant#5)(287, 299). Telemedicine also responds to the health care system's need to reduce the burden of the so-called "frequent-flyer" patients with unusually high service utilization. To do so, these stakeholders envision telemedicine as reducing patient hospitalizations and ER visits and supporting the overall shift from an acute-based model of care to a chronic condition management model, which also enables patient selection based on their chronic conditions (299):

> It's not about letting patients see specialists, it's about finding patients who have serious chronic disease, right now, CHF [congestive heart failure] and COPD [Chronic Obstructive Pulmonary Disease], so heart and lung disease, and they are quite sick, they're quite far along in the disease (Participant#14).

As the passage above highlights, these stakeholders adopt comic and genetical narrative strategies to describe the shift from a telemedicine model of care based on access to specialized care to patients' self-management at home, through IT devices and web-enabled software. Comic narrative strategies move from inevitable complications that arise from diverging perspectives to a point of resolution resulting from a defined common purpose (88, 127). Genetical narratives paint a scenario of incremental change that does not challenge the status quo, expressing an overall idea of gradual and organic

transformation (141, 152). Together, these narrative strategies depict telemedicine as accommodating both patients' expectations of having access to care in their homes as well as "very packaged, very controlled medical devices" as envisioned by the traditional health care system (Participant#14). As opposed to consumer-controlled telemedicine, "health care ugly" telemedicine then envisions telemedicine technology to be a medical equipment, supervised, managed, and controlled by health care professionals:

> Now, we're delivering blood pressure monitors into the home, so they assume that they can use a Fitbit and their own smartphone, and it'll all go into our computer as well. But no, we're doing, still, very packaged, very controlled medical devices that send things back […], so it's not quite as, app, and digital, designer-y Apple stuff, as people expect. (Participant#14).

The comic and genetical "health care ugly" vision defines telemedicine not only as a tool for patients to self-manage their care but also as a tool for physicians. For telemedicine to fit in the health care system, governmental stakeholders and OTN envision telemedicine as a tool, "toolkit," and "workspace" for physicians to provide the best care, in the most cost-effective way, and by keeping physicians accountable for their practice (292, 317). As such, OTN has devised online virtual tools for physicians to consult remotely with other physicians, such as the OTN eConsult service – for secure communication and coordination of care among health care providers, and automated referral through standardized electronic software and web-based solutions (317):

> This technology is no way meant to replace the traditional physician-patient relationship. Rather, we see it as another tool in a growing tool box of ways the doctor can connect to a patient, and another way to increase patients' access to good medical care (292).

These stakeholders envision telemedicine to become like a "blockbuster drug of

the 21st century" (318). They envision physicians to prescribe telemedicine applications to patients as traditional drugs, with the support of app directories such as the web-based resource Practicalapps (319). In this way, physicians would control the technology, and become the exclusive – together with OTN who devised the list of certified apps – telemedicine gatekeeper.

Government and service provider stakeholders envision telemedicine as a tool that empowers health care professionals in the community – that is physicians, nurses, and allied health care providers – to provide direct care to patients. To integrate telemedicine these stakeholders envision telemedicine to be a physician-oriented tool to deliver home care to patients, for hospital to community transitions of patients, and for supporting community and specialist physicians within and beyond hospitals walls. In these visions, telemedicine would conciliate with the health care system priorities, which are, defining models of care that are efficient and cost-effective. They envision telemedicine as expanding access to specific types of care across the entire province in both rural and urban areas. Crucial is the idea of improving primary care service delivery in the community and in the patients' homes by integrating telemedicine in the primary care setting. Through care coordination and collaboration among different health care professionals, care is offered not only in the hospitals but also and foremost in the community and in the homes, limiting patient's hospitalizations and ER visits. The underlying *telos* of the narratives points towards telemedicine as a catalyst for the creation of a collaborative space for care integration, coordination, and communication supported by the belief of improving the efficiency and quality of the overall health care

delivery system.

Conclusions

From the year 2009 to the year 2017, old and new expectations crystallize and define two distinct telemedicine paradigms. On one hand, commercial vendors and forward-looking telemedicine advocates envision the consumer-controlled or so-called "bring your own device" telemedicine paradigm. On the other hand, governmental stakeholders, OTN, and skeptical health care providers envision a "health care ugly" version of telemedicine, not as perfect and ideal as the consumer-controlled vision, but integrated within the health care system's goals to provide publicly insurable and clinically appropriate care.

Vendors and forward-looking telemedicine advocates adopt romantic, critical, and exemplary narratives to convey a revolutionary and successful vision of change brought by patients' expectations of using personal commercial IT devices in access to health care. As such, the consumerization of telemedicine would untether patients from the health care system and empower them to access care on their terms, finally owning both their access to care and their health information. Through a process of enrolment and alignment, vendors and telemedicine champions mobilize the future of telemedicine by aligning their visions to patients' expectations of "bring your own device." Commercial vendors strategically adopt these narrative strategies to paint a scenario in which consumer-controlled telemedicine will become an opportunity to transform health care into a consumer product and the health care system into a market, generating more business for the private sector.

Governmental stakeholders, OTN, and skeptical health care providers envision a packaged and controlled telemedicine to overcome the envisioned risks of providing consumer-controlled telemedicine services. In these visions, the institutionally unmediated access to care granted by the consumer-controlled telemedicine would open opportunities for creating a second, privatized "underground" health care system (Participant#14). As such, these narratives depict consumer-controlled telemedicine as potentially threatening the integrity of the public and universal Ontario health care system in two ways. First, unmediated access to care through consumer-controlled telemedicine risks to create access disparities by discriminating patients' access to care based on financial and IT proficiency barriers. This way, consumer-controlled telemedicine removes physicians from their traditional gatekeeping role transferring such responsibility to the consumer IT devices. Hence, by revoking and undermining physicians' and government's control over free and equitable access to care, consumer-controlled unmediated access to care encourages the creation of a second, private health care system. Second, consumer-controlled telemedicine threatens patients to be exploited by profit-seeking physicians who use telemedicine to skim through patients and provide demand-induced services rather than high-quality and accessible patient care.

Governmental stakeholders, OTN, and skeptical health care providers adopt comic and genetical narratives to bestow on telemedicine a future path based on the acknowledgement of different standpoints within the health care system, as well as accommodating demands of consumerized telemedicine. Telemedicine's struggle to merge into the health care system ultimately would contribute to the overall integration of

the fragmented distribution of health care services and to the enhancement of care coordination among hospital, community, and homecare. In a part-whole relationship with the health system, telemedicine's development would also provide cost-effective health care. Telemedicine would displace health care delivery services from the acute care centers and hospitals into the community and homes, relieving the health care system from the most costly health care services, that is, those provided to chronic care patients. Finally, as opposed to the consumer-driven telemedicine paradigm, which focuses primarily on the patient as the principal consumer/end-user, government stakeholders, OTN, and skeptical health care providers continue to envision telemedicine as a physician- and health care system-oriented application.

In brief, these opposing telemedicine visions, conveyed with different narrative strategies, reveal the tension between the consumer/market-driven demand for more freedom in accessing health care as opposed to the highly controlled and managed traditional health care system. As consumer-controlled telemedicine tries to break free from the health care system's control romantically envisioning telemedicine to provide convenient, easy, accessible, and affordable care, the government and OTN conveys visions of high quality, efficient, and cost-effective telemedicine care. As such, the government's, OTN's, and the skeptical physicians' telemedicine vision continues to limit commercial vendors' telemedicine pull to transform it into a disruptive innovation.

CHAPTER 6: CONCLUSIONS

Narrative analysis as a health policy analysis tool

The term "telemedicine" currently lacks a shared understanding among the public, research, health care, policy, and commercial telemedicine stakeholders in Ontario. Past and current narratives regarding telemedicine's defining characteristics and future role are speculative, overlapping, and in conflict. Narratives of its future depict many different definitions of the term and diverse visions of where telemedicine should fit in the health care system (3, 5, 22). The multiplicity of perspectives generates ambiguity and often confuses the aims of health policy decision-makers and other relevant telemedicine stakeholders.

This study aims to clarify telemedicine innovation processes and to map how the complexity of multiple stakeholders' perspectives and their interdependencies shapes telemedicine artifacts in Ontario. While technological determinists view technologies as rational, value-free, and objective endeavours that develop in a linear progression (94, 320), this study views technology as "simultaneously a social, an economic, and a political enterprise" (320). Technological artifacts result from the social relationships in which stakeholders articulate, affirm, and contest visions that define the normative assumptions embedded in the technology (25, 48, 50, 79, 82, 93, 320). Analyzing complex social processes, that is, the interrelationships and interactions among relevant stakeholders, then allows to understand technology creation processes and reduce ambiguity (25, 50, 51, 321).

Social and policy scholars distinguish two approaches to analyzing social

processes that can be used to map the dynamic relationships among stakeholders that shape technological innovation: a rationalist approach and a narrative approach (98, 322, 323). The rationalist model privileges formal, value-free deliberations based solely on facts and objective and measurable outcomes. However, new technologies are uncertain, open to multiple interpretations, and ambiguous. They can have different and conflicting aims, their outcomes may vary over time, and some of their key features may not be amenable to measurement (324). The rationalist program thus risks overlooking and limiting the understanding of those unpredictable, messy, and not measurable issues (50, 85, 98, 324, 325). Conversely, narrative approaches provide a framework to handle the heterogeneity and ambiguity of the competing perspectives, claims, and relationships among the relevant stakeholders (25, 85, 96, 324). Narratives have "the power to relate what *is* to what *might be* and play a recognized role in policymaking" (98).

In health policy analysis, narrative inquiry acknowledges decisions, commitments, and goal-oriented actions of the policy arena as contingent on emergent social processes based on the "formal struggle over ideas and values, rather than only through rational debate over facts" (25, 84, 86, 96, 98). A focus on narratives is valuable because it helps to identify stakeholders' multiple perspectives and their complex interdependencies by illuminating their value positions, shared values, and meaning systems (85, 96). Various stakeholders adopt different narratives to define, regulate, and communicate knowledge of how the world works (78, 88, 98, 325). Narratives originate and develop from stakeholders' values and judgments, rather than objectively representing facts and events. As such, they are inherently political because stakeholders intentionally select different

narrative strategies to frame and shape meanings to legitimize particular courses of action and interests (86, 98). Narratives' underlying normative assumptions strategically define the boundaries for what is possible and not possible to say and do (78, 88, 96, 98, 101). By this token, narratives are both performative and normative acts that construct meaning by situating events and characters in a meaningful order (78, 85, 88, 96, 98, 141, 152, 326). They are performative because narratives evoke values and emotions that persuade and affect the way stakeholders behave, by attracting support and forging alliances (or creating reasons for expressing dissent) with other actors through a process of enrolment and alignment (96). In this way, the choice of narrative strategy has the power to affect social processes and relationships, deliberately trying to influence how individuals perceive ideas and values (98). They are normative because they persuade not by outlining objective facts or truths, but rather by adopting literary emplotment devices to frame events and actors as virtuous or vile, righteous or unfair, strong or weak, right or wrong (88, 96, 98). Narratives, and in particular "expectation narratives" about the future, show direction in which to think about events (80, 141, 152). They act as a "source of arbitration" and orientation (141). They define what to include and what to exclude, and who is accountable to whom and for what, showing how events and actors should change (or not) in the future (93, 141, 152).

Narratives of future expectations are worth examining because they focus on imagining future possibilities, hopes, and intentions. Narratives hold an imaginative power that legitimizes actions and creates "negotiation spaces" in which stakeholders mobilize key audiences to attract interest and enlist support (80, 82, 93). To do so,

narratives assign different character roles to the technology – such as hero, villain, or clown – to make it more or less amenable to challenge. Whereas clowns are easily dismissed, heroes take a stronger counter-narrative. Romantic heroes are portrayed as having extraordinary abilities through which they solve intractable problems. Heroes represent virtuous and just principles, and thus they are less amenable to questioning than comic narratives. Comedy heroes and clowns are less elevated than the romantic heroes and so are susceptible to challenge, debate, and exclusion.

The analysis of technological visions and expectation narratives reveals the strategic frameworks stakeholders use to enable or limit the construction of specific socio-technical networks that will ultimately shape the physical design of technological artifacts (50, 51, 80, 93).

The arc of "future telemedicine" narratives in Ontario over time

By taking an empirical narrative approach, this study examines the envisioned futures of telemedicine in Ontario from 1993 to 2017. Using insights from the Social Construction of Telemedicine theory (50, 51) and narrative literary and historical theory (78, 88, 104, 105, 138, 215), I present a narrative theory of how differing telemedicine visions have shaped telemedicine technologies over the last 24 years.

As observed with expectation narratives in studies examining telemedicine visions in the UK (28, 83, 95), the evolution of telemedicine narratives in Ontario is a multi-storied process of competing visions and expectations among stakeholders and interests. The history of expectation narratives about telemedicine reveals a historical focus almost exclusively on the process of innovation, the provider-centered approach to telemedicine,

and the benefits and risks of adopting consumer-controlled telemedicine in a publicly insured health care system. The history of telemedicine expectation narratives falls roughly into three characteristic periods. From 1993 to 2000, telemedicine emerges as a proof-of-principle revolutionary technology for the delivery of specialized health care services in remote and rural areas. The ensuing period from 2001 to 2008 saw proof-of-principle and skeptical narratives slowly reconcile to shape telemedicine as part of mainstream health care services. And, finally, from 2009 to the present (2017) telemedicine emerges as a mobile, consumer-controlled device-based technology which can both empower and exploit patients as well as undermine physicians' and government's integrity.

First era: Proof-of-principle and cautionary narratives

During the first telemedicine era from 1993 to 2000, industry and telecommunication service providers, telemedicine clinical champions, hospital managers, and researchers adopted proof-of-principle narratives envisioning telemedicine as overcoming major, intractable problems of the health care delivery system. In these narratives, telemedicine was an organic and inevitable wave of progress transforming the health care system. These stakeholders envisioned both push and pull dynamics that characterized telemedicine as playing a role analogous to the mythical hero: overcoming impassible barriers where other attempts had failed.

The federal Industry Ministry and private technology vendors actively pushed telemedicine within national and provincial agendas, beyond health care, as part of a broader knowledge-based economy vision. This increased the visibility to science and

technology policies that supported the development of new IT product and service markets. Clinical telemedicine champions, clinical research centers, and pioneering hospital managers joined in telling these stories of change by pulling telemedicine into the health care sector as a solution to Ontario's health system problems of access, efficiency, and quality. Telemedicine would create new access to specialized care in rural and remote areas, replacing old roads and face-to-face access to care. Telemedicine would benefit hospitals, health care providers, and patients by reducing travel, curtailing patient overload in urban hospitals, and improving the quality and scope of care practiced in rural hospitals. These visions – and their accompanying pilot initiatives – initially addressed only the subspecialty areas of radiology ("teleradiology"), dermatology ("teledermatology") and stroke ("telestroke"). However, these pilot models served as powerful metonyms for specialized care more generally.

Telemedicine advocates' narratives during this period were essentially romantic: telemedicine was a hero that would triumph over the shortcomings and problems of the health care system; in particular, it would lead to improved access for patients and clinical workflows for health care providers. The emplotment of this romance also characterized the fundamental commitment of telemedicine as a provider-centered technology. Telemedicine champions emphasized the advantages of telemedicine for physicians, especially specialists in urban areas, who would benefit from having to travel less to remote areas. It would have also benefited rural physicians, who would have had access to shared information and to expert second opinions through distant video and store-and-forward physician-to-physician consultation. Consultations among physicians included

synchronous applications, such as video conferencing and emergency "telestroke," whereby rural emergency physicians would directly consult over video with urban specialists for the treatment of ischemic strokes. Together with real-time telemedicine, developers also envisioned asynchronous applications, such as "teleradiology," whereby X-ray images would be sent to radiologists over telephone lines. These visions converged around the data transmission and connectivity features of telemedicine, which linked physicians and patients over great distances, bridging places and time. As telemedicine overcame physical barriers, telemedicine clinical champions and hospital managers envisioned telemedicine as a "hospital without walls." In the late 1990s, these stakeholders began to define a new idea of telemedicine, "telehomecare," for the delivery of remote health care services in the patients' homes. Notably, patients did not voice these early, dominant stories of Ontario telemedicine's expected future. I found no evidence of documented patient stories in the news media and in the documents from the 1990s decade. Instead, I found only second-hand retelling of patients' perspectives through other sources, including newspaper articles and participant interviews. Among these other sources, telemedicine clinical champions and hospital managers recounted patients' telemedicine experiences in their terms, as success stories to gain physicians' approval and support of the technology.

Whereas the Federal Industry Ministry as well as the provincial Science and Technology Ministry – in line with telemedicine advocates' enthusiastic expectations – envisioned telemedicine as part of the greater IT revolution, the Ontario Ministry of Health approached telemedicine with a more administrative approach. During the 1990s,

the Ministry of Health recounted new stories aimed at legitimizing the northern and rural care policy action plan, the hospital restructuring agenda, and the primary care reform. According to these reform agendas, telemedicine responded to the provincial governments and hospital managers' need to improve access to care in a time of fiscal restraint and hospital re-organization. However, the government did not define a clear and actionable plan for telemedicine's implementation, leaving it as an experimental and provisional project. Instead, the government envisioned telemedicine as a promise for patient and health care provider satisfaction, by providing care "closer to home," addressing the shortage of physicians in underserved areas, and supporting remote and rural community and family physicians in the delivery of care.

Despite the enthusiasm of a few physician telemedicine entrepreneurs, Ontario physicians as a professional group resisted telemedicine technology by appealing to traditional medical practices. They voiced discomfort over taking clinical practice outside of local clinical settings. These stakeholders replaced earlier romantic narratives of enduring telemedicine triumph with literary *quasi*-tragic narrative strategies. They approached telemedicine skeptically, raising administrative, institutional and policy problems that might prevent them from using this technology safely. This resistance helped permanently transform telemedicine as a provider-centered application because telemedicine champions envisioned the successful implementation of telemedicine as contingent upon physicians' acceptance and adoption in the clinical workspace.

In addition to resistance from physicians, economic challenges and technological barriers, such as network accessibility and the cost of the equipment, ranging from

monitors to fibre optic installation, threatened the survival of the first pilot projects in Ontario. However, by the end of the 1990s, the narrative shifted again to cast telemedicine as a "hero" overcoming all barriers; in 1998, telemedicine clinical champions and hospital managers successfully launched the first telemedicine network (NORTH Network), and subsequently two other networks (VideoCare and CareConnect) in 2001.

By the end of the 1990s, telemedicine emerged as a proof-of-principle vision framing it as a tool to respond to physicians' clinical and workflow needs and the government's health care system reform demands in a time of fiscal restraint and hospital rationalization. However, health care professionals as a professional group did not emanate as cutting-edge as the forward-looking telemedicine champions expected. Despite health care professionals' conservative stance, visions about the technology survived most forms of skepticism regarding the equipment's high costs, the lack of clear clinical evidence, and the lack of clinical and regulatory guidelines for its adoption and use in the clinical settings.

Second era: Reconciliation of romantic and skeptical narratives

During the second telemedicine era from 2001 to 2008, telemedicine visions reconciled telemedicine advocates' proof-of-principle narratives with the skeptical and cautionary narratives of health care stakeholders. This narrative shift transcended the limitations of the earlier romantic telemedicine visions by acknowledging differing stakeholders' contradictory perspectives as they negotiated telemedicine's role in the public health care system. In a process of incremental adaptation and negotiation,

stakeholders' opposing telemedicine expectations naturally reached a point of resolution in a way that suggested the integration of telemedicine within the broader health care delivery system.

Whereas in the 1990s the idea of telemedicine arose from health care champions' and hospitals' grassroots visions of distant specialized care for rural and remote areas, in the 2000s, telemedicine expectations started to grow out of top-down visions of interconnected and centralized networks of clinical care across the entire province. The federal and Ontario governments' support mitigated the early proof-of-principle visions of radical change, as funding for telemedicine came with specific requirements to align it with health care system needs and priorities. Clinical champions and service providers shifted their proof-of-principle narratives to accommodate and correspond with the governments' request to demonstrate telemedicine's value for the health care system. The narrative shifted from romantic to comic: instead of tightly focusing on and framing telemedicine as a romantic hero vanquishing and solving the health care system's problems, comic plots broadened telemedicine's apprehension as part of the larger health care system. Comic narrative strategies did not focus on telemedicine's inherent qualities as a hero, rather they depicted telemedicine's role as a catalytic factor within the health care system and sharing the health care planners' and administrators' purposes.

When expectations among these stakeholders aligned, a new telemedicine agenda emerged, indicating which specifications were relevant for the health care system. This agenda envisioned telemedicine as a tool for care coordination that would support existing health care services, but not as a service that would replace existing services.

Central to this agenda was telemedicine's role in supporting and enhancing physicians' efficiency in the delivery of health care services. Telemedicine's connectivity and coordinating capability enabled physicians to reduce travel, visit more patients per day, and spend more time in direct patient care. Telemedicine also improved quality of care since it allowed physicians to provide more reliable and accurate assessments through knowledge sharing and through specialists' support to rural physicians. Telemedicine's capacity to provide solutions to current health care delivery problems, such as health care professionals' shortages, overcrowded emergency rooms, and high hospitalization rates, was also crucial. As telemedicine integrated primary care with home care, patients would have pre-emptively accessed health care services in their homes, or have been discharged earlier from the hospital and assisted with remote home telemedicine follow-up consultations. In particular, telemedicine service providers envisioned telemedicine as a home monitoring service for chronic disease management among selected eligible patients. At the same time, these visions showcased telemedicine's economic value in the health care system. Given the high costs of hospitalizations, telemedicine represented a cost-savings solution associated with the reduction of ER visits and hospitalizations, and in length of hospital stays.

As telemedicine service providers negotiated telemedicine's role in the health care system, they reconciled contradictory proof-of-principle telemedicine visions with physicians' skeptical stance. Physicians' buy-in and adoption still represented the missing link for telemedicine's integration in the health care system. To overcome this barrier, telemedicine service providers aligned their visions with physicians' expectations of

regulated, secure, and easy-to-use telemedicine applications, defining telemedicine again as a provider-oriented technology. On the policy level, these visions and goals encouraged the Ontario health care professional organization in 2007 to draft their first telemedicine policy, which would fill the policy gap and guide physicians' use and practice of telemedicine in Ontario. This policy acknowledged telemedicine's innovative role but maintained that the practice of telemedicine must correspond with traditional health care service. By doing so, the policy defined physicians as the ultimate telemedicine gatekeepers. As a result of this vision, the policy held physicians accountable for exercising their expertise in judging telemedicine's compliance with technical and clinical quality standards, as well as with legal and professional obligations. Telemedicine expanded physicians' required expertise for practicing medicine to include IT proficiency in clinical practice. This policy provided an initial policy framework defining telemedicine as a traditional health care service but failed to resolve two unsolved issues: First, it held physicians responsible for the practice of telemedicine by judging its applicability case-by-case, instead of providing standards of care. Second, it did not solve physicians' telemedicine services reimbursement problem. Rappert & Brown's study conducted in the UK in 2000 similarly identified how the administratively oriented telemedicine visions of the government and telemedicine service providers had "largely ostracized the clinical community" (28). As these authors argue, the government's vision of telemedicine aligned with the idea of "resource management rather than clinical care" (28)

Telemedicine service providers and MOHLTC attempted to overcome some of

these missteps and tensions and encourage physicians' adoption by mapping telemedicine onto the current health care system. First, MOHLTC and the Ontario Telemedicine Network (OTN) agreed upon a new telemedicine billing code to facilitate telemedicine's adoption in the clinical setting. Second, OTN computerized the scheduling and referral systems to preserve traditional clinical workflows and practices. To facilitate telemedicine's adoption into clinical practice, OTN began to envision it as a truly mobile application. OTN transformed the room-based telemedicine application into a portable hospital cart equipped with monitors, camera, and handheld electronic peripherals, and into a physician-dedicated video conferencing application accessible from any laptop at the hospital, office, or home. Finally, to address security and privacy issues, they devised a private internet network infrastructure separate from the public network for the secure exchange of health data.

During the 2000s, the vision of telemedicine as an enabler and catalyzer of the health care system's existing services promoted a higher, universal vision of telemedicine as part of the overall health care system. Specialized and dedicated telemedicine billing codes, scheduling systems, equipment, and private internet networks reconciled physicians' expectations and naturally rendered telemedicine as a service within the traditional health care system.

Third era: Patient empowerment and "health care ugly" narratives

During the contemporary era, from 2009 to the present, new telemedicine expectation narratives trace an alternate trajectory that moves away from, but does not rule out, the reconciliatory narratives of the 2000s that envisioned telemedicine as

providing solutions to current health care delivery problems.

Private commercial businesses redefine telemedicine as a consumer-controlled technology, empowering patients to access care autonomously from anywhere and at any time. As developers of a hopeful technology, commercial vendors depict consumer-controlled telemedicine as originating and developing within the market, rather than under the direct and mediated control of the government and institutional gatekeepers. A similar study conducted in the UK identifies a similar "modernist discourse," which views telemedicine as a revolutionary health care delivery tool but most importantly as a "business opportunity" for the IT industry (83). Consumer-controlled telemedicine challenges the traditional in-person and institutionally mediated health care delivery services by providing a better and convenient way to access care. Likewise, this narrative guides the way in which health services and health care professional practice should evolve. According to commercial stakeholders, the increased demand for personal IT consumer devices would decrease the costs of commercial IT mobile technologies, defining a new cost-effective way for the health care system to distribute resources. Rather than investing in old, bulky, and expensive telemedicine equipment specifically designed for the health care setting, consumer IT mobile devices offer a better and more cost-effective way to practice telemedicine. Consumer-controlled telemedicine enables a fairer distribution of both health care resources and tools across hospital and community clinical settings compared to the present and past. Hence, consumer-controlled telemedicine would empower not only patients but also physicians and allied health care professionals in community settings, by granting them access to cost-effective, accessible,

and better tools, naturally improving the way they practice care. Whereas business stakeholders viewed patient empowerment as something new and radical, they consider physicians' empowerment as a natural and organic part of the overall health care system's evolution. Although somewhat dissimilar, narratives of patient and provider empowerment provide a rhetorical justification for the pursuit of a specific market agenda.

Although patient empowerment appears to be "inevitable" as this trend empowers consumers through better access to care, from a public policy perspective this telemedicine vision paradoxically enables the creation of a second, privatized "underground" health care system. Poorly controlled and regulated telemedicine threatens to discriminate patients' access to care based on unequal and differential economic access to IT devices and to exploit patients due to profit-motivated providers' induced demand. Business narratives look at consumer-controlled telemedicine with a positive outlook since it enables providers, especially physicians, to provide privately paid, profitable services outside of publicly funded OHIP coverage. However, from a public policy standpoint, consumer-controlled telemedicine undermines health care professionals' integrity and ethical behaviour, and more broadly, the integrity of publicly insured services. Here, the emphasis of these narratives lies on the uncertainty of whether medicine's current institutions can maintain control over telemedicine as a way of preventing such exploitation and regulate telemedicine to ensure the integrity of health care professionals and the publicly funded health care system. According to this account, consumer-controlled telemedicine allows physicians to select and cherry-pick the most

profitable services, favouring profit-seeking behaviours over quality and access to care. Likewise, public policy narratives frame consumer-controlled telemedicine as threatening to physicians' professional integrity, by raising issues of clinically inferior and possibly clinically inappropriate care.

The articulation of these visions is not just a narrative enterprise but also reveals the need to define policies and guidelines for telemedicine adoption. However, the creation of telemedicine policies, regulations, and standards proves to be one of the key issues that impede telemedicine adoption. This is because policies are tightly entangled with stakeholders' differing technological expectations. In this case, governmental and health care professional organizations' failure to negotiate telemedicine's role and agenda in the health care system hinders telemedicine policies and adoption. These findings further support previous research on telemedicine expectations in the UK (28, 83, 95). Similar to this study's findings, studies in the UK identified a gap between policy-makers' expectations and telemedicine implementation in practice due to the lack of clear policy frameworks and practice guidelines (28, 83, 95). The authors of these studies stressed the relevance of establishing interdisciplinary dialogues to mutually position themselves in a way to learn about each other's expectations and to define priorities, rights, duties, and responsibilities (28, 83, 95).

Nevertheless, these stakeholders have set out modest incremental efforts to provide telemedicine regulations and to fill the policy gaps. The introduction of OHIP telemedicine billing codes and the 2012 Physician Services Agreement between OMA and MOHLTC (310) has begun to define some (but not all) physician remuneration fees

for telemedicine services. At the same time, health care professional organizations both at the federal and provincial level have devised telemedicine policies to guide physicians' adoption of telemedicine in clinical practice (307, 308). These policy accounts (307, 308) define telemedicine as a traditional clinical practice, and as such, define physicians as the principal telemedicine gatekeepers. By asserting physicians' authority over the access and use of telemedicine, these policies limit and deter consumer-controlled unmediated access to health care services. These accounts also warn physicians against unethical and economically exploitive adoption of telemedicine in clinical practice by invoking physicians' professional obligations of accommodating the needs of patients. These accounts thus continue to assert telemedicine as a physician-oriented technology.

As the professional organizations affirm this telemedicine vision, government and telemedicine service providers' narratives define telemedicine as something conditionally woven into the fabric of the health care system. Considering the risk of unregulated and unmediated consumer-controlled telemedicine, these stakeholders view telemedicine as in line with existing health care system priorities and values. These stakeholders' narratives depict telemedicine constrained by both health care system needs and accountability requirements, as well as by health care professionals' needs and clinical and liability requirements. In particular, to exert control over telemedicine and avoid the unwarranted consequences of consumer-controlled unmediated access to care, these narratives define telemedicine as a tool to provide affordable, accessible, and high-quality care. As such, these narratives position telemedicine within existing health care services, as a way to fill the delivery gaps and as a way to provide cost-effective health care services.

As commercial businesses advance consumer-controlled telemedicine narratives, government, telemedicine service providers, and health care professional strategically start to define telemedicine and its role in the health care system to counter and deter the unmediated consumer-controlled telemedicine. Rather than praising patient empowerment through better access to care, these stakeholders view telemedicine as a way of reaching underserved patient populations and ensuring the delivery of high-quality and cost-effective care, thus legitimizing and reinforcing health care professionals' and the publicly funded health care system's authority and integrity.

Looking forward

Today, stakeholders' visions and interpretations of telemedicine have slowly begun to reach some form of consensus that is socially acceptable among the different groups of stakeholders (50, 51). As discussed in the introduction chapter, Pinch and Bijker describe this process as the *stabilization* and *closure* stage of the social construction of technologies (50, 51). Stabilization and closure are key concepts for assessing the state of a technology's social construction process (50, 51). According to the Social Construction of Technologies (SCOT) framework, *stabilization* represents the step in the process in which different technological expectations and interpretations reach alternative levels of consensus (50, 51). *Closure* indicates the endpoint, the final step in the social construction process in which specific visions are collectively accepted and embedded within the society, thus ruling out other interpretative alternatives and visions (50, 51). Socially acceptable here means that different stakeholders have found a shared and agreed solution based on rhetorical closure (the group considers the problem as

solved) and closure by redefinition of the problem (the group frames the problem in a different way) (50, 51).

In contemporary narratives, the problems telemedicine has solved have shaped telemedicine as a set of alternative solutions socially accepted among the groups of relevant stakeholders. First, there is a shared understanding that views telemedicine as a means to facilitate access to specialized care in remote and rural areas of the province. In this case, there is no one social group vision that prevails, as all consider the core functions of telemedicine (i.e., overcoming distance and time barriers to serve underserved patients) as taken for granted, viewing telemedicine as a solution to problems of access to care in rural and remote areas. This vision has become fundamentally institutionalized in the term itself, "TELEmedicine": if a technology does something else, it is not really telemedicine. Therefore, the formation of this robust shared meaning has locked telemedicine into a fixed niche of rural care, making it difficult to realize new visions and applications.

Second, two dominant groups' expectations have strived to dominate in the field; namely, the health care professionals group – which includes physicians, nurses, allied health care professionals, and hospital managers – and the government, which has enlisted the support of the telemedicine service provider Ontario Telemedicine Network (OTN). This scenario reveals how the health care professionals' conservative and skeptical stance has constrained the telemedicine agenda while making explicit the government's vision of telemedicine as a tool to support and enhance the management, coordination, and delivery of high-quality and affordable health care services. These

visions highlight how the resource management and care coordination vision of the government aimed not only to enhance the delivery of health care services but also to disenfranchise clinical professions, whose resistance to telemedicine, premised on the lack of clear and transparent policies, it attempted to offset. Telemedicine physician reimbursement policies, confidentiality and security concerns, physicians' liability and licensure regulations, as well as clinical and practice standards for telemedicine implementation, have all become the principal issues through which the health care profession has gained power over the definition and role of telemedicine in the health care system. Previous research on telemedicine expectations conducted in the UK pointed out to a similar conclusion (28, 83, 95). These studies analogously identified and highlighted the contrasting visions between the government and the health care profession as limiting telemedicine's adoption (28, 83). Moreover, the authors of these studies similarly emphasized health care professionals' "hostility" in regards to the government's "managerial" telemedicine expectations (28), concluding that health care professionals' enrolment was central to ensure telemedicine's uptake (28, 83, 95). Small incremental changes have overcome some of the issues through protracted negotiation about regulation and remuneration among health care professional groups and the government, stabilizing and providing a certain level of shared understanding of telemedicine. Together, health care professionals' group, government, and OTN's expectations stabilize around two telemedicine visions: First, they envision telemedicine as a physician-to-physician consultation service, which includes both video conferencing and store-and-forward services such as telestroke, teleradiology, and teledermatology. Second, they

depict telemedicine as a direct-to-patient home care delivery service for selective and limited services, such as telehomecare and remote telemonitoring for follow-up consultations, wound care, telemonitoring, and self-management coaching.

Finally, these two dominant groups' visions rule out businesses' consumer-controlled telemedicine visions, which view this variant of telemedicine as discriminating and unsafe for patients, as well as undermining the integrity of health care professionals and publicly insured services. Poorly controlled and unregulated consumer-controlled telemedicine would foster patients' unequal access to care based on patients' differential economic access to commercial IT devices and to different levels of computer proficiency. Moreover, this telemedicine vision would provide opportunities for profit-seeking physicians to favour profit-induced services over quality and access to care, as well as telemedicine's failure to provide the best possible and most clinically appropriate care. By advancing these arguments about safety and professional and institutional integrity in the delivery of care, the two dominant groups – the health care professional group and the government – reach a degree of closure. They bring stabilization in the way they persuade the audience, that is, the private commercial businesses and the patients/consumers, of the potential threat of creating an unwarranted second, private health care system. In such circumstances, these arguments legitimize the slow integration of a selected set of consumer-controlled commercial telemedicine applications for chronic conditions management, e.g., diabetes and chronic heart failure, under physicians' control through technological certifications and registries, as devised by OTN's PracticalApps®.

Finally, with respect to the two dominant groups, neither group wins a total victory, since debates and negotiations around policy and practice issues are likely to remain the crucial criteria that will continue to constrain telemedicine's future agenda and shape telemedicine as a physician-oriented technology.

Narrative analysis for understanding health technologies

New health technologies, such as telemedicine, emerge in a context of uncertainty and indeterminate future, and are thus difficult to analyze, both in terms of future trajectories and in terms of social, political, and moral concerns (25, 28, 48, 93). It is not possible to define new health technologies without making assumptions about what they are (and are not) and about their role (79, 81). These assumptions comprise "desirable futures" (321), that is, expectations, hopes, and promises that create opportunities and "negotiation spaces" by which stakeholders express the normative beliefs and claims that shape the innovation process (48, 93). By this token, technological artifacts act as normative devices in the way that they define what is possible and not possible to do, as they influence human behaviour and modify the settings in which the technology is used (48).

Promises and visions do not exist in themselves, and they are not naturally displayed in plain sight; rather, they need to be communicated and mobilized to attract interest and enrol support (28). Different stakeholders position themselves strategically when envisioning the desired futures and expect different roles and outcomes from the same technological artifact (48, 79, 94). However, not all stakeholders can voice their desired visions, leaving these expectations disregarded and omitted during the

development process (48, 94). Understanding the desirability and expectations of health technologies, therefore, reveals the implicit and explicit value judgments of the stakeholders involved, as well as the power relationship that build around specific visions, ultimately shaping what the technology is and what role it plays in the health care system (48, 94).

Analyzing and understanding technologies means shifting the unit of analysis from the technological artifact to the social actors and processes among them (50, 51); in particular, to the "statements uttered by humans" (p. 66) (50), that is, the narratives they use to make sense of the world and communicate such expectations (78, 88). Narratives tie times together – past, present, and future are weaved together in one whole fabric, making sense of reality and orienting action through time (141, 152, 325). Understanding and analyzing the "dialects of promises" reduces uncertainty by identifying a meaningful pattern that defines hopes and intentions (85, 215). Narrative analysis seeks to find out "what happens" rather than "what works" not by measuring progress in terms of key outcome indicators, but rather by exploring the ways stakeholders define, negotiate, mobilize, and construct goals and interests (48, 50, 51, 324). As such, narrative analysis provides a sense-making tool for understanding complex technologies such as telemedicine, as narratives structures map the "rhetorical space" in which visions and expectations define what is possible to do and not do, and what are right or wrong decisions. That is, it functions as a "diagnostic tool" to explore and describe the claims and value judgments that limit or legitimize the alternative interpretations that shape the technology (84, 325).

In this study, narrative analysis has revealed tensions between the fascination with medical breakthroughs and path-breaking health technologies, which traditionally depict medicine and health care professionals as cutting-edge, and the health care professionals' conservative, skeptical approach to telemedicine. As a result, telemedicine emerges today as a physician-oriented technology, as well as a health care service controlled and mediated by public and traditional institutional gatekeepers. This finding highlights health care professionals' relevant role and power in the social process, which have shaped – and continue to do so – telemedicine technologies in Ontario as we see them today. By taking a conservative and traditional stance, this vision has also ruled out the most recent path-breaking expectation advanced by private commercial stakeholders. Whereas private commercial businesses' narratives evoked path-breaking visions of unmediated access to care through consumer-controlled telemedicine, public sector managers and health care professionals viewed telemedicine's consumerization as a threat to their integrity and role as health care delivery gatekeepers. By evoking values of fairness and equality to access, as well as to the government's duty and health care professions' professional obligations to provide high-quality and accessible care, governmental stakeholders and the clinical profession limited private businesses' visions. In a similar fashion, but adopting different types of narratives, health care providers recalled principles of clinical safety, privacy of health information, liability, and licensure, as well as malpractice and reimbursement issues to restrain and confine vendors' consumer-controlled telemedicine vision.

Potential lessons for policy-makers, technology vendors, and end-users

Telemedicine encompasses a wide variety of technological products, from self-

managed remote monitoring kits for chronic conditions management to real-time video conferencing for stroke care that delivers remote audio-visual access to a neurologist for remote treatment. Therefore, it would be reductive to conceive their adoption as a single case. However, by focusing on the social construction of telemedicine process, this study empirically identifies the shared understandings of what telemedicine should (and should not) be and what role telemedicine should play in the health care system in Ontario. The findings outline and identify the principal telemedicine stakeholders in Ontario that have arranged themselves around telemedicine through a process of alignment and enrollment. The holistic and more complete picture of the construction of complex telemedicine technologies reveals the visions that organize the multiple perspectives and interdependent relationships that shape telemedicine's future-oriented trajectories.

A widely accepted and stabilized vision among all the relevant stakeholders acknowledges the value of telemedicine as a solution to the problem of access to specialized care in rural and remote areas. As this vision has reached wide-scale consensus, this finding also reveals how this stabilized variant of rural telemedicine has limited other alternative visions and has adversely affected the uptake of telemedicine in urban areas.

However, other factors hinder the adoption of telemedicine in Ontario, since telemedicine's future agenda is linked to extensive organizational reforms in the health care system. In the near future, opportunities for wide-scale telemedicine adoption will depend on system-wide policy changes in health care delivery, encompassing both rural as well as highly populated urban areas. Past and current telemedicine narratives suggest

that telemedicine stakeholders are less likely to draw on revolutionary and path-breaking promises of change, which may alienate specific groups of supporting key stakeholders, first and foremost, physicians. Instead, it might be argued that more attention should be directed towards filling the telemedicine policy gaps, which represent one of the major barriers to physicians' telemedicine uptake. Until now, conflicting and misaligned visions among the different stakeholders involved in the field have shaped telemedicine as a hybridized uninsured/*quasi*-insured service. Telemedicine remains an uninsured service; however, it acts as an insured one, as physicians can now bill telemedicine consultations through OHIP billing codes, even though the payment for these services does not come from OHIP. Making telemedicine a provincially insured service would encourage further negotiations and encourage physicians' support for telemedicine's uptake. Negotiations between government and health care professional organizations representing physicians and other health care providers would generate debate around each stakeholder's assumptions and values attached to telemedicine and would help define clear telemedicine priorities, responsibilities, and objectives. The narratives identified in this study demonstrate that telemedicine physicians' reimbursement schemes, liability and licensure policy regulations, and the development of standardized clinical guidelines for implementation are foremost among the needed telemedicine policies.

Not only do these findings reveal critical ongoing policy gaps that inhibit telemedicine adoption, but they also disclose and make more explicit the envisioned risks embedded in telemedicine technologies. From a public policy perspective, telemedicine represents a threat to the publicly funded health care system, since it allows patients to

access care unmediated by governmental and institutional gatekeepers. In particular, consumer-controlled telemedicine may transform health care into a consumer product situated beyond the health care system. This risks transforming health care systems into markets and opening the way for a second, private tier in the health care system. A private system enables the exploitation of patients by profit-seeking physicians, driven by demand-induced services through the unregulated use of telemedicine. Unregulated and poorly controlled telemedicine thus threatens the integrity of the publicly funded health care system and the values it upholds and endorses.

Directions for future research

This study contributes to the understanding of how stakeholders' different expectations narratives have shaped telemedicine technologies in Ontario by outlining the established understandings shared among the groups of stakeholders. However, telemedicine is a complex technology with many moving parts, and a wider focus could produce interesting findings that would account for additional aspects not included in this study. In terms of directions for future research, further work may include the empirical study of the social construction of telemedicine as an education and administrative application, as well as exploring the social construction of Electronic Health Records (EHRs). By comparing the different shared understandings of telemedicine and EHRs, this future research may illuminate the greater role of ITs in health care delivery and practice.

Another possible area of future research would be to investigate patients' telemedicine visions and expectations, and how these visions align (or not) with health

care providers', commercial vendors', government's, and research organizations' visions. As this study focuses on telemedicine's development from the early days to the present, I excluded patients' perspectives, since they do not participate in the early design and definition of technologies (48). However, with the increased accessibility to and wide use of personal IT consumer devices today, patients' expectations may start to play a greater role in defining new future telemedicine scenarios.

Finally, the comparison of telemedicine expectations between countries with different health care systems (e.g., privately insured vs. publicly insured health care systems) may represent an additional avenue for future research. This research could explore whether the understanding of the context is considered important in understanding the success or failure of telemedicine adoption.

Strengths and limitations of this study

This study offers the first in-depth analysis of Ontario telemedicine expectation narratives. A small body of literature has examined narratives of telemedicine visions in Canada (Quebec) (327), in the UK (28, 83, 328, 329) and in Germany (330) and future narratives of other medical technologies, such as eHealth programs (331), deep brain stimulation technologies (332), pharmacogenetics technologies (333), genetic testing (28, 329), xenotransplantation (82), and stem cell banking (81). Similar findings on telemedicine expectation narratives observed in past studies further support and strengthen this study's results. The main findings of this study are consistent with prior research showing that telemedicine encompasses a heterogeneous set of stakeholders distributed broadly within, across, and beyond the health care system, rather than

concentrated in smaller networks of relevant stakeholders (28). Another common finding is the identification of two main opposing visions between governmental and health care profession stakeholders (28, 83, 95). Previous research observed that whereas the government envisioned telemedicine as a tool to both manage resources and integrate services across health sectors, health care profession's cautionary and skeptical visions highlighted the gap between managerial expectations and the lack of clear policies for practice (28, 83). As in this study, these opposing visions revealed the government's and health care profession's misalignment of expectations as a crucial factor inhibiting telemedicine's future agenda. This misalignment of visions identified in previous and current research further suggests that negotiations and debate among these two groups of stakeholders will help achieve a common understanding of telemedicine and thus define a clearer agenda and policy framework.

However, the findings of this study conducted in Ontario partly differ from previous research conducted in the UK (83). Greenhalgh et al.'s study (83) described policymakers adopting revolutionary and path-breaking "modernist" discourses of radical change. This differs from this study conducted in Ontario. Here, policymakers rarely adopted radical narratives to depict telemedicine's revolutionary role in the improvement of the health care system. Rather, the private vendors' and end-users' consumer-controlled telemedicine visions, which threatened the integrity of the Ontario health care system, pushed the government to adopt a more reconciliatory vision. Here the power dynamics among the different groups of stakeholders defined the way each stakeholder positioned itself and formulated diverse expectations on telemedicine's development.

As the findings of past research and this current study highlights, expectation narratives differ importantly from more familiar "innovation-based" descriptive historical accounts, which mark technological progress based exclusively on an orderly sequence of successful innovations. Instead, the narrative variability reveals the variation in the stakeholders' incentives and perspectives, suggesting that telemedicine emerges as a negotiated and socially constructed artifact. Narrative analysis enables identification and recovery of the meaning implicitly and explicitly embedded in the data, capturing the richness of stakeholders' perspectives and the uniqueness of the social interdependencies and ambiguities that shape telemedicine technologies. As such, narrative analysis enables understanding of the complexities of telemedicine by enhancing our understanding of the *idea* of telemedicine, which drives its constant evolution and application. Previous research adopted similar interpretative inductive methodologies to analyze and interpret telemedicine visions and expectations, including discourse analysis (83) and hermeneutics (95). The interpretive inductive narrative approach is a strength of this study. Based on the Social Constructivist worldview (62), it is not necessary to seek to "draw every possible interpretation" from these data (101). I aim to reveal the implicit meanings and understandings embedded in stakeholders' expectations narratives; however, I do not intend to impose a particular structure or interpretation replacing the narrator's meaning, nor to claim that this is the only way to interpret a narrative (88, 101). The purpose of a historical narrative study is not evaluation (with the aims of "generalizability" or "reproducibility") but rather interpretation and sense-making. As with most qualitative interpretive research, these findings have value for understanding the specific topic at

hand (i.e., the transformation of ideas concerning Ontario's telemedicine program and technologies) and for offering potential contributions to the development of social theory about health technology and policymaking. Additional studies, of more diverse settings and technology cases, would help to build a theory of the power and mechanisms of expectation narratives and their roles in shaping health care technologies.

This study drew on the perspectives of a limited number of participants, due to logistical difficulties in identifying and enrolling knowledgeable individuals who had participated in the early development stages of telemedicine up to 24 years ago. A number of individuals have retired or changed organizations over time and were difficult to trace. However, to overcome this problem, I used a snowball sampling method (i.e., identifying potential participants from other participants) and further enlisted some participants to establish contact with potential interviewees to help improve the response rate. Through persistence, nearly all of the most potentially informative participants were involved in the study. I was also able to triangulate findings from participant interviews with narratives collected from other sources, such as government reports and media stories.

The inclusion of both documentary records and interview data is a strategy that "adds rigor, breadth, complexity, richness, and depth to any inquiry" (64). Documentary data, such as newspaper articles, website pages, reports and public records, are "physical traces of social settings" (334), and as such provide a source for both the description of the social context and the interpretative analysis of concepts and meanings. However, documents are not objective facts (100, 334); rather, they are socially constructed

accounts created with deliberate purposes and for intended readerships (100, 334). As social constructs, documents reflect the power dynamics and relationships among different stakeholder groups (137, 335). For this reason, documents can limit or exclude those at disadvantage, while they give voice to "dominant elite voices in the public conversation" about the topic (100, 336). Interviews, on the other hand, allow for more control over the data collection and the conceptual refinement of the analysis. In this study, first-hand interviews ensured that I was capturing a heterogeneous set of perspectives by purposively identifying and selecting diverse stakeholders who had direct experience with telemedicine technologies and programs in Ontario over the last 24 years. Moreover, the study interviewees situated key relevant documents in context, adding relevant details about the authors, circumstances, and purposes that produced those documents. With a focused approach to data collection based on the ongoing documentary analysis, interview data provided insights about tacit assumptions and underlying power relationships that shaped the content and form of telemedicine expectation narratives. The flexibility and control over the collection of interview data allowed me to follow the analytical leads identified in the documents to refine my overall conceptual categories and analytical framework.

REFERENCES

1. Bashshur RL, Shannon G, Krupinski EA, Grigsby J. Sustaining and Realizing the Promise of Telemedicine. Telemedicine and e-Health. 2013;19(5):339-45.

2. Stevenson, Lindberg. New Oxford American Dictionary. 3rd ed: 'Oxford University Press'; 2010.

3. Sood S, Mbarika V, Jugoo S, Dookhy R, Doarn CR, Prakash N, et al. What is telemedicine? A collection of 104 peer-reviewed perspectives and theoretical underpinnings. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2007;13(5):573-90.

4. World Health Organization W. Telemedicine: opportunities and developments in Member States: report on the second global survey on eHealth. Global Observatory for eHealth Series. 2009;2:1-93.

5. Bashshur RL. On the definition and evaluation of telemedicine. Telemedicine journal : the official journal of the American Telemedicine Association. 1995;1(1):19-30.

6. Grigsby J, Rigby M, Hiemstra A, House M, Olsson S, Whitten P. Chapter 7: The Diffusion of Telemedicine. Telemed J e-Health. 2002;8(1):79-94.

7. Meystre S. The Current State of Telemonitoring: A Comment on the Literature. Telemedicine and e-Health. 2005;11(1):63-9.

8. Gaikwad R, Warren J. The role of home-based information and communications technology interventions in chronic disease management: a systematic literature review. Health Informatics Journal. 2009;15(2):122-46.

9. Paré G, Jaana M, Sicotte C. Systematic Review of Home Telemonitoring for Chronic Diseases: The Evidence Base. Journal of the American Medical Informatics Association : JAMIA. 2007;14(3):269-77.

10. French B, Day E, Watkins C, McLoughlin A, Fitzgerald J, Leathley M, et al. The challenges of implementing a telestroke network: a systematic review and case study. BMC Medical Informatics and Decision Making. 2013;13:125-.

11. Levine SR, Gorman M. "Telestroke": The Application of Telemedicine for Stroke. Stroke. 1999;30(2):464-9.

12. Chan S, Torous J, Hinton L, Yellowlees P. Mobile Tele-Mental Health: Increasing Applications and a Move to Hybrid Models of Care. Health care. 2014;2(2):220.

13. Coates SJ, Kvedar J, Granstein RD. Teledermatology: From historical perspective to emerging techniques of the modern era: Part I: History, rationale, and current practice. Journal of the American Academy of Dermatology. 2015;72(4):563-74.

14. Ruggiero C. Teleradiology: a review. Journal of Telemedicine and Telecare. 1998;4(1):25-35.

15. Thrall JH. Teleradiology Part I. History and Clinical Applications. Radiology. 2007;243(3):613-7.

16. Krupinski EA. Virtual slide telepathology workstation of the future: lessons learned from teleradiology. Human Pathology. 2009;40(8):1100-11.

17. Weinstein RS, Descour MR, Liang C, Bhattacharyya AK, Graham AR, Davis JR, et al. Telepathology overview: From concept to implementation. Human Pathology.32(12):1283-99.

18. Weinstein RS, Graham AR, Richter LC, Barker GP, Krupinski EA, Lopez AM, et al. Overview of telepathology, virtual microscopy, and whole slide imaging: prospects for the future. Human Pathology. 2009;40(8):1057-69.

19. Kumar S, Yogesan K. Internet-based eye care: VISION 2020. The Lancet.366(9493):1244-5.

20. Tulu B, Chatterjee S, Maheshwari M. Telemedicine Taxonomy: A Classification Tool. Telemedicine and e-Health. 2007;13(3):349-58.

21. Armfield NR, Edirippulige S, Caffery LJ, Bradford NK, Grey JW, Smith AC. Telemedicine--a bibliometric and content analysis of 17,932 publication records. International journal of medical informatics. 2014;83(10):715-25.

22. Fatehi F, Wootton R. Telemedicine, telehealth or e-health? A bibliometric analysis of the trends in the use of these terms. Journal of Telemedicine and Telecare. 2012;18(8):460-4.

23. Bashshur R, Shannon, G., Krupinski, E., Grigsby, J. . The Taxonomy of Telemedicine

. Telemedicine and e-Health 2011;17((6)):484-94.

24. Yang Y-T, Iqbal U, Ching JH-Y, Ting JB-S, Chiu H-T, Tamashiro H, et al. Trends in the growth of literature of telemedicine: A bibliometric analysis. Computer methods and programs in biomedicine. 2015;122(3):471-9.

25. Greenhalgh T, Russell J, Ashcroft RE, Parsons W. Why National eHealth Programs Need Dead Philosophers: Wittgensteinian Reflections on Policymakers' Reluctance to Learn from History. Milbank Quarterly. 2011;89(4):533-63.

26. Brown EM. The Ontario Telemedicine Network: a case report. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2013;19(5):373-6.

27. Murray E, Burns J, May C, Finch T, O'Donnell C, Wallace P, et al. Why is it difficult to implement e-health initiatives? A qualitative study. Implementation Science. 2011;6(1):6.

28. Rappert B, Brown N. Putting the future in its place: Comparing innovation moments in genetic diagnostics and telemedicine. New Genetics and Society. 2000;19(1):49-74.

29. Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S. Interactive telemedicine: effects on professional practice and health care outcomes. The Cochrane database of systematic reviews. 2015;9:Cd002098.

30. Bashshur RL, Reardon TG, Shannon GW. Telemedicine: a new health care delivery system. Annual review of public health. 2000;21:613-37.

31. Kraetschmer NM, Deber RB, Dick P, Jennett P. Telehealth as gatekeeper: policy implications for geography and scope of services. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2009;15(7):655-63.

32. Pare G, Moqadem K, Pineau G, St-Hilaire C. Clinical effects of home telemonitoring in the context of diabetes, asthma, heart failure and hypertension: a systematic review. Journal of medical Internet research. 2010;12(2):e21.

33. Sevean P, Dampier S, Spadoni M, Strickland S, Pilatzke S. Patients and families experiences with video telehealth in rural/remote communities in Northern Canada. Journal of clinical nursing. 2009;18(18):2573-9.

34. May C, Mort M, Williams T, Mair F, Gask L. Health technology assessment in its local contexts: studies of telehealthcare. Social Science & Medicine. 2003;57(4):697-710.

35. OECD. Improving Health Sector Efficiency: OECD Publishing.

36. Ontario's Action Plan for Health Care. Better patient care through better value from our health care dollars. In: Care MoHaL-T, editor. Government of Ontario: Queen's Printer for Ontario 2012.

37. Broens THF, Huis in't Veld RMHA, Vollenbroek-Hutten MMR, Hermens HJ, van Halteren AT, Nieuwenhuis LJM. Determinants of successful telemedicine implementations: a literature study. Journal of Telemedicine and Telecare. 2007;13(6):303-9.

38. Rada G. Telemedicine: are we advancing the science? Cochrane Database of Systematic Reviews 2015;9.

39. Zanaboni P, Wootton R. Adoption of telemedicine: from pilot stage to routine delivery. BMC Medical Informatics and Decision Making. 2012;12(1):1.

40. Bahaadinbeigy K, Yogesan K, Wootton R. Gaps in the systematic reviews of the telemedicine field. Journal of Telemedicine and Telecare. 2010;16(7):414-6.

41. Ekeland AG, Bowes A, Flottorp S. Methodologies for assessing telemedicine: a systematic review of reviews. International journal of medical informatics. 2012;81(1):1-11.

42. Gammon D, Johannessen LK, Sorensen T, Wynn R, Whitten P. An overview and analysis of theories employed in telemedicine studies. A field in search of an identity. Methods of information in medicine. 2008;47(3):260-9.

43. Williams T, May C, Mair F, Mort M, Gask L. Normative models of health technology assessment and the social production of evidence about telehealth care. Health policy (Amsterdam, Netherlands). 2003;64(1):39-54.

44. Greenhalgh T, Russell J. Why Do Evaluations of eHealth Programs Fail? An Alternative Set of Guiding Principles. PLoS Medicine. 2010;7(11):e1000360.

45. Bashshur RL. On the definition and evaluation of telemedicine. Telemedicine journal : the official journal of the American Telemedicine Association. 1995;1(1):19-30.

46. Greenhalgh T, Swinglehurst D. Studying technology use as social practice: the untapped potential of ethnography. BMC Medicine. 2011;9(1):45.

47. Cresswell KM, Worth A, Sheikh A. Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare. BMC medical informatics and decision making. 2010;10:67.

48. Lehoux P. The Problem of Health Technology: Policy Implications for Modern Health Care Systems: Routledge; 2006.

49. Bijker WE. Why and how technology matters. In: Goodin RE, Tilly C, editors. The Oxford Handbook of Contextual Political Analysis: Oxford University Press; 2006. p. 681--706.

50. Bijker WE. How is technology made?—That is the question! Cambridge Journal of Economics. 2010;34(1):63-76.

51. Pinch TJ, Bijker WE. The Social Construction of Facts and Artefacts: or How the Sociology of Science and the Sociology of Technology might Benefit Each Other. Social Studies of Science. 1984;14(3):399-441.

52. Lehoux P, Sicotte C, Denis JL, Berg M, Lacroix A. The theory of use behind telemedicine: how compatible with physicians' clinical routines? Social science & medicine (1982). 2002;54(6):889-904.

53. May C, Harrison R, Finch T, MacFarlane A, Mair F, Wallace P. Understanding the Normalization of Telemedicine Services through Qualitative Evaluation. Journal of the American Medical Informatics Association. 2003;10(6):596-604.

54. Jennett PA, Scott RE, Affleck Hall L, Hailey D, Ohinmaa A, Anderson C, et al. Policy implications associated with the socioeconomic and health system impact of telehealth: a case study from Canada. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2004;10(1):77-83.

55. Verbeek P-P. Materializing morality design ethics and technological mediation. Science, Technology & Human Values. 2006;31(3):361-80.

56. Stone D. Policy Paradox: The Art of Political Decision Making: W.W. Norton & Company; 2012.

57. Creswell JW. Qualitative Inquiry and Research Design: Choosing Among Five Approaches: SAGE Publications; 2007.

58. Giacomini M. Theory Matters in Qualitative Research. In: Bourgeault I, Dingwall, R., & de Vries, R. , editor. The SAGE Handbook of Qualitative Methods in Health Research. California: Thousand Oaks; 2010. p. 125-56.

59. Lehoux P, Blume S. Technology assessment and the sociopolitics of health technologies. Journal of health politics, policy and law. 2000;25(6):1083-120.

60. FinOHTA FOfH. HTA Core Model for Medical and Surgical Interventions. Finland; 2008. Report No.: v 1.0r.

61. Leonardi PM, Barley SR. What's Under Construction Here? Social Action, Materiality, and Power in Constructivist Studies of Technology and Organizing. Academy of Management Annals. 2010;4(1):1-51.

62. Berger PL, Luckmann T. The Social Construction of Reality: A Treatise in the Sociology of Knowledge: Penguin Adult; 1991.

63. Phillips DC. The Good, the Bad, and the Ugly: The Many Faces of Constructivism. Educational Researcher. 1995;24(7):5-12.

64. Denzin NK, Lincoln YS. The SAGE Handbook of Qualitative Research: Sage Publications; 2005.

65. Maxwell JA. Qualitative Research Design: An Interactive Approach: SAGE Publications; 2005.

66. Longino H. Subjects, power, and knowledge: Description and prescription in feminist philosophies of science. Knowledge and Inquiry: Readings in Epistemology. 2002:385.

67. Faulkner A, Lange B, Lawless C. Introduction: Material Worlds: Intersections of Law, Science, Technology, and Society. Journal of Law and Society. 2012;39(1):1-19.

68. Williams R, Edge D. The social shaping of technology. Research policy. 1996;25(6):865-99.

69. Woolgar S. Reconstructing man and machine: A note on sociological critiques of cognitivism. The social construction of technological systems: New directions in the sociology and history of technology. 1987:311-28.

70. Winner L. Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology. Science, Technology & Human Values. 1993;18(3):362-78.

71. Latour B, Woolgar S. Laboratory of Life: The Construction of Scientific Facts: Princenton University; 1986.

72. Barnes B. The Science-Technology Relationship: A Model and a Query. Social Studies of Science. 1982;12(1):166-72.

73. Kuhn TS. The structure of scientific revolutions: University of Chicago press; 2012.

74. Nahuis R, van Lente H. Repertoires of democracy: the case of public transport.

75. Nahuis R, Van Lente H. Where are the politics? Perspectives on democracy and technology. Science, Technology & Human Values. 2008;33(5):559-81.

76. Klein HK, Kleinman DL. The Social Construction of Technology: Structural Considerations. Science, Technology & Human Values. 2002;27(1):28-52.

77. Winner L. Do Artifacts Have Politics? Daedalus. 1980;109(1):121-36.

78. White H. The content of the form: narrative discourse and historical representation. Baltimore: John Hopkins University Press; 1987.

79. van Lente H. Navigating foresight in a sea of expectations: lessons from the sociology of expectations. Technology Analysis & Strategic Management. 2012;24(8):769-82.

80. Borup M, Brown N, Konrad K, Van Lente H. The sociology of expectations in science and technology. Technology analysis & strategic management. 2006;18(3-4):285-98.

81. Brown N, Brown N. Shifting tenses: Reconnecting regimes of truth and hope. CONFIGURATIONS. 2005;13(3):331-55.

82. Brown N, Michael M. A Sociology of Expectations: Retrospecting Prospects and Prospecting Retrospects. Technology Analysis & Strategic Management. 2003;15(1):3-18.

83. Greenhalgh T, Procter R, Wherton J, Sugarhood P, Shaw S. The organising vision for telehealth and telecare: discourse analysis. BMJ Open. 2012;2(4).

84. Van Lente H, Rip A. The Rise of Membrane Technology: From Rhetorics to Social Reality. Social Studies of Science. 1998;28(2):221-54.

85. Deuten JJ, Rip A. Narrative Infrastructure in Product Creation Processes. Organization. 2000;7(1):69-93.

86. Shaw SE. Reaching the parts that other theories and methods can't reach: How and why a policy-as-discourse approach can inform health-related policy. Health:. 2010;14(2):196-212.

87. Bacchi C. Policy as Discourse: What does it mean? Where does it get us? Discourse: Studies in the Cultural Politics of Education. 2000;21(1):45-57.

88. White H. Metahistory: The historical imagination in nineteenth-century Europe: JHU Press; 1975.

89. Rusen J. Meaning and Representation in History: Berghahn Books; 2006.

90. Jóhannesson IÁ. The politics of historical discourse analysis: a qualitative research method? Discourse: Studies in the Cultural Politics of Education. 2010;31(2):251-64.

91. Gergen KJ, Straub J. Narrative, moral identity, and historical consciousness. Narration, identity and historical consciousness. 2005:99-119.

92. Campbell JL. Ideas, Politics, and Public Policy. Annual Review of Sociology. 2002;28(1):21-38.

93. Hedgecoe A, Martin P. The drugs don't work: expectations and the shaping of pharmacogenetics. Social studies of science. 2003;33(3):327-64.

94. Lehoux P. Why Examining the Desirability of Health Technology Matters. Healthcare Policy. 2008;3(3):29-39.

95. Klecun-Dabrowska E, Cornford T. Telehealth acquires meanings: information and communication technologies within health policy. Information Systems Journal. 2000;10(1):41-63.

96. Russell J, Greenhalgh T, Byrne E, McDonnell J. Recognizing rhetoric in health care policy analysis. Journal of Health Services Research & Policy. 2008;13(1):40-6.

97. Hooker C. History and Social Change in Health and Medicine'. In: Ivy Bourgeault RD, Ray de Vries, editor. The Sage Handbook of Qualitative Methods in Health Research. London: Sage; 2010. p. 265-86.

98. Stone D. Policy Paradox: The Art of Political Decision Making. 2012.

99. Brown N. Hope against hype--accountability in biopasts, presents and futures. Social Studies of Science. 2003;16(2):3-21.

100. Charmaz K. Constructing grounded theory. London; Thousand Oaks, Calif.: Sage; 2014.

101. Feldman MS, Sköldberg K, Brown RN, Horner D. Making Sense of Stories: A Rhetorical Approach to Narrative Analysis. Journal of Public Administration Research and Theory. 2004;14(2):147-70.

102. Riessman CK. Narrative Analysis: SAGE Publications; 1993.

103. Riessman CK, Huberman A, Miles M. Narrative analysis. The qualitative researcher's companion. 2002:217-70.

104. Rüsen J. History: Narration, Interpretation, Orientation: Berghahn Books; 2005.

105. White H. The Question of Narrative in Contemporary Historical Theory. History and Theory. 1984;23(1):1-33.

106. Bryant A, Charmaz K. The SAGE handbook of grounded theory. Los Angeles, [Calif.]: SAGE; 2007.

107. Bowen G. Grounded theory and sensitizing concepts. International Journal of Qualitative Methods. 2008;5(3):12-23.

108. Glaser BG, Strauss AL. The discovery of grounded theory; strategies for qualitative research. Chicago: Aldine Pub. Co.; 1967.

109. Patton MQ. Qualitative research & evaluation methods : integrating theory and practice : the definitive text of qualitative inquiry frameworks and options. Fourth edition. ed2014.

110. Glaser BG. Theoretical sensitivity: advances in the methodology of grounded theory: Sociology Press; 1978.

111. Kelle U. "Emergence" vs. "Forcing" of Empirical Data? A Crucial Problem of "Grounded Theory" Reconsidered. Historical Social Research / Historische Sozialforschung Supplement. 2005;6(2).

112. Kelle U. "Emergence" vs. "Forcing" of Empirical Data? A Crucial Problem of "Grounded Theory" Reconsidered. Historical Social Research / Historische Sozialforschung Supplement. 2007(19):133-56.

113. Walsh I, Holton JA, Bailyn L, Fernandez W, Levina N, Glaser B. What Grounded Theory Is … A Critically Reflective Conversation Among Scholars. Organizational Research Methods. 2015.

114. Bryant A, Charmaz K. The SAGE Handbook of Grounded Theory: Paperback Edition: SAGE Publications; 2010.

115. Charmaz K. Constructing grounded theory: A practical guide through qualitative analysis: Sage Publications Limited; 2006.

116. Patton MQ. Qualitative Research & Evaluation Methods: SAGE Publications; 2002.

117. Riessman C. Narrative methods for the human sciences: Sage; 2008.

118. Rüsen J. Sense of History: What does it mean? With an Outlook onto Reason and Senselessness. Meaning and Representation in History New York. 2008:40-64.

119. Ospina SM, Dodge J. It's About Time: Catching Method Up to Meaning—The Usefulness of Narrative Inquiry in Public Administration Research. Public Administration Review. 2005;65(2):143-57.

120. Lal S, Suto M, Ungar M. Examining the potential of combining the methods of grounded theory and narrative inquiry: A comparative analysis. The Qualitative Report. 2012;17(21):1-22.

121. Franzosi R. Narrative Analysis-Or Why (And How) Sociologists Should be Interested in Narrative. Annual Review of Sociology. 1998;24:517-54.

122. Stevenson, Lindberg. New Oxford American Dictionary. 'Oxford University Press'.

123. White H, Doran R. The Fiction of Narrative: Essays on History, Literature, and Theory, 1957–2007: Johns Hopkins University Press; 2010.

124. White H. Tropics of Discourse: Essays in Cultural Criticism: Johns Hopkins University Press; 1985.

125. Griffin LJ. Narrative, event-structure analysis, and causal interpretation in historical sociology. American Journal of Sociology. 1993:1094-133.

126. Rüsen J. Tradition: A principle of historical sense-generation and its logic and effect in historical culture. History and Theory. 2012;51(4):45-59.

127. Frye N. Anatomy of criticism: four essays. Princeton: Princeton University Press; 2000.

128. In: Stevenson A, Lindberg, Christine A., editor. New Oxford American Dictionary. 3rd ed. ed: Oxford University Press; 2010.

129. Fairclough N. Language and power: Routledge; 2013.

130. Gasher M, Hayes MV, Ross I, Hackett RA, Gutstein D, Dunn JR. Spreading the News: Social Determinants of Health Reportage in Canadian Daily Newspapers. 2007. 2007;32(3).

131. Helen Fulton H, Rosemary, Julian Murphet,, Dunn. A. Narrative and Media: Cambridge University Press; 2005.

132. Collins PA, Abelson J, Pyman H, Lavis JN. Are we expecting too much from print media? An analysis of newspaper coverage of the 2002 Canadian healthcare reform debate. Social science & medicine (1982). 2006;63(1):89-102.

133. waybackmachine [Internet]. Available from: http://archive.org/web/.

134. Ontario Telemedicine Network. Welcome to the Ontario Telemedicine Network 2006 [24/29 Novembre 2006]. Available from: http://web.archive.org/web/20061124030411/http://otn.ca/.

135. Lexis Nexis Academic [Internet]. Available from: http://www.lexisnexis.com.libaccess.lib.mcmaster.ca/hottopics/lnacademic.

136. Priest L. Enabling the long-distance house call; Technological revolution has led to mobile apps that have the potential to save lives and millions in health-care costs. Globe and Mail. 2012 January 21, 2012.

137. Duke K. Getting beyond the 'official line': Reflections on dilemmas of access, knowledge and power in researching policy networks. Journal of Social Policy. 2002;31(01):39-59.

138. White H. Interpretation in History. New Literary History. 1973;4(2):281-314.

139. Miles MB, Huberman AM, Saldana J. Qualitative Data Analysis: A Methods Sourcebook: SAGE Publications; 2013.

140. McNaught C, Lam P. Using Wordle as a supplementary research tool. The qualitative report. 2010;15(3):630-43.

141. Rüsen J. The Development of Narrative Competence in Historical Learning - An Ontogenetic Hypothesis concerning Moral Consciousness. History and Memory. 1989;1(2):35-59.

142. Deveau D. Ontario Telemedicine Network gaining momentum. Ottawa Citizen. 2010 October 26, 2010.

143. Hall WA, Callery P. Enhancing the rigor of grounded theory: incorporating reflexivity and relationality. Qualitative health research. 2001;11(2):257-72.

144. Ahern KJ. Ten Tips for Reflexive Bracketing. Qualitative Health Research. 1999;9(3):407-11.

145. Walt G, Shiffman J, Schneider H, Murray SF, Brugha R, Gilson L. 'Doing' health policy analysis: methodological and conceptual reflections and challenges. Health Policy and Planning. 2008;23(5):308-17.

146. Lincoln YS, Guba EG. Naturalistic inquiry: Sage; 1985.

147. Morrow SL. Quality and trustworthiness in qualitative research in counseling psychology. Journal of Counseling Psychology. 2005;52(2):250-60.

148. Guba EG, Lincoln YS. Guidelines and checklist for constructivist (aka fourth generation) evaluation 2001. Available from: http://www.wmich.edu/evalctr/archive_checklists/constructivisteval.pdf.

149. O'Connor MK, Netting FE, Thomas ML. Grounded Theory: Managing the Challenge for Those Facing Institutional Review Board Oversight. Qualitative Inquiry. 2008;14(1):28-45.

150. Sikolia D, Biros D, Mason M, Weiser M. Trustworthiness of Grounded Theory Methodology Research in Information Systems. 2013.

151. Coutts J. Telemedicine erases distance Interactive-video project lets Toronto doctors treat patients in Thunder Bay. The Globe and Mail. 1996 January 24, 1996.

152. Rüsen J. Historical narration: foundation, types, reason. History and Theory. 1987;26(4):87-97.

153. Shaw DJ. THE INFORMATION HIGHWAY: THE CONVERGENCE OF TELECOMMUNICATIONS, BROADCAST DISTRIBUTION AND MICROPROCESSING. In: Division E, editor. 1996.

154. Industry Canada. Information Highway Advisory Council Secretariat. Final Report of the Information Highway Advisory Council. 1995.

155. Secretariat. ICIHAC. Building the Information Society: Moving Canada into the 21st Century 1996.

156. Tuohy CH. The Costs Of Constraint And Prospects For Health Care Reform In Canada. Health Affairs. 2002;21(3):32-46.

157. Surendra Gera; Kurt Mang. Working Paper Number 15: The Knowledge-Based Economy: Shifts in Industrial Output. In: Finance. ICDo, editor. 1997.

158. Emery C, Shaw DJ, Allain J, Wherrett J, Smith M, Wrobel M, et al. The Information Highway: The Convergence of Telecommunications, Broadcast Distribution and Microprocessing: Library of Parliament, Research Branch; 1996.

159. Surtees L. Companies gear up for information highway Major alliances formed in 1993 to get into fast lane of potentially lucrative new market. The Globe and Mail. 1993 December 29, 1993.

160. Priest L. Reach out and treat someone Long-distance medical treatment is becoming a reality with a high-tech TV and computer system linking hospitals in two cities. Toronto Star. 1996 February 8, 1996.

161. Surtees L. REPORT ON TELECOMMUNICATIONS Telemedicine comes of age. Healthy Prognosis. The Globe and Mail 1996 April 16, 1996.

162. Kainz A. Information highway gets a boost. The Ottawa Citizen. 1994 December 6, 1994.

163. Laucius J. Heart Institute hooks up MDs in remote areas: Province provides $ 2 million to launch project. The Ottawa Citizen. 1997 March 12, 1997.

164. Kirkey S. Heart Institute gets $ 300,000 from Bayer Inc. for major study; Keon says using drug-company money sign of new reality Ottawa Citizen February 21, 1996.

165. Diener S. Housecalls on tap for Ottawa doctors. The Ottawa Citizen. 1998 April 15, 1998.

166. Kainz A. INFORMATION HIGHWAY: NorTel, N.B. Telephone announce $ 300M deal. The Ottawa Citizen. 1994 June 25, 1994.

167. Stentor Vision Statement. Stentor Telecom Policy Inc.; 1994.

168. Orton M. New media now: The future Toffler predicted is here today. The Ottawa Citizen. 1998 March 3, 1998.

169. Atack C. Information, health care delivered at a distance. Toronto Star May 4, 2002.

170. Starvision Multimedia. The Globe and Mail. 1998 September 21, 1998;Sect. Report on Business.

171. Industry Canada. Connection, community, content: The challenge of the Information Highway. Information Highway Advisory Council; 1995.

172. Lee Mea. Telehealth in Canada Clinical Networking, Eliminating Distances. Ottawa, ON1997. p. 1-39.

173. Ontario Ministry of Health. Access to Quality Health Care in Rural and Northern Ontario - The Rural and Northern Health Care Framework. . 1998.

174. Leitch C. Report on Health and Pharmaceuticals 'Robodoc' surgeons at cutting edge. The Globe and Mail. 1995 October 31, 1995.

175. Orton M. Remote medical care soon to take leap through space: Coming together: Software marries electronic medical files and remote access heart monitoring. The Ottawa Citizen 1997 March 6, 1997

176. Page S. High-tech heart-to-heart. The Ottawa Citizen. 1994 November 29, 1994.

177. Hospitals form electronic link on information highway. The Ottawa Citizen 1996 February 6, 1996.

178. INFORMATION AND PRIVACY COMMISSIONER/ONTARIO. Review of the Smart Systems for Health Agency (SSHA): An Electronic Goods or Services Provider to Health Information Custodians under the Personal Health Information Protection Act, 2004. 2007 March.

179. Hamilton T. Digital health slow to boot up; EXCLUSIVE: Ontario's push to get patient records online is plagued with bugs. Toronto Star November 21, 2005.

180. Orton M. Sugar and medicine: Small business, health centres take advantage of network. The Ottawa Citizen. 1998 October 6, 1998.

181. Foss K. Sick Kids gives doctoring at a distance a try; Pilot project uses two-way audio-visual systems,; telephone, vital-sign monitoring devices; to follow patients' progress at home. The Globe and Mail. 2000 March 15, 2000.

182. Marchildon GP. Health Systems in Transition. Canada, Second Edition: University of Toronto Press; 2013.

183. NORTH Network. Report to our Communities. 2003.

184. Coutts J. New Ontario policy will spare most rural hospitals Controversial plan says that health services proposed for northern areas should be delivered 'as close to home as possible'. The Globe and Mail. 1997 June 27, 1997.

185. Press C. Ontario to research rural health care Researchers given five years, $1.85-million to evaluate initiatives and find solutions. The Globe and Mail. 1997 July 17, 1997.

186. NORTH Network. Bringing health care closer to home 2006 [11 February 2006].

187. Orton M. Kit monitors blood sugar over Internet: CHEO tries out tracking young patients using a remote device application developed by March Healthcare Ottawa Citizen. October 19, 2005.

188. Pilieci V. Mitel, March get $60M in R&D funding: Cash part of program that has recov- ered $35M of $2B dished out. Ottawa Citizen December 12, 2002.

189. McMullin JA, Davies L, Cassidy G. Welfare reform in Ontario: Tough times in mothers' lives. Canadian Public Policy/Analyse de Politiques. 2002:297-314.

190. NORTH Network. Sudbury Joins the NORTH Network 2001 [11 December 2001].

191. Heartfield K. Px: IT Slowly but surely, health-oriented: Information Technology is improving the way Canadians get medical care. Ottawa Citizen October 7, 2004.

192. Canadian Institute for Health Information. Health Care Cost-Drivers: The Facts. 2011.

193. Powell J. TELECOMMUNICATIONS CAN SAVE LIVES, CUT COSTS: CardioLink service aimed at providing almost instant diagnosis of heart problems or indigestion. The Financial Post. 1995 April 1, 1995.

194. Daly R. Kids' care consolidated to 5 hospitals. The Toronto Star. 1997 March 8, 1997.

195. Boyle T. Medical experts praise verdict Health minister vows to act on jury's proposals The Toronto Star. 1998 December 12, 1998.

196. Abraham C. Ontario doctors want voluntary plan to fill vacancies: Billing limits controversial across Canada. The Ottawa Citizen. 1996 November 3, 1996.

197. Canadian Press. Harris promises Northern Ontario 'tele-health' centre Hamilton Spectator 1999 February 6, 1999.

198. Ontario Telemedicine Network. Making the Connection for Health 2007 [5-10 February 2007]. Available from: https://web.archive.org/web/20070205105824/http://www.otn.ca/clinical_programs.html.

199. Network N. Making the Connection for Health 2008 [1 December 2008].

200. Morrison S. He's a telesurgeon; Space surgery awaits Dr. Mehran Anvari. Hamilton Spectator November 5, 2003.

201. Kingston A. This Won't Hurt a Bit From simulated flight to virtual surgery Canadian avionics giant CAE Inc. discovers a new technology for saving lives and breaking into a multibillion-dollar market. The Globe and Mail 1993 September 24, 1993.

202. Dunlop M. Long-distance check-ups via TV Toronto doctors can see and talk to patients in Thunder Bay. The Toronto Star. 1996 May 30, 1996.

203. NORTH Network. Overview - The NORTH Network Feasibility Study 2001 [updated 24/12/2001. Available from: https://web.archive.org/web/20011224081309/http://www.northnetwork.com/overview/feasibility.html.

204. NORTH Network. Welcome to the North Network 2000 [cited 25 October 2000. Available from: https://web.archive.org/web/20001025071711/http://www.northnetwork.com/index.html

205. Sommers J. REPORT ON TELECOMMUNICATIONS NorTel, Bell linking doctors, patients in different cities. The Globe and Mail. 1997 May 6, 1997.

206. Starnes R. Making room for new blood. The Ottawa Citizen. 1998 January 17, 1998.

207. Ontario Ministry of Health. Health Insurance Act, R.S.O. 1990, CHAPTER H.6. 1990.

208. Lewis M. Award winner dismayed by abuse of Web: 'We are abusing the technology'. The Ottawa Citizen. 1998 April 2, 1998.

209. Ontario Ministry of Health. Public Hospitals Act, R.S.O. 1990, CHAPTER P.40. 1990.

210. Nikulin D. Everyone Joins the Fight: The Dialectic of Comic Action. Comedy, Seriously: Springer; 2014. p. 47-68.

211. Scholes R, Kellogg, R. . The nature of narratives. Press OU, editor. New Yorkl966.

212. Frye N. The Argument of Comedy. In: Richardson B, editor. Narrative Dynamics: Essays on Time, Plot, Closure, and Frames: Ohio State University Press

; 2002.

213. Lomas J, Culyer AJ, McCutcheon C, McAuley L, Law S. Conceptualizing and combining evidence for health system guidance. [Working paper]. In press 2005.

214. Canadian Intergovernmental Conference Secretariat. A 10-year Plan To Strengthen Health Care. Ottawa2004.

215. Rüsen J. Historical Consciousness: Narrative Structure, Moral Function, and Ontogenetic Development. Theorizing Historical Consciousness: University of Toronto Press; 2004. p. 63-85.

216. Canadian Intergovernmental Conference Secretariat. 2003 First Ministers' Accord on health care renewal. Ottawa2003.

217. Kirkey S. Stroke victims to get aid online: The Telestroke program will link patients in remote communities with urban specialists. Sharon Kirkey reports. Ottawa Citizen

218. Orton M. Rural hospitals make city link: Tele-health services will allow two-way high- speed Internet transmission of test results, and video consultations. Marlene Orton reports. Ottawa Citizen. October 16, 2001.

219. Prithi YP, Power. Robot surgery to the rescue. Toronto Star November 9, 2001.

220. Health Canada. ARCHIVED - Canada Health Infostructure Partnerships Program (2000-2002) (Online) 2004 [Available from: http://www.hc-sc.gc.ca/hcs-sss/ehealth-esante/infostructure/finance/chipp-ppics/index-eng.php.

221. Ontario Telemedicine Network. Ontario Telemedicine Network - Making the Connection for Health 2006.

222. CareConnect. Welcome to CareConnect 2005 [6 April 2005].

223. NORTH Network. Integrating Telemedicine into Everyday Practice 2002 [27 May 2002].

224. VideoCare. Health care closer to home 2003 [27/10/2003]. Available from: https://web.archive.org/web/20031027203540/http://www.videocare.ca/

225. CareConnect. Connecting for Health! 2004 [22 October 2004]. Available from: https://web.archive.org/web/20040804073609/http://www.careconnect.org/index.asp.

226. NORTH Network. What is the North Network 2001 [Available from: https://web.archive.org/web/20010302054007/http://northnetwork.com/media/backgrounder.html

227. NORTH Network. North Network - Technical Specs 2001 [updated 06/02/2001. Available from: https://web.archive.org/web/20010206154952/http://northnetwork.com/overview/tech_specs.html.

228. VideoCare. Videoconferencing – How does it work? 2004 [8 December 2004]. Available from: https://web.archive.org/web/20041208221643/http://www.videocare.ca/faq.php.

229. CareConnect. The Technology - Wide Area Network 2006 [Available from: https://web.archive.org/web/20060827145511/http://www.careconnect.org/technology.html - tele.

230. NORTH Network. Tech Specs - Telecommunications Network 2001 [Available from: https://web.archive.org/web/20011201054457/http://www.northnetwork.com/overview/tech_specs.html.

231. Vardy J. Enduring expertise in technology and in Ottawa: There has been plenty of change in the technology sector, and some constants. Four men exemplify what it takes to make it, even with extraordinary challenges. National Post (Canada). April 19, 2002.

232. McLean D. VoIP pointing way toward complete convergence. Globe and Mail. April 28, 2005.

233. Kapica J. From outsourcing to health care, tech's allure gets stronger. Globe and Mail. January 16, 2003.

234. Campbell J. Doctors seek 'smart apartments' for seniors: Technological tools would allow the frail, elderly to live alone longer. Ottawa Citizen. January 7, 2003.

235. Belford T. A healthy dose of IT; Canadian hospitals are beginning to see the front-line benefits of patient-focused software. The Globe and Mail. July 26, 2007.

236. Crane D. Use health funds to spawn innovative firms. Toronto Star September 5, 2002

237. The Canadian Press. Primary health-care gets a $240m boost. Hamilton Spectator. August 2, 2001.

238. Ontario Telemedicine Network. The Transformation of Telemedicine In Ontario. 2006.

239. Eastern Ontario Telehealth Network. Welcome to EOTN 2003 [Available from: https://web.archive.org/web/20031125230906/http://careconnect.org/.

240. Pilieci V. Health Canada approves March Networks telehealth kits Ottawa Citizen. January 23, 2003.

241. First ministers' Communiqué on Health. 2000, announced September 1.

242. Canada Health Infoway. The Electronic Health Record Solution Blueprint: A Roadmap for Planning and Implementation in Canada. . 2003, revised 2006.

243. Ontario Telemedicine Network. Home / Ontario Telemedicine Network (OTN) 2008 [Available from: http://web.archive.org/web/20080919124822/http://otn.ca/.

244. New Provincial Telemedicine Network to Improve Access to Care [press release]. November 23 2006 2006.

245. Ontario Telemedicine Network. Making the Connection for Health 2008 [1 Dicembre 2008]. Available from: http://web.archive.org/web/20081201064243/http://otn.ca/.

246. Infoway CH. The Infoway Approach 2008 [11 December 2008]. Available from: https://web.archive.org/web/20081211235819/http://www.infoway-inforoute.ca:80/lang-en/about-infoway/approach.

247. Ontario Telemedicine Network. NEW - New Billing Procedure for Telemedicine Physicians effective April 1 2008 [Available from: http://web.archive.org/web/20080502165010/http://www.otn.ca/physicians.html.

248. Ontario Telemedicine Network. Making the Connection for Health - Membership 2007 [3 July 2007].

249. Ontario Telemedicine Network. Membership 2007 [3 July 2007]. Available from: https://web.archive.org/web/20070703132033/http://www.otn.ca/membership.html.

250. NORTH Network. The NORTH Network Feasibility Study 2001 [Available from: https://web.archive.org/web/20010302054007/http://northnetwork.com/media/backgrounder.html.

251. Health Canada. Evaluation of the Canada Health Infostructure Partnership Program. 2005.

252. North West Local Health Integration Network. North West Local Health Integration Network Information and Communication Technology Background Paper. October 2006.

253. Pilieci V. Telehealth project 'an awakening': Successful test could lead to Internet nursing. Ottawa Citizen. April 19, 2002.

254. McCulloch A. Stroke patients get long-distance help: 'Telestroke' among topics to be discussed at conference starting this week. Ottawa Citizen. June 7, 2001.

255. Primary Care now available in 15 communities thanks to innovative videoconferencing technology [press release]. November 8, 2005 2005.

256. Kirkey S. Study tracks stroke patients' recovery: More than 3,200 patients have enrolled in new registry. Ottawa Citizen. March 2, 2002.

257. NORTH Network Brings Emergency Stroke Care to Sault Ste. Marie and Timmins [press release]. October 27, 2005 2005.

258. Eastern Ontario Telehealth Network. About EOTN 2003 [6 Decembre 2003]. Available from: https://web.archive.org/web/20031206101132/http://careconnect.org:80/about_eotn.html.

259. Lu V. Free Medical Advice. February 3, 2001.

260. Health OMo. Bill 26: The Savings and Restructuring Act. Toronto: The Queen's Printers; 1996.

261. Ontario Ministry of Health. Looking backward, looking forward. Toronto: Health Services Restructuring Committee; 2000.

262. Cambell M. Tories ramping up pre-vote ad campaign. Globe and Mail. January 30, 2003.

263. Brennan R. DIAL-A-NURSE SERVICE READY FOR CALLERS. Toronto Star. February 16, 2001.

264. Canadian Press. Help line designed to unburden health system a hit, Tories say. Globe and Mail. August 29, .

265. Nickoloff BE-J, Fadi. PRIMARY HEALTH CARE A background paper. In: Canada HCo, editor. 2005.

266. Emergency measures. Toronto Star. December 26, 2001.

267. Prithi Yelaja. Telehealth job just the cure for some RNs. Toronto Star. October 6, 2001.

268. Yelaja P. 'Hello, nurse?' Medical advice a phone call away. Toronto Star October 6, 2001

269. Romanow R. Building on values: the future of health care in Canada. . In: Canada; CotFoHCi, editor. Saskatoon, SK2002.

270. Dworki DB. Telephone medicine poor substitute for ER visits: Idea of 24-hour care is appeal- ing, reality is it's costly, ineffective. Ottawa Citizen. October 29, 2001.

271. See a problem, solve a problem. Ottawa Citizen. May 1, 2006.

272. Health network holds promise. Ottawa Citizen. September 24, 2002.

273. Patch C. Sick Kids: We aim to be best in the world Toronto Star. May 29, 2003.

274. Immen W. Healing without the human touch; Telehealth technology is allowing doctors to treat patients; without being in the same room - or even the same country. Globe and Mail. August 7, 2001.

275. Alvarez R. Health care moves into hi-tech age. Toronto Star. February 1, 2005.

276. Ontario Telemedicine Network. Your Health. Your Home. 2008 [18 February]. Available from: http://web.archive.org/web/20061124030411/http://otn.ca/.

277. NORTH Network. Overview 2001 [updated 10/03/2001. Available from: https://web.archive.org/web/20010110190300/http://www.northnetwork.com/overview/north.html.

278. Trapunski E. Plugging in to better medicine. Toronto Star. October 6, 2001.

279. Dialling our way to better health. Ottawa Citizen.

280. NORTH Network. Telemedicine: As Old as the Telephone 2001 [updated 23/01/2001. Available from: https://web.archive.org/web/20010123175300/http://www.northnetwork.com/news/june3.html.

281. College of Physicians and Surgeons of Ontario. Telemedicine. Policy Number #1-07. Toronto: ON 2007.

282. Rockel N. Smartphones join stethoscopes in the doctor's first aid kit; Mobile apps can help pool information and allow patients to monitor their own data to avoid costly medical intervention. Globe and Mail. 2011 November 16, 2011.

283. Khayat Z. We can reinvent health care for the digital age. Toronto Star. 2016 January 19, 2016.

284. Pearce T. Diabetes app designed with teen behaviour in mind; SickKids hosting pilot project to help young patients keep track of their blood sugar levels. Globe and Mail. December 27, 2010.

285. Digital technology is changing health care; Electronic systems not only more convenient, they also help improve safety and efficiency. Toronto Star. October 16, 2010.

286. Deveau D. eHealth innovation starts with a global perspective. Ottawa Citizen. November 9, 2010.

287. Dingman S. Vital signs; Chronic illnesses cost the Canadian health-care system billions of dollars. Could a 99-cent smartphone app represent part of the solution? Globe and Mail. 2011 October 28, 2011.

288. Aw DJ. Paging Dr. Smartphone; Medical Apps For Diabetics, Stroke Patients And Phy- sicians Are Changing The Landscape Of Diagnosis And Treatment. National Post. 2011 November 8, 2011.

289. Hacking Health connects tech groups with health care. Hamilton Spectator. July 20, 2015.

290. Five innovations from ottawa's clearwater clinical. Ottawa Citizen. 2016 August 13, 2016.

291. Gerstel J. Technology improves health care delivery; Internet and cellphones set to revolutionize how patients and health care provid- ers communicate. Toronto Star. March 6, 2009.

292. Adami H. The doctor is in (Toronto); Ottawa patient surprised by video-link treatment. Ottawa Citizen. 2012 February 26, 2012.

293. Gillis M. Re-inventing health care; help themselves; A local doctor-turned-inventor is part of a revolutionary move toward mobile devices as medicine ' shifts left ,' writes Megan Gillis. Ottawa Citizen. 2016 August 13, 2016.

294. Ontario telemedicine Network. Your telemedicine appointment …just like a regular doctor's appointment. 2010.

295. Mudhar R. Technology eases 'aging in place'. Toronto Star. May 8, 2014.

296. Lien T. FTC talks health data with Apple; Commission wants to know how tech giant will use HealthKit information. Toronto Star.

297. Rogers J. E-counselling helps keep patients on track; People can now send information about their health from comfort of home. Toronto Star. 2015 January 31, 2015.

298. McNeil M. Hamilton tech startup gets $2-million boost. Hamilton Spectator. 2016 February 18, 2016.

299. Martin S. BEDSIDE MANNERS. Globe and Mail. 2014 January 25, 2014.

300. Webster PC. TAKE TWO APPS... AND CALL ME IN THE MORNING; Despite grand plans from Ottawa and concerted pushes by IT giants like Telus and CGI, our creaking health care system is still mired in paper records. Pre- scription: Apply creative disruption. The Globe and Mail 2012 November 30, 2012.

301. Baskerville R, Lee, A. Individual-organizational bindings. A design theory for bring your own system. 2013 Proceedings of the Pacific Asia Conference on Information Systems2013).

302. Network OT. OTN BEST ADVICE – The Case for Telehomecare. 2014.

303. PracticalApps.ca helps doctors choose the right app for patients [press release]. September 21, 2016 2016.

304. Government of Canada GoC. Canada Health Act. Ottawa, ON1984.

305. Payne E. Botox, telemedicine seen as a bad mix; Waterloo doctor complains about 'Botox mills'. Ottawa Citizen. March 24, 2014.

306. Canadian Medical Protective Association. Videoconferencing consultation: When is it the right choice? [updated October 2015. Available from: https://www.cmpa-acpm.ca/en/advice-publications/browse-articles/2015/videoconferencing-consultation-when-is-it-the-right-choice.

307. Policy on Telemedicine, (2010).

308. College of Physicians and Surgeons of Ontario. Telemedicine Policy Statement #3-14 2014.

309. Canadian Medical Protective Association. Telemedicine — Opportunities, challenges, and obligations 2015 [Originally published September 2013 / Revised March 2015]. Available from: https://www.cmpa-acpm.ca/en/advice-publications/browse-articles/2013/telemedicine-challenges-and-obligations - ref.

310. 2012 Physician Services Agreement, (2012).

311. Ontario Telemedicine Network. Embarking on the Journey for Virtual Care. 2013.

312. Office of the Auditor General of Ontario. 2016 Annual Report. In: Office of the Auditor General, editor. Toronto, ON 2016.

313. Frketich J. Build a health app in a weekend at Hamilton event. Hamilton Spectator. 2017 March 21, 2017.

314. Stancu H. Project Horizon's five-year plan. Toronto Star. 2015 May 7, 2015.

315. A brief overview of OTN's eConsult. Ontario Telemedicine Network; 2014.

316. Ontario Telemedicine Network. Home & Community Care 2014 [29 June 2014]. Available from: https://web.archive.org/web/20140629162204/http://otn.ca/en/home-community-care.

317. Ontario Telemedicine Network. eConsult: Secure clinical collaboration 2015 [Available from: https://web.archive.org/web/20150324183746/https://otn.ca/en/programs/econsult.

318. Brown E. The home front. Globe and Mail. 2016 January 29, 2016.

319. Ontario Telemedicine Network. Bringing Innovation to Health Care 2016 [

320. MacKenzie D. Missile accuracy: a case study in the social processes of technological change. The social construction of technological systems: New directions in the sociology and history of technology. 1987:195-222.

321. Rip A. Pervasive normativity and emerging technologies. Ethics on the laboratory floor: Springer; 2013. p. 191-212.

322. Greenhalgh T, Russell J, Swinglehurst D. Narrative methods in quality improvement research. Quality & safety in health care. 2005;14(6):443-9.

323. Stone D. Causal stories and the formation of policy agendas. Political science quarterly. 1989;104(2):281-300.

324. Greenhalgh T, Russell J. Why do evaluations of eHealth programs fail? An alternative set of guiding principles. PLoS medicine. 2010;7(11):e1000360.

325. Brown AD, Gabriel Y, Gherardi S. Storytelling and Change: An Unfolding Story. Organization. 2009;16(3):323-33.

326. Spector-Mersel G. Narrative research: Time for a paradigm. Narrative Inquiry. 2010;20(1):204-24.

327. Pascale L. The duality of health technology in chronic illness: how designers envision our future. Chronic Illness. 2008;4(2):85-97.

328. Klecun-Dabrowska E, Cornford T. The Organizing vision of telehealth. ECIS 2002 Proceedings. 2002:49.

329. Rappert B, Brown N. Putting the future in its place: comparing innovation moments in genetic diagnostics and telemedicine. New Genetics and Society. 2000;19(1):49-75.

330. Thielscher C, Doarn CR. Long-Term Future of Telemedicine in Germany: The Patient's, Physician's, and Payer's Perspective. Telemed J e-Health. 2008;14(7):701-6.

331. Shaw T, McGregor D, Brunner M, Keep M, Janssen A, Barnet S. What is eHealth (6)? Development of a Conceptual Model for eHealth: Qualitative Study with Key Informants. J Med Internet Res. 2017;19(10):12.

332. Gardner J, Samuel G, Williams C. Sociology of Low Expectations: Recalibration as Innovation Work in Biomedicine. Science, Technology & Human Values. 2015;40(6):998-1021.

333. Hedgecoe A, Martin P. The drugs don't work: expectations and the shaping of pharmacogenetics. Social Studies of Science. 2003;33(3):327-64.

334. Coffey A. The SAGE Handbook of Qualitative Data Analysis. 2014 2018/01/15. London: SAGE Publications Ltd. Available from: http://methods.sagepub.com/book/the-sage-handbook-of-qualitative-data-analysis.

335. Hodgetts D, Chamberlain K. The SAGE Handbook of Qualitative Data Analysis. 2014 2018/01/15. London: SAGE Publications Ltd. Available from: http://methods.sagepub.com/book/the-sage-handbook-of-qualitative-data-analysis.

336. Bogard CJ. Claimsmakers and Contexts in Early Constructions of Homelessness: A Comparison of New York City and Washington, D.C. Symbolic Interaction. 2001;24(4):425-54.

APPENDIX

Appendix A: Interview Guide

1. To begin, would you tell me a bit about your own involvement in the field of telemedicine?
    a. What is your current position?
    b. Tell me about your involvement with telemedicine.
    c. How long have you been personally involved with telemedicine?
2. My research traces the development of telemedicine in Ontario over the last 20 years, starting about 1993. Can you tell me anything about the early days of telemedicine (if only what you've heard, if you weren't directly involved that early)?
    a. By going back in time, how do you think telemedicine started to be developed and implemented?
    b. Could you describe telemedicine and its development (in particular of video conferencing and telemonitoring)?
3. How did people talk about telemedicine in the early days? What did we hope or expect for the future of telemedicine?
    a. For video conferencing and telemonitoring in particular, when did you first start hearing about these technologies?
4. From your perspective, what have been the major milestones for telemedicine over the past 20 years?
    a. How has it changed over time?
    b. What have been the important projects? ….initiatives? …policies?
    c. Have there been any setbacks for telemedicine?

i. What were they, and how did they change things?

ii. Did they affect how we approach telemedicine today?

(n.b.: Question 4 reworded, with the addition of a, b, c, and d probes, after the 3rd interview)

5. Turning to telemedicine today, what do you see as the most crucial issues right now?

    a. Would others agree? If not, what would they say?

    b. Does it dovetail with other, larger agendas for Ontario, or the healthcare system? Which ones?

    c. Who are telemedicine's major players, stakeholders today? Are there differing views on how it should develop?

    d. Who champions telemedicine (or specific ideas of what telemedicine should be), who opposes it?

6. Now that we've talked about the past and present, I'd like to turn to the future of telemedicine. Do you see any important events on the horizon?

    a. Do you see any important events on the horizon?

    b. How do you see this telemedicine unfolding over the next 10 years? …25, 50 years?

    c. What's the best that could happen? … the worst?

7. Finally, is there anything else you'd like to tell me about telemedicine? And are there additional questions you think I should be asking, to get a more complete picture?

8. Who else would you recommend I interview?