ATHABASCA UNIVERSITY

Exploring Physician Leadership Development in Health-Care Organizations through the Lens of Complexity Science

By

Colleen Marie Grady

A Dissertation

Submitted to the Faculty of Graduate Studies

In Partial Fulfillment of the Requirement for the

Degree of Doctor of Business Administration

Faculty of Business

Athabasca, Alberta

November, 2015

Approval of Dissertation

The undersigned certify that they have read the dissertation entitled

"Exploring Physician Leadership Development in Health-Care Organizations Through the Lens of Complexity Science"

Submitted by

Colleen Grady

In partial fulfillment of the requirements for the degree of

Doctor of Business Administration

The dissertation examination committee certifies that the dissertation

(and the oral examination) is approved.

Co-Supervisors

Dr. Deborah Hurst (Internal)

Athabasca University

Dr. Bob Hinings (External)

University of Alberta

Committee members

Dr. Chad Saunders

University of Calgary

Dr. Leonard Friedman

George Washingon University

November 9, 2015

Epigraph

"The greatest danger in times of turbulence is not the turbulence....

.....it is to act with yesterday's logic"

Peter Drucker

Dedication

To my father, Francis Grady, whom I owe lifelong

gratitude for his encouragement to strive for more.

His belief in me drives me every single day.

To my children; Katrina, Justin, Marisa and McKenzie

who put up with me and cheered me on throughout the journey.

And to my friend Kerri, without whom this ride would

not have been nearly as much fun.

Acknowledgements

The first and most important person to acknowledge is Bob Hinings, University of Alberta, who gave so much of his time to support my goal of making a scholarly contribution to the world of health-care. Without his guidance and support this dissertation would not have seen its completion. I will remain eternally grateful to have enjoyed the benefit of his wisdom and wealth of experience as a well-respected scholar.

I would also like to thank Dr. Chad Saunders, University of Calgary, as well as Dr. Deborah Hurst, my co-supervisor with Athabasca University for the valuable guidance they provided along the way.

Thanks also to my external examiner, Dr. Leonard Friedman, George Washington University, for his ability to make me reach a bit higher and challenge my assertions through his valuable lens of health-care administration.

Thanks to all my friends and colleagues in the Athabasca University DBA program, and beyond, who supported and encouraged me every step of my journey.

Abstract

Physician leaders are viewed as critical in the transformation of health care and in improving patient outcomes and yet significant challenges exist that limit their development. Leadership in health care continues to be associated with traditional, linear models, which are incongruent with the behaviour of a complex system such as health care. Physician leadership development remains a low priority for most health-care organizations although physicians admit to being limited in their capacity to lead. This research was intended to provide conceptual and practical considerations to both physician leaders and health-care organizations that recognize the importance of developing them.

This study was based on five principles of complexity science and used grounded theory methodology to understand how the behaviours of a complex system can inform leadership development for physicians. These principles include; connectivity, interdependency, feedback, exploration-of-the-space-of-possibilities, and co-evolution and were associated with either behaviour of agents within a system, or patterns of behaviour. Semi-structured interviews and documents provided the basis for data collection. Twenty-one experts in areas of health-care management, physician leadership, or leadership development participated. Participants included authors, academics, advisors, physicians and non-physicians, at both middle and senior operational levels.

The study demonstrated that there is a strong association between physician leadership and patient outcomes and that organizations play a primary role in supporting the development of physician leaders. Findings indicate that a

physician's relationship with their patient and their capacity for innovation can be extended as catalytic behaviours in a complex system. The findings also identified limiting factors that impact physicians who choose to lead, such as reimbursement models that do not place value on leadership, and medical education that provides minimal opportunity for leadership skill development.

This study presents convincing evidence that organizations play a primary role in developing physician leaders, giving them a competitive advantage and an increased ability to affect patient outcomes. The participation of highly knowledgeable and experienced participants strengthens the value of the results of this study and is likely to provide further research opportunities in health-care organizations that prioritize physician leadership development.

Table of Contents

Approval Page....i

Dedication.... ii

Acknowledgements.... iii

Abstract.... iv

Table of Contents.... vi

List of Tables x

Chapter 1: Introduction 1

1.1 Setting the context 1

1.1.1 The research question 5

1.2 Why does it matter?.... 5

1.3 Theoretical relevance 8

1.4 Practical relevance.... 11

1.5 Importance/benefits of the study 12

1.6 Why now? 14

1.7 Chapter summary 17

Chapter 2: Review of the Literature.... 19

2.1 Introduction 19

2.2 Complexity in health care.... 21

2.3 Health-care leadership.... 25

2.3.1 Human capital or social capital?.... 27

2.3.2 Shared leadership.... 31

2.4 Physicians as stakeholders (or shareholders) 35

2.4.1 Competitive advantage 37

2.4.2 The need for physician leaders 38

2.5 Physician leadership development: the known and the unknown 44
2.5.1 How prepared are physicians to lead? 46
2.5.2 Structural barriers 48
2.5.3 Personal barriers 49
2.5.4 What don't we know? 50
2.5.5 A multi-pronged approach 53
2.6 Complexity science as a theoretical framework 55
2.6.1 Complexity science in relation to organizations 61
2.6.2 Complexity science and health-care leadership 65
2.7 Applying complexity science to physician leadership development 69
2.7.1 Connectivity/ interdependence/feedback 72
2.7.2 Exploration of the space of possibilities 73
2.7.3 Co-evolution 75
2.8 Chapter Summary 76
Chapter 3: Research Framework and Methodology 78
3.1 Introduction 78
3.2 Research framework 79
3.3 Methodological approach 81
3.3.1 Using grounded theory to theorize 88
3.4 Ethical considerations 89
3.5 Data collection 90
3.5.1 Participant selection and profile 90
3.5.2 Data collection instruments 97
3.5.2.1 Interviews 98
3.5.2.2 Documents 108

3.6 Data analysis 112
3.7 Generalizability and evaluation criteria 117
3.8 Chapter summary 119
Chapter 4: Analysis of Findings 121
4.1 Introduction 121
4.2 Initial analysis 122
4.2.1 Relationships between agents 123
4.2.2 Patterns of behaviour 129
4.2.3 Enabling functions 134
4.3.1 Challenges for physician leaders 137
4.3.2 Success factors 139
4.3.3 Impact on patient outcomes 140
4.3.4 Administrators versus physicians 141
4.3.5 The role history plays 144
4.4 Connecting the data 146
4.4.1 Physicians as leaders 147
4.4.2 The organization's role 150
4.5 Chapter summary 153
Chapter 5: Discussion 156
5.1 Introduction 156
5.2 Implications for practice 158
5.2.1 Complex system behaviours and physician leaders 158
5.2.2 Physicians and leadership development in health-care organizations 166
5.3 Implications for theory 176
5.4 Chapter Summary 179

Chapter 6: Conclusion 180

6.1 Introduction 180

6.2 Transferability 180

6.3 Evaluation of this work 181

6.4 Strengths and limitations of this study 181

6.4.1 Strengths 181

6.4.2 Limitations 183

6.5 The path forward in research 184

6.6 Significance of the findings and recommendations 185

6.7 Concluding thoughts 189

References 190

Appendix 1 – Invitation to Participate 213

Appendix 2 Ethics Approval 216

List of Tables

3.1 Applicability of principle to research……. 79

3.2 Participant grouping 91

3.3 Participant expertise 94

3.4 Connectivity..... 101

3.5 Interdependency..... 102

3.6 Feedback..... 103

3.7 Exploration-of-the-space-of-possibilities..... 104

3.8 Co-evolution..... 105

3.9 Analytical framework 115

Chapter 1: Introduction

1.1 Setting the context

This introductory chapter establishes the context for this research, which is the pairing of complexity science with physician leadership development. Following this opening section, Section 1.2 discusses why the research topic is important for today's health-care organizations. Theoretical and practical relevance is discussed in Sections 1.3 and 1.4, respectively. Section 1.5 highlights the importance of this research while Section 1.6 establishes why now is the time to engage in discussion about physician leaders and their development. Section 1.7 summarizes the chapter.

The primary purpose of this research was to examine physician leadership development using principles of complexity science. Through the behaviours and actions of complex adaptive systems, insights can be provided for health-care organizations that have established physician leadership development as a primary strategy to effectively respond to calls for health-care transformation. Through this research, health-care organizations are provided with a different view of leadership. By viewing the organization as a complex system there can be an increased understanding of the adaptive and creative processes found in natural complex systems. It is by furthering an understanding of complex systems that practical strategies can be developed, which may foster the conditions to enable the development of physician leaders different from currently employed methods that are primarily focused on individual competency development. In addition, health-care leadership that is consistent with complex system behaviour is less

likely to remain firmly attached to the hierarchical structure, which currently exists in most Ontario hospitals where physicians report directly through a Medical Advisory Committee to the Board of Directors with the administrative side of the organizational chart reporting separately to the same Board of Directors. This dual reporting mechanism, and the separation of clinical and administrative functions within a hospital challenges leadership in the sense that the "steering" and the "rowing" behaviours must work together to make progress. While it is recognized that both clinical and non-clinical leaders can benefit from an enhanced understanding of each other's perspective to expand their leadership capacity, and that complexity science principles applied to leadership could prove to be beneficial to both, this research has been primarily focused on physicians that choose to lead. This does not mean that physicians are necessarily seen as having a more important leadership role than other health professionals. Rather, it is due to their position within the health-care system and the fact that leadership development for physicians is often overlooked that has provided the impetus for this research.

This research positions physician leaders as important partners in health-care administration and demonstrates that their leadership can lead to effective transformation of patient-care practices. Improving patient-care practices provides additional rationale for organizations to support physician leadership development and their increased engagement in health-care operations. Through exploration of the principles of complexity science and how they may, or may not translate into actions and behaviours that currently exist at the health-care leadership level, this

research provides a starting point for health-care administrators to consider both the enablers and the limiting factors for potential physician leaders and how their organizations may respond. It is expected that the findings from this research study will provide the opportunity for follow-up action-research studies in individual health-care organizations to identify the relativity of some of the enablers to the growth of physician leaders, potential changes to leadership models, and, possibly, organizational performance.

The ten generic principles of complex systems as identified by Mitleton-Kelly (2003), which relate to the actions/behaviours of elements (or agents) within the system as well as the behaviour of the system itself, plus the processes of transformation, formed the basis for theory building related to physician leadership. By using a complexity science lens, organizations may allow for capitalization of both clinical and non-clinical intelligence for effective stewardship and improved health-care outcomes centered on the patient. These ten principles include the following: self-organization, emergence, connectivity, interdependence, feedback, far from equilibrium, exploration-of-the-space-of-possibilities, co-evolution, historicity & time, and path-dependence. The primary focus in this research was on the principles that are most directly associated with agent behaviour (connectivity/interdependence/feedback), and transformational processes (exploration-of-the-space-of-possibilities, and co-evolution). These principles are thought to affect system behaviour (self-organization, emergence, far from equilibrium, historicity & time, and, path-dependence).

The value of using these principles or "generic characteristics of complex evolving systems" (Mitleton-Kelly, 2003, p. 3) is the potential for building theory on the alignment of the behaviour of a social system (such as a health-care organization and its leadership) with the behaviour of a natural complex system. It is based on the similarities between systems such as complexity in design, inter-relationships of many diverse agents (such as ants, bees, molecules, or people), and constant states of change. In a complex adaptive system, leadership as behaviour is non-linear, prompting a shift in thinking from current, top-down competency-based leadership to a more collective style of leadership that focuses on mutual accountability for patient outcomes. Such leadership will provide impetus for new dialogue and development of practical strategies to support physicians who choose to become leaders within organizations. The potential outcomes of this research were thought to include an adaptive leadership style in health-care organizations which includes physicians, an increase in the promotion of new ways of learning such as action learning, and an increased understanding of relationship dynamics that values the inter-dependent nature of administrators and physicians. It was estimated that a by-product of these outcomes may be improved physician engagement and effective collaborative leadership. Popely (2009) indicates that "the hospital-physician relationship continues to increase in importance," and that "strengthening this relationship is key to improving patient care and enhancing the health-care organization's competitive position" (p. 9). Clearly, the literature presents us with a picture of hospital systems that are in need of physicians who are prepared to take on leadership roles, and yet, many

organizations are unable to identify creative solutions to develop physician leaders who can be instrumental in transforming health care.

1.1.1 The research question

Can physician leadership development within health-care organizations facilitate improved outcomes by examining complex system behaviours?

1.2 Why does it matter?

This research topic is timely and important if health care in Canada is going to be transformed in such a way as to continue to meet the needs of patients affordably.

When speaking to the Toronto Board of Trade in 2010, Dr.Kellie Leitch, paediatric orthopaedic surgeon, former Chair of the Ivey Centre for Health Innovation and Leadership, and now the Minister of Labour and the Minister Responsible for the Status of Women, highlighted findings from a health leadership conference held that same year. She noted that leaders in health care could "get into the DNA of our organizations" but that they needed to be "game changers" (Leitch, 2010, p. 9) in adopting innovation. She stated that, due to the extremely risk-averse culture within health care, there's not enough momentum in the smaller, pilot projects that are undertaken to have any sustainable effect and that shifting the focus "towards one that has the "consumer" of health-care as the nucleus is critical" (Leitch, 2010, p.9).

Using a complexity science framework and input from both administrative and clinical leaders could provide the impetus for change within health-care

organizations that are willing to be innovative and entertain broader ideas for change. Rouse (2007) warns against the "inertial power of the status quo" within health-care organizations and that, while incentives to change are needed, "one incentive might be a crisis" (p. 24). Many would argue that current health-care systems are at a crisis point.

Baker and Denis (2012) suggest that only a systemic approach to medical leadership will transform health-care organizations and it is how some organizations are trying to create better "alignment between clinical and managerial goals" (p. 355). While the authors recognize that a collaborative culture is not easily defined or achieved, "a collective or distributed approach to leadership," (Baker & Denis, 2012, p 358) along with structural strategies (i.e. availability of clinical leadership positions) and capitalizing on lessons learned, can lead to a more effective system of care. Recognition of the mutual dependency of clinical and non-clinical leaders allows health-care management to see past the development of any one individual: it values a leadership approach that is distributed and that must harness the collective intelligence from the beginning. Plsek and Wilson (2001) suggest that using "complexity thinking" provides the ability to focus on "the relationships between parts" and that these relationships are "more important than the parts themselves." This approach suggests a new management style, one that can capitalize on the creativity within.

Physicians' involvement in hospital leadership teams is directly correlated to improved results in quality and safety performance indicators (Hayes, Yousefi,

Wallington & Ginzburg, 2010). The Institute for Health Care Improvement looked at leading organizations to identify a framework that includes the following: improving patient outcomes; making physicians partners; developing skills; showing courage and; most importantly, engaging physicians from the beginning for improved quality and safety results (Reinertsen, Gosfield, Rupp & Whittington, 2007). According to Reinertsen et al, health-care associations are increasingly citing the value of engaging physicians, using the term "partner" to describe what can be considered a unique relationship. This relationship is different from the current situation where "hospitals and their physicians are increasingly in competition with each other" (p. 1). St. Joseph's Health Centre in Toronto recognized that physician leadership was critical to implementing hospital strategy. In a two-year pilot project they developed, along with physicians, a leadership framework that is intended to align with their mainstream leadership program. The project has been met with significant approval from those physicians in the program. Vimr and Thompson (2011) state that "hospitals that fail to recognize the importance of engaging, preparing, and supporting their physician leaders risk an ever-widening gulf between medicine and administration that will eventually compromise their ability to meet the needs of patients within an evolving health-care system" (p. 53). A 1999 hospital survey of 27 states in the US (Berry, 1999), identified the development of physician leaders as a key factor in strengthening hospital-physician relationships, followed by factors related to quality care and reduction of hospital costs.

Lee (2010) talks about the need for physician leaders and cites teamwork as vital to performance improvement in hospitals. However, as a physician himself, he admits that this means a "fundamentally different approach" (p. 3). He identifies "superior coordination, information sharing, and teamwork across discipline are required if value and outcomes are to improve" (Lee, 2010, p. 3).

1.3 Theoretical relevance

This research contributes a specific focus on physicians to current theoretical discussions pairing complexity science and health-care leadership.

Complexity science and health-care organizations have been increasingly paired in recent years. The National Health Service in the UK produced a study related to complexity science and service improvement (Mowles, van der Gaag, & Fox, 2010). Researchers in Australia have found that viewing their mental health system as a complex adaptive system has provided useful insights for "leadership for change in such systems," and that "command and control styles of leadership are dead" (Minas, 2005, p. 38). Complexity leadership theory has also received increased attention. This theory recognizes that leadership is similar in nature to complex organizations as it "emerges in the interactive spaces between people and ideas," and that it "is a dynamic that transcends the capabilities of individuals alone" (Lichtenstein et al, 2006, p. 2). Plsek and Greenhalgh (2001) emphasize that historical solutions for clinical and organizational problems have been limited by "reductionist thinking." They refer to "Newton's clockwork universe in which big problems can be broken down into smaller ones, analysed, and solved by

rational deduction." They suggest that this model no longer applies to health-care organizations, and systems as they have become more complex (p. 628). The authors suggest abandoning linear models of linearity for complexity science, which, provides the premise for a flexible response "to emerging patterns and opportunities" (Plsek & Greenhalgh, 2001, p. 628). Using the example of transformation in the largest U.S. integrated health-care system, the Veterans Health Administration (VHA), Litaker, Tomolo, Leberatore, Stange, and Aron (2006) also suggest that previous models based on continuous quality improvement, such as Plan-Do-Study-Act (PDSA) are based on a linear, cause-and-effect relationship. However, social systems are usually quite unpredictable and non- linear. The authors indicate that development of a "working knowledge of the principles of complexity theory" may offer the ability to "make sense of occurrences in everyday practice that may otherwise seem paradoxical" (Litaker et al., 2006, p. 34).

At the same time, increased focus is being placed on physician leaders. In their clinical capacity, physicians are well-positioned to contribute substantively to health-care transformation of a sustained and, potentially, a more affordable publicly funded patient-centred model (Vimr & Thompson, 2011; Goodall, 2011; McAlearney, Fisher, Heiser, Robbins & Kelleher, 2005). Despite the recognition of hospitals as complex systems and the recognized value of physician leaders, structural and cultural barriers continue to exist in organizations with a command and control style of leadership. Such leadership does not value the collective intelligence of all leaders. Neither does this model support leadership

development in a progressive, fundamentally adaptive manner. There is increasing recognition that physician leaders can contribute significantly to improved patient care. However, organizations find minimal guidance in defining roles and supporting the development of physician leaders. Hayes et al (2010) emphasizes that physician leads "are seen as influential among their peers as resources" and that they play a significant role in success of hospital improvement projects. Complexity science principles can be used effectively to explore leadership development practices when examining physician leadership development and organizational capacity for this development,. This research was intended to add knowledge to this field of study, specifically focused on physician leadership development. Current practice for physician leadership development includes attendance at week-long workshops put on by academic institutions (Physician Management Institute) or annual association conferences (Ontario Hospital Association Physician Leadership Summit). It is primarily the physician's own responsibility to seek out, attend, and often fund this development opportunity.

Brown and Mayer (1996) highlight the paradox that, although hospitals are all "headed in the same direction" with integrated care delivery, they have "failed to build truly productive relationships with their most important resource: their physicians" (p. 35). According to Stoller, (2009), the development of physician leadership programs is an emerging trend. This trend has been brought about as health-care institutions come to understand the value that leadership can have to an organization's success. Stoller purports that "those institutions that develop the

answers and implement the solutions to these questions will design the future of health care" (p. 878).

1.4 Practical relevance

In this next section I will describe the potential practical application of my research for physician leadership development in Ontario.

Conflicting cultures between physicians within hospitals and non-clinical administrators has influenced a divide at association levels. "Non-clinical administrator" refers to the majority of health-care executives who are trained as business managers and have no formal academic training in the field of medicine. Currently, the Ontario Hospital Association and the Ontario Medical Association working to ameliorate the divide with the formation of the Physician Provincial Leadership Council (PPLC). The Council's workplan (2011) identifies physician leadership and physician engagement as their first and second priorities. They have established objectives to provide hospitals with the guidance and support for each priority. This research is expected to have practical value for hospitals that are members of the Ontario Hospital Association. In particular, the Physician Provincial Leadership Council will benefit as it engaged their members as research participants. It can provide timely, relevant conceptual and practical data to assist them in achieving their related goals. The Chair of the Council expressed keen interest in this research. This expression of interest is expected to carry considerable value for dissemination of findings.

Because I have used grounded theory for this work, throughout the course of the research, I acquired support for its practical application and for further research opportunities. These opportunities may accelerate the progress of physician leadership development. This uptake could increase the performance of health-care organizations. My research could sow the seeds of a new model of health-care leadership. In this new model, health care could respond adaptively to the challenges of today and ensure that physician leaders are capable of transforming tomorrow's health-care system.

1.5 Importance/benefits of the study

The benefits of this research to health-care organizations are covered in this section.

This research provides both conceptual and practical input for health-care organizations in the development of physician leaders to guide patient-centered care. Increasingly health-care organizations are understood as organizations that learn. In conceiving of health-care organizations as complex adaptive systems, my research aligns closely with this understanding. In order to develop the collaborative skill of their leaders, organizations need to be responsive and adaptive. Organizations that recognize the need to be responsive and adaptive and tp use learning and development tools to develop the collaborative skills of their leaders. In Gronn's (2000) work on "distributed leadership," he connects the "rise in popularity of organizational learning and the learning organization" (p. 333) to the increased use of teams within organizations. Team approaches recognize that

knowledge is dispersed and focuses on capitalizing on "harnessing collective expertise" (p. 333).

In spring 2012 I conducted a preliminary environmental scan among academic hospitals. Several of the hospitals surveyed spearheaded robust and well-developed leadership-development programs for non-clinical leaders at various levels (executive, director, manager). Despite this, in most cases, physician leadership development was done off-site and separate from their mainstream leadership development, or not done at all. The reasons for this lack included various challenges of a financial, structural, or interpersonal nature. Using the principles of complexity science, my research can assist health-care organizations to integrate leadership development for clinical and non-clinical leaders. It places value on harnessing collective intelligence within an organization. Further, complexity "offers a means to analyse emerging patterns and trends to illuminate how the disparate system parts are, or are not, working together" (McQuillan, P.J., 2008. *Small-school reform through the lens of complexity theory: it's good to think with"* as cited by The Health Foundation, 2010, p. 24). According to Leatt and Porter (2003), "progressive health systems that invest in leadership development for the entire senior management team will have the more significant return on investment in terms of organizational effectiveness" (p. 15).

The outcomes of this research may provide organizations with insights that will enable physician leadership development. In this way, it can support physician talent management and succession planning for clinical leadership positions. This

enables organizations to take a proactive approach rather than the current approach, which is seen by many physicians as obligatory or turn taking.

My use of grounded theory allows me to test theory as projects within hospitals. This approach can accelerate the lessons that can be incorporated on a wider basis. Several high-profile leaders in health care, hospitals and in physician leadership development, participated in my study. Their participation will be valuable in accelerating the uptake of research findings and theory building.

The results will provide evidence for increased investment in physician leadership development by health-care organizations, health regions and policy makers. It could lead to potential inclusion of leadership concepts in medical school curriculum and encourage newly-trained physicians to play a pivotal leadership role in patient-centered care.

The inclusion of both clinical and non-clinical leaders in this research has allowed for the development of concepts and practices that can be supported by both types of leader. Further, I understand leadership as an organizational element and a process, rather than embedded in any one type of individual with specific competencies. “Leadership teams must be able to discuss complex issues and reach innovative multifunctional decisions and yet speak with one voice” (Leatt & Porter, 2003, p. 18).

1.6 Why now?

In this section the reader will better understand why the time for this research is now.

Public health care consumes a significant proportion of public funds. Further, increasingly, it has been the main topic of discussion for politicians, health-care leaders, physicians, and the taxpayer. Considerable concerns are mounting related to the effectiveness and efficiency of our health-care organizations and systems. In Canada, the health-care system is managed by each individual province and territory. As a result, it is difficult to capitalize on the strengths within each individual system for the benefit of the entire country. Further, our country is typically reluctant to embrace innovation and take risks. The Health Care Innovation Working Group is a national collective of Premiers that have emphasized the need for action now. According to their first report, Canada's "immense size," its aging population, rising health-care costs and continued fiscal pressures do not allow for complacency (Health Care Innovation Working Group , 2012, p. 5). The leadership demonstrated by this inter-provincial working group of top politicians should increase the focus on leadership in our health-care systems. Specifically we need leaders that can "directly engage in innovation in order for health system innovation adoption to be successful" (Snowdon, Shell, and Leitch, 2011: 6).

Calls for reform within health care identify the need for more patient-centered care and wellness promotion, with the primary focus no longer solely being to care for the sick. A recent survey by the American Society for Health Care Human Resources Administration indicated that "hospitals need to begin preparing for this radical shift and develop creative strategies for closing gaps in capability, structure and management" (Towers-Watson, 2011, p. 1).

In their recent report, *Change that Works, Care that Lasts,* (2010) the Canadian Medical Association suggested that "Canada cannot continue on this path," and "Canadians deserve better." Most critically they indicated that, "the focus of reform must better serve the patient" (p iii).

In a report from the Canadian Health Services Research Foundation (CHSRF) it is noted that the "perpetually changing landscape" (Dickson, Lindstrom, Black & Van der Gucht, 2012, p. 15) demands constant adaptation. It provides a comprehensive list of practical approaches to consider. However, no approach is seen to be effective without the necessary state of "readiness and leadership capacity … to embrace and implement … in a highly complex system" (Dickson et al., 2012, p 15). The authors suggest that future research would benefit from study of the capacity of clinical and managerial decision makers to implement change in "a modern complex health system" (p. iv)

The timing is appropriate to begin serious dialogue with clinical and non-clinical leaders, together, to see the nature of complexity in health care along with the need for collective leadership. Such an approach will affect changes to current efforts to include physicians in leading patient-centered care. My research is relevant currently, as evidenced by the Ontario Hospital Association (OHA) hosting its inaugural Physician Leadership Summit in 2011, and the recent formation of the Physician Provincial Leadership Council. The Council develops tools and strategies for formal leadership skill development of physicians.

Ball's blog (Oct 2, 2012) post compares health care's "current reality" with what is the "emerging vision." Ball suggests that current skills in the system are focused on "knowing stuff," and argues that while we need to maintain this focus, we must shift from a sense of being in "control" to being "innovative." Health-care leaders must look at what might be needed if any shift is going to occur.

1.7 Chapter summary

Numerous factors supported the need for this research at this time, not the least of which was the impetus for change to the status quo for health-care organizations that are challenged to deliver patient-centered care that remains high quality and affordable for the public purse.

An increased focus on physician leaders recently has created a heightened sense of need for physicians that can lead, although historical challenges related to hospital-physician partnerships have been difficult to overcome. While it is recognized that physician leaders add value to health-care management, only a minority of health-care organizations (specifically hospitals) have acted on this, although those that have cite benefits to performance, bottom line accountability and patient-focused care. According to Dr. David DiLorento, executive vice president and chief medical officer with Resurrection Health Care in Chicago, "Physician leaders are uniquely positioned in today's world to help identify business and clinical needs in organizations that have a greater emphasis on clinical quality, clinical outcomes, and health system performance" (Stagg Elliott, 2011, Bridging a gap, para 14).

Additionally, leadership models that are based on complexity science are being associated with health-care organizations. Chadwick (2010) writes that "health-care organizations can no longer function under the traditional view of "the machine model" where standardization and control are the primary drivers" (p. 154). Complexity science principles can help to "make sense of the chaotic environment that we call health care" (p. 157), and, based on the nature of self-organization in complex adaptive systems, using this lens can help us to understand leadership development as it relates to physicians. It provides the opportunity for hospital leaders to think innovatively and creatively in order to move beyond traditional models of learning.

Avakian (2011) points out that it is "not management by best seller" but that it should be considered "serious work of health-care organizations that realize success lies in the hands of skilled leaders who motivate high-performing teams to deliver unparalleled patient care" (para 17).

Chapter 2: Review of the Literature

2.1 Introduction

This research provides health-care organizations with practical strategies to develop physician leaders based on complexity science principles. This represents a new way to think about physician leadership and organizational efforts to improve patient outcomes by supporting their development as leaders. This chapter explores the literature, which provided the foundation for the research but also identifies the current gaps in knowledge related to physician leadership development based on complexity science principles.

Following this introduction, Section 2.2 provides context for thinking about health-care organizations as complex. Health-care leadership is covered in Section 2.3. Setions 2.4 and 2.5 address literature related to physicians, their value within organizations and their development as leaders. In Section 2.6 complexity science as a theoretical framework is discussed. Section 2.7 addresses how this framework can be applied to physician leadership development. The final section (2.8) summarizes the chapter.

A recent white paper from the Ivey Centre for Health Leadership and Innovation contends that health care in Canada is significantly behind other developed countries. The authors note that we lagging behind due to a deficit in adopting innovative practices and processes (Snowdon, Shell, & Leitch, 2011). They argue further that our inability to see health care as "the largest business sector in the country" (p. 6) and the impact on economic prosperity leaves us vulnerable and

unable to address spiralling costs. The authors note that it is not that Canada lacks the ability to advance technology and science. Nor is it the lack of published articles on promising development. Rather, it is in the inability to "translate (sic) that knowledge into productivity" (Snowden et al., 2011, p. 5). The impact on health care is damaging unless we focus efforts on health leaders that can advance innovations and drive change.

Due to increasing health-care spending, calls for health-care transformation have been evident throughout most developed countries for at least the past two decades. There is an increased demand due to an aging population and the rise of chronic illnesses. In Ontario, should the current trend on health-care spending continue, by 2030 as much as 80% of the budget will be required to sustain the health-care system. This cost could bankrupt governments. Other Canadian provinces and territories have similar challenges (Falk, Mendelsohn & Hjartarson, 2011). According to the Canadian Medical Association (CMA) there are two serious challenges to the country's "prized Medicare system." These are meeting health care needs, and making it "affordable for the public purse" (CMA, 2010, p. iii). The Association's report, "Change that Works, Care that Lasts," notes that the "system needs to be massively transformed" (CMA, 2010, p. iii). The report cites the requirement for courage, leadership, and far-sightedness in order to provide Canadians with the value they deserve from the health-care system. "The focus of reform must better serve the patient" (CMA, 2010, p iii).

Increasingly, improved alignment between medical and administrative leadership within health-care organizations is seen as a valuable mechanism to improve the quality of care, and organizational efficiency (Baker & Denis, 2011). Physicians are viewed as advocates for their patients and as such they are "considered a model of individual professionalism" (Baker & Denis, 2011, p. 355). Because the physician determines what each patient needs, this has driven the costs of health care. The role of hospital administrator (non-medical leaders) has historically been to fulfill patient needs based on physician expectations. However, escalating health-care costs, increasing external pressures and an ever-widening gulf between clinicians and administrators has contributed to a system, (or perhaps better a "lack of a system,") which is not sustainable. A collective approach to improve health-care organizations is necessary. Although change will not come easily, there needs to be a focus on systemic thinking instead of individual priorities,. Baker and Denis claim that to "overcome the inertia of traditional professional bureaucracies" (p. 355) organizations must develop transformational strategies to develop physician leaders.

2.2 Complexity in health care

One of the most oft-used adjectives to describe both the health-care environment and the health-care organization is "complex" (Chadwick, 2010; Falcone & Satiani, 2008; Scott, 2010; Heine & Maddox, 2010; Leatt & Porter, 2003). The four main drivers cited by Billou, Crossan, and Seijts (2010) that "interact to produce complexity in organizations" (Complex environments, complex organizations, para 2) are readily apparent in health care. These include;

organizational diversity, interdependence, ambiguity and flux. There is considerable diversity in internal operational systems and processes, as well as diversity in the professions working within health care. Additionally, there are multiple stakeholders, which include patients, professionals, the public, and the government. This presents "formidable challenges to its leadership, such as defining strategies, promoting common values, and integrating processes" (Billou et al., 2010, Diversity, para 1). The interdependency between the administrative and the clinical components of health-care organizations means that changes to one component rapidly affects all other components of the system. Increasingly, decision-making is difficult in organizations where ambiguity prevails and the pace of change is unrelenting.

According to Weick, (2001), ambiguity results in organizations that depart from the "rational bureaucratic model" and where "connections of variable strength" exist. He argues that variability within organizations makes it difficult to plan and to organize and that it is bothersome to many organizations. Most organizations, and the leaders within them, strive to achieve identified goals with detailed planning, allocation of resources, specific timelines and accountability measures determined in advance. Deviation from the plan wreaks havoc for leaders. He suggests, however, that ambiguity within a structure be embraced as it allows for a continued shift in the organization's design. Ambiguity can "take advantage of some of the unique opportunities for change" (p. 47). These ideas point us toward the complexity inherent in health care. They also serve as a counterpoint to the more linear and hierarchical approaches that are evident.

Even for those that can embrace complexity within health care and see the inherent value in allowing for constant change, the system in which the organization is embedded is not structured to reward innovative leadership. Health-care organizations are influenced by their external environment. They are accountable to regional and provincial bodies that provide funding based on tangible outcomes. They operate according to defined standards, clinical guidelines and, increasingly, an emphasis on quality improvement initiatives that are rewarded with financial incentives. Lean methodology, a process improvement practice that came from manufacturing, is being implemented in almost all large health-care organizations. This method places continued emphasis on finding efficiencies, which can eliminate wasted resources and, hopefully, ensure fiscal sustainability (Machado, Scavarda & Vaccaro, 2014). Linearity pervades the way health-care organizations are funded and therefore structured.

Leatt & Porter (2003) identify some of the unique characteristics of health-care service delivery that, combined with external demands, set the stage for the "unprecedented change" (p. 22). Relationships between provider and client are intimate and personal and yet must remain objective and professional in delivery of services. Technologies are evolving rapidly. Patient care decisions are complex and often made with incomplete knowledge with the consequence of errors considered serious. High levels of autonomy of some professions can make them difficult to manage. Even so, interdisciplinary teams are expected to deliver high quality services that are difficult to measure (Leatt & Porter, 2003). Various health-care professionals, each with different status in the organization often work

on the same patient and are expected to do so collaboratively. Additionally, consumers are demanding increased accountability and higher quality services. Professionals are increasingly dissatisfied, citing burn out and having to cope with the added recent changes such as downsizing, regionalization and decreased funding (Leatt & Porter, 2003).

Heine and Maddox (2010) note the complexity of the hospital environment as well as the turbulent industry. Further, health-care professionals work with "customers who are not directly paying for the services they receive" (p. 2) and who are generally unaware of the costs of those services delivered. The professionals delivering the services are not necessarily employed by the hospital organization.

Using complexity principles, the National Health Service in the United Kingdom (Mowles, van der Gaag, & Fox, 2010) identified the "messy, conflictual nature of work in organizations" (p. 140). The authors suggest that complexity thinking is not necessarily palatable to those employed in health care. However, an increased ability to detach from day to day practice allows managers to gain a sense of greater control when they recognize the constant fluctuations of their work. "Working with ideas of ambiguity, paradox and complexity are not easy for staff educated in a Western tradition of linear cause and effect" (Mowles et al., 2010, p. 127). Indeed, working within complex organizations requires that one assumes less that Y is caused by X and more about allowance for the "unforeseen" (Mowles et al., 2010, p. 140). Weick and Sutcliffe (2007) use examples of high-reliability organizations (HROs) to illustrate how organizations can learn to be

mindful and prepared for the unexpected. They note that, "the ability to cope with the unexpected requires a different mind-set" (p 69).

Hospital emergency rooms have been described as "high reliability organizations," similar to aircraft carriers where mistakes are costly and alert minds are required (Vibert, 2004). Weick (2001) uses the example of an aircraft carrier to describe a high reliability organization that capitalizes on "aggregate mental processes." The aircraft carrier is a model for understanding organizational sense making which is applicable to the context of health care, with its inherent complexity and goal of operating without catastrophe. Vibert (2004) suggests that both aircraft carriers and hospital emergency rooms are alike in that the "ongoing struggle for alertness by its personnel" produces "metaphorically speaking, a more complex mind than that of a typical high-efficiency organization" (p 139).

According to Scott (2010), the underlying structure within health-care organizations is based on a history of leadership that is top-down and the associated processes seem to oppose change. The author posits that, unless old models and leadership development practices are addressed, the integration that needs to happen when such a diverse group of stakeholders exists will not happen.

2.3 Health-care leadership

This section brings health-care leadership into focus. Specifically I will consider whether leadership efforts are adding human or social capital (2.3.1). Further, I will consider current notions of shared leadership (2.3.2) in different sectors.

Much of the literature related to health care argues that current leadership development practices are at a crisis point. Scholars suggest that without significant attention and investment by organizations, any type of health-care reform will be unlikely (Block, 2007; Leatt & Porter, 2003). In the corporate sector leadership development and succession planning is an important priority. It is necessary as both a retention strategy and in order to mitigate the exodus of baby boomers from leadership roles. However, health care has yet to place value in the same way (Block, 2007; Leatt & Porter, 2003, Roundtable on Hospital Leadership, 2006). Organizations must commit to the growth of leaders as a long-term strategic priority to address reform challenges (Block, 2007). In Canada there are numerous issue-specific reports and health-care reviews but very little attention has been given to leadership planning. Some reports are national in scope such as "the Kirby report" (Parliament of Canada, 2002) or "the Romanow report" (Commission on the Future of Health Care in Canada, 2002), while others are provincial, like Alberta's "Mazankowski report" (Premier's Advisory Council, 2001), or Saskatchewan's "Fyke report" (Commission on Medicare, 2001). However, what is most needed are long-term solutions for a system that is already struggling to meet its service demands (Hylton, 2008). "In an environment characterized by cost pressures, increasing public expectations and fragmented organizational structures, leadership development is often overshadowed by operational urgencies" (Block, 2007, p 94). In the United Kingdom the National Health System represents a unified workforce and corresponding budget. However, in Canada health care is managed by provinces that each prioritize

differently. Some recent attempts at a unified approach are evident, such as the Health Care Innovation Working Group, a collaborative of all provincial and territorial governments. Within each province, health-care organizations are also somewhat autonomous in their decision making and priority-setting. Leadership development is not often viewed as a long-term strategic investment that requires a multi-faceted and well-planned approach (Block, 2007).

2.3.1 Human capital or social capital?

Leadership development that does not take context into account limits its potential. Programs that are primarily established to enhance personal competencies place responsibility on the individual to develop themselves. Most leadership development programs are structured to develop individuals according to an established set of ideal competencies. This can be viewed as increased capacity within individuals (or human capital). However, this does not necessarily equate to an increase in the organization's leadership capacity (or social capital) when that leader leaves. Wheatley (2011) describes this as moving from thinking of "leader-as-hero" to "leader-as-host." While the former descriptor "rests on the illusion that someone can be in control," the latter "trusts in other people's creativity and commitment to get the work done" (p. 2). A focus on human capital development limits the potential of improved organizational effectiveness; a poor return on investment for the organization (Leatt & Porter, 2003). Even though it continues to anchor the sector in the bureaucratic age, this competency-based approach to leadership development in health care is predominant worldwide. This approach gives "organizations a sense of continuing hierarchical control"

(Edmonstone, 2011, p. 8). According to Greenfield (2007), to achieve positive outcomes and change in health care, its historical association with hierarchical and separated management "must be overcome" (p. 159). Leadership as a process is emerging within organizations that value its contribution to social capital premised not on individual leaders but on collective or distributed leadership. It is based on the notion of improving systemic leadership through dialogue and relationship building and not solely on building better leaders. Edmonstone (2011) suggests that a "rebalancing" is required. By recognizing and valuing leadership, individual leaders will also be able to grow and develop. This development will take place in the context of the entire organization and thus add value and not just another "program" or leadership fad. In a service-type industry, such as health care, with complex environments and decisions that are made across functions and disciplines, leadership that is distributed across teams is more fitting than dependence on one heroic leader (Leatt & Porter, 2003).

Leadership development in health care is increasingly focused on the ability to think systemically. National associations identify this as one of the key skills and attributes of a leader in health care. The Canadian Health Leadership Network (CHLNet) along with the Canadian College of Health Leaders (CCHL) are focusing efforts on developing health system leaders who can demonstrate competency in the following areas: leading self, engaging others, achieving results, developing coalitions, and systems transformation (LEADS in a Caring Environment, CHE Program Capabilities). According to Ontario's independent health-care think tank, The Change Foundation (Nov 2011), the need for broader,

strategic thinkers among health leaders with respect to system transformation is clear. "This domain is increasingly more important than ever, because more sophisticated leadership is required to address the fiscal, technological, and professional challenges, particularly in the large, integrated health systems that are becoming the norm in Canada" (The Change Foundation, 2011, p. 10). This requires the ability to encourage innovative and creative thinking, challenging the status quo, constantly scanning the environment for opportunities and championing change.

A study that included forty-six Ontario hospital CEOs noted the importance of working collaboratively with all stakeholders "to make sure that we're properly integrated to best serve the taxpayers and the patients" (Reeleder, Goel, Singer & Martin, 2005, p. 29). This finding is consistent with the need for big-picture thinking that is required in leading toward a more integrated system of services, The study found that the attributes of CEOs that were most relevant to their leadership roles were "fostering a vision, creating alignment, developing relationships, living values and establishing an effective process by which internal and external stakeholders can abide" (Reeleder et al., 2005, p. 24). In order to identify the opportunities for integrating services, leaders must be able to think systemically and analytically. They must also be able to embrace the concept of patient-centred care. Current recruitment efforts for leaders within health care, particularly at the Chief Executive Officer level for hospitals, place emphasis on the need for candidates to be "a systems-thinker and able to seize opportunities and orchestrate effective horizontal integration of strategies with internal and

external stakeholders" (OdgersBerndtson, May 2011, & Aug 2011). Systems thinking remains a challenge when, according to Friedman, King, and Bella (2007) the common interpretation of a system of health care includes various professionals "who are somehow organized into a coherent whole that is there to take care of patients." The challenge lies in our capacity to see the whole when "our focus is on one part of the system"(p 21).

Better integration is also one of four key recommendations made by the Ontario Hospital Association (OHA) and the Ontario Association of Community Care Access Centres (OACCAC) (2011). These organizations note that, "Patients can derive many benefits from integration" (p. 18). By "promoting better coordination among providers, integration can help patients chart a smoother, faster journey through the health-care system" (OHA & OACCAC, 2011, p. 18).

Scott (2010) suggests that a shift toward a systems-thinking model of leadership in health care is necessary to merge "the best of administrative and clinical practices" (p. 83) and improve patient outcomes. Large health-care institutions remain bureaucratic with distinct divisions between administration and physicians. Reducing this persistent tension and fostering trust within organizations is vital to transitioning to a new leadership model. However, "around the world accessibility, fragmentation and affordability issues challenge health-care systems "(Scott, 2010, p. 83). Many agree that the context in which a new model of leadership must become embedded should guide the approach. According to Scott (2010), health care, consisting of complex organizations with

"silos that thwart collaboration," requires innovative, integrated processes, and the mobilization of "collective energy" (p. 83). She identifies three current strategies for integration of leadership: shared governance, frontline staff empowerment and increasing the number and competency of clinical leaders (Scott, 2010, p. 84). Thinking about being part of a whole represents a monumental shift in health care, where the nature of the physician has been one of "specialist." "Ironically, the profession whose very calling is about wholes is perhaps the most embedded in fragmentation...the word *health* has the same roots as 'whole'...yet, most physicians behave like mechanics that only consider their area of specialty instead of the whole person" (Kofman & Senge, 1994, p 6).

2.3.2 Shared leadership

Recently there has been increased emphasis on leadership as a process and less on specific leadership authority that conveys the existence of certain qualities or competencies (Leatt & Porter, 2003). Moving from a "command and control" style of leadership to a model, which allows for increased collaboration is fitting for health-care organizations. These organizations are struggling to survive intact as a cohesive whole rather than individual parts. Layers of specialization and hierarchy and the existence of systems and processes that are standardized, does not allow the creativity and adaptive learning that complex environments demand. Complex organizations cannot flourish without enabling the "distributed intelligence" needed to remain agile (Billou et al, 2010, Flux, para 4). Denis, Lamothe, and Langley's study (2001) of five Quebec hospitals provides evidence that, although "leadership constellations" can be fragile, the ability to work

harmoniously and capitalize on distinct, separate roles within a "pluralistic organization," can bring about substantial change. Their research provides rich examples of the dynamic features of both change and hospitals where "objectives are divergent and power is diffuse" (Denis et al., 2001, p. 809). The authors studied hospitals undergoing change and identified three levels of "coupling," which they suggest are necessary to effect change, yet may exist at varying levels at various times. Strategic coupling is that which happens between leadership team members. Organizational and environmental coupling refers to the links between team members and their internal, and external constituencies. Interestingly, the authors suggest that collective leadership be viewed not just horizontally, but also vertically: "a cascading process that involves chains of interlocking role constellations at different levels" (Denis et al., 2001, p. 837). This view will broaden the perspective and support change efforts.

Weick (2001) takes up the same theme at a more abstract level. He also argues that power, diffused throughout an organization, is beneficial in complex systems. He also suggests that, in a "well-developed organizational mind," there is no room for heroics or individualistic mindsets (p 279). He describes the concept of "group mind" to reflect collective mental efforts within organizations. This concept does not imply singularity of thinking but rather "differentiated responsibility for remembering different portions of common experience" (p 260). He suggests that efforts to develop collective mindfulness within an organization be viewed as "heedful interrelating." Further, he argues that corresponding behaviours of alertness, attentiveness, and action are critical in complex systems.

Collaborative, connected, shared, or distributed leadership are commonly used to define this approach. “Complex change is facilitated when the strengths and contributions of all stakeholders are openly and genuinely valued” (Collins-Nakai, 2006, p. 70). Health-care organizations need only look to the business world for examples of shared leadership (i.e. Motorola, Research in Motion). Some are more successful than others but for a variety of reasons. In fact, according to Miles and Watkins (2007), leadership structures that could be considered “complementary” have been around for over 3,000 years and evidenced back to the Trojan War. King Agamemnon, Achilles, Odysseus and Nestor, each with big egos and a unique skill set collectively prevailed against Troy. While the authors” primary focus is on complementary teams, for instance a CEO position balanced by a COO position, one focused externally and one internally, they indicate that shared leadership is on this same continuum. They provide the example of Bill Gates and Steve Ballmer at Microsoft and identify that the key driver in such a relationship is their “shared passion for the company” (Miles & Watkins, 2007, p. 5). An absence of passion for “the enterprise” by complementary leaders may only lead to a risk of confusion. As the division of roles is solely along the lines of duties and responsibilities, it is unclear who’s in charge of what. The “four pillars” for effective alignment “in a successful complementary team” are as follows: common vision, common incentives, communication, and trust (Miles & Watkins, 2007, p. 6).

Organizations stand to gain from what might be considered “a strong “left-brain”” leader that is more task-oriented plus a “strong “right brain”” leader that is

relationship-oriented. If "the talents and interests of each leader" can be leveraged effectively, the organizations gain the best from these complementary skill sets (Arnone & Stumpf, 2010, p. 15). Movement toward this type of structure must be predicated on the adoption of a whole new leadership philosophy, and represent a new paradigm within health care. Shared leadership uses influence both across and upward as well as downward. It is consistent with the dynamics of health-care organizations that are complex, in continuous flux and rely on cross-functional teams to deliver service (McCauley, 2004). Leveraging the talents of each leader provides the primary reason for a shared leadership model. However, this does not mean there is a clear separation of functions or power as this would only serve to further silo both physicians and administrators. We must recognize that both those trained as clinicians and business leaders have learned in a culture where competition, and "big risks for big rewards" (Arnone & Stumpf, 2010, p.16) has fuelled their career. Further, emotions will factor into the model's success. According to Merry (1994) health-care organizations that create a shared leadership structure will benefit from having clinician-leaders that will "have greater understanding of management science," and that "non-clinically trained leaders will better understand both clinicians and the clinical work of the organization" (p. 29). Leadership development within health care that brings in both process and clinical perspectives fosters a culture that can function within an interdisciplinary framework and contribute to the growth of physician leaders (Leatt & Porter, 2003).

2.4 Physicians as stakeholders (or shareholders)

In this section the discussion revolves around physicians. I consider their role in health care as well as their value for organizations (2.4.1) and the need for physicians to assume leadership (2.4.2).

Physicians can be considered one of the "most important resources" (Brown & Mayer, 1996, p. 35) in building an efficient and effective hospital system. Physicians contribute to improved patient care outcomes and bottom line success. They are also critical to health-care transformation. Relationships between hospitals and physicians must move from viewing this critical group as "customer of the organization" (Buell, 2012, p. 20). They relationship must become one in which they are seen as partners and pivotal to helping the organization achieve its goals. Failure to do so will negatively impact a hospital's ability to move closer to a model of an integrated delivery system. The priorities for such a system include the following: decreased wait lists, shortened hospital stays, an increased focus on preventative care and improvements in coordinated and appropriate care for each patient (Brown & Mayer, 1996). Physicians can make powerful contributions to health-care organization effectiveness in their connections with patients. Physicians can also contribute to greater demands for evidence-based medicine and improved knowledge sharing among professionals (Gilmore, 2010). Due to the nature of the physician-patient relationship, almost all health-care decisions are driven by physicians. These decisions include how resources are utilized, approaches to health management, and types of care provided (Dye, 1996). According to the Canadian Medical Association (CMA, 2010) they are

instrumental in the role they play in the empowerment of the patient. They are key in encouraging patients to manage their own care, to make healthy lifestyle choices, and to be included in treatment decisions. Increased involvement of physicians in executive decision-making, and at the leadership level within the organization can lead to better-informed decisions and an improved health-care system. Snowdon et al (2011) describe the physician group as a primary stakeholder. They understand very well what the trends and shifting needs are of the populations they serve. Their leadership can represent a "critical component of health system innovation" (p. 22). However, service delivery is not always consistent with their understanding of health needs. This leads to a "disconnect" (Snowden et al., 2011, p. 23) that stifles innovative change.

The Canadian Medical Association's national health-care report card in 2008 shared that only 1 in every 10 Canadians agreed that health care is focused on the patient's needs (CMA, 2010). Physicians can play a key role in building a patient-centred culture. Despite this, the lack of attention to their role as leaders indicates that their knowledge and capacity to effect change is not being valued. Due to their close relationship with the patient and their intrinsic understanding of the services delivered, increased patient satisfaction with health-care services is an achievable outcome with a patient-centered model of care (CMA, 2010). Physicians can offer a unique perspective as leaders and yet the emphasis on their development and opportunities to lead is sorely limited.

2.4.1 Competitive advantage

As a valuable driver of revenue for hospitals (Brown & Mayer, 1996; Popely, 2009), the contribution of physicians to an organization's bottom line cannot be underestimated. Productive engagement is necessary not only for their ability to contribute to effective solutions to processes and service delivery but to build the type of collaborative relationships needed to meet challenges of hospital operations (Popely, 2009). With numerous recent community hospital mergers over the past few years, hospitals now must consider their market share and demonstrate value for public funds. "Both the 2008 and 2009 Euro-Canada Health consumer Index ranked Canada 30th of 30 countries (the U.S. was not included in the sample) in terms of value for money" (CMA, 2010, p. iii).

A recent survey of over 100 US hospitals (Towers Watson, 2011) referred to the challenges facing the hospital industry, "a perfect storm of forces." It identified the urgency of health-care reform from a focus on caring for the sick to wellness promotion. The survey also identified the need to develop "creative strategies for closing gaps in capability, structure, and management" (p. 1). The report calls for a greater focus on developing leadership capacity well in advance of it being critically required. Despite this, the retention tactics common among hospitals continued to be top-down strategies such as enhanced performance management and improved onboarding. These strategies could shift to training or development for clinical staff and other professionals (Towers Watson, 2011).

A cross-sectional study of the top-100 U.S. hospitals (Goodall, 2011) found that there was a strong correlation between quality of services and the existence of a physician CEO. Quality was ranked based on three specialities (cancer, digestive disorders and heart surgeries) and while the study does not purport that physician managers perform better than professional managers, clearly those hospitals with clinical leaders are competitively advantaged.

2.4.2 The need for physician leaders

Many agree that the value of physician leadership cannot be underestimated. This is especially the case as health-care organizations have increased in complexity. Successful organizations will be those that recognize the importance of physician leadership development (Stoller, 2009; McAlearney, Fisher, Heiser, Robbins & Kelleher, 2005; Avakian, 2011; Letourneau & Curry, 1997). The health-care sector has been slow to recognize the competitive advantage that physician leaders can bring to an organization. The sector has also been slow to follow what has been the practice of "frontrunner organizations" in the business sector that invests in leadership development for a culture that is performance-oriented (Stoller, 2009). Physicians as members of the Canadian Medical Association have identified "both a need and a void" (Collins-Nakai, 2006, p. 68) in the area of leadership in medicine. They stated that their medical training did not provide them with this skill set and further development as a leader is needed to deal with the increasingly complex health-care issues (Collins-Nakai, 2006). Falcone and Satiani (2008) suggest that a swing of the pendulum is evident as physician leadership increases in importance in a system that is "complex, troubled and

challenging." They suggest that this swing harkens back to the beginning of the twentieth century when hospitals were often physician led. The authors suggest that physician leaders bring "a unique set of skills to the business of medicine" but also that training and developing physicians to lead may be "one of medicines" many challenges as it expands into the 21st century" (p. 88). Schwarz and Pogge (2000) state that it is physicians who are at the clinical center of service delivery. Because of that fact, they "are the ideal leaders for health care in the 21st century" (p. 187). Mounting pressures in health care over the past two decades have only served to further frustrate health-care executives that bemoan the dearth of physician executives that "can articulate and implement" (Guthrie, 1999, p. 3) the vision of health-care organizations. And all of this takes place against a background of increased corporatization of health care, which also requires greater leadership participation by physicians (McNulty and Ferlie, 2002).

In their study of organizational change within Leicester Royal Infirmary, McNulty & Ferlie (2002) identified that radical change, such as business process reengineering (BPR) met with resistance. They concluded that effective change is not revolutionary but evolutionary (Brugue, 2004). They identified that success required a "coalition of actors that support the transformational policy" (Brugue, 2004) and that medical staff are highly influential in their control over work practices. Essentially, change will not occur without them.

Guthrie (1999) points out that physicians can make many of the changes required to address issues within our health-care institutions. However, much of that talent remains "untapped and underdeveloped" (p. 5). He identifies the uniqueness of physician leadership due to the "social and cultural differences among physicians" (Guthrie, 1999, p. 6). However, he also notes the obstacles many face on the path to leadership. By "harnessing" the capacity and intelligence of physicians, Guthrie believes that they can help achieve "organizational objectives and improve the health of our communities" (Guthrie, 1999, p. 6). He further posits that medical leaders are often found through a turn-taking model, or chosen based on those that present the least challenge or are the most liked. This model is possibly based on a desire by administration to make the "least provocative or the most comfortable choice" (Guthrie, 1999, p. 7). This could be viewed as a guarantee that the institution will continue with the status quo, which minimizes the opportunity to pursue innovative approaches to familiar problems. This will continue to challenge succession planning for physician leadership positions in hospitals. In a personal interview one Chief of Staff indicated to me (D.Zelt, personal communication, August 4, 2012) that he currently has three upcoming physician director positions for which there is no identifiable candidate. Clearly this is problematic.

Physicians that choose to lead see the potential to have an impact on health care on an organization-wide basis. They are able to see the whole, the sum of all the parts (Guthrie, 1999). Developing physician capacity to lead may be viewed as a way to improve patient care, reduce costs, and strengthen strained relationships

between hospitals and physicians. Fostering leadership and increasing the opportunities for physicians to be involved in organizational decision-making can lead to decreased turnover and improved ability to deliver on strategy (Misra-Hebert, Kay, Stoller, 2004; Vimr & Thompson, 2011). Canada appears to be slowly following the lead of countries like Denmark and the UK. These countries understand the importance of supporting leadership in physicians. These professionals "must not be swept aside in the implementation of measures that will directly affect their daily work" (Chadi, 2009, p. 53). Dickson (2012) identifies a significant body of evidence from around the world that indicates that engaged physicians outperform, have less turnover and higher job satisfaction, and produce higher patient satisfaction and outcomes. He also notes that, "leadership development is an enabler of engagement." Leadership development is referred to this way several times in the project plan for Enhancing Physician Engagement in the Regina Qu'Appelle Health Region in Saskatchewan.

Physicians possess the technical knowledge and, with an increased understanding of the business side of operations, can make powerful contributions to health-care organizational effectiveness. They can do this through their connections with patients. They are able to meet the greater demands for evidence-based medicine and improved knowledge sharing among professionals (Gilmore, 2010). Because of their relationships with patients, physicians drive almost all of the health care, including how resources are utilized, approaches to health management, and types of care provided (Dye, 1996). As new business models, such as corporatization, become further entrenched in health care, the autonomy given to those who have

control over the production of services increases. An increased involvement of physicians in executive decision-making, and at the leadership level within the organization, can lead to better-informed decisions and an improved health-care system. Snowdon et al (2011) highlight the physician group as a primary stakeholder who understand very well what the trends and shifting needs are of the populations they serve. Their leadership can represent a "critical component of health system innovation" (p. 22). However, how services are delivered is not always consistent with their understanding of health needs, leading to a "disconnect" that stifles innovative change (Snowden et al., 2011, p. 23). Clark (2012) even suggests that "doctors are becoming more like shareholders rather than stakeholders as perhaps has been the case historically" (p. 438). On the other hand, "doctors are ideally placed to lead improvements" (p. 437). Successful physician leaders can act as a pivotal influence with their physician colleagues as they build upon their credibility through their competence as clinicians. This assumes an approach that values the collective intelligence and expertise that physicians bring to hospital operations. This approach cannot be predicated on a command-and-control style of leadership that can be used with positional power (Guthrie, 1999).

Parayitam and Phelps (2007) present evidence that the inclusion of physician executives on teams that make strategic organizational decisions enhances the decision quality and increases the level of commitment to the intended outcome of that decision (p. 292). They qualify "strategic decisions" as those that can be "vague, complex and non-routine" but that they also "must be effective and

competitive in order for hospitals to survive" (p. 283). The authors argue that the overall objective of health-care organizations benefits from strategic decision-making by physician executives because they both have the same goal; that of patient care.

As health-care organizations continue to focus their attention on creating value for the consumer, the imperative is for physicians to take up leadership roles that can produce change. According to Schwarze and Pogge (2000) strong leaders are those that can establish direction, align people, motivate and inspire. They differ from strong managers that are focused on planning, organizing, controlling and problem solving (p. 188). Stating that "only physicians can truly have an impact on this value equation" (p. 187) (increased quality plus decreased cost equals value) they posit that "it is important for health-care executives to identify those physicians best suited to serve as leaders within the larger health-care system and to deliberately nurture their growth" (p. 187). McKimm and Swanwick (2011) identify the need for physician leadership development to shift from "treatment of illness in individuals" to be "orientated towards the delivery of systems of health care within finite resources, focusing on disease prevention and health promotion within whole populations" (p. 182) Due to this shift, physicians are being asked to respond to considerable changes in health care. Effective physician leadership must be nurtured within organizations. Leadership must be supported through developmental opportunities that don't simply focus on "tick box competencies" that "will not ensure that doctors become better leaders and that health care will improve" (p. 184). McKimm and Swanwick (2011) call for leadership that is

sustainable and not based on competency achievement. Competency achievement may only provide short-term solutions and is unlikely to impact performance within an organization. The authors recommend a "holistic approach to leadership" (p. 182) that is "best rooted in work-based activities" (p. 181) and which is most reflective of a clinician's reality. Chaudry, Jain, McKenzie and Schwartz (2008) contrast a medical student's education in quantitative, technical skills development with the leadership that is needed in health care today. They state that physicians possess the capacity to become "superb leaders" and have a profound impact on health-care development (p. 219). The authors contend that if physicians continue to work only within individual health-care-delivery situations, or at the "microeconomic level," they can't have the impact that they might have if they truly led the system "at the macroeconomic level" (p. 213).

2.5 Physician leadership development: the known and the unknown

Section 2.5 situates the topic of physician leadership development in current literature to identify what is known and how we know it (2.5.1). Sub-sections 2.5.2 and 2.5.3 address structural and personal barriers for physicians in developing as leaders, respectively. Some exploration of what we do not know is included in 2.5.4. The next sub-section (2.5.5) suggests that a single approach to leadership development is not helpful.

Very little training in Canadian medical schools is focused on leadership. However, Chadi (2009) calls McGill University a "pioneer in this domain" with their introduction, in 1996, of a MD-MBA program that is considered unique. He

points out that there remain several challenges in Canada that stall a comprehensive medical leadership program. Not the least of these relates to the disconnect between hospital administrators and physicians in what he calls a "huge and complex bureaucracy." While physicians may be charged with leading the necessary changes in health-care organizations, the planning of such changes is often "left in the hands of bureaucrats" (p. 55). Edmonstone (2009) refers to this divide as the "disconnected hierarchy." Further, agreeing on a definition of clinical leadership in the UK (as opposed to managerial leadership) is a challenge. He contends that clinical leadership is the "elephant in the room – it is large and significant- an obviously important entity that is often ignored or goes unaddressed for the convenience of other interested parties"(p. 301).

Through the Physician Management Institute (PMI) the Canadian Medical Association (CMA) offers leadership courses that are generally 3 days in length and offered in most major cities. The framework adopted by PMI is consistent with what the majority of Canadian provinces use to guide their mainstream health-care leadership training. This program is referred to as LEADS in a Caring Environment. This framework enables valuable course offerings consistent with the complex and ever-shifting health-care environment. Courses focus on topics such as, engaging others, leading change, and systems transformation. All of these present opportunities for new physician leaders to comprehend their role as facilitator, or influencer, and validates the role that environment plays in their leadership. Understanding the context of leadership in health care necessitates learning about the various elements, which a potential leader will face. This

training is critical to new leadership and also critical to instilling a level of confidence in physicians when their medical training lacked such leadership topics. According to Denis, Langley, and Pineault (2000), the challenge for many new leaders in an organization that is considered complex is successful integration. The process of integration is not easy. "The new leader may, in theory, have more levers for action than any other organization member, but without deep knowledge of how the organization works, he or she is vulnerable to making errors" (p. 1064). This research was not intended to diminish the value of understanding leadership from the perspective of increasing knowledge related to best practices and enhancing personal capacity.

While PMI has moved to offer physician leadership training in-house to accommodate clinical schedules and eliminate travel time, most physicians pursue these courses individually. According to Chadi (2009), "very few incentives are provided to doctors or future doctors who pursue this leadership training" (p. 55). McAlearney (2006) points out that although physicians deliver health-care services, they are "rarely employed by provider organizations and are thus typically outside the purview of traditional human resource practices and leadership development initiatives" (p. 968).

2.5.1 How prepared are physicians to lead?

Researchers in Finland and elsewhere (Kumpusalo et al, 2003) have identified that physicians are "ill-equipped for management" (Kumpusalo cites a US study, Lane and Ross, 1998, and a UK study, Clack, 1994). In an assessment of 318

physicians at the level of chief or assistant chief by their colleagues on items related to management, most received barely a passing grade. The survey used a 100-point scale and eight management items: visions of the future, planning of activities, organising, delegating, motivating, communicating, evaluating and providing feedback. The highest mean score was related to visioning (57). Providing feedback rated the lowest (46). An additional study component asked those same principal physicians to rate how much training they had received for professional tasks and "85 % reported that they had had too little training for managerial skills" (p. 457). The authors contend that their "findings emphasize the urgent need to improve the way managerial skills are taught to physicians" (p. 460). They posit that this is particularly critical, as health-care delivery has changed considerably with respect to technology and medical innovations. This means that service delivery poses "new challenges to physicians – they have to become health care managers for their patients and communities" (p. 457).

Markuns, Fraser and Orlander (2010) conducted a qualitative study to identify best methods of leadership training and how physicians come to acquire these skills (p. 401). Findings primarily centred around three themes: that medical directors chose a leadership role out of a desire to make improvements within the health-care system; that a lack of training for the role was considered a barrier to their ability to enact change; and that training was considered "a facilitator of success" (p.404). Most stated a preference for a practical approach to training, noting that while conferences are available, "these 1-day to 1-week courses do not suffice" (p. 406). The authors conclude that the various stakeholders, including

academic institutions, government and health-care institutions (such as community health centres) must "work together to generate adequate funding and develop and coordinate this important leadership training to provide the highest quality health care to all" (p. 406).

2.5.2 Structural barriers

Several barriers to the development of physician leaders exist. The pursuit of a clinical education is a significant commitment. The process is "exceptionally long and arduous" with the addition of inclusion of leadership studies "problematic at best" (Collins-Nakai, 2006, p. 71). According to Lee (2010) most physicians "learned medicine when it was more art and less finance." Yet today's health-care institutions require a "fundamentally different approach – and a new breed of leaders" (p. 1). Physician leadership programs have surfaced over the last several years as part of the recognition that leadership skill development is lacking in clinical education. Organizations are starting to recognize the value of physicians as part of their leadership group. Even so, this still presents challenges for both the physician and the organization as leadership training removes them from their practices and their patients as they attend courses off-site. Some physicians choose to pursue an MBA to gain leadership expertise, although it can add considerably to their length of education. Further, while the fundamentals in leadership are gained, often the training is not done within the context of health care (Collins-Nakai, 2006).

2.5.3 Personal barriers

For those physicians that choose to take on a leadership role, according to Guthrie (1999), they may also face a "personal hurdle" (p. 14) in relation to their possible estrangement from other physicians, sometimes with consequences. Aside from the different skills and values practiced by both the physician set and the executive set, a physician leader may find it quite difficult to exert authority over their former peers. Physicians taking on leadership roles often do so in the face of negativity from their peers. It is as if they have abandoned their primary purpose where two distinct and separate foci are not seen to be capable of being blended. Physicians themselves often view their movement into administrative roles as accidental, or as turn taking and obligatory (Lee, 2010; Gilmore, 2010). Many identify themselves as "accidental leaders" and that their transition to a leadership role was less deliberate and more "happenstance" (Collins-Nakai, 2006, p. 68). Of course some physicians seek leadership roles and can associate their role as patient advocate with a leadership role. The same core values that applied to their clinical practice can be transferred to advocating for improvements to health-care organizations and have a far-reaching impact on the future delivery of health services for many (Collins-Nakai, 2006).

Physicians themselves grapple with the balance needed to maintain some clinical practice in order to remain clinicians. This is exacerbated by organizational leaders that identify leadership training as a "waste" and "take a physician away from what he or she was trained to do – take care of patients" (Letourneau & Curry, 1997, p. 9). Some pursue leadership studies on their own time in order not

to disadvantage their patients or practice. This may be done without any clear path to a leadership position, making the distinction between leader and clinician even greater due to the fact that, as a clinician, employment is guaranteed (Carruthers & Swettenham, 2011). There is some apprehension from non-physician health-care leaders that may see physician leaders as a threat (Letourneau & Curry, 1997) and not regard them as a "true executive" (Saunders and Hagemann, 2009, p. 6). Physicians and hospital administrators often bring quite different mindsets to improved patient care. Some have gone so far as to classify the physician-administrator relationships in some hospitals as "antagonistic," further fragmenting an already fragmented system (Lee, 2010; Gilmore, 2010).

As long as traditionally held views of leadership continue to dominate organizations such as those found in health care, physicians aspiring to leadership roles may continue to be associated with the "crude dualisms." These dualisms, referenced by Gronn (2000), assume leaders and followers take specific roles. Should health-care organizations choose to abandon this premise and view leadership as "the flow of influence in organizations," disentangling it from "automatic connection to headship" (p. 334) physician leaders may be seen as influential in "widening the net of intelligence and resourcefulness" (p. 334) lessening the current divisiveness.

2.5.4 What don't we know?

Weberg (2012) describes traditional health-care leadership as linear in its solutions. Linearity is perhaps more applicable to management activities than to

the role of leader. He cites two other specific problems with traditional leadership: being unprepared for innovation, and a lack of awareness of the organizational culture that becomes disconnected from the system in which it operates. A departure from the command-and-control style of leadership (or management) that has been generally associated with the industrial age offers the opportunity to explore complexity leadership.

Complexity leadership is defined as one that "conceptualizes leadership as a continual process that stems from collaboration, complex systems thinking, and innovation mindsets. According to Weberg (2012), it "is more consistent with the complex system that is health care" (p. 268). He proposes a complexity framework to view operations within such a system. He posits that the "incongruence in the way leaders currently lead in health care and the leadership competencies that will guide our health-care organizations effectively into the future" should be cause for serious exploration. It is likely to represent a paradigm shift in health-care leadership development (p. 275).

Denis, Lamothe, and Langley (2001) investigated the concept of collective leadership in Quebec hospitals and the criticality of the collective approach in achieving change. Such work can provide further impetus for exploring the collective intelligence referred to in complex systems and the capacity for transformation. Just as in Ontario hospitals, the authors refer to three "poles" of leadership: the CEO (or administrative lead), the Board (or publicly accountable lead), and the Medical Committee (governing the physicians who are not

employees of the organization). In order to achieve change, the "destruction of past patterns of embedded equilibrium" (p. 813) must take place. Within health care current command-and-control leadership styles are likely to inhibit the introduction of complexity-science principles of leadership and new models for physicians as partners. Gronn (2000) suggests that leadership approaches that focus primarily on leadership characteristics or the structures in which leaders lead "rests on a false ontological dualism" based on "leadership-followership" (p. 318). Although these previous perspectives are not without merit, he suggests that, "distributed leadership is an idea whose time has come" (p. 333). It is an idea, which is premised on a theory of action, where outcomes are "part of the overall system of collective relations between agents, activities, and objects (p. 323). The author uses the term "socially positioned actors" to describe pivotal players in a networked environment. This environment is one in which "decision making is heavily dependent upon the rapid processing of large amounts of information" (p. 323). In turn, this corresponds with the role of physicians in health-care settings, more dependent upon teams and collective problem solving than has historically been the case for physicians.

A study by Chreim, Williams, and Hinings (2007) into professional role identity, particularly in reference to physicians, presents evidence that the institution itself plays a significant role in the dynamics of role association. In light of this, what remain unknown are the institutional barriers preventing physician leadership development. These same barriers quite likely prohibit change that is associated with a more holistic, less bureaucratic, approach to leadership. Interestingly

enough, the changes taking place in this case involved different approaches to health care from treatment of illness to preventative care, reduction of autonomy of physicians through payment structures and increased reliance on team members and inter-disciplinary care. At the time this represented a unique approach for this small clinic. Currently, this team-based model of inter-disciplinary care and focus on wellness promotion is gaining momentum in many health-care organizations. Attendance to institutional barriers for implementation of a new leadership paradigm based on complexity science is more relevant than ever. Some vocal opponents to physicians-as-leaders still exist (Saunders and Hagemaan, 2009) and change will not come easily in a culture that is long-standing. Smith (2003) identifies that culture change does not happen easily and that a company's culture is a significant reason why some people choose to work there. This is highly likely to be applicable to health-care organizations where roles such as physician, nurse, or administrator are considered to have traditional responsibilities.

2.5.5 A multi-pronged approach

Researchers suggest a varied approach to physician leadership development (Collins-Nakai, 2006). There is considerable agreement that today's health-care issues will not be resolved solely by virtue of classroom training methods. When asked about the focus of leadership for physicians Canadian Medical Association members identified that "old models are irrelevant and unappealing" and that a balance of methods is needed (Collins-Nakai, 2006, p. 72). One of their suggestions, action learning, pioneered by Reginald W. Revans (Levy & Delahoussaye, 2000), is consistent with continuous learning and rejects traditional

learning approaches as being short-lived . According to Dilworth (2012), action learning "is seen as a way to develop the capabilities of individuals, teams, and overall organizations" (p. 28). This is consistent with the philosophy of developing leadership as a process that can be supported and sustained. It is not about investing heavily in the development of leaders that take their talent with them when they leave the organization. Action learning is also a way to shift organizational culture. It empowers several agents and augments the organization's learning capacity due to collective problem-solving. Problems to be addressed are fresh and real and relevant to the organization. The solutions are not found by experts. Researchers in Switzerland have found that leadership development practices vary in their effectiveness on the development of social capital within organizations. Most emphasis is placed on the traditional development of human capital instead (Galli & Muller-Stewens, 2012). Social capital is defined as "the quality created between people whereas human capital is a quality of individuals" (Burt, 1997 as cited by Galli & Muller-Stewens, 2012). While unable to make a distinct link, the study provides a good basis for further research on the effects of increases in both human capital and social capital as they relate to organizational outcomes. Of the six leadership development practices included in the study, both job assignment (short-term job rotation in another business unit) and action learning (12-18 month intensive project based learning to address a strategic challenge) have the highest potential to support strong social capital within an organization (Galli & Muller-Stewens, 2012).

2.6 Complexity science as a theoretical framework

In this section, complexity science is situated within current literature to illustrate how it is being used as a framework to examine behaviour of complex organizations. This is a departure from the mechanistic view of organizations and represents an approach that is relevant to the dynamic nature of health care and can offer new insights. Sub-sections 2.6.1 and 2.6.2 are discussions most specifically related to how complexity science is currently being used in relation to organizations and leadership.

It has only been in the recent past that social scientists have begun to look at health-care systems in a different way. By shifting to complexity principles, systems that exhibit dynamic behaviour patterns that do not correspond with linearity, causality, and predictability can present new insights. Jayasinghe (2011) suggests that this is the case in population health as "social epidemiologists … have in recent years moved closer to some of the concepts in complexity science" (p. 4). Uhl-Bien et al (2007) state that, "leadership models of the last century have been products of top-down, bureaucratic paradigms" (p. 298). In addition, even case study as a research method is seen to be more applicable when incorporating complexity science. McDaniel's (2005) conceptual paper is based on research methods in health care. It is interesting to note that complexity science principles are also being applied to this methodology. With the incorporation of relationship-based concepts inherent in this science, there is added value.

The authors suggest that using case study as a research method in health-care organizations is "driven by theoretical models that are not congruent with the nature of the health-care organizations we study" (p. 2). Case study is primarily a method looking at data that demonstrates cause and effect, history, and might be considered as straightforward and predictable. While the authors are not dismissing the value of case study as a method of research, they propose that "applying the blueprint of complexity science" (p. 4), might improve this method of research with a "richer understanding(s) of relationships in our case studies" (p. 5). This incorporation of complexity science with a time-tested research method in health care added to my impetus for using these same principles. I might suggest a new model of leadership development for physicians while traditional competency-based models continue to be the primary offering. The predictive philosophy behind most leadership education programs is referred to by Jayasinghe (2011) as "reductionism, linearity, and hierarchy" (p. 1). Anderson et al (2005) refer to leaders experiencing failures and that "adopting 'recipes' will not work in their particular organizations because of unique actors, political situations, and random events that interfere with implementation or replication" (p. 3).

Complexity science is not considered a single theory, but is the study of complex adaptive systems. They are considerably diverse and include ant colonies, forest ecosystems, hospitals, stock markets, and human bodies. This diversity speaks to the appeal of complexity science as it relates to changing, adaptable systems and its use in multiple disciplines including biology, economics, sociology,

mathematics, and management theory. Mitleton-Kelly (2003) refers to "several theories" rather than a single theory, suggesting that these theories provide us with "a conceptual framework, a way of thinking, and a way of seeing the world" (p. 4). In fact, Begun, Zimmerman, and Dooley (2003) suggest that the study of health-care organizations "will best be facilitated by comprehensive application of the metaphor of the system as a living organism, rather than the system as a machine" (p 254). Systems that are considered "living" do not correspond to the machine metaphor. Morgan (2006) refers to this framework when organizations were assumed to operate mechanistically "in a routinized, efficient, reliable, and predictable way" (p. 13).

Several principles of behaviour are associated with complex systems. Richardson (2008) identifies feedback, emergence, self-organization, adaptation and learning as some that, "have become synonymous with complexity thinking" (p. 14). Health-care organizations are complex for several reasons. They are multi-disciplinary. They also provide services to patients, their families and their communities. They operate within an increasingly turbulent environment and are "nested" in larger regional governing bodies. They function within an environment that includes many "markets" (Rouse, 2007) such as pharmacy, health insurance, medical equipment and health wholesalers. This increases the complexity of the delivery system for consumers.

Consumers themselves are complex due to the fact that "each patient is embedded in a variety of systems – physiological, family, political, and social" (Carlson

School of Management, 2013). Subsequently, patient-care and decision-making is complex. New technologies for medical records are making new demands upon physicians and health-care staff, especially as their introduction has been slow and inconsistent (Miller & Sim, 2004). The workforce in health care is "notoriously difficult to manage," according to Leatt and Porter (2003). This is due to the previously high autonomy levels of many professions and the shift to a higher level of integration (p. 22). External pressures (government, public accountability) have seen numerous strategies, including "restructuring, regionalization, downsizing of personnel, reduced bed capacity and decreased funding" (p. 22). All of these increase health-care complexity.

Traditionally, reductionist models and mechanistic thinking have had a strong influence on health-care systems. Rational deduction assumes that larger problems can be broken down into smaller segments, and solved by analyzing each of the "parts" (U of O/Notes/Complexity, 2012). Boundaries in a mechanical system are well defined. A paper describing outcomes of the Plexus Institute's 2003 Conference (Carlson School of Management, 2013) identifies the origins of health-care management with machines. "Arguably, this framework for understanding how machines work, guided the orientation of medicine around organ-based disciplines and physiological processes, and organizations around linear, hierarchal relationships and rules" (p. 2).

According to Zimmerman (1999), although complexity science is premised on an "intuitive or ancient wisdom," most organizations are predicated on leadership at

the top of the organization that can "control results." This approach is essentially "antithetical to a complexity science approach" (p. 46). Boundaries are difficult to identify in complex systems, with rules considered internalized and more instinctual. Further, each "agent" within the system interacts with all others creating movement and change.

An exploration into teacher education by Clarke and Collins (2007) using complexity science provides some interesting findings related to the practice of student-teacher supervision and viewing the practicum as a complex system. They suggest that, "some of our long-held notions about teaching and learning are challenged" (p. 164). The authors cite the teacher education system as a good example of a classic hierarchy with a flowchart that exhibits directional arrows pointing downwards to students. Their exploration of five characteristics of complexity science within a kindergarten classroom with student teachers suggests that the flow chart "does not represent, at least in our experience, the practicum as it unfolds in school settings" (p. 165). Using the principle of feedback loops, the authors cite oft-heard examples from teachers that learn many new ideas from the student teachers. Teaching is not necessarily linear. The authors also recognize the "constant undercurrent of activity" that surprises and can remind of the "circles of influence and opportunities for learning (p. 166). They note that "the unexpected, the unusual, and the unanticipated" (p. 167) needs to be taken into account in each school day. Using the complexity science principle of adaptation, the authors suggest that, more often, student teachers

follow the supervisor's lead and "forgo inquiry." They argue that this is "not the sort of learning that we would expect from professionals" (p. 170).

Due to the dynamism in a complex system, big changes can come from small actions and uncertainty and paradox is inherent (UofO/Notes/Complexity, 2012). Complexity science is based on dynamic systems in which outcomes are emergent due to their ability to self-organize and adapt where the "independent agents" act based on constant interaction with other agents (Zimmerman, 1999). No externally imposed hierarchy exists. Complex systems often demonstrate patterns of behaviour predicated on "attractors" and the interactions of agents and the environment (U of O/Notes/Complexity). In relation to a natural system, such as slime mould, an "attractor" may be a chemical secreted by cells that acts as "a turn-on for neighbouring cells that encourages them to wriggle closer" (Weber, 2002, p. 10). In a health-care system, a common goal or problem to solve can represent the attractor. An attractor is "something that an organization, group, or individual is naturally drawn toward" and serves "to determine how change will happen" (Penprase & Norris, 2005). This might be something like decreasing patient wait times or improved hand hygiene to reduce hospital-acquired infections.

Simpson (2006) undertook a case-study analysis of an MBA program's simulation exercise that uses an outdoor two-day event with groups of students. From this study, Simpson proposes some interesting observations related to leadership development as complexity science is applied. Simpson references Houchin and

MacLeans (2005) who identify stability as "the more "natural" state for organizations (p. 480). For example, only one group of MBA students out of approximately 50 achieving success with the exercise, demonstrated risk-taking behaviour and an emergent learning process that differed from most. The analysis included three relatable complexity science principles: self-organization, leader as participant (p. 469), and the tension of paradox and control (p. 468). Based on the limitation of the one observed group of students, developing a prescriptive leadership design is not feasible. However, the evidence provides some rationale for organizations that include leaders engaged in the process of learning along with the other participants (p. 480).

According to Richardson, (2008), the value of complexity thinking stems from the fact that it offers a "rigorous and scientific explanation" (p. 23) for our helplessness in the management of organizations. He sees this departure from current management science and traditional approaches as healthy: "not a disease to be eradicated. Status quos are never maintained and are rarely healthy in the long term" (p. 26).

2.6.1 Complexity science in relation to organizations

Complexity science as it relates to organizations can provide leaders with a new way of thinking and how they see their role. As Grobman (2005) explains, complexity science can "induce a healthy level of tension and anxiety in the organization to promote creativity and maximize organizational effectiveness" (p. 350). Rational decision making and determinism can no longer be applied when

different results are produced from two similar organizations (Grobman, 2005). Suchman (2011) states that there are "two ways to think about organizations," the mechanistic model and "the newer perspective." which is "based on principles of complexity" (p 11). According to Suchman, the complexity perspective "weans us off our unrealistic expectations of control." He goes further noting that by retaining these unrealistic expectations within a complex system "we may be instigating patterns of anxiety and frustration that can grow and spread, impairing organizational function" (p 18).

Distribution of control and allowing for emergent solutions, or as Zimmerman (1999) explains "growing solutions chunk by chunk" (p. 69) can be a highly effective way for organizations to manage. Complex adaptive systems are those that are "open to the flow of matter, energy, information" (Minas, 2005, p. 34). They are represented by the type of organization that is premised on learning, which supports evidence-based practice. As a result, they can shift toward "attractors" when it is a more desirable state of change. Organizations that foster sharing of knowledge are referred to as learning organizations, a concept that is consistent with harnessing ever-changing information in a complex environment (Senge, 1990). According to Garvin, Edmondson, and Gino (2008), the third building block of a learning organization is leaders that reinforce learning. This emphasizes the necessity for leaders to allow for a constant exchange of information and shared responsibility for outcomes. The other two building blocks include a supportive environment and concrete learning processes.

Weick (2001) suggests that organizations become "interpretation systems," which allows for processes of translating events and "developing models of understanding" (p. 244). The author purports that two conditions exist that distinguish interpretive organizations. First, they do not view the external environment as concrete. Second, they do not passively "accept whatever information the environment gives them" (p 247). They take an active role in acquiring data about an environment they consider unanalyzable. Weick identifies that the role of leader is to act as interpreter and to "make sense of things."

Uhl-Bien et al (2007) express curiosity with the fact that there is "little explicit discussion of leadership models for the Knowledge Era." Despite this, for an organization to be able to meet the challenges of globalization, competition and complexity, leadership must be considered "a core factor" (p. 299). The authors purport that traditional leadership theory identifies rational goals with practices of management that are designed to achieve them with the actions of leaders seen as the pivotal factor. They suggest that complexity science provides the tenets on which to examine "the dynamic, complex systems and processes that comprise leadership" (p. 299). Like them, I use complexity science to develop a new perspective on physician leadership development that "extend(s) beyond bureaucratic assumptions to add a view of leadership as a complex interactive dynamic through which adaptive outcomes emerge" (p. 314).

I have examined behavioural elements of natural complex systems such as patterns of behaviour, relationships between agents, and enabling functions to

move from one state to another. This new perspective provides an approach to leadership that enables physicians to assume a leadership role consistent with the environment in which they work. Further, it is predicated on a more natural expression of leadership as a process and less on the concept of leader as sole conductor of the orchestra. Weberg (2012) also identifies that organizations, and health-care organizations specifically, cannot continue managing "with outdated linear solutions" (p. 268). He contends that those that do apply linear processes to management "are not exhibiting leadership" (p. 269). This is because outcomes cannot be described as adaptive or emergent or innovative.

Survival in a complex environment has been referred to as "balancing on the edge of stability and instability" (Billou et al, 2010, Final Thoughts, para 4) and "working at the margin between a stifling stability and organizational chaos" (Minas, 2005, p.34). Minas identifies the inability of systems, sectors and organizations to cope with complexity as poor risk management. However, "complexity is one of the salient hallmarks of the 21st century" (para 3). The "butterfly effect" is often referred to in the literature on complex and/or chaotic systems. It refers to a small change that can take place in one part of a system (such as a butterfly flapping its wings) and have a huge impact on another part of a system (such as a hurricane in another part of the world) (Minas, 2005; Annabelle & Critten, 1998).

As the degree of complexity and dynamics within an organization increases, so does the required from a command-and-control mindset (Billou et al., 2010). The

authors describe this as being the difference between how jazz musicians "work collaboratively to co-create music in real time" and "the orchestral musician working from a musical score with a conductor ensuring the pieces fit together" (Billou et al., 2010, Dealing with complexity through organizational learning and improvisation, para 2).

2.6.2 Complexity science and health-care leadership

Traditional leadership in health care remains entrenched in current bureaucratic structures that emphasize trait-based models, and the "dyadic relationship between leaders and follower" (Weberg, 2012, p. 269 citing Bass, 2008). Weberg's review of traditional leadership theories implies that the goal for a leader is to "control uncertainty and work toward absolute stability" (p. 270). He goes on to say that it is these very linear traditional leadership models that have produced the fragmented health-care system that we have now. He suggests that leadership based on complexity science can provide a different, and improved way of leading in organizations. This way of thinking about leadership is particularly relevant to physician behaviour as autonomous professionals within organizations that are formal in their structure and operations. Begun et al (2003) reference Stacey, Griffin and Shaw (2000:59) and this paradox. They note that the value of complexity science is in identifying that despite "intended design" that may not go exactly as planned, things "get done anyway"(287).

Complexity science has recently become associated with health-care leadership. Parallels have been identified between hives of bees, flocks of birds and slime

mould and the complex nature of the collection of professionals that work in health care. All of them need to remain adaptive. “Both slime mold and health-care organizations are creatures of their environments...both must adjust to fluctuating conditions if they are to thrive” (Weber, 2002, p. 11). Leadership within such structures is seen as complex and adaptive. It “focuses on the interactions of agents – whether people or molecules – and their inherent capacity for self-organization and emergent behaviour...behaviour that can simultaneously produce stability and novelty” (Weber, 2002, p. 12).

The leader in a complex organization is seen as a facilitator. The leader “creates an environment which makes it possible for” the interaction and creation necessary for “new forms of reality” (Keene, 2000, p. 16). Keene identifies the leader in a complex world as a “torch bearer” and one who is always “scanning the environment” to help create a reality that emerges. This implies that this leader understands the paradox associated with complexity science. That is, the “very act of control may prevent the creativity and innovation we seek and as a result starve the system of the myriad options open to it” (p. 15). According to Weberg (2012), the speed at which health care embraces innovation is tremendously slow. Weberg cites examples of both the implementation of an electronic medical record system and the time for new research to reach the bedside of a patient to be implemented, noted as being 17 years (citing Melnyk and Fineout-Overholt, 2010). He provides these examples to emphasize improving outcomes by moving from traditional leadership models to complexity leadership. Doing so would “leverage the interdependencies of the system” (p.

271). Rouse (2008) purports that value is focused on the "benefits of outcomes rather than the outcomes themselves." Again this is a deviation from traditional leadership behaviours that may be premised on specific outcomes regardless of associated value. According to Rouse knowledge-based economy leaders have the ability to see improvements in productivity relative to "the intellectual assets embodied in people" (p. 22). Leadership is about "influence rather than power" (p. 22). According to Zimmerman and Hayday (1999), "outcomes are not 'owned' by any one person. They are the result of interdependencies and connections" (p 302).

Zimmerman (1999) suggests that concepts associated with complexity science underpin current trends in health-care leadership. This is evidenced by employment ads that indicate that organizations in the lead "require a great tolerance for ambiguity, an appetite for novelty, and a capacity to act even when facing great uncertainty" (p. 42). Essentially, health-care organizations, that consider complexity science as a lens for leaders, are attempting to re-frame traditional linear thinking. They see potential benefit in the "paradox and tension," which "means the ability to get comfortable with uncomfortable environments" (Chadwick, 2010, p. 161). Scott (2010) identifies most health-care organizations as having a leadership focus that is more consistent with the Industrial Age. The focus is on the administrative types of roles leaders play. However, she notes that "post-industrial leadership models are relational, value-based, and affirm a need to tap into the collective wisdom of members of the organization" (p. 86).

She indicates that organizations are united around a shared health-care field where clinical and administrative goals may differ but the need to provide safe and high quality patient care is shared. Weberg (2012) refers to the need for leaders to "attain competency for innovation" and that "complexity leadership" requires operating from "within the system to encourage adaption and emergence." This is different from traditional leadership that assumes a role outside "the unit of action" can control and lead (p. 272). The author identifies complexity leadership as a "contrasting option" (p. 269) to traditional leadership. Leaders engaging in complexity leadership do so with "an understanding that interconnectedness and change are normal operating conditions" (p. 271). For the purpose of this research complexity leadership has been used to define leadership that works with complexity science principles. To use a definition from Rouse (2007) "the best way to approach the management of complex adaptive systems is with organizational behaviours that differ from the usual behaviours, such as adopting a human-centered perspective that addresses the abilities, limitations, and inclinations of all stakeholders" (p. 22).

A research scan completed by The Health Foundation (2010) collated over 100 articles related to several sectors, including health care and complex adaptive systems thinking and suggests that there are advantages to using this approach. Such advantages include; this approach challenges assumptions and may suggest new possibilities as it "provides a more complete picture of forces affecting change" (The Health Foundation, 2010, p. 3) and also that it is focused on relationships. Limitations, however, are suggested to be the lack of predictive

value and empirical testing along with the challenge of definition of a complex adaptive system. This research study adds to the body of knowledge related to complex adaptive systems thinking and health-care leadership models.

2.7 Applying complexity science to physician leadership development

In this section the application of complexity science to the development of physicians as leaders is discussed including the five principles that formed the basis for data collection. Subsections 2.7.1, 2.7.2, and 2.7.3 elaborate on principles of connectivity/interdependence/feedback, exploration-of-the-space-of-possibilities, and co-evolution, respectively.

Using principles of complexity science, this study encourages a different way of thinking about physician leadership that encourages a new organizational form to impact health-care outcomes. Based on Mitleton-Kelly's (2003) principles, the study identifies leadership strategies associated with complexity science and the characteristics of natural complex systems. Further, I suggest how they can be applied within health-care organizations to improve patient outcomes. Due to the physician's unique role, central to patient care, their leadership can provide the influence associated with complexity science. In complexity science interdependencies are leveraged. In traditional leadership styles power is the basis for performance expectations (Rouse, 2007). Complexity leadership is based around tasks with agents that collaborate through flexible and creative processes. In a complex system no one leader is "in charge."

Increasingly, physicians are expected to perform in teams, working as part of inter-disciplinary care models, and understand very well the dynamics of health care and shifting priorities. Physicians understand that patients are "embedded in a variety of systems – physiological, family, political, and social-that recalibrate themselves, and appreciate that small interventions at the correct leverage points can have large results" (Rouse, 2007).

This research is consistent with Uhl-Bien, Marion, and McKelvey's (2004) core proposition related to what they term complexity leadership theory, which is that leadership goes beyond "the influential act of an individual or individuals but rather is embedded in a complex interplay of numerous interacting forces" (p. 302). Their work influenced my choice in exploring the dynamics in health-care systems and identifying, not only the physician leader's relevance to valuable outcomes, but more importantly, their role as enabler. The research has been focussed in three primary areas: relationships between agents (connectivity, interdependency, feedback), patterns of behaviour (exploration of the space of possibilities), and enabling functions (co-evolution).

While the other five principles of complexity identified by Mitleton-Kelly are no less applicable to the context of health care as a system, these five are applicable to agent behaviour most associated with the process of leading. By contrast, the remaining five principles-far-from-equilibrium, historicity & time, path-dependence, emergence, and self-organization-are considered relative to the structural changes inherent in complex systems. Mitleton-Kelly refers to the

energy exchange between open systems and their environment and "when pushed far-from-equilibrium create new structures and order"(p.11). She references the Benard cell heat transfer process and Prigogine's award for the 1977 Nobel Prize for his related work to "non-equilibrium thermodynamics" (p. 11).

Mitleton-Kelly also cites Nicolis & Prigogine (1989, p. 14) when identifying historicity & time as the system establishing an "historical dimension, some sort of memory of a past event." This suggests that this memory impacts further system evolution. Similarly, path-dependence is seen to reflect systemic behaviour in its evolution as it gets pulled toward a certain path due to a number of influences. The principle of emergence comes from systems theory and, according to Mitleton-Kelly, "may be difficult to predict by studying the individual elements" (p.19). This is similar to that of self-organization which refers to the "creation of the new order" (p. 19) to which a system evolves. This research has centered on the five principles as identified, each thought to be most closely associated with the process of leading.

This research was focused on the actions and/or behaviours of physicians and the processes of change that maximize opportunity for creativity, continuous learning, and connectivity between agents that can lead to improved outcomes for patients and/or the organization. This approach assumed that leadership development within organizations is processual and was not predicated on a precise set of competencies demonstrated within any specific individual. Using these principles prompted new thinking about leadership models that capitalize on collective

leadership strength. Some principles may be considered enablers in supporting strategies to develop physicians as leaders and add to current learning approaches. According to Weberg (2012), "research connecting complexity leadership to health outcomes is still very new" (p.275). It is anticipated that the paradigm shift that complexity leadership implies, coupled with its application to physicians, represents a unique approach. It is hoped to be one that can provide practical applications within health-care organizations that leverages the physician's role and is consistent with the current integrated delivery systems that are unlikely to fade away.

This research is based on five of the ten principles cited by Mitleton-Kelly (2003). These are connectivity, interdependence, feedback, exploration of the space of possibilities, and, co-evolution. The first three, connectivity, interdependence and feedback, have been grouped together as they all relate to the nature of relationships between agents.

2.7.1 Connectivity/ interdependence/feedback

According to Mitleton-Kelly (2003), "connectivity and interdependence means that a decision or action by any individual (group, organization, institution, or human system) may affect related individuals and systems" (p.5). This "relatedness between human social systems" will be variable and can include systems of an intellectual nature, which can "create new ways of working" (Mitleton-Kelly, 2003, p. 5). From the Health Foundation's report (2010) some of the literature reviewed included studies related to leadership in health-care

organizations. This study indicated that leaders that can build on the principles of complex adaptive systems thinking, focusing on fostering relationships, are able to produce outcomes that are more creative in nature. Collins-Nakai (2006) also identifies medical leadership as benefitting from being connected and that facilitation of change comes "when the strengths and contributions of all stakeholders are openly and genuinely valued" (p. 70). From a study in Wales (Matthews & Thomas, 2007), it was identified that "collaborative multidisciplinary communities which support knowledge capture and adaptive learning" were built using "interdependent working practices" (The Health Foundation, 2010, p. 19). Feedback can be seen as either a positive or negative influence and is relative to the level of connectivity (Mitleton-Kelly, 2003) between individuals in a social system. Feedback affects "how the organization will behave in the future" (Penprase & Norris, 2005, p. 130). Weber's (2002) comparison between slime mould and health-care organizations as "complex collectives" sums up the nature of connectivity, interdependency and feedback processes. They are important to survival in their environments and "both must adjust to fluctuating conditions if they are to thrive" (p. 10).

2.7.2 Exploration of the space of possibilities

Generating variety in strategies is referred to by Mitleton-Kelly (2003) as exploration-of-the-space-of possibilities. She cites Kauffman's (2000, p. 142) reference to "the adjacent possible" and that possibilities expand when consideration is given to change that may be "one step away." Less dependent on "pin-point forecasting, top-down planning, or elaborate controls" (Weber, 2002,

p. 10), natural system behaviour morphs to create a new structure through exploration. Complexity science "suggests that to survive and thrive, an entity needs to explore" and "to generate variety" in strategies. The ability to explore allows organizations to identify multiple strategies before a significant investment of resources is made. In fact, Suchman (2011) contrasts the aspect of "not knowing," seen as a deficiency in the machine model to the value of a complexity perspective that provides opportunity to "be more curious and less anxious" (p. 19). Begun, Zimmerman, and Dooley (2003) identify different frames of study using a complexity perspective. This strategy is considered "relatively emergent" and organizational relationships are for "learning" in complex systems. They contrast these to what they refer to as "established perspectives." Established theoretical perspectives (including structural contingency, transaction cost and institutional theories) view strategy as "relatively designed" and relationships as valued in their "efficiency" and "institutional conformity" (p 265).

Snowdon, Shell, and Leitch (2011) caution us with the "innovation adoption deficit" that is hurting Canada's prosperity in health care, making it "less and less efficient, more and more expensive." We must "more quickly adopt new technologies, innovative processes and procedures." The authors go on to say that, "physician leadership is a critical component "in the "adoption of innovation."

In a human system, action learning may offer opportunities for physician leaders in the context of hospital operations. This is one of the key insights offered by Collins-Nakai (2006) from the CMA as a new way of thinking about leadership.

She notes that "action learning principles" can bring an "appropriate balance among self-reflection, theory, practice and skills" (p. 72). It is valuable in its nature of learning leadership within the context of health care.

2.7.3 Co-evolution

Mitleton-Kelly (2003) differentiates between co-evolution and adaptation as change that is seen in relation to "all other related systems" and not simply adapting to a "separate and distinct environment" (p. 8). For instance, in a social system each "fully participating agent" "both influences and is influenced by" the related agents or organizations. Within a health-care organization, both clinical and non-clinical leaders are influenced by unique forces due to their specific tasks, their professional affiliations, and their role in the organization. Looking at how each may co-evolve and influence change may provide some insights as to how best fit can be determined and where the collective leadership capacity can be most valuable. According to Denis, Lamothe, and Langley, (2001), "the creation of a collective leadership group in which members play complementary roles appears critical in achieving change" (p. 809). Collective leadership in health care presents a good example of enabling function and correlates well with the complexity science principle of co-evolution. It does not imply simply adaptation but values the "collective phenomenon to which different individuals can contribute in different ways" (p. 810) According to Suchman (2011), "differences within a group are the seed crystals for creativity" (p 21).

2.8 Chapter Summary

Creation of an innovation culture (Snowdon, Shell & Leitch, 2011) that encourages risk-taking is the type of leadership critical for sustaining the health-care system. Although this is not a competency for health-care leaders that is a focus of current education programs, nor is it well adopted by health-care organizations that resist change. Challenging the norm requires " 'mavericks' who see things in their own way" (Snowden et al., 2011, p. 20). However, this is an important strategy to create the types of innovative environments where progress can be made.

Wood and Matthews (1997) identify that those health-care organizations refusing to address, or attempt to bridge, the divide between physicians and administrators will be unable to achieve integrated care. Differences between physician groups and hospital administrators can be overcome. This will lead to success in areas such as "standards of patient care, cost containment, resource utilization, physician compensation, revenue enhancement, and consolidated data collection" (Wood & Matthews, 1997, p. 69). The value of synergistic relationships lies in the potential to achieve greater things than any one party can achieve on its own. However, physicians "have historically seen themselves as their patient's sole advocates," and fear loss of autonomy (Lee, 2010, p. 9).

According to Smith (2003), culture change is a common type of change within organizations and usually associated with other types of change. However, success that was deemed to be "breakthrough or near-breakthrough" (p. 259) was

only achieved 19% of the time. A couple of factors contribute to successful culture change. First, recognition of "the crucial role of the middle rank of leadership." Second, it is "supported by an array of quantitative performance measures while unsuccessful projects were mainly described with subjective data" (Smith, 2003, p. 259).

Current literature provides us with the rationale for using principles of complexity science to study health care and makes the argument for developing physicians who can lead. However, it is sparse when it comes to identifying the challenges that relate to a physician's capacity to lead in 21st century organizations. While complexity science has been applied to leadership in health care, it has not been focussed on the uniqueness of physicians. This research fills that gap by specifically focussing on physician leaders and the nuances of developing their potential to meet the needs of today's health-care environment.

Chapter 3: Research Framework and Methodology

3.1 Introduction

This chapter is divided into 8 main sections. Following the introduction (3.1), Section 3.2 identifies how complexity science was used as the framework for this research. Section 3.3 describes grounded theory as the chosen methodological approach and puts it into context as it relates to its evolution as a research method and the challenges and opportunities that it can present. Data collection is covered in Section 3.5, which provides information on the participants, the research instruments, and how each of the five complexity science principles formed the basis for collecting data. Section 3.6 illustrates how data were analysed and Section 3.7 addresses generalizability and evaluation of grounded-theory research. The final section, 3.8, sums up the chapter.

This topic of physician leadership development will be of interest to physicians who choose to lead and to health-care organizations that choose to invest in physician leadership development. As physicians continue to gravitate toward team-based, inter-disciplinary models of health care, we require an improved understanding of both the enablers and barriers to physician leadership development. According to the literature, physicians continue to play an instrumental role in the way health care is delivered and those organizations that are beginning to see them as partners are also seeing their value as leaders.

This research provides recommendations related to practical approaches which will facilitate the development of physician leaders. This research presents data

gathered from those knowledgeable in any or all of the following areas: health-care management, physician leadership or leadership development.

The research question is as follows: *Can physician leadership development within healthcare organizations facilitate improved outcomes by examining complex system behaviours?*

3.2 Research framework

This section describes how complexity science has been used in this research and how the five principles of connectivity, interdependence, feedback, exploration-of-the-space-of-possibilities, and co-evolution have been used to generate data.

Complexity science is an emerging research approach in the study of management (Richardson, 2008), and offers insights on "our inevitable shortcomings and limitations" in leading organizations. The scientific principles of complexity were used because leadership is viewed as a process that involves many individuals. Complexity science emphasizes the adaptability, creativity and flexibility of leadership, not as a set of values existing in any one individual. This research is premised on an approach that is similar in nature to what von Bertanlanffy, the pioneer of systems theory, described as "biological systems," and "more influenced by the environment and having to interact with it and exchange matter and energy in order to stay alive" (as cited by Jayasinghe, 2011, p. 3). In the words of Gareth Morgan, "Leadership is a verb and a process, not a noun" (cited by the Centre for the Study of Health Care Management, 2003).

As the study of complex systems primarily focuses on the relationships between parts, patterns of behaviour and interdependencies within a dynamic system, applying the same principles to health care and leadership provides guidance in practice and presents an alternative leadership model that enables physicians to embrace leadership suitable for the 21st century. There is greater demand for leadership that understands, and values, the nature of this high level of interactivity. Strategies to develop physician leaders able to function well in this complex system that are based on complexity science are likely to be more relevant than using traditional hierarchical approaches to leadership. These traditional approaches are not only out dated, but incongruent with system (organizational) behaviour. Complexity science provides an approach to studying systems that can identify how change takes place, how such systems sustain themselves and how agents adapt to their environment. It suggests how innovation might take place within a system to accommodate the adaptation required.

This research focused on five principles of complexity science, grouped into three areas for purposes of research discussion (Table 3.1). Principle definitions are based on Mitleton-Kelly's (2003) Application of Complexity Theory to Organizations, with areas of potential research identified prior to the study. Related questions were anticipated as potential questions for participants and used as prompting questions if needed. Allowing that the concepts of connectivity, interdependency, and feedback would be considered abstract to participants, these questions were considered in advance as important to frame discussions.

Table 3.1 Applicability of principles to research

	Complexity Science principle	**Defined**	**Potential research areas**
Relationships between agents	**Connectivity** **Interdependency** **Feedback**	Fostering relationships Adaptive learning Adjusting to fluctuation	What is the degree of participation/co-learning among team? How do decisions or actions impact on other? How do feedback processes drive change?
Patterns of behaviour	**Exploration-of-the-space-of-possibilities**	New structure through exploration Action learning principles	How is the landscape scanned and new opportunities sought? How is leadership developed and encouraged?
Enabling functions	**Co-evolution**	Influences other and is influenced by other	How do clinicians and administrators collectively lead?

3.3 Methodological approach

In this section the reader will understand the origins of grounded theory as well as why this was the chosen methodology for this research. There are some drawbacks to this methodology, however, which are addressed in 3.3.1.

This research assumed a grounded theory approach, inductive in design and appropriate for exploring leadership concepts based on complexity science principles.

Grounded theory was used due to its value in the exploration of new relationships between complexity science principles and physician leadership development. It was also chosen based on the premise that this topic was inciting fresh discussion among scholars, operational directors and physicians. This approach was used based on the scarcity of knowledge amongst the sample population in reference to complexity science principles. It was expected that most participants would be knowledgeable about the more common management structures and approaches to physician leadership development. The ability to build from each interview and use data to inform subsequent interviews provided the opportunity for further probing of concepts, producing new data.

Grounded theory is a method and a methodology that combines several procedures using empirical data to build "middle-range theory" (Eriksson and Kovalainen, 2008) as opposed to broader theory that is applicable to society. The value of using this method is that the constant comparison of data and interplay of data collection and analysis can inform theory by identifying relationships between concepts. The use of grounded theory enabled me to explore the two areas of physician leadership and complexity science, and, by combining the two allowed for an interchange that prompted new ideas to emerge. Recognizing leadership development as a "socially related issue" (Jones and Alony, 2011) and also the expectation that the study was an "investigation of complex multifaceted phenomena" (p 95) the use of grounded theory was viewed as an appropriate methodology. By using grounded theory methodology the production of theory that is directly applicable to the development of physician leaders can provide a

valuable framework to health-care organizations, health-care providers, and to the health-care system itself that faces a myriad of challenges demanding strong and knowledgeable leadership. This objective drove this research and this researcher.

Barney G. Glaser and Anselm L. Strauss are considered the pioneers of grounded theory methods with their seminal work, The Discovery of Grounded Theory (1967). Grounded Theory emerged at a time when quantitative research methods overshadowed qualitative methods based on the focus on "logically deduced hypotheses and confirmed evidence – often taken as *the* scientific method" (Charmez, 2006, p 4). Glaser and Strauss's new epistemological approach challenged positivism. The introduction of grounded theory methods allowed for positivist methods, based on "causal explanations" and "predictions about an external, knowable world" (Charmez, 2006, p 4), to be revisited, particularly as it related to the process of data collection.

Glaser and Strauss identified that the observer's role is not a passive one and that theory could be generated in the process of data collection. The authors identified practical guidelines for data collection and analysis premised on the advancement and generation of theory that remained sensitive to "real-life problems" (Eriksson & Kovalainen, 2008, p 155). Glaser and Strauss took divergent paths in the late 1980's. Glaser became critical of Strauss's movement away from their original method. On collaboration with Juliet M. Corbin, Strauss developed a method that, according to Glaser "force data and analysis into preconceived categories" (Charmez, 2006, p 8). Grounded theory methods have continued to evolve with

Kathy Charmez. Her approach retains methods consistent with earlier works but includes neutrality that remains respectful of the uniqueness of the data and how they inform theory. This more recent approach by Charmez was taken in this study. It was thought to provide the best method to allow for the variety of expertise of participants and to produce theory that will be widely applicable and yet robust.

Charmez (2006) differentiates herself from the originators of grounded theory and posits that, "neither data nor theories are discovered" (p.10). Theory related to this research builds, not only on the data, but also upon the lived experience of participants and is underpinned by the current realities of existing health-care organizations in Canada. Additionally, it must be recognized that the researcher brought twenty-five years of experience in the workforce to the study and that any construction of theory cannot be completely removed from her knowledge of leadership, physicians as leaders and health-care organizations. The inquiry used by this researcher fits with constructivism and the approach to theory generation was based on an interpretive analysis of data. Constructivism contrasts with objectivism as the former views both the data and the process from which that data was produced while the latter is a positivist approach that considers the data solely. It is the position of the constructivist researcher to study the data as "embedded in larger, and often, hidden positions, networks, situations, and relationships" (Charmez, 2006, p. 130). Charmez posits, "we are part of the world we study" (p 10). The original impetus for this study stems from an informal environmental scan among academic hospitals in Ontario that identified a dearth

of leadership-development opportunities specific to physicians. "Neither observer nor observed come to a scene untouched by the world" (Charmez, 2006). Every effort was made to remain true to Charmez's emphasis on researcher as writer with sensitivity to the data that "has the potential to communicate how participants construct their worlds" (Mills et al, 2006).

There are several advantages to using a grounded theory approach. One is the ability to identify areas of importance to participants and to build on data by modifying the interview in order to follow through on an area of emerging emphasis. This was valuable as the pairing of complexity science and physician leadership represented a new conversational topic for most. Charmez (2006) identifies this as one of the values of qualitative research that "permit you to follow leads" and "add new pieces to the research puzzle" (p. 14). The researcher used probes throughout interviews to explore areas of emphasis by the participant and concluded interviews with an opportunity to add what they felt was particularly important to this topic.

The ability to incorporate the perspectives of advisors, academics, mid-level and senior-level operational subjects and physician leaders fits with grounded theory methodology as it relates to the richness of data. In addition, the coding and constant comparison of data guided the research, enabling the researcher to increase confidence in the reliability of data and procedures. This, in turn, enabled the development of theory that resonates with the participants. Interviews were viewed as a dialogue with participants often sharing general perspectives from

previous interviews to allow participants to either confirm or refute that perspective and provide their own. According to Charmez (2006) it is "an inquiring mind, persistence and innovative data gathering approaches" (p 13) that produces rich data.

Suddaby's (2006) positioning of grounded theory in a historical context claimed that Glaser and Strauss built upon the pragmatism of earlier scientists. Further, it is suggested that their diversion from positivism allowed for an "empirical reality" as "the ongoing interpretation of meaning produced by individuals in a common project of observation" (p. 633). The author notes that the emergence of theory remains organic and that, this research approach starts with substantive theory. It is understood that the researcher does not necessarily begin with a blank slate. According to Suddaby (2006), researchers may focus on "the elaboration of existing theory" rather than "untethered new theory" (p. 635). It is the interplay and the "ongoing interaction between researcher and data, that generates the fundament of grounded successful research" (Suddaby, 2006, p. 638).

The research design was consistent with the inductive reasoning of grounded theory methodology (Charmez, 2012). By starting at the outside and working toward the centre of the topic, it allowed the researcher to stay true to the approach of grounded theory, which enabled the unfolding of data. It also allowed the data to emerge, build upon complexity theory and inform the ways in which it may be applicable to leadership-development processes in health-care organizations.

"If organizations are seen as complex evolving systems, co-evolving within a social "ecosystem," then our thinking about strategy and management change" (Mitleton-Kelly, 2003, p. 1).

Using open-ended questions of semi-structured interviews, data collection, coding, and analysis were combined for an iterative process to build from the data. According to Eriksson and Kovalainen (2008), applications of grounded theory are less common in leadership studies (p. 156) than in marketing or consumer research. Therefore the contribution of this research to the field of leadership studies is considered worthy. The authors suggest that one possible reason for the lack of examples in leadership studies may be related to the original "objectivist assumptions embedded in positivism." However, much of the more recent grounded theory studies follow "constructivist assumptions" (examples cited include Charmez 2003, 2006). The differences between "epistemic assumptions" (p 156) related to either consumer or leadership research may have made grounded theory a more-, or less-preferred approach.

This approach has significant merit related to the research question due to the novelty of using complexity science principles and applying them to this type of organization (health care) and sample population (clinical and non-clinical leaders in hospitals). These traditionally embrace hierarchical, linear principles of management and strategy development and didactic leadership development methods. The World Health Organization (WHO) has linked the need for medical schools to be inclusive of "understanding systems and the impact of complexity on patient care" particularly as it relates to patient safety (Baxter, 2010, p.3).

Partington (2002) identifies the fundamental four elements that must remain in alignment to effectively conduct grounded research: 1) purpose, 2) research question, 3) theoretical perspective, and 4) research design. This research has retained congruency between each.

Using complexity science as a theoretical perspective allowed for creative exploration of related organizational-leadership concepts. This framework provided value as it relates to current calls for health-care transformation and movement away from the traditional, bureaucratic style of health-care management to recognize the need for adaptive leadership. Using a complexity science framework is consistent with recent trends in health-care leadership programs, including those for physicians (Physician Management Institute) to support the development of "systems-thinkers." This is predicated on the assumed similarities and comparable properties between natural, biological, complex adaptive systems and the social, complex adaptive system of a health-care organization.

3.3.1 Using grounded theory to theorize

As a researcher, my prior knowledge informed the data collection and analysis. Charmez (2006) clearly identifies that theory generation "offers an *interpretive* portrayal of the studied world, not an exact picture of it" (p 10).

Grounded theory allows for exploration of complex phenomena. However, the outcome of that exploration remains unknown until the journey is finished. It is a

challenge to know when the data is sufficient to merit theoretical claims and/or whether the analysis offers original and relevant insights and findings.

3.4 Ethical considerations

This section identifies the considerations around ethics and the approval process.

Ethical approval was received from Athabasca University's Research Ethics Board June 25, 2013 after slight revisions to the application were made as required (Appendix 2). Areas that could be considered as risk were identified as follows: discussion of sensitive issues and/or physical/emotional/economic/social harm. Risks were considered to be minimal. No vulnerable participants were included in this research.

Due to the nature of the in-depth interview method and the personal conversation that it entailed, it was important to ensure that all efforts were made to address ethical concerns of the participant in advance and establish a degree of trust by conveying how the information would be used. This included asking participants for permission to quote them, deleting certain phrases or sentences that they may reconsider being used, and considering the timeliness of acquiring written consent so as not to disrupt the interview flow (Rubin & Rubin, 1995). Informed consent was obtained through the letter of invitation. The letter identified the research purpose, process, and participants' right to withdraw, their agreement to be interviewed via email. As well, an agreement to a recorded interview was included at the beginning of each interview.

Assurance was provided regarding the confidentiality of the information and the relevance of the information to the broader research on health-care leadership in general and not specific to their particular organization.

3.5 Data collection

This section provides the reader with information related to participants (3.5.1) and the data collection instruments (3.5.2) and how they were used.

3.5.1 Participant selection and profile

Consistent with the notion of theoretical sampling (Glaser and Strauss, 1967), a staged approach to interviews and data gathering was used. This informed subsequent interviews with a different type of participant, adding to the development of theory and "directed by evolving theoretical constructs" (Eriksson and Kovalainen, 2008, p. 160). "Purposive sampling" (Silverman, 2010, p. 41) was used. The researcher chose interview participants based upon their knowledge of the topic, the researcher, or their interest in the research, and the assumption that this knowledge or interest would prompt their participation. Each participant was actively involved in work directly related to this research topic and all expressed keen interest in the results. Participation was sought from individuals associated with either, physician-leadership development or health-care organizations, and/or those that would have an understanding of current realities of health-care leadership and systemic forces that may support, or inhibit transformational changes. Participants were identified as one of three types:

Type 1- Key representatives in physician leadership programs (academic institutions), Local Health Integrated Networks (LHINS), health-care clinical staff or program operational directors, the Canadian Medical Association, the Canadian Society of Physician Executives, and the Ontario Hospital Association. A goal of 7 participants from this group was established.

Type 2 – Those in middle and upper management positions within health care, primarily associated with operations, at both clinical and non-clinical levels. This included those in human resources, organizational development, chief executive positions and clinical leaders within CAHO (Council of Academic Hospitals of Ontario) hospitals. Academic hospitals are those affiliated with a university medical or health sciences faculty and CAHO member hospitals "teach the next generation of health care providers, and foster health-care innovation through research and discovery" (CAHO, 2012). A goal of 7 participants from this group was established.

Type 3 - Senior physicians and health-care leaders that were members of the Provincial Physician Leadership Council (which included community and academic hospitals, clinical and non-clinical hospital leaders). According to the mandate statement of the Provincial Physician Leadership Council, it is to assist in enhancing "hospital-physician relationships by promoting a collaborative culture among health professionals to ensure the delivery of high quality patient care"
(http://www.oha.com/CurrentIssues/keyinitiatives/PhysicianandProfessionalIssues

/Physicians/Pages/PhysicianProvincialLeadershipCouncil.aspx), The Council's 2011-2013 work plan has seventeen objectives. These relate to physician leadership, physician engagement, physician human resources, health system redesign and partnerships. Both the Council's mandate and the focus of their work plan provided the rationale for seeking 7 participants from this group.

A goal of 7 participants within each of the three types was established, although reaching saturation, defined by Morse (1995) as "data adequacy and operationalized as collecting data until no new information is obtained" (p. 147) was of primary interest. It is not the quantity of the data or the frequency of data, but the richness of the data that allows for a "comprehensive theoretical model" (Morse, 1995, p. 149). Twenty-one in-depth interviews were planned and achieved.

While it was originally anticipated that interviews would follow a progression between types of participants, the researcher had to remain flexible and available to conduct interviews with willing participants based on their availability. As a result, there was some overlap in the timing of interviews between participant groupings. In addition, while the end goal of 21 interviews was accomplished, the availability of participants per type dictated the number of interviews that were completed. Table 3.2 provides details of intended participants and actual participants per type.

Table 3.2 Participant groupings

Participant type	Included	Number of participants interviewed by defined types
Type 1 Approximately 7 participants anticipated from this category	Authors, academics, advisors in health care (national committees)	7
Type 2 Approximately 7 participants anticipated from this category	Physicians and non-physicians currently considered to be employed or associated within health-care organizations, both at senior and mid-management level	11
Type 3 Approximately 7 participants anticipated from this category	Physicians and non-physician members of the Ontario Hospital Association's Provincial Physician Leadership Council.	3*
*Important to note that while only one (1) from initial Type 3 participant list was interviewed, an additional two (2) were interviewed January/February 2014 who are new and current members of Provincial Physician Leadership Council. In addition, although one Type 3 participant from initial list (and ongoing Council member) declined an interview, relatable primary data has been included in the form of a video-taped interview with this participant and provided by another potential participant.		

Sample size was predicated on the need to have a full array of perspectives related to the topic. Charmez (2006) suggests that study quality rests on having participants with various viewpoints and data that may be reflective of changes over a period of time. Strauss and Corbin (1990) also recognized "the importance of a multiplicity of perspectives," (Mills et al, 2006, p 4) to enable a theory that is reflective and rich in context. By including physicians and non-physicians, mid-

and senior-level participants, both genders and a considerable age range there is a greater likelihood of building theory that will resonate with many. Letters of invitation were sent to thirty-six potential participants based on several factors: the subject's current status as related to the initial sample list, the ability to identify a current email address for them and the subject's name, as suggested by another participant and seen as suitable participant.

Of the letters of invitation sent, four potential participants were unable to participate. This included two who were associated primarily with provincially-mandated health organizations, one senior physician leader who indicated that he was too busy to participate and another who indicated he was not the right person in the organization to speak to and provided another person's name. Eleven of those invited did not respond. Three participants who initially accepted the invitation to be interviewed were subsequently unable to commit to an interview time despite options provided by the researcher. By using a snowballing technique and a data collection period between July 2013 and February 2014, the researcher was able to obtain 21 intensive interviews from the types of participants defined in the initial proposal. One additional videotaped interview was made available from one of the participants. The original target of 21 interviews was achieved.

Each participant had expertise in one of three areas related to the research; they personally defined in which of the three areas they were most knowledgeable. These were as follows: health-care management, physician leadership, and leadership development. While no definitions were provided to the participants

and they were expected to self-identify areas of industry strength, the three defined areas of knowledge were specific enough to convey relevant work responsibilities and were commonly-known areas of expertise amongst all of the participants.

Health-care management expertise related to roles that included administrative responsibilities such as financial, strategic, and the management of resources including staff. Physician leadership expertise meant that participants held a past or current role either as a physician in a leadership position or in direct support of physician leaders. Expertise in leadership development included active roles in training, coaching, and/or educating leaders. Each participant identified the area(s) they felt most experienced in along with the approximate number of years they would associate with that experience. For some there was one primary area they were most confident in speaking about, for others two of the three topics were areas of expertise and still others identified that they were knowledgeable in all three. The average number of years experience relative to any or all of these three areas was 18 years. Confidence in their knowledge, related to both health-care management and physician leadership was the same, with the most expertise concentrated within the topic of leadership development. (Table 3.3)

Table 3.3 Participant expertise

Participant type and number of each	Health-care management expertise in years	Physician leadership expertise in years	Leadership development expertise in years	Are physicians	Are physicians with current clinical practices
Senior operational (4)	*I – 7 M - 8 T-10	I - 7 M – 8 T - 10	I – 7 J - 20	3 (J,M,T)	0
Mid-level operational (10)	G – 25 K – 5 N – 8 O – 10 U - 13	K – 5 L – 5 N – 8 O – 10 P – 4 S – 13 U - 5	D – 7 H – 17 L – 5 N - 8	6 (K,L,O,P,S,U)	6 (K,L,O,P,S,U)
Academics (4)	E - 18	0 years	B – 30 C – 20 F - 8	0	0
Advisors (3)	A - 13 Q - 2	A – 13 Q - 2	A – 13 Q – 2 R - 25	1 (A)	0
*Participants are identified by alphabetical symbols which correlates with pseudonyms given to each in Chapter 5 Findings					

As one of the criteria for evaluating grounded theory, credibility of associated claims lies within the richness of data and evidence of sufficient data (Charmez, 2006). The researcher remained open to additional interviews during the coding stage either through presentation of an opportunity or if data was seen to be insufficient through initial coding, with the identification of "categories that are intriguing but thin" (p 96). This resulted in three additional interviews with physicians. Charmez refers to theoretical sampling as the purposeful collection of data to build upon current emerging themes, requiring additional interviews albeit for a more narrowed focus; to "explicate" categories. (p. 100). This provided the researcher with a further opportunity to produce theory that is robust and firmly grounded in data, or saturated.

3.5.2 Data collection instruments

Two methods were used for the collection of primary data: intensive interviews and extant texts as provided by participants. Details of each are included in sub-sections 3.5.2.1 and 3.5.2.2, respectively. Participants provided documents considered valuable, which were included as primary and referenced during their interviews. Both sources are appropriate data collection methods, consistent with the nature of grounded theory, as they provide opportunity to identify areas of information that are meaningful to the participant and can inform exploratory discussion (Charmez, 2006).

3.5.2.1 Interviews

Flexibility on the part of the researcher allowed the participant to choose the best time and location for the interview to take place. Respect for a participant's time kept interviews to their stated time frame and still allowed for a brief introduction to the researcher and her credentials, the purpose of the research, and a review of their vital role in the conversation. Participants were advised that the interview was expected to take no more than an hour with no interview exceeding forty-five minutes.

As the participants were leaders within the health-care sector, establishing a trusting and respectful conversational tone was considered essential, particularly related to topics that were seen as politically sensitive.

Consistent with constructivist grounded theory, individual in-depth interviews took place, face-to-face, or, alternatively, by telephone. Cachia and Millward (2011) noted that the increasingly common use of telephones in business communication, and the increase in access to either "fixed or mobile telephony" (p. 268) made the use of telephones for semi-structured interviews increasingly valid. They suggested that telephone interviews could be perceived by extremely-busy people as taking up less of their valuable time than a face-to-face interview. As the participant population included physicians and/or senior organizational leaders, it was felt that the option to be interviewed by telephone increased their ability to participate. In addition, the researcher's ability to conduct 21 face-to-

face interviews throughout the province was a challenge due to its geography and the associated travel cost.

Using questionnaires was considered and known to add value in its capacity to provide greater generalizability to results. However, the personal interview was used to increase the opportunity for insights and understanding from the participants of the theoretical principles as they may apply to a health-care organization's physician-leadership model (Rowley, 2012). It was also felt that securing interviews with persons with high positions and limited time was likely to produce useful data. The researcher needed to remain reflexive and reflective, continuing to consult with supervisors in order to ensure adequately-captured data and theory building.

Interviews were primarily "constructionist" in order to identify "how" health-care organizations can maximize physician leadership development for organizational transformation, but also "emotionalist" to identify the "what." This included participant viewpoints on complexity theory principles and their application to physician leadership development (Eriksson & Kovalainen, 2008).

Due to the nature of the work that participants were engaged in, it was expected that recruiting participants would be difficult and creativity on the part of the interviewer was required. In order to access participants for interviews, the researcher utilized all opportunities to engage them, including networking and a research poster presentation at a national health-care leadership conference (National Health-Care Leaders Conference, Niagara Falls, 2013). All

opportunities were sought to encourage participation in this research where interest was expressed.

Each potential participant was emailed a personalized letter of invitation signed by one supervisor and the researcher. They were also provided a time frame between two weeks to a month in which the interview was proposed to take place. A second email to request consideration of the proposed interview was sent if a response was not received within two weeks.

An interview time and location was established according to the availability and preferences of the participant. Where possible the researcher travelled to the location of the participant with interviews taking place at both the participant's place of work and in their home. Nine interviews were conducted face-to-face with the other twelve conducted by telephone, achieving a total of 21 interviews as per the original target. A publicly available video-taped interview was provided by one participant featuring a physician leader from the initial list of invited participants and has been included as primary data.

Interview participants were reminded that their participation was voluntary and that they could withdraw from the research at any time during the data collection phase. Their confidentiality was assured and where permission was asked to quote their material it was clearly identified that no names would be used in publication. Three of the participants made reference during their interview to the fact that material they were sharing was considered sensitive and asked for confirmation of confidentiality of information prior to continuing.

All interviews were digitally recorded including the participants' agreement to do so. Notes were taken through the interview. This allowed the researcher to revisit a particular point to ask for clarification and/or expansion, by the participant.

A snowballing technique was also used when, in the course of data collection, it was identified that there was a potential participant who was considered worthy of inclusion because they could contribute meaningfully and that their interest in this research was consistent with its purpose. The snowballing technique was consistent with the data-driven method of grounded theory as data collection provided the opportunity to pursue particular areas further with participants that were previously unknown to this researcher.

Between July and September 2013, eighteen interviews took place. Following initial coding of data, five additional participants were invited to be interviewed with three interviews conducted in late January or early February 2014. Within this group, participants could be said to fall within one of four categories based on their current primary role: senior operational (i.e. CEO, Primary Lead), mid-level operational (i.e Director, Vice-President), academic (i.e. author), or advisor (i.e. on national organizations, physician coach). Fourteen participants are considered to be at the operational level of organizations, with four senior-level (CEOs) and ten at the middle-management level. Four academics and three advisors were interviewed. (Table 3.2)

Eleven participants were female.

Seventeen of the twenty-one interviewed lived and worked in Ontario while those outside of the province would be categorized as either advisors or academics but all with relevant knowledge of the topic from a broader perspective. These participants are also considered to know and understand the current health-care context within Ontario. Of the four that did not reside and/or work primarily in Ontario, one called the United States home.

All interviews were conducted and transcribed by the researcher. Interview recordings (audio), transcriptions, follow-up memos and memos reflecting the process were uploaded using Nvivo software. Memos included key points from each interview and primary or new points of learning, specific to each participant.

A semi-structured interview format was used that included five structured questions and one open-ended question. Each of the five questions was focused on one of the principles of complexity science designated in the theoretical approach: connectivity; interdependence; feedback; exploration-of-the-space-of-possibilities; and co-evolution (Tables 3.4, 3.5, 3.6, 3.7, 3.8).

Below are details of how each of the five principles were translated to form interview questions, as well as the initial expectations of research areas that could have been explored.

Table 3.4 Connectivity

Principle	Applicability within complex systems	Initially defined and proposed research areas for discussion	Defined for purpose of interview	Interview question
Connectivity	Relationships between agents	Fostering relationships What is the degree of co-participation/co-learning among team?	Fostering relationships	#1. In a natural complex system relationships between each of the components are critical to its survival. In what ways might a physician foster the relationships within a team that could have an impact on outcomes for patients?

According to Mitleton-Kelly (2003), the principle of connectivity relates to "the inter-relatedness of individuals within a system" (p 5). Question #1 in the interview was based on the concept of relationships within a health-care team and, specifically, sought to identify how physicians could act as the catalyst for relationships. Initially this was identified to be consistent with actions related to teamwork or team learning but the final question was further simplified to address any type of team behaviour that supported relationships.

Table 3.5 Interdependency

Principle	Applicability within complex systems	Initially defined and proposed research areas for discussion	Defined for purpose of interview	Interview question
Interdependency	Relationships between agents	Adaptive learning How do decisions or actions impact on other?	Trust	#2. In what ways might a physician help to build trust between team members that could have an impact on outcomes for patients?

"Propagation of influence through an ecosystem depends on the degree of connectivity and interdependence" (Mitleton-Kelly, 2003). Initially the principle of interdependence was viewed as how agents may adapt to one another's behaviour through learning but was modified as question #2, the nature of trust between team members. It is assumed that the existence of trust allows for influential behaviour amongst the team. Patrick Lencioni (2002) identifies the absence of trust as the 1st level of team dysfunction.

Table 3.6 Feedback

Principle	Applicability within complex systems	Initially defined and proposed research areas for discussion	Defined for purpose of interview	Interview question
Feedback	Relationships between agents	Adjusting to fluctuation How do feedback processes drive change?	Adjusting to fluctuation	#3. In what ways might a physician help to promote effective feedback processes between team members, which could have an impact on outcomes for patients?

According to Mitleton-Kelly (2003) "positive (reinforcing) feedback drives change, and negative (balancing, moderating, or dampening) feedback maintains stability in the system" (p. 15). The initial focus on the principle of feedback was on understanding how outcomes were affected by feedback mechanisms. Although the final script for question #3 sought to identify impact on patient outcomes, as per other questions, the question focused primarily on the use of feedback mechanisms and not their corresponding effect on change.

Table 3.7 Exploration-of-the-space-of-possibilities

Principle of	Applicable within complex systems	Initially defined and proposed research areas for discussion	Defined for purpose of interview	Interview question
Exploration-of-the-space-of-possibilities	Patterns of behaviour	New structure through exploration Action learning principles How is the landscape scanned and new opportunities sought? How is leadership developed and encouraged?	New structure through exploration Action learning principles	#4. Tell me how a physician could encourage team members to try new strategies that might have an impact on outcomes for patients?

"Complexity suggests that to survive and thrive an entity needs to explore the space of possibilities and to generate variety. To survive, an organization needs to be constantly scanning the landscape and trying different strategies" (Mitleton-Kelly, 2003, p 14). Question #4 allowed the researcher to generate discussion on the capacity, within a team, to explore new ways of doing things, which led to conversations about innovation, acceptance of change and sustaining new models of working together. As with each of the questions, this exploration was premised on the role that the physician might play in facilitating change.

Table 3.8 Co-evolution

Principle	Applicability within complex systems	Initially defined and proposed research areas for discussion	Defined for purpose of interview	Interview question
Co-evolution	Enabling functions	Influences other and is influenced by other How do clinicians and administrators collectively lead?	Influences other and is influenced by other	#5. Often clinicians and administrators have to make adjustments to accommodate the many changes in health care. How might a physician help in facilitating ongoing change within the organization?

Mitleton-Kelly (2003) refers to co-evolution in human systems as placing "emphasis on the relationship between the co-evolving entities" (p 7). The 5th question related to the two primary leads within health-care organization, administrators and physicians, and sought to find strategies that might enable each to co-exist and even co-lead effectively. This requires, not only the ability to accept change, but the willingness to learn from each other.

The planned approach was to interview participants considered furthest from the topic, such as authors and academics, to those considered to offer insights from an operational perspective, such as vice-presidents of human resources and clinical directors, ending with physician leaders was followed. Although four variations of the interview tool were used, the five primary questions related to the five complexity-science principles were included in every interview (Appendix 1). Demographic questions were used at the beginning of each interview to identify

the current role of the interviewee, their assessment of which of the three areas they felt they had the most expertise in and the approximate number of years of experience they possessed in this related to this area of the topic. Each of the participants was also offered the opportunity to add anything of their own at the end of each interview. All but one participant offered additional insights at that time including their praise and interest in this research based on its presumed value to them.

Consistent with Charmez (2006) and her identification of the value of the intensive interview in grounded theory, the interviews were conducted as a conversation that allowed the researcher to go beyond the question to explore further when appropriate. Participants were asked for more detail about their responses or about their reference to written material to further the discussion. According to Charmez, "both grounded theory and intensive interviewing are open-ended yet directed, shaped yet emergent, and paced yet unrestricted" (p 28).

3.5.2.2 Documents

Documents were an important primary data source for the study. Documentation was received from participants following their reference to the material during the interview. This included documents from within their organization, as well as material that was publicly available and which the participant felt was particularly relevant to the research. Eight documents, representing 254 pages in total, were provided by participants and included in this research. Textual data was reviewed post-interview and further memo-writing to include key points within the

documentation in relation to the research was completed. One video, supplied by a potential participant who was unable to commit to an interview, is also included as primary data.

Documentary sources of data were as follows:

1) The Association of Faculties of Medicine of Canada (2010). *The Future of Medical Education in Canada (FMEC): A Collective Vision for MD Education.*

2) The Association of Faculties of Medicine of Canada (2012). *The Future of Medical Education in Canada (FMEC): A Collective Vision for Post-graduate Medical Education in Canada.*

Both reports (1 & 2) were referenced by a senior-level participant who participated in report development relative to a discussion about the current forces in medical education in fostering physician leaders.

3) Royal College of Physicians and Surgeons. (2005). *CanMEDS 2005 Framework*. Retrieved Sept. 12, 2013 from: http://www.royalcollege.ca/portal/page/portal/rc/canmeds/framework

The CanMEDS Framework (2005) was referenced often during an interview with one mid-level operations-physician participant, specifically in relation to its 7 roles for physicians "to be better doctors." The participant stressed 4 in particular that related to physicians as leaders and represented the model by which physicians that are most recently trained are expected to abide by.

4) Roth, V. (2011). *Female Physician Leadership at The Ottawa Hospital*. (2011). The Ottawa Hospital

5) *Professionalism: A Guide Book for Physicians: TOH Model for Dealing with Disruptive Physician Behaviour.* August, 2013. The Ottawa Hospital

6) *Physician Performance Review Form.* July, 2013. The Ottawa Hospital

Three documents (4, 5, and 6) were received from a mid-level operations physician participant, two of which are used within the organization and one of which is a master's thesis based on a project completed within the same organization. Each of these was referenced as accountability mechanisms for both physicians and the organization in order to support a model of physician leadership.

7) Dickens, P.M., (2013). *Facilitating emergent change in a health care setting.* Health Care Management Forum, (26) 116-120

8) *Power Dynamics in New Models of Care.* Case Study at a Toronto hospital

Two documents (7 and 8) were received from an advisor participant. One was a paper to be published in a health-care journal in reference to a discussion about complex adaptive systems (CAS) and the culture that leaders can foster to encourage, and value emergent change. The second document is a case study paper and offered as material that expanded on our discussion of the use of power within health care and shifting power that enables distributed leadership and represents a significant change from traditional management approaches within health-care organizations.

9) OHA Today (Producer) (April 9, 2013) *Interview with Charles Chan; Perspectives on Physician Leadership and Engagement.* (audiotape) (http://www.youtube.com/watch?v=VfdORSra878)

An audiotape (9) was included as primary data and provided by a potential participant representing an interview with Dr. Charlie Chan, VP Medical Affairs at University Network Hospital and a member of the OHA's Provincial Physician Leadership Council.

Documents referenced by participants were primary data and a synopsis of each was written to identify key research concepts and included in the analysis as themes emerged. This approach to data collection was thought to be consistent with the concept of constant comparison with purpose of "searching for similarities and differences between them" (Partington, 2002, p. 159). The inclusion of these documents and subsequent analysis of each added to the identification of themes that would resonate in practical applications within a health-care organization.

Additional sources of data included government and health-care organization websites, policies, reports, publications and media reports. A review of organizational websites associated with research participants was completed as well as reports hosted on those sites. Media sources were followed as they related to the research topic. This included news articles, social media feeds and public video broadcasts. The websites of professional organizations such as Canadian Society of Physician Executives (CSPE), Ontario Hospital Association (OHA),

Canadian Medical Association (CMA), Canadian College of Health Care Leaders and National Health-Care Leadership Conference were also considered data sources, and reviewed.

3.6 Data analysis

This section provides information on the process of data analysis. The researcher's lack of expertise related to data coding and analysis required the purchase of qualitative research analysis software (Nvivo) and training prior to data collection and analysis. Memo-writing post interviews helped to capture essential points and new concepts that could be explored further. Ongoing memos, addressing the evolution of concepts, were also used to help with identification of emerging themes. Despite an initial intent to hire a transcriptionist, the researcher conducted and transcribed all interviews. Although the process of transcription is time-consuming, it was seen as a valuable exercise as, according to Partington (2002) "the joint process of transcription, coding and analysis offers an extraordinary opportunity to become sensitized to the full richness of your data" (p. 144). "Handling one's own rat," according to a member of my committee, provided me with intimate knowledge of the data through the transcription and coding process.

Nvivo10 qualitative data software was used to store and organize data with tools for analysis to support the research. This software supports a qualitative-inquiry method, such as grounded theory, and provides a framework to assist with the

evaluation, interpretation and analysis of data through coding and queries to compare data and explore the relationships between data.

The coding process was extremely important, particularly as it related to the transparency of the process. The researcher became familiar with coding types (initial, focused, axial and theoretical) in order to compare data as the analysis emerged with each coding step. The constant sorting of themes and the identification of emerging concepts provided the opportunity to think both analytically and conceptually, and move from "description to prescription" (Partington, 2002, p. 162).

Initial coding of data remained relevant to each of the five complexity science principles studied, allowing the researcher to compare data with data within each specific direction of inquiry and identify emerging themes within the data. These included responses to each of the five questions and were separated as follows: fostering relationships (based on the principle of connectivity); building trust (based on the principle of interdependency, promoting feedback (as a principle); trying new strategies (based on the principle of exploration-of-the-space-of-possibilities); and adjusting to change (based on the principle of co-evolution). Additionally, a node was created to collect responses to the question posed as "do you have anything to add?", which provided insight into the area of emphasis within the interview to which the participant wanted to return. This line by line coding provided the researcher with evidence of emerging categories of data within each of the five areas of inquiry. This process identified the significant

variety among responses to the same question, allowing the researcher to identify possible patterns for further exploration. At times the deviation from the proposed question presented as confusion when coding data however it provided a solid initial introduction to understanding which areas were of most importance to the participants.

Five themes within the data were initially evident in at least four of the five primary areas of inquiry. These were physician leader challenges, patient outcomes, and administration versus physicians, shared successes, and relationship history. Memos were written as initial analysis of these five emerging themes.

Following initial coding, a return to the three groups of complexity science principles specific to behaviours and actions within the complex health-care system, framed a more focused coding. An intentioned focus in this research on the dynamics within complex systems directed the analysis back to address the preconceived categories of activity related to agent behaviour: relationships, behaviour patterns and functional enablers within an organization. The five principles were grouped as follows: connectivity; interdependence and feedback are viewed as relationships between agents; exploration-of-the-space-of-possibilities is categorized as patterns of behaviour; and co-evolution, viewed as enabling functions.

As expected, there was a shifting between initial coding and focused coding as categories emerged and, according to Charmez (2006), “moving to focused

coding is not entirely a linear process" (p 58). Comparing data with data necessitated refining codes as new ideas emerged from the data.

Theoretical coding provided the opportunity to begin to analyze relationships between data, identify categories with the most relevance and begin to piece together and reflect on earlier hunches about the data.

Memos to reflect new insights were written following each interview and continued throughout the data collection process to detail further items that required checking, highlight any new connections between the data that were identified, as well as to document any challenges to the data gathering that might impact the data-collection process. This process is consistent with the constant comparison method identified by Glaser and Strauss (1967), which values ongoing checking between data and the researcher's observations, at each stage of analysis. It provided the opportunity to compare the initial reflections of the researcher with the data.

These early memos identified data of interest from each interview and, of particular importance, highlighted areas that represented an area of particular passion for this participant, which led to further exploration of that data and, in some cases, additional primary data in materials referenced by the participant. In some instances, reference to additional information was used to support this area of keen interest and was followed up by the researcher to obtain the material. Memo-writing was also used to identify points in the data-collection process when

the research reflected on shifts in thinking, based on initial coding. Table 3.3 provides details of the steps used for analysis of primary data.

The inclusion of documents, provided by the participants, into the continual analysis, allowed for new perspectives on relationships between principles of complexity science and leadership-development processes for physicians. Documents were reviewed and summarized to identify primary points of both the author(s) and those that were consistent with the participants' reference to the document. Document analysis provided key points that were then included in coding steps that informed the unfolding theory.

Table 3.9 Analytical framework

Steps	Procedures	Value in analysis process
Initial coding	Assigning each of the responses to five primary questions within a separate node in Nvivo Further breaking down each response within nodes to complete line-by-line coding, assessing for fit and relevance	Provided initial insight into breadth of responses within each of five complexity science principles Line by line coding provided opportunity to break data down into smaller parts Allowed for identification of gaps in data
Focused coding	Identifying the larger, most predominant codes from initial coding process	Enabled researcher to check initial preconceived notions of what to expect from data Enabled researcher to compare data with data
Theoretical coding	Following the codes identified in focused coding and looking for relationships between categories	Provided the opportunity to identify relationships between predominant categories Began the process of theorizing through connections between data Assimilated early hunches
Memo-writing	Memo-writing as categories and relationships between categories emerge to reflect connections being made Memo-writing as predominant categories reflect supplementary documentation review Memo-writing as predominant categories and relationships reflect participants area of emphasis	Memo writing was ongoing as relationships between categories surfaced Memo-writing was inclusive of relationships between primary and secondary data

3.7 Generalizability and evaluation criteria

This section addresses the concept of generalizability of this research as well as the evaluation of it as a grounded-theory study.

The research is directly relevant to the province of Ontario, given that the data gathering was primarily within that province's health-care organizations. However, it is expected that it is also applicable beyond its borders to a much broader audience. Physician leadership is a discussion taking place in all provinces and beyond Canada. Therefore, the research is of interest to many, specifically to its practical application.

Consistent with Charmez's criteria for grounded-theory studies, consideration has been given to the following elements of rigour; credibility, originality, resonance and usefulness.

To be considered credible, it was important to identify whether saturation had been reached with data collected. Triangulation of data is considered relevant due to data collection from different sources (interviews and documents) and obtained from different perspectives according to type of participant expertise. Triangulation of data has been illustrated through constant comparison of emerging categories with supplementary documentation provided. The ability to track, and illustrate "strong logical links between the gathered data and your argument and analysis" (Charmez, 2006, p. 182) is essential to establishing this research as credible. The range of professionals, represented by the participants, will assess credibility, when they are able to assess, and agree with the findings.

This research has produced findings that are original and that "challenge, extend, or refine current ideas" (p. 182), as it provides the basis for future actionable research in organizations. The researcher's satisfaction with the value of the work

will be reached when evidence is produced that demonstrates an increase in dialogue among participants and their organizations relative to development of physician leaders. Evidence may include follow-up from participants post-publication of results, increased opportunity for further research, such as action-learning projects within organizations, and confirmation from participants that the resulting grounded theory is strengthened by its situation in "their social historical, local, and interactional contexts" (Charmez, 2006, p 180).

Resonance within the field of health care is evident through the linkages that can be made between data that illuminate lived physician-leadership experience with the organizations with which they partner, the professional colleges they belong to, and the institutions responsible for the education of physicians.

The usefulness of the research will be determined by its readers, most importantly by the participants, through its ability to recommend processes that are considered generic (Charmez, 2006) and replicable within health-care organizations. The ability of the research to add knowledge to the world of physician-leadership development is the judgement of its usefulness.

3.8 Chapter summary

The use of grounded theory in this research was based on the value of the methodology in understanding the relationship between complexity science principles (which exist in natural, complex-adaptive systems) and leadership-development activities or leadership enablers that already take place (or could take place) in health-care practice to support physicians. According to Parry

(1998) the "iterative interplay between data collection, data analysis and conceptualizing/theorizing" (p 85), allows for confirmation of relationships between elements to be made and the generation of theoretical ideas provides the basis on which to build.

As health-care organizations face structural and financial barriers and physicians who choose to lead often face personal hurdles when peers view them as different, most organizations grapple with how to support physician leaders in their development.

Parry (1998) also notes the value of grounded theory as a methodology that is consistent with the concept of change as it relates to building new theory, rather than testing existing theory. Further, the idea that "leadership is a social influence process," (p 85) is also consistent with the development of theory by exploring concepts and the relationships between them.

In-depth interviews allowed the researcher to identify the most relevant leadership activities for physician development and what resonated most closely for physicians, as well as administrators, based on their experience and "the meaning they make of that experience" (Seidman, 1991, p. 3). According to Rubin and Rubin (1995) interviewees are "treated as partners rather than as objects of research" (p. 10).

Chapter 4: Analysis of Findings

4.1 Introduction

This chapter presents the steps of the analysis and the findings in response to the research question: *Can physician leadership development within health-care organizations, facilitate improved outcomes, by examining complex system behaviours?*

In the following chapter the reader will find a more in-depth exploration of how the findings relate to the research question. This chapter is divided into five sections. Following the introduction, sections 4.2 and 4.3 cover the analysis of findings through progressive coding of data while section 4.4 begins the process of theorizing by connecting the data related to physician leadership and the health-care organization's capacity to support their development to facilitate improved outcomes. The chapter is summarized in section 4.5.

The purpose of this research was to identify the behaviours and actions related to physicians as leaders and use some of the principles of complex systems to investigate how organizations can better understand and build upon these principles to foster their development. By increasing knowledge about the enablers and barriers to current physician leadership roles and skills-development practices, organizations can act decisively to build a cadre of physician leaders that are engaged and supported, and who can effectively lead health-care teams to improve patient outcomes. To further an organization's capacity to develop

physician leaders it is critically important that there is an understanding of the nature of complex systems, of which health care is considered one, and also of the unique needs and challenges facing physicians in developing leadership skills.

When health care is viewed as a complex system, an increased focus on the relationships between agents, behaviour patterns and functions of influence between interdependent agents, allows us to view leadership differently and to question previous assumptions about how teams perform. When physician leadership is seen as an enabling function and the leader is viewed as a facilitator of movement toward desirable outcomes, it becomes even more important to look closely at their behaviours and actions.

4.2 Initial analysis

This section provides relevant findings related to each explored area of questioning identified through initial line-by-line coding. Participants are identified with a pseudonym that corresponds to alphabetical symbols used in Table 3.2. The five questions provided the opportunity for discussion around each of the five complexity science principles, and, in particular, addressed the research question by asking about the physician's role in fostering each behaviour. Questions were designed to be twofold: to seek feedback on their observation of specific types of behaviours but also to identify what role physicians may have in encouraging (or discouraging) that behaviour within a team. There was considerable variety in the responses, some more specific to the

behaviour and others more specific to the physician's role. Data were then sorted according to emerging themes and expanded upon here.

4.2.1 Relationships between agents

Consistent with Mitleton-Kelly's (2003) emphasis that isolating one principle to "the exclusion of others" (p 3) does not allow for an understanding of the inter-relatedness of several principles of complex system behaviour, the research explored the concepts of connectivity, interdependence and feedback to better understand the quality of relationships between agents, in this case, health-care professionals. These three principles are grouped together in this section. While each principle corresponded to a separate question, it was evident in participant responses that often no clear delineation was made between questions 1, 2, and 3 and participants responded broadly to these questions on the nature of the relationships between agents in a general way. Because they had the interview questions in advance, some participants prefaced their responses to the first question as being applicable to questions 1, 2, and 3.

Just as it is important to leadership within social systems, relationships are key to effecting behaviours within complex systems. In health care, various individuals that are uniquely educated, respective of their profession, come together to provide services to the same patient, or same group of patients, with a high degree of interactions every hour of every day. Although complex system behaviour is affected by elements within its broader environment, for the purpose of this study the primary focus was on agents considered to be inside the health-care

organization. Some references are made to external environmental influences such as provincial or federally-legislated bodies, if identified by research participants.

The data supported the broader notion of team in which physicians function with four predominant themes emerging. These were as follows: the physician and the patient; the physician and the inter-professional health-care team that collaborates to provide care; the physician and administrator of the organization; and the physician and their peers (other physicians). There were many variances in the responses depending on which type of relationship physicians were viewed as cultivating.

Physician and patient

A physician's primary relationship is with their patient. Indeed, it is their raison d'etre. Often referred to as the gatekeeper to medical interventions and services, physicians are viewed as critical influences within health care on behalf of their patient. They are seen, by patients, and often by the physicians themselves, as driving the process from start to finish. However, this does not necessarily equate to being a leader.

> *In the medical system, the way it's set up with the physician being primarily responsible for the patient - they're admitted under a specific physician, the physician really drives the management. They are seen as having a leadership role although I'm not sure there's always self-insight on the part of physicians in that regard.*
>
> *Penny, mid-level operations, physician*

> *What they do do really well is relate to their patients but for the most part it's such a different type of interaction arrangement than being in a true leadership role where it's the masses of people that they have to deal with*

Michael, senior-level operations, physician

Physician and team

Participants noted that the physician's role on a team was critical and that physicians who are able to relate well to others were seen as vitally important but they also had to understand the nature of sharing power.

> *My belief is the physician is the critical element on that team and how the physician leader shows up is critical. It really depends on the mindset and the attitude and the communication skills of the physician that I believe significantly dial up or dial down the quality of care.*
>
> *Quesnel, advisor*

> *I think physicians are in a position to have huge degree of influence on a health-care team for better or for worse. But I've seen it can go both ways.*
>
> *Penny, mid-level operations, physician*

Physician participants spoke of the challenges they face as members of a team.

> *I think that's why physicians when they are on teams do tend to get into a bit of trouble because we're trained to be autocratic, confident, direct, and accountable for whatever you decide. If you look at a team, it's not autocratic, it's often not direct and the team is accountable, so everybody has a say and you decide with consensus as opposed to individuals.*
>
> *Jason, senior-level operations, physician*

> *I think if you're going to practice as a team you need to work as a team so that includes developing, you know, a team-based problem solving approach and I think it probably could vary depending on the size of the organization. It's some of the basic things – make sure people have opportunity to speak, make sure they're heard, make sure that you ask for their opinion, you actually attend to their opinion when they give it. I think there needs to probably then be an educational component and development component within the team that the physician is a part of.*
>
> *Umar, mid-level operations, physician*

Physician and the administrator

For the purpose of clarity, administrators are considered to represent the primary-health-care organization within which physicians practice.

From physician and non-physician participants, the theme of dichotomous relations between clinicians and administrators was raised often, and usually with emotion. The lack of a good working relationship between physicians and administrators perpetuates an "us-and-them" type of mentality evident often in interviews.

From the perspective of physicians, historical relationship challenges colour current working relationships.

> *I think, certainly within our department there's a very strong and ongoing feeling of distrust of the hospital. That has had to do with some things that the hospital has done that has legitimately caused them to feel distrustful. Think that's history but it's the lens that everybody looks through. So when there are things that they're not open, they're not transparent about you do not give them the benefit of the doubt.*
>
> *Kevin, mid-level operations, physician*

> *It's just constant, constant tension between parts of the hospital that should otherwise be working together because they're both coming with the same motive which is best care for the right patient at the right time, you know all those mumbo-jumbo that everybody spills off.*
>
> *Leon, mid-level operations, physician*

Administrators also expressed frustration with the tense relationships between them.

> *We just did our first ever enterprise-wide physician and employee engagement survey and we had remarkable physician engagement rate compared to what we expected. And the effect is that they were really willing to tell us what it was like for them and there are some things that*

> *they're really frustrated and angry about. And we're happy they told us because it gives us an opportunity to do something about it. On the flip side now we're starting these action committees to really get at the things that we know we can fix that are major parts of the frustration for them. And as we're asking for them to participate they're telling us that they won't come unless they get a stipend. So if we don't pay them to come they say they won't come. They're happy to tell us what's wrong but not happy to be part of the solution.*
>
> *Helen, mid-level operations*

Physician and other physicians

As independent practitioners, a physician's ability to relate to his/her peers is highly variable, seen both as instrumental and detrimental to providing optimal patient care. According to an advisor who works with physicians in developing their leadership skills

> *Trust is built by having the wagons circled. It's all about making sure there's safety and they perceive the risk that they're in. They feel at risk often so oftentimes trust is built by being very mindful of keeping issues within the physician realm. So it makes it very difficult when there's problems. Because that's how trust is built and if you're seen as somebody who's not part of that inner circle that's going to try to keep issues within the physician community, you can run into some difficulties there.*
>
> *Quesnel, advisor*

However, one physician identified that doctors do not always relate to one another in the spirit of camaraderie.

> *There are times when specialists look down on family physicians and will do that in front of the patient. They comment about their lack of depth of knowledge or that's not current treatment. There are times when family medicine will say, well they obviously didn't take the time to get to know you and make judgement calls on the specialist.*
>
> *Trish, senior-level operations, physician*

Summary of findings

Four predominant themes were evident in discussions on relationships between agents. Physicians were seen as influential in fostering crucial relationships, although with varying degrees of success. Data related to the first theme shows that physicians are adept at cultivating the most critical of relationships within health care; those between themselves and the patient. Patients are their livelihood and caring, connected relationships are often built over a long period of time, from cradle to grave. This linear relationship, however, can limit a physician's ability to view the patient within a system of interconnecting agents that require ongoing feedback to adjust the course of providing care to that same patient. In the second theme, data demonstrates that, although physicians are viewed as taking a lead role (with the patient, with a team), they do not necessarily demonstrate leadership qualities that inspire or influence others much of the time. A physician's singular focus on one patient at a time further restricts his/her capacity to demonstrate leadership that can impact a population of patients, due to, either, tense relationships with administration or careful positioning among their peers, evident in both the third and fourth discussion themes. Participants identified that physicians, however, play a valuable role as agents of collaboration. Where physicians were identified as good communicators, they were also credited with being able to act as facilitator for team development, to support the team as well as the patient. Conversely, if the physician showed up "thinking they were the smartest person in the room," then team members acted to protect their personal emotional safety and limited their interactions. This type of

behaviour is generally associated with a hierarchical structure and not one that is consistent with complex-system dynamics or an inter-disciplinary team approach.

4.2.2 Patterns of behaviour

Due to the dynamic nature of complex systems and the constantly-evolving eco-system in which it resides, a constant state of tension between stability and flux allows the system to continually change and adjust to exhibit new forms. In this study, exploring the space of possibilities and generating variety is examined through the lens of new strategies and new ways of doing things. The quality of relationships impacts how a team behaves and whether it is able to change behaviours to effectively adapt and evolve within a complex system. Behaviour patterns in teams are formed over time and processes can become ingrained. The dynamic nature of complex systems requires that processes change as needed and that teams demonstrate a nimbleness that can provide the fluidity to adapt. Leadership behaviour is instrumental to either the encouragement or discouragement of a team's ability to embrace change, including its capacity for generation of new ideas or to be innovative. Two themes in particular were noted in discussions about patterns of behaviour: a physician's training may encourage them to explore various options when treating patients but they are constrained by the policy-driven structure of health-care organizations; and, the health-care system, and, physicians in particular, are slow to adopt innovative practices.

Cautious problem solving

A distinct paradox exists with a physician's capacity to be exploratory in a risk-averse industry. This highlighted a key area of conflict for physician leaders in the context of their ability to find ways to improve patient outcomes. This provided data related to the focus of the research question that sought to identify behaviours consistent with complex system but also their influence on outcomes for patients. Most physician participants agreed that the ability to be exploratory was factored into a physician's learning, although a cautious approach is the norm as mistakes are costly. Physicians addressed both their training in finding the best solution for their patient and the challenges within the health-care system in embedding a culture of exploration.

> *A physician is taught, basically here's the problem and here's where we'd like to get to in terms of the resolution or solutions and then physicians basically find their way to the end point. So there's not just one way to do most things in health care.*
>
> *Jason, senior-level operations, physician*

> *Now this is very difficult in the health-care context because health care is a risk averse extremity. Not sure it delivers that but it sort of conceptually is extremely conservative. The default is do what you do unless there is compelling evidence otherwise. The acceptable error rate in medical procedures is zero. Zero. If you have 2 mistakes in 1000 that's 2 too many for the people that it happened to.*
>
> *Oliver, mid-level operations, physician*

Although physicians may find their own resolution to a medical issue in front of them, they act solo in this regard and are less likely to accept another's diagnosis until they have done their own investigation. This equates to a lack of trust in the generation of new ideas from others and makes physicians particularly hesitant to

being open to ideas from other professionals. It can result in a team atmosphere that is guarded and cautious and one in which the assets of team members are underutilized, potentially at the expense of the patient.

Adapting through innovation

It was identified that physicians are limited in their ability to invite innovative thinking within a team and that the health-care system itself was known to be slow to adopt innovative methods.

I don't think physicians are great out of the box thinkers because they are primarily managers. A good manager never thinks outside the box, right? A manager does exactly what they're told, they're risk averse, they gather the information, they are rule driven.

Umar, mid-level operations, physician

We know from our research it really does take almost seventeen years to get new evidence to bedside practice. Is it really taking us that long? Shortening the adoption rate would really be to help the physicians and researchers and academics who could perhaps improve knowledge translation and uptake techniques.

Helen, mid-level operations

The nature of remuneration for physicians in a fee-for-service model does not encourage or allow for innovative thinking and is considered an out-dated payment model by many. When innovative thinking from a physician would be most useful, the reimbursement model is inconsistent with their participation in generating ideas.

The fee schedule and the various payment schedules lag so far behind in many ways or are so anti-innovative that if you do something different there's a good

chance you're not going to be paid for it. Well why would you then? Why would you even think about it?

Umar, mid-level operations, physician

One operations-director participant captured the irony in this situation when expressing her frustration in being unable to involve physicians in advocating for bed-management issues, as it is not an activity for which they are compensated.

To get them to commit their time to something that doesn't provide an immediate monetary impact or benefit to them is very challenging yet at the same time our inability to manage the issue around ALC patients or flow is in fact, ummm, cannibalizing on their income earnings because we can't move the patient out of the system fast enough because they either won't discharge or whatever the cause of the flow jam may be.

Helen, mid-level operations

According to participants that work with physicians in developing their leadership skills, some exhibit an eagerness to be innovative where opportunity exists.

There's some that really love to be at the front of the innovation curve with technology procedures, especially in surgery. I see that more and more them starting to take initiative to share how they think, how things could be accomplished in a more strategic view

Quesnel, advisor

According to Dickens (2013), seven factors are considered to position an organization for emergent change. A "culture of experimentation" was defined as being critical in complex systems and as "the degree to which people are willing to try new ideas and approaches, to listen to people who think differently than they do, and to welcome innovation."

Document provided by Roger, advisor

Summary of findings

Two obvious themes emerged in discussion related to patterns of behaviour. In the first theme, data highlighted the challenge for physicians working within an organizational structure that, at times, is conflicting with their culture and how they were trained. These data related to how organizations do, or do not, support physician leadership development. The second discussion theme identified that physicians are considered adaptive regarding patient procedures and that their medical training supports a professional autonomy that can be seen as giving them permission to skirt policy. They are competent at managing the care of the complex system of the human body that is in a constant state of evolution. However, they are less capable when allowing others to be innovative. They often lack trust in the contributions of others and/or administration. Beyond being exploratory with patient procedures, physicians were largely seen as leaning toward a cautious, evidence-based approach, even beyond life-or-death matters, where exploring possibilities would benefit patient care. One participant indicated that physicians must let go of their "knowingness" to allow trust to build and innovative approaches to be taken. Data demonstrate that physicians are able to impact patient outcomes when they can harness the value of curiosity that comes from not knowing and by their willingness to encourage innovative solutions that can lead to a new structure.

4.2.3 Enabling functions

Leadership is important to identify the expectations of teams and how they must function within the organization. In health-care organizations it is even more critical that recognition for a dual accountability is in place. Most staff in health-care organizations have both clinical and administrative accountabilities and the way in which administrators and physicians work together can either enable or disable the capacity of the organization. In an ecosystem there are numerous entities influencing each other, producing an ongoing dynamic but also a system whose behaviour cannot be pre-determined. Interactions among team members, external influences, such as government or suppliers, and political, cultural or economic forces vary all the time with each entity evolving constantly but together, or co-evolving. Traditionally, health-care organizations have two distinct types of leadership, the administrative side that tends to the business of operations while the clinical side, or physicians, tend to matters of clinical operations. This divide continues to be a strong deterrent to an effective collaboration between the sides and conscious effort is required to recognize that one cannot operate without being influenced by the other. Both physicians and non-physicians recognize the nature of influence each has on the other in a physician's capacity to enable change, both positively and negatively.

> *So physicians can, should and in a lot of cases do articulate on behalf of patients in an advocacy role but even in an advocacy role it's an advocacy role from a particular perspective. The next phase is to transcend that, to sort of, the notion that the organization is actually the people that are in it.*
>
> *Oliver, mid-level operations, physician*

It's about getting on the same page as far as goals. We have to acknowledge as physician that we have a conflict internally as well. Often what we default to is "I'm just advocating for the patients." I have a single patient in front of me and I'm here because I have to get them into the OR or I have to get them to a bed or I have to do something. We tend to abdicate our global responsibility of saying that if everybody was doing this all the time the system would grind to a halt.

Kevin, mid-level operations, physician

I think really there has to be the interest and I think they need the education to be honest to do that. There's a lot of assumptions and some of it's just, we came from the culture where a physician went to school for seven years, therefore he's got all the up to date information, and yet I know from a clinical practice, rarely do they go back and take a masters in administration or any leadership or any of that stuff. I think that if we're going to help them go forward there needs to be education so that they can get into that position to help make the change.

Darlene, mid-level operations

I think one of the things this calls to mind is they kind of have to know and understand, kind of, the organizational governance and practice. Where is their power, where is their authority, where is their autonomy within the organization? I think the other thing, the physicians, it's been my experience, is that they don't understand. They've never been trained or educated in the good practices of change management.

Helen, mid-level operations

Summary of findings

The nature of health-care organizations requires both clinical and administrative skill sets to function. Each influences the other. However, negative past associations between clinicians and administrators, challenges their ability to collectively lead. Data generated in relation to this area of discussion highlighted the division that exists within most organizations and related to the criticality of the shared focus on improved patient outcomes, and linked to the shared

responsibility for developing physician leaders. The evidence indicates that 'systems thinking' is required for effective health-care leadership and that chaos should be seen as opportunity. Participants suggested that physicians are generally unaware of the stages of change and that they often do not see themselves as part of the organization. Patient-centred-care leadership was suggested as being central to both administration and clinicians and that having this as the common goal should push them beyond the ever-present us-and-them mentality that limits co-evolution. Data shows that physicians and administrators that can find the common ground are able to explore methods to exchange knowledge in mutually-beneficial ways. This relates back to the research question as it asks for an examination of complex system behaviours and how they influence patient outcomes. Agents within a complex system are sensitive to fluctuations in the environment. Agents are both the initiator of change and the receiver of influences from other actions within their environment; physicians and administrators influence each other by their actions. A heightened sensitivity to the dynamics of complex systems allows for the co-evolution necessary for change and movement within a health-care organization.

4.3 Gaining focus through coding

Initial coding produced numerous categories of data primarily based on observable behaviours of physicians relative to the five complexity science principles. In this section I explore the five distinctly predominant codes that were evident in at least four of the five areas of exploration. This provided the

opportunity to identify specific types of behaviours that were demonstrative of complexity science principles and which of these were most predominant in data gathering. These included the following: challenges for physician leaders, success factors, impact on patient outcomes, administrators versus physician, and the role of history as related to behaviours. Within each of these five areas, memos were developed to explore data between the different principles to find relationships between discussion categories and are presented in this section. This more-focused coding provided the opportunity to synthesize large data segments that addressed areas that participants felt identified behaviours were either the influence or were influenced by the context of a social system of health care. This allowed for a deeper analysis related to the development of physicians who lead; both the challenges for the physician but also the challenges for the organization in supporting that. The research question was more fully addressed by understanding leadership development within the context of the organization.

4.3.1 Challenges for physician leaders

Participants talked specifically of the factors that present as challenges for physicians becoming part of the organizational team: perception of power dynamics and ability to communicate and research focus. Kevin, a physician himself, identified that doctors had "influence, but not necessarily power" and that while they could keep "patient care on the radar" they also were victims of administrative decisions that impacted their ability to function. He identified his frustration with a position "as one that has a lot of responsibility but no authority" as a feeling of "hitting the wall and hitting the wall and hitting the wall."

Physicians spoke of a "different language" used by administrators and that working toward a shared language would improve the ability of both to effectively communicate. Jason, a physician participant who held a senior-leadership role noted that the training obtained by clinicians and administrators was vastly different and if one held both roles "you have to figure out which one you are at the moment."

From the administrative perspective success looks like getting team buy-in whereas from the physician perspective success looks like be in charge, make the diagnosis, prescribe the meds, make decisions

Jason, senior-level operations, physician

Although recruited specifically for their research interests, physicians working in academic hospitals were identified by operations directors as having, "conflicting agendas" that impacted their allegiance to the organization. They were seen to have two employers, the university and the hospital, often with different priorities where one was viewed as successful based on independent work such as research or teamwork such as patient care.

So if you're a physician leading a $100M research study you're going to have a lot more say, people are going to listen to you much more than a physician that doesn't have any funded research at the moment and is doing a tiny little bit teaching at the university and is running a half day clinic.

Helen, mid-level operations

The CANMeds Framework (Royal College of Physicians and Surgeons, 2005) is seen as influencing medical education in recent years and identifies that physicians are expected to function at several levels. The role of scholar is one of seven roles included in the framework and expects that "physicians demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application and translation of medical knowledge."

Document referred to by Leon, mid-level operations, physician

4.3.2 Success factors

Participants emphasized the valuable role that physicians had in an organization and how that role can facilitate success within the complex system of health care. Jason, a physician and CEO that lived and breathed the reality of straddling two realms, administrative and clinical, spoke of the physician as "the collaborative agent with the ability to bust that myth and cross that chasm" to lead the team toward common ground. Roger, an advisor with several years experience working with physician leaders, emphasized the criticality of the respect for the physician and that the health-care team could be viewed as "where there is no master neuron but executive leadership still important," making the connection back to complex system behaviour.

Umar and Oliver, both physicians, referenced the need for forethought in "designing the process" of collaboration and that "early involvement and consultation with each other is very important. Oliver noted that, "when values are aligned I've seen people move mountains."

Michael, CEO and physician, emphasized the value that physicians can bring to new initiatives as they can "sell concepts of change to other physicians if they ask them to help with the how-to." According to Michael, a physician's credibility with peers, and their acknowledgement that change will impact the way they do business, goes a long way to "find ways to invite innovative thinking."

4.3.3 Impact on patient outcomes

Physicians that can utilize their role as patient advocate in being able to support an effective team dynamic can be instrumental in both individual patient outcomes and in patient population outcomes. If physicians are unable, or unwilling to use their roles to enable effective team functioning, the patient is adversely affected.

The CANMeds Framework (Royal College of Physicians and Surgeons, 2005) identifies the role of health advocate for physicians to "responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations."

Document referred to by Leon, mid-level operations, physician

One physician referenced the current challenge for patients in the absence of the physician's ability to lead the team toward improved patient outcomes.

> *Otherwise really you have poor patients that get bumped from silo to silo to silo. The silos don't even hand them off necessarily. They just sort of go, ok you're on your own, here's the information for contacting the next silo*
>
> *Oliver, mid-level operations, physician*

The role of Communicator, also included in the CANMeds Framework (Royal College of Physicians and Surgeons, 2005), is critical to optimal patient outcomes. Breakdowns in communication have been shown to impact issues relative to patient safety (Canadian Patient Safety Institute, 2011).

Participants noted often that physicians are generally not skilled at delivering feedback.

I don't think health-care professionals in general and physicians in particular are really very good at having difficult conversations or difficult feedback. My sense is that the physician will often try to solve the problem on their own rather than have a difficult conversation. And I think it may be the type of people that choose health care. Generally nice people that don't want to upset others and cause hard feelings. It's in our nature to avoid difficult conversations and feedback.

Jason, senior-level operations, physician

When hierarchical models of care delivery remain in place, the patient's trust in their care team can be compromised. A physician that is able to demonstrate their trust in other health professionals can affect how care is delivered, how the team collaborates to help achieve the best patient outcomes and can instil confidence within the patient that they are obtaining the best possible care. One example provided by a physician participant was that of a surgeon who took the time to train a group of nurses in critical skill development for effective team functioning that enabled improved patient care.

My husband was a surgeon and because he was covering several hospitals he took a group of nurses at the hospital and taught them a level of critical skills so that they could ask the right questions and do the right things so that if they called him in an emergency he could ask them, what about this, what about this, what about this and know what needed to be done. So he trained the nurses up to almost a resident level and they became a very smooth functioning team because they had been taught special information and they knew that he was relying on them to be able to transmit that to him in an emergency.

Anna, senior-level operations, physician

4.3.4 Administrators versus physicians

Physicians who retain power with their medical expertise are not willing to follow administrative policy that undermines their role as patient advocate and their ability to practice within their capacity for knowledge and decision-making.

Physicians provided examples of the challenges they face in their practices related to policy-driven environments.

> *A nurse had basically told me that there was this policy therefore I had to do this which was, to me what she was directing me to do was a medical decision. I had to transfer a patient off of my service onto another service. And I'm like going, well, one, what policy is that, and two, this is a medical decision not an operational decision. And three, I would be the one who would be selling this to my colleagues so how come I don't know about it?*
>
> *Kevin, mid-level operations, physician*

> *If you grow up as an executive in a hospital not following policy is big thing. Not following procedure is a big thing. And physicians do whatever they feel is right and not limited by policy or procedure. The most you can do for a physician is to give him/her a guideline, don't prescribe for them what to do, don't give them a policy. So I think more than anybody in the hospital, physicians are so empowered to do the right thing as defined by them not as defined by the hospital whereas everybody else feels only empowered to follow the policy because that has been defined for them.*
>
> *Jason, senior-level operations, physician*

The existence and enforcement of policies within an organization that can only insist on compliance from employees and not necessarily from physicians continues to be a source of tension between administrators and clinicians. Administrators require policies for consistency of operations, while physicians retain autonomy in treating the patient because, put succinctly by Jason, to a physician, "no two gall bladders are alike." This directly affects the degree of inter-connectivity or quality of relationships between physicians and administrators, which leads to mistrust on both sides.

Both administrators and physicians categorize each other, which increases the suspicion of motives. Administrators identify physicians as "ego-centric," while

physicians don't believe that administrators recognize them as patient advocates. Two sides of the same issue provided some interesting insight on the relationship between administration and physician.

> *It's interesting because we grant them privileges to work here so it's the whole notion that we're allowing them to do your business, so to speak, to work here. However sometimes it's helpful to remind them that it's a privilege to work here.*
>
> *Gerald, mid-level operations*

> *As a clinician this is the one thing I got – my badge, which is a symbol of my privileges here at this hospital. Beyond that I didn't get anything. But for two years, no actually for three years I walked around with my bag in this entire hospital. I had no office. So if that's the way the hospital perceives you it's hard to engage if it's not a two-way street.*
>
> *Leon, mid-level operations, physician*

Much distrust exists between administrators and physicians related to their level of expertise. An academic spoke directly to this.

> *That's actually a challenge physicians have with administrators. Because even though administrators supposedly have expertise, there's no guarantee that that expertise actually exists. There's no profession of administrators, there's no professional body that represents them, there's no single body of knowledge that speaks to their role so physicians can't make the same decisions about a management person that a nurse can make about a physician from an authority of expertise perspective.*
>
> *Colin, academic*

Seven of the physician participants retain their clinical practices in addition to taking on leadership roles and as one physician put it, one primary reason for blending both roles is to help him to know "what's relevant and what's not relevant" and not having to rely on administrators to best represent clinical issues.

4.3.5 The role history plays

References to the role that history plays is considered significant to physician leadership development both in the way historical influences cultivate physician behaviour and in the organizational response to that behaviour. More than one physician participant addressed physician behaviours that may have been previously accepted as the norm.

I think that physicians at one point, and I would probably say, maybe before my time, so I have to be careful, don't know in my career that I've experienced this, but certainly my perception was that the physician was sort of the key and nothing got done unless they said and the buck stopped with them. And to some degree we still feel responsible. But the doctor ordered it. And this is what I need so you should give it to me.

Kevin, mid-level operations, physician

Evidence was given that indicates changes are happening in health-care organizations however, referred to a "pendulum swing" by one physician.

Step-by-step methods for addressing disruptive physician behaviour are provided in The Ottawa Hospital's Professionalism; A guide book for physicians (2013). This guide is consistent with the expectations outlined in the engagement agreement between physicians and the hospital.

Document referred to by Leon, Jason, and Penny, physicians

An excellent example was provided that indicates historical acceptance of physician behaviours built on ego-centricity and ever-increasing demands is no longer being tolerated.

At the hospital we have a probationary requirement for physicians coming in in the first year as part of what they're evaluated on is their ability to develop with others, and actually some of the common reasons that we have axed the physician or not renewed somebody's privileges after the probationary period is more

because of collegiality skills, that they just can't get on with people and they're disrespectful, is probably the more common a reason. It has nothing to do with competency as it relates to their clinical skills.

Trish, senior-level operations, physician

A national focus on an updated curriculum to equip medical students with the ability to work in present-day organizations, the Future of Medical Education project, calls for an increased focus on relational skills (The Association of Faculties of Medicine of Canada, 2010). One of the recommendations addresses the need for enhancements to the admissions process "to include the assessment of key values and personal characteristics of future physicians – such as communication, interpersonal and collaborative skills."

Document referred to by Isabelle, senior-level operations

Physician compensation presents challenges for everyone working in the health-care organization; indeed, many consider it an out-dated reimbursement model. The fee-for-service model limits their allegiance to the organization, as physicians are not then governed by the same rules that are applicable to other employees of that organization. Some organizations are finding ways to change this.

In a fee for service system compensation doesn't recognize the value (of physicians taking leadership roles). You can't bill for leading a team. This is an issue. So the hospital on certain roles, like the chair of medical advisory committee, like a professional medical director, we pay for time associated with that. People are actually compensated for medical program director the equivalent of a day a week.

Isabelle, senior-level operations

Summary of findings

This secondary coding process provided important insights to respond to the research question. Most importantly it illustrated the challenges for organizations, and for physicians, in their respective roles related to leadership development. The data shows that challenges exist between physicians and administrators as they

both use a "different language" and areas of authority in decision-making remain muddy. This is further challenged in academic hospitals where physicians can be accountable to more than one organization. Successful physician leaders are those that act as collaborative agents and who engage early, and often, in relationships. Their credibility with their peers was viewed as having significant merit related to organizational change. Patient outcomes were seen to be optimal when physicians recognize their role in supporting the entire team along with the patient with a particular impact in areas of patient safety. Both physicians and administrators reported challenges in identifying how physicians become part of the organization. Further, both expressed that historical demonstrations by physicians of disruptive behaviour have influenced an increased emphasis on accountability and behaviour expectations. Physicians are being asked to lead but an out-dated reimbursement model and the lack of training in leadership development create barriers. Both factors are more consistent with a linear-based model of command and control and inconsistent with functioning in a complex system with multiple priorities.

4.4 Connecting the data

Theoretical coding provided the opportunity to explore the relationships between data in previous coding and relate those concepts back to the initial research purpose. What we know now is that relationships between agents do impact patient outcomes and that physicians are a strong influence in these relationships, both positively and negatively. We also know that exploring innovative solutions presents a paradox for physicians working in a risk-averse industry and yet, those

who encouraged a culture of curiosity were regarded as leaders that valued all members of the patient's care team.

In addition, the willingness of both physicians and administrators to co-evolve was viewed as critical to the process of change and yet this complex behaviour appears stymied by historical us-and-them attitudes. We have learned, however, of examples of success and explored how physicians are challenged in their leadership roles. This section continues to discuss how data has responded to the research question: *Can physician leadership development within health-care organizations facilitate improved outcomes by examining complex system behaviours?* Based on what has been gained through coding thus far, this section primarily focuses on the role for physician leaders but also the role that organizations play in supporting them in their leadership journey.

4.4.1 Physicians as leaders

According to physician participants, the clinician's credibility as leader was often assumed from the get go but physicians needed to develop leadership skills and "embrace it as an opportunity" rather than the usual scenario as described by Anna, senior advisor and physician as "it's your turn, you were out of the room so you got the job." Jason, a CEO and a physician recognized that "things won't change unless physicians lead the way." Another CEO and a physician herself, Trish, agreed and noted that she was pleased to see the transformation in the past decade with respect to physicians embracing leadership roles and "recognizing that if we as physicians don't get prepared and develop credibility for leadership

roles the system won't change without us."

Not all physicians, however, have the "insight" according to another physician participant, Umar, to recognize their leadership capacity although he identified a physician's reluctance to recognize their leadership abilities as "hogwash." Interestingly enough, more than one participant identified that the challenge for physicians in adopting leadership abilities may lie in the fact that patient care is individual and "not mass consumer driven." Physicians self-identified that their ability to be reflective in their work was "not why I got into this" and yet the ability to think "how am I part of the problem?" would go far in ameliorating differing perspectives and priorities within health-care organizations that must focus on "patient-centred-care leadership."

Some participants noted that a physician's understanding of leadership could preclude their ability to take a more active role due to the negative connotations associated with a command-and-control style.

Historically you would be commander and chief, US president model, follow me up the hill boys, off you go. But nowadays is that the best way that it should be? Or is it leading by example? Or is it more of a servant kind of a model. Is it more of a facilitator? Coach?

Leon, mid-level operations, physician

According to a group of women leaders that took part in a study on leadership "the term "leader" had negative connotations" (Roth, 2011). "They perceived a lack of support, a risk of burn-out due to taking on too much and a loss of close collaboration with their peers – "it's lonely at the top." The physician leaders role was identified as key in a health-care team in "convincing people that they can do something better or differently than they're doing it now" which takes the pressure off the need for the physician to see themselves, or be seen as having all the answers.

Document referred to by Penny, mid-level operations, physician

When physicians are able to recognize the collaborative nature of leadership necessary in health-care organizations due to the shared accountability between administrators and clinicians, one academic participant remarked, "I must think that that's a lot less lonely and daunting." Another academic participant referenced that "one of the tricks of leadership" was to figure out a way to "deal with an incoherent, insane system where you pay lots of attention to relationships, level of trust, spirited camaraderie" so that good work gets done.

The participants that were physicians referred to the need for leadership skills development for physicians and the absence of opportunities provided to them in their medical training highlighted. All ten of the physicians interviewed addressed the need for physicians to get serious about their inherent leadership role and that they had to invest in obtaining the skills to lead in today's rapidly changing health-care environment. One participant summed it up the best.

And recognizing that if we as physicians don't get prepared and developing some credibility for leadership roles, the system won't change without our going. But we need to do the hard work of getting prepared, getting ready for the shift. And physicians have a bit of a naïve assumption that you can be a leader without preparation or practice. You have to do leadership to be a leader, it's not something you learn from books for the most part any more than being a doctor is learned from books. You learn your grounding, you have to do clinical training, you have to get grounded in the academic knowledge to be a physician and you have to do leadership to be a leader.

Trish, senior-level operations, physician

4.4.2 The organization's role

Most of the health-care organizations that participants were associated with exhibit a willingness to put into place the supports for physicians to develop as leaders, some being further along that path than others.

The development of the Ottawa Hospital's Physician Engagement Agreement, which is included in the hospital's guide book Professionalism: A Guide Book for Physicians (2013), allowed the organization to make great strides in the engagement of physicians. It was important, however, that ample time for consultation prior to its implementation was given in order to "articulate a common value set." Bringing physicians together over a period of a year for focussed discussion on values for the hospital as well as the physicians to share offered the opportunity for "being commonly engaged, having had the chance for input" which provided the foundation for the resulting agreement.

Document referred to by Penny, mid-level operations, physician

In another organization, recognition of the challenges faced by physicians in their demanding roles led to the extension of some benefits to demonstrate support.

We did things, like we extended our EAP to all our physicians because we realized they have these major personal problems too. You know their kids do, their spouses do, and yet they get no support. If we really wanted to say to our physicians we're concerned about you as a whole person and want to support you and we understand how challenging it is to do your job and appreciate that it takes a toll on you and your family, you know it's one of those things that I say sometimes the hospital, or the employer has to be the first mover and give something to physician to show them that they're valued.

Helen, mid-level operations

Physician participants identified the lack of incentives that exist for physicians to take on leadership roles or to develop their capacity. There is often "no added pay, no support," and, it "doesn't take anything off your plate" according to Michael.

It's very hard for physicians after 12 or 14 years of medical training to go out and do a weekend or 6 PMI (Physician Management Institute) courses or whatever. It requires a lot of time, a lot of self-knowledge, quite frankly a lot of money to do it well

Umar, mid-level operations, physician

Female physician leaders taking part in a leadership study (Roth, 2011) identified that there should be "more transparency" around leadership and that organizations should plan for them, identify them and recruit for them. They stated that leadership should be framed as an opportunity and not as "accidental."

Document referred to by Penny, mid-level operations, physician

Bonnie, an academic, cited that in order for physicians to embrace leadership they needed to "create islands of sanity or islands of possibility within a very crazed stream" and find a way to deal with an "insane system."

Organizational support for physician learning and managing change was also noted as important. Action-learning projects that are utilized as part of a physician leadership-development program were seen as valuable opportunities for physicians to lead people through change and develop the ability to become a model for innovative thinking and team learning. Quesnel, an advisor with experience in physician leadership development, spoke of the powerful changes that happened when physicians were told to "take all your complaints and turn them into innovations and requests." She noted that when physicians led projects as part of the program, previously insurmountable issues became achievable with the projects taking on their own momentum toward success that had immediate team buy-in due to the physician leading the way.

Although academic hospitals consider research integral to their work, physician participant noted a sense of "fear and trepidation" when the opportunity to take

part in a neonatal study presented itself. The organizational culture was not one that embraced innovation, despite the hospital's CAHO status (Council of Academic Hospitals of Ontario).

And I can tell you that, and this is touchy-feely with the family but even with clinical care it's extremely hard, extremely hard and I find this as a clinician and certainly with nurses that have been doing this for more than a decade longer than I have. It's very hard to acknowledge that what you did all these years was wrong. Because at the time, it was the best thing they needed.

Kevin, mid-level operations, physician

Summary of findings

Piecing together the data and knowledge gained about complex-system behaviours and the physician's role within health-care organizations we are able to identify insights into physician leadership development and the roles that both the physician themselves, and the organization play. Obvious themes included the following: physicians and organizations both have responsibility in leadership development; understanding complex system behaviour is instrumental in making system changes; moving from a command-and-control leadership model to one that is less hierarchical but still very influential is necessary; and, organizations can, and must, get creative in using resources to support physician leadership development.

The data indicates that physician leadership requires both a personal investment by the physician to lead and an organizational investment to engage and support them in their way forward. It requires that physicians understand not only complex systems but, complex-system behaviour. It also requires that physicians break away from past associations with what leadership is and how their medical

training has placed limitations on their ability to function well in a health-care organization that is patient-centric with team-based delivery of care. Physicians cannot achieve leadership skills and worthy positions of leading by themselves. Organizations must find creative solutions to provide resources to support physicians in leading in today's complex health-care environment in order to achieve improved patient outcomes. It's about a different way of leading in a system that's different.

4.5 Chapter summary

This chapter has taken the reader through the process of analysis of data and identified the key findings that can inform practice of organizations in the development of physician leaders. In response to the research question, data collection produced themes related to each of the five complexity-science principles that identified the most commonly observed, or most desperately needed, physician leadership behaviours. Several connections were made between physician behaviours and the impact on patient outcomes. Data presented in this chapter also provided insights into how organizations may, or may not support the leadership development of physicians.

While physicians have a valuable and beneficial direct relationship with their patients they are challenged to see the patient beyond this linear connection. Several agents in health care impact patient care and physicians can demonstrate leadership by cultivating their relationship skills with the health-care team, other physicians, and administrators.

Although physicians understand the complexity of the human body and the need to try new approaches to care, organizational limitations and distrust in the expertise of other agents restricts their ability to explore possibilities. They are less exploratory and able to value innovative approaches related to organizational processes and, in some cases, organizations are prohibitive in a policy-driven environment.

Clearly both clinicians and administrators impact one another in their common mandate to provide the best patient care and yet, barriers between them that have existed for a long time and that continue to exist are not easily dismantled. The divisiveness between administrators and clinicians prevents the co-evolution that must happen for effective change to take place.

Physicians are unsure of where they fit within health-care organizations and how to lead and yet both clinical and non-clinical participants in this research indicated that they play the largest role in impacting patient outcomes. Health-care-organizational history significantly influences culture and the pace of change is glacial. Data indicates both, that organizations play a critical role in developing physician leaders, and that physicians must invest in their inherent leadership role to be able to improve patient outcomes.

A synthesis of the findings follows this chapter in Chapter 5: Discussion. Through the lens of complexity science it has been demonstrated that there are several paradoxes that must be addressed if patient outcomes are going to improve

through physician leadership. Health-care transformation will not happen without physician leaders.

Chapter 5: Discussion

5.1 Introduction

In this chapter the empirical contributions of the study are presented in Section 5.2 to illustrate how the study has addressed the research question. Four significant findings are presented relative to the development of physicians as leaders and consistent with behaviours of a complex system. Two of these relate to a physician's capacity to function in a complex system, one relates to the challenges of co-evolution for both physicians and administrators, and the final finding relates to barriers that exist that discourage physicians from leading in the complex system of health care. Section 5.3 presents the theory that this study has generated along with the implications to the current dialogue on physician leadership while Section 5.4 summarizes this chapter.

This research provided the opportunity to generate discussion among academics, advisors and senior and mid-level operational directors in health care on physician leadership and to identify some of the enablers and barriers to the development of skills necessary to lead in a complex system. This discussion centred around five complexity science principles as defined by Mitleton-Kelly (2003): connectivity, interdependency, feedback, exploration-of-the-space-of-possibilities, and co-evolution. This research adds to the literature that addresses the critical need for physicians to lead in the modern complex health-care environment by looking closely at the unique challenges of clinical leadership in complex systems. In today's health-care system where patients are demanding a different type of care and where public demand for control over health-care spending and improved

efficiencies forces a different approach to leadership, this research identifies that health-care transformation will not happen unless physicians are prepared to lead in a complex environment. This research also emphasizes that organizations, governments and physicians all play key roles.

The goal of this thesis was to inform leadership development for physicians in health-care organizations by engaging in a discussion with experts anchored by some of the principles of complex system behaviour. Through this research I anticipated being able to pinpoint some of the practical strategies that can be used by organizations to engage and support their physicians as leaders but of equal importance, to be able to identify what barriers exist that prevent this from happening consistently in Ontario. This chapter will synthesize the empirical findings (Chapter 4) to answer the research question. The study has provided useful insights in response to the research question:

Can physician leadership development within health-care organizations facilitate improved outcomes by looking at complex system behaviours?

It is clear that viewing leadership for physicians through the lens of complexity science principles has value for the development of leadership roles, training, and practice. It is also clear that there are strong associations between physician leadership and improved patient outcomes and equally evident that health-care organizations play the primary role in supporting the development of physicians to lead effectively.

5.2 Implications for practice

This research has added to the field by pairing the study of physician leadership with the principles of complexity science. The following sections (5.2.1, 5.2.3, 5.2.4) discuss the insights gained with respect to the following: how complex system behaviours are relevant to physician leadership; what role organizations and physicians play in developing skills consistent with leading in health care; and how outcomes may improve as a result.

5.2.1 Complex system behaviours and physician leaders

Relationships between agents

In a complex system, connectivity, interdependence and feedback relate to behaviours of agents that influence, and are influenced by, other agents. Each agent, in turn, impacts other agents, which creates action. In a social system, movement and change are impacted by the inter-relatedness between humans, or, in other words, the relationships that influence behaviour. It is clear through the analysis of data and the four identified themes that physicians are highly influential in health care and that the nature of the relationships they cultivate with their patients, team, administrators and peers is critical in the delivery of patient care. Physicians who are able to demonstrate relationship skills based on trust and respect at all levels within the organization are well regarded, looked to as exemplary leaders and can most effectively promote a collaborative work environment. On the other hand, physicians who are less-skilled socially are detrimental to collaborative practice, ultimately influencing patient care

negatively. This leads to the first key finding about physicians and their capacity to lead.

Finding #1 - Physicians are good at developing relationships with their patients but unable to transfer that skill to cultivate other relationships within the organization that also impact the care of the patient. Data shows that they are often challenged to be able to see beyond their direct relationship with the patient. As the most influential agent in a patient's care, their capacity to foster good communication and trust between other team members, administration and peers has a direct bearing on the patient. When physicians are able to adopt a broader view of patient care the focus can shift to cultivating the relationships with the inter-professional teams in which they work, with the administrators with whom they co-lead and with other physicians that also share care. Those that identify with an attitude that their only role is to fix the patient present as a barrier to the interdependent nature of the team and minimize the necessary feedback for the benefit of optimal patient information exchange.

Complex systems retain their stability through both positive (reinforcing) and negative (moderating) feedback (Mittleton-Kelly, 2003) and findings suggest that some physicians lack skills to effectively use feedback. It was also somewhat surprising to find that they may also lack an understanding of the value that feedback processes have on the system. Physicians that were able to foster well-functioning relationships among their team members had considerable influence on the capacity of the team to impact the patient experience. This was evident

when a physician invested the time to develop the assessment skills of nursing staff and entrusted them to effectively triage critical-care patients. Physicians that identify the value of expertise among teams demonstrate one of the principles described by Weick and Sutcliffe (2007) as critical to creating a high-reliability structure, which is "takes advantage of shifting locations of expertise." This practice recognizes the knowledge, skills and experience of the entire team and is referenced as "deference downward" which places less emphasis on the physician as sole expert and capitalizes on information that might be considered previously unforeseen (p 76).

Physicians that utilize their role as patient advocate in being able to support an effective team dynamic with the same goals in mind are instrumental in both individual patient outcomes and patient population outcomes. When physicians can harness the collective intelligence of the entire team and capitalize on the "cognitive interdependence," referred to as group mind (Weick, 2001), they demonstrate leadership that is required in a complex system. As in any high-reliability system, the mind of the organization is "highly social" and, according to Weick (2001), "interpersonal skills are not a luxury" (p 278).

Patterns of behaviour

Complex systems are dynamic, and survive due to their capacity to generate variety and explore possibilities in their environment. Various strategies, rather than one single strategy, are linked to thriving in unstable environments. Data shows that physicians demonstrate innovative thinking when treating their patients. However, they are much less likely to encourage input from other

members of the health-care team. This is in part a product of working in a risk-averse industry. However, the literature also shows that there is an innovation deficit in Canadian health care and that patients are adversely impacted as a result. A current focus on innovation in health care by the federal government (Advisory Panel on Health Care Innovation, 2014), highlights this deficit and gives us cause to be hopeful. Their recommendations can lead to "improvements in the quality and accessibility of care" (Government of Canada, 2015). It is also evident that, when curiosity is encouraged and rewarded in health care, innovative strategies result and patients are the beneficiaries. A physician's capacity to lead change strategies is vital in health care although the second key finding indicates that this is not easily achieved and rarely observed.

Key finding #2 - Physicians are innovative in managing the complex human system but are unable to transfer that capacity to the ever-changing environment of health care and to understand the impact that capacity would have on patient care. They are medically trained to find different routes in the provision of care to achieve the best outcome, making incremental adjustments to treatment to minimize risk. This is consistent with the principle of exploration-of-the-space-of-possibilities, as defined by Mitleton-Kelly (2003); there is no optimal, solitary strategy and drastic changes present risk for the sustainability of complex systems. Just as the discovery rate in molecular systems is limited as a way of avoiding catastrophic changes that can render the population obsolete, so too should there be a balance within social systems, such as health care, to allow for innovation yet manage risk. In this way, sustainability of novel approaches is

possible. Transferring that exploratory capacity to the processes and the people within the health-care organizations is a challenge for physicians. Physicians that pay attention to the dynamics that affect the patient, beyond the provision of care, demonstrate an understanding of the corresponding changes at the micro, meso, and macro levels of the health-care system. When the team's diversity is embraced and the various perspectives allowed to be shared to inform action, its capabilities are enhanced and the patient is the beneficiary.

Health care is an industry slow to adopt innovation with a prolonged period between evidence gathering and implementation. According to researchers it takes an average of 17 years for research to reach the bedside in clinical practice, a time lag that would be unheard of in other industries and is obviously too lengthy if one is the patient awaiting a breakthrough that impacts their life (Morris, Wooding, and Grant, 2011). As scientists, physicians are critical thinkers that value evidence but may identify only random control trials and validated research studies as evidence. The environment in which they work is risk-averse and may also limit their ability to try innovative approaches. One physician participant identified that fee schedules are "anti-innovative" and therefore restrict innovation. Shifting their thinking from evidence-based to evidence-informed requires that physicians shorten their adoption rates for new ideas and understand the value that all evidence can provide, empirical or otherwise, in improving processes that impact patient care. Patients expect that their health-care providers, and the organizations in which they place trust for their care, are constantly scanning the environment and looking for new ways to approach problems,

utilizing the most current information to put them on the path to wellness as soon as possible. This demands a curious mindset and a predisposition to continual learning.

Enabling functions

In a complex system, entities co-evolve as they change response to their environment and as they adapt to the evolution of the other entity. Learning and knowledge transfer is associated with co-evolution and enables growth and increased capacity to adjust to fluctuations that impact the organization or system as a whole. Data analysis related to co-evolution led to the third key finding.

Finding #3 –If dichotomous relations are allowed to exist between physicians and administrators within health-care organizations, energy that could be spent on the development and achievement of shared principles is instead used to fan the flame of an us-and-them mentality that impedes progress. It was evident in discussions with participants, from both administrators and clinicians, that each influences the other when it comes to leading in health-care organizations. Just as it is important for physicians to acquire an appreciation of diverse skill sets to lead a team of health-care professionals, it is critical that physicians and administrators understand the co-leadership nature within the organization and the need to have aligned goals.

Data provides us with a look at some of the challenges associated with strained relations between the two entities but also indicated shifting changes. Physicians are constrained in policy-driven environments and feel powerless, unsure of

where and how they belong in the organization. Organizations are becoming less tolerant of disruptive physician behaviour and, at the same time, are finding ways to support and engage physicians and to increase their sense of belonging.

Even though organizations are branding themselves as patient-centred, most participants identified that the health-care system remains provider-centred. Hospital administrators are meeting with resistance when exploring better utilization of operating rooms as much hospital space is unused for many hours each week and yet overhead expenses continue. Patients have to work around physician hours, which can make it cumbersome to manage their health and compromises family and work commitments. Organizations can prompt change in how buildings are used and their availability to patients through incremental steps. Piloting weekend hours in the operating room with a few physicians willing to cooperate in the short-term can provide evidence that supports shifting more permanently to patient-centred hospital operations.

Organizations can make time for regular dialogue between physicians and administrators and ensure that time is spent developing a common language in order to improve understanding. One of the primary challenges noted by participants was that both physicians and administrators used a “different language,” which affected their communication. These could be regular meetings with agendas or opportunities for networking with an engaging speaker that can facilitate topics of discussion. Hosting a speaker with expertise in health-care systems can prompt thinking, discussion and sharing between administrators and

physicians, beyond operation of the organization and provide an increased awareness of external factors that impact complex health-care organizations.

Unless health-care organizations and physicians are proactive in finding ways to work collaboratively toward their shared goal of optimal patient care the divide between them will continue to exacerbate an "us and them" mentality that is detrimental to everyone. Until administrators and physicians invest themselves in finding solutions, both skill sets are unable to be capitalized upon for the benefit of the patient, the other health-care professionals and the organizations.

The knowledge era requires a different form of leadership. It is no longer about how many widgets one can produce in a day on the assembly line but about harnessing the unique knowledge each team member brings to the task of caring for the patient. This includes the physician's expertise but not only his/her expertise. Looking through a lens that recognizes the "webs of interdependence" (Senge, 2012), that we are all a part of, whether in families, organizations or in society, can be catalyze administrators and clinicians to enable each other to co-lead in health care.

Both physicians and the organizations in which they work are accountable for health-care transformation. The concept of co-evolution as reciprocal in nature means that changes within a system are a shared responsibility with knowledge gained incorporated as learning between teams. Patients, and their families engaged in their care, have the power to shift how an organization provides services but only if clinicians and administrators can harness that knowledge

collectively for "short-term adaptation and long-term co-evolution" (Mitleton-Kelly, 2003, p 9).

5.2.2 Physicians and leadership development in health-care organizations

If physicians are not invested personally and organizations are not proactive in engaging them and developing them as leaders, a state of inertia stalls the progression toward optimal patient outcomes. The data provided several examples of physicians demonstrating leadership but also identified challenges that they face as well. Mainly, the opportunities for successful leadership development are found within the organization and not predicated on lengthy pursuit of external administrative-based courses. Data analysis related to physician leadership development leads to the fourth key finding, which, although not solely dependent upon organizational action, can be ameliorated by it.

Finding #4 – Disincentives for physicians to lead include a lack of education in areas of leadership and a reimbursement system that does not allow for leadership activities. The concept of leadership that is understood by, and bred into physicians, is consistent with the machine age and counterproductive to producing physician leaders working in complex systems. It was clear from participants that most medical training remains consistent with the traditional model, which has been tweaked but not entirely overhauled for decades. While some gains have been made to enable a health-care system that can embrace its complexity, it appears that most medical education in Canada is based on an out-dated curriculum and premised on the physician of yesteryear.

Health Canada can move swiftly to implement recommendations of the FMEC project in Canadian medical schools now. CAHO can also adopt policies that reflect the expectations for academic hospitals to expand upon medical training to provide team-based and leadership opportunities for residents to prepare them as valuable health-care system leaders. For the second year in a row, the CMA Physician Leadership Institute includes a course on complex systems, entitled Systems Transformation: Navigating Complexity through Dialogue (http://www.cma.ca/pmi). However, this is not considered to be one of the five core courses. If this course was mandatory for physician leaders, it could help them to understand the nature of complex behaviour in the organizations in which they lead. Leadership development for physicians that retains an emphasis on classical management theory, with an emphasis on financial or strategic planning or organizational design as its primary focus, only further supports the concept that the leader seeks to manage and control an unknowable world.

Physicians are scientists, trained to see the human body as a complex system in a constant state of flux. They understand that there is never one solution to every problem that the human body presents. Despite this, viewing organizations as complex remains a challenge. It is conceivable that physicians may be able to apply complexity ideas to leading organizations if they are able to increase their knowledge of the context in which decision-making takes place. Moving beyond archaic models of leadership requires that one understand fluctuation within an organization and the affect that it has on being able to control outcomes. Physicians are in an influential place to effect change in health care but much of

this is dependent upon their willingness to address the need for change, to invite change ideas, and to recognize that complexity and chaos are inherent in health care.

Possibly as a result of their training, or due to the lack of role models who are physician leaders, there exists an out-dated notion of what leadership is, potentially limiting a physician's desire to lead. Physicians identified being a leader as a lonely role with unrealistic expectations, limited recognition and not why they were attracted to the role of clinician. A physician's view of leadership is consistent with a command-and-control style and similar to their notion of the physician as "heroic lone healer" (Lee, 2010). Both hero-style views of physician and leader are out dated, yet still rewarded in an organizational culture that embraces models well suited to the industrial age but not at all effective for the knowledge age. Both concepts are unsuited to the collaborative team atmosphere within health-care organizations and yet both are firmly entrenched in organizations slow to change and a medical education that is hopelessly out of date. Organizations can make leadership positions more attractive for physicians by emphasizing it as an opportunity to influence patient care on a broader scale but also must put into place the supports for any leader to work effectively and not have to forfeit work-life balance.

The current reimbursement model is viewed as contravening a physician's ability to function effectively within a team and provides no incentives for leading a team. The fee for service model reimburses physicians based on the number of

patients they see in a day and the nature of those encounters and represents the primary source of compensation for physicians. It reinforces a physician's ability to increase the quantity of patients he/she sees but does nothing to reinforce the quality of care or the integration of care with other health professionals. No billing codes exist for additional time spent attending meetings, engaging in team discussions or leadership activities. Organizations should seek creative solutions to compensate physicians for time spent on leadership activities and prioritize such in their budgets.

Health-care organizations that create incentives for physicians to be present, mentally and physically, and support their leadership-skill development by capitalizing on their engagement with patients, and their role as advocate, are focused on best patient outcomes. Organizations that prioritize clinical leadership and utilize resources to enable physicians to embrace their leadership roles as valuable members of the organization, benefitted from high levels of engagement among physicians. This was evident through participation on satisfaction surveys in an organization that extended the Employee Assistance Plan to include physicians, and evidenced elsewhere with a Physician Engagement Agreement that was the culmination of months of discussions between administration and physicians to identify alignment of values. These health-care organizations were referenced by participants and looked upon as shining examples of bold organizational leadership that others are trying to emulate. This is consistent with a key finding from a physician engagement project in the Regina-Qu'Appelle Health Region in Saskatchewan (Grimes and Swettenham, 2012) that health-care

administrators have the chance to "send the message that physicians-along with all other workers-are valued, their opinions and insights matter, and they have a role beyond their vital clinical one in making the organization stronger" (p ii). Data indicates that physicians want to understand how they are part of the organization and where their influence can make a valuable contribution.

Organizations can provide opportunities for physicians to take the lead on projects which can provide action learning for physicians to develop leadership skills but also benefits the patient directly rather than waiting for years of research to provide firmly defined steps to improvements in patient care. Few incentives are available for physicians keen to learn. Participation in formal organized learning events requires significant coordination to be provided at a time and place convenient to physicians with practices. Knowledge transfer happens most effectively within organizations and not at business schools. Just as impractical as it would be for an administrator to attend medical school in order to fully understand the clinical side of operations, so too is it rare for a physician to pursue a degree in business administration, although those physician participants that did so were obviously more system literate as a result. It is clear that organizations must get creative in finding resources to compensate physicians engaged in leadership activities that are not compensable. Otherwise, it's equivalent to volunteer work.

It is clear that training which includes a focus on communication is required for physicians to improve their capacity to adapt to team-based models. Effective

communication is a challenge in most industries but particularly so in health care where life and death decision-making is required every day. The need for a step-by-step model to assist physicians in addressing other physicians demonstrating disruptive behaviour (The Ottawa Hospital, 2013) provides proof that physicians shy away from confronting their peers. By developing effective communication skills and through utilization of feedback mechanisms or tools, physicians are well positioned to impact patient outcomes by skilfully enabling collaborative practice. The data clearly show that a physician's relationship skills and their ability to communicate well through all levels of the organization has a positive influence on quality of patient care. Organizations can place increased emphasis on effective communication skills through performance management and can support physicians in developing those skills through funding programs such as Crucial Conversations or by offering a guide on how to facilitate effective discussions similar to the one utilized at The Ottawa Hospital. Most leaders are challenged with both how to deliver and how to receive feedback and the study demonstrated that physicians are limited in this skill.

Organizations can facilitate continuous learning for physicians by offering opportunities for knowledge sharing such as lunch-and-learn events, opening up mainstream leadership development opportunities to physicians at no cost to them and by seeking creative methods of learning which may include easily accessible online learning tools. Calls for leaders in health care who are systems thinkers and recent emphasis on learning organizations underlines the value of understanding

complex system behaviour; increasing a physician's knowledge of organizational governance and improving knowledge exchange is beneficial.

Health-care organizations that effectively engaged physicians demonstrated their support by providing leadership development opportunities and by making sure that there are clearly defined leadership opportunities for them in which to develop and practice those skills. Organizations can identify formal physician leadership roles and can also identify leadership capacity of all physicians through regular performance discussions, which emphasizes that it is an expectation of their profession.

Organizations prioritize physician leadership by finding creative solutions to supporting physicians through extension of benefits to physicians and their families, through funded training opportunities, by compensating them for leadership activities and by inviting them to contribute to values discussions and strategic-visioning exercises. Evidence of an organization's support for physician leadership is strong when succession planning is considered important, job descriptions are in place to aptly describe the physician leader's role and suitable workspace or access to benefits is afforded to them.

Through this research, several strong physician leaders were identified. Organizations can cultivate the growth of physician leaders within their own organization by recruiting a physician leader who can role model and inspire other physicians to invest in their leadership capacity in order to affect the broader population of patients. Organizations can begin by inviting physician leaders who

demonstrate strength in leading in today's health-care system to speak to all physicians to spark dialogue and energy. Organizations can support physicians willing to increase their leadership skills through sponsorship of learning opportunities, particularly those that will result in projects accomplished within the organization and where there is a dual benefit. In this case there is value in the development of the physician as leader as well as the in-house project that produces data and results specific to that organization.

Accountability for performance

Physicians that embraced their role as leaders in health care also recognized their skills deficit and invested themselves in continued professional growth either within or outside of the organization. Being held accountable as a leader in the organization requires a demonstrable investment of time for learning and visibly upholding the organizational values, as any employee would be expected to do. Their ethical responsibility to their patients underlines the need for them to develop their leadership capacity for health-care transformation.

Physicians play a particularly important role on teams, sometimes as leader, sometimes as team member, and can be instrumental in how team functioning impacts patient outcomes. Those that can develop an understanding of complex system behaviour can more effectively lead in a collaborative team environment. They are more likely to embrace leadership roles when they understand the concept of enabling team functioning and not having to dictate all functions of a team. Physicians that are able to demonstrate their skills in team leadership are

those that value relationships of trust, provide an atmosphere that encourages feedback between members, and recognize the inter-dependent nature of the work.

Accountability for performance must be clear to both parties. Organizations can use physician-organization agreements that require annual review and signatures of both the CEO and each physician, which establishes the commitments each agree to in order to engage in the work of the organization together. The understanding of both administrators and physicians starts with an agreement outlining the obligation of each to commit to principles upon which they can agree which support the goal of best patient outcomes. Organizations can implement 360-degree performance appraisals for physicians, which provides input from several perspectives and can be beneficial in identifying strengths and where opportunities for growth exist.

The capacity for physicians to affect their profession as well as their organization is huge. The capacity for organizations to affect change in the dearth of physician leaders is enormous.

5.2.3 Physician leaders and improved outcomes

The physician's role in leading clinical teams toward best patient outcomes is of critical importance. Improved patient outcomes identified in this study include the following: smoother transitions between services or less "bumping" from one silo to another more effective transfer of critical patient info for timely delivery of care; and, more holistic health-care as various specialized professionals contribute to the patient's care journey. The data shows that physicians lead this

journey and act as the gatekeeper to all services; health outcomes were directly influenced by their capacity to lead.

Physicians can lead the way to improved information flow on behalf of the patient by taking the time to train clinical staff in effective diagnostics that can assist in the timely transfer of patient information at critical moments. They can also facilitate team debriefings and encourage the contribution of every team member that plays a role in the care of the patient for most effective knowledge sharing and solution-finding. Having the shared end goal of optimal patient outcomes, referred to in complexity science literature as an attractor, is something that all team members are focussed on. Attractors are referred to as the end result, which comes from a pattern of interactions. Patient outcomes are influenced in many ways, and by numerous interactions among the care team. Identifying it as an attractor means that agreement on the end goal can be gained, even if the processes to achieve it differ each time. As patient advocates, due to their role in their care, their choice of profession and their assumed leadership authority, physicians play a critical role in engaging team members to focus on this common attractor. The synergetic nature of a collaborative approach to care requires that physicians use their leadership capacity to emphasize this value for the patient and to enable it to happen within the team.

Patients are increasingly taking a greater role in their health-care management by being more vocal and organizations are providing the opportunity for their input to guide organizational performance. As health-care organizations are consciously

shifting toward patient-centred care, physicians can effectively act as patient advocate by inviting participation from patients on patient advisory committees, through feedback surveys and as a participant in team discussions about their own care. Organizations that employ physician assessment methods can ensure that patient feedback is included as a key performance indicator.

Patient outcomes cannot be improved simply by virtue of the relationship that is built between the physician and the patient. It is equally important that physicians understand, and learn to relate well to, all those in the patient's circle of care in order to demonstrate their advocacy for the patient's care. Patients expect that this is happening and dire consequences happen when it does not. From the patient's point of view, knowing that your health-care providers can effectively lead and facilitate communication and trust among the team is critical to their sense of being well cared for.

5.3 Implications for theory

It is posited that health-care organizations that prioritize clinical leadership development based on the interdependent and dynamic nature of complex systems can most effectively impact health-care transformation.

Using complexity science principles as a framework to increase understanding of the nature of a social, complex system has been helpful in studying physicians as leaders who can effectively enable the inter-relationships and capitalize on the constant fluctuations of the system to affect change. It is noted, however, that physician leaders are being asked to lead in a model that has history, ambivalence

and a reimbursement system that does not place value on their leadership pursuits or activities. What complexity science does provide is a new way to think about organizational behaviour and prompts us to consider leadership differently, suggesting a new way to work and relate which can inform leadership development practices. Complex systems are dynamic and if health-care organizations are managed in a controlling style then the multitude of actions that take place are hindered from producing emerging new ideas, processes and innovations. Complexity science gives us an opportunity to think about creating enabling structures within health care, with conditions for learning and changing and adapting which will lead to a different type of culture within which clinicians and non-clinicians work. What can be learned by studying complex system behaviours can be applied to health-care organizations. This will allow for more opportunities for interacting, agreement on common principles, inspiring innovations, and support for leadership activities and skills development that supports physicians in their leadership path.

Although health care is viewed as a complex system it is recognized that mapping principles from one domain (such as economic or molecular systems) to another domain (human or social systems) is not necessarily direct. On the one hand complexity science provides a way to understand system behaviours while, on the other hand, it highlights the limitations imposed upon a complex social system by its structural environment, which can be seen to constrict movement. While it is posited that system behaviour can be better understood by studying principles of similar types of systems (i.e. complex), humans act with free will and choice and

bring various levels of expertise, experience, and personal attributes that impact outcomes.

Finding new ways of working together pushes both health-care organizations and physician leaders to a state that is referred to as "far-from-equilibrium" by Mitleton-Kelly (2003), which means that the ability to dialogue, explore and seek alternatives allowed for the creation of new relationships, patterns, and behaviours. While this opens up new possibilities it also challenges leaders in health care to re-think linear models, hierarchies and the types of skills that are needed to enable a "new coherence" (Mittleon-Kelly, 2003). By using complexity science principles to view physicians as leaders numerous possibilities present themselves, nudging us to enable physicians and organizations to find a new order. This requires that policies, practices and governing legislation are not prohibitive in allowing the constant evolution necessary to have an impact on transforming the health-care system.

Viewing physician leadership through a complexity-science framework represents a novel approach. This research adds to the current dialogue on physician leadership development by providing the human context of complexity-science principles in action relative to physicians as leaders. Complexity-science principles have provided an explanatory framework to help health-care leaders and decision makers understand the behaviour of a complex social (human) system (Mitleton-Kelly, 2003). This work expands upon the literature relative to complexity leadership in health care for nurses and administrators (Pinnington,

2011, Weberg, 2012, Chadwick, 2010, Zimmerman, 1999, Weber, 2002) by specifically shifting the focus to physicians who present unique assets and challenges in their leadership path. This work serves to challenge trait-based theories of leadership, by far the prevailing model in leadership in health care.

5.4 Chapter Summary

This study has demonstrated that, by virtue of being a physician, leadership is assumed although their capacity to lead cannot be assumed unless there is dedicated effort to acquire the appropriate skills for effective leadership. Physicians should be considered a significant stakeholder group with the capacity and ability to utilize limited health-care resources and supported in their leadership to do so. Physicians that are engaged and active within organizations can have a powerful impact on patient outcomes but must demonstrate patient-centred leadership, which is a different model than the traditional notion of a provider-centred focus.

Complexity science provides us with insights into the behaviours within a complex system such as health care and prompts us to consider what enables, or disables, physician leadership development. In addition, by considering complex behaviours, organizations can be pro-active in supporting the development of physician leaders, which has been shown to have an impact on improving patient outcomes. This chapter has provided practical strategies that organizations can adapt to most effectively transform health care through physician leadership.

Chapter 6: Conclusion

"Because effective leadership is critical to organizational success, frontrunner organizations cultivate leaders for bench depth and pipeline development" (Stoller, 2008, p 307).

6.1 Introduction

This final chapter comments on the value of the research and the contribution that it makes to physician leadership development and complexity science. Sections 6.2 and 6.3 discuss transferability and evaluation; section 6.4 shares thoughts on the strengths and limitations of the study. Section 6.5 suggests areas for future research, followed by section, 6.6, which makes recommendations arising from this study. Section 6.7 closes the chapter and this dissertation.

6.2 Transferability

The concept of generalizability presents a potential conflict in interpretive studies. Lincoln and Guba (1985) suggest that transferability may be a suitable substitute. (cf Kaufmann & Denk, 2011, p. 68). Transferability implies that, while results from grounded theory studies are not intended to have strict application to all other contexts, the researcher should present the findings sufficiently "to make this transfer possible" (Kaufmann & Denk, 2011, p. 69). The authors contend that it is in the transparency of the categorization of the data, and related literature "including sufficient descriptions of what is discovered in the data," that makes applicability of the findings possible (Kaufmann & Denk, 2011, p. 70). Presentation of the data and subsequent analysis has been detailed in such a way that it can be easily followed and will resonate with those who have an interest in

health care due to the variety of perspectives and current reality in most organizations. It was evident that, while no two health-care organizations in the study were the same, they shared similar challenges. Complex systems are not designed systems. The behaviour of the system and the constant state of flux influences an emerging structure. Therefore an application of complexity-science principles, including in this research, can be considered transferrable in some way to all health-care organizations to varying degrees.

6.3 Evaluation of this work

An interpretative approach challenges the standardized tenets of rigour that are applied to more positivist, theory-driven research: internal validity, reliability, objectivity, and external validity (Kaufmann & Denk, 2011). Grounded theory offers varying criteria for evaluation of studies, most of which overlap and weave together, to emphasize the value of transparent process. It is expected that the study will have practical application for both clinical and non-clinical health-care professionals. Eriksson and Kovalainen (2008) sum it up nicely that for "analytic impact," "all of these together....with evocative writing, can make well-grounded arguments for the case" (p. 170).

6.4 Strengths and limitations of this study

6.4.1 Strengths

The participation of highly knowledgeable and experienced participants who provided input is a strength of this study. The number of years of expertise in

three primary areas (health-care management, physician leadership, leadership development) is very significant.

Most of the participants expressed keen interest in the research findings, which is valuable for future collaboration with their organizations to enable further research on physician leadership. A national task force, proposing changes to developing health-care leaders, has requested that I share my findings from this research, based on the presumed value added for that project.

The value of using a grounded theory methodology situates the findings and the implications for policy, practice and theory in the current social reality of health care. This study is significant in health-care organizations that are grappling with how to engage and support their physicians to lead effectively and also to physicians that are challenged to gain leadership skills while practicing medicine. New insights are offered from this study to inform ongoing discussion on physician leadership development. These include the following: leadership in complex systems demands a different approach than traditional management models; physicians are well positioned to play an instrumental role in health-care transformation; and limitations on their leadership skills and the opportunities to develop those skills stalls its progression.

Finally, a strength of this research is that it has achieved what Charmez (2006) refers to as “intimate familiarity with the setting or topic,” as a result of the participation of academics, advisors, administrative and clinical personnel at both the middle- and senior-levels of operations. This has ensured a broad discussion

that was able to address barriers and challenges, including associated tensions that restrict the dialogue.

6.4.2 Limitations

Although the findings are considered to be strongly supported by data and add knowledge to the currently active discussion of physician leadership, as with any research there are limitations. Two are identified here.

First, this topic was a strong area of interest to the participants. Therefore the results may be more representative of a valuation of the need for physician leaders and supportive of efforts to encourage their development than a study in which random sampling was used. All physician participants held leadership roles either currently or in their recent past. Although there are some who feel that developing physician leaders takes them away from what physicians are trained to do, which is, to care for patients, no effort to seek their participation was made.

Secondly, achieving theoretical saturation remains a challenge in the use of grounded theory methods. With the different types of participants (physicians and non-physicians) the achievement of 21 participants, while meeting the original target, may have limited exposure to additional categories of data that could have been explored. If physicians and non-physicians were viewed as representative of opposing viewpoints, a deeper analysis from either one or the other perspective would have required at least 21 interviews of each. The use of additional data beyond participant interviews provided the opportunity to expand upon the discussions.

6.5 The path forward in research

Future research to expand upon this study would be beneficial to identify the value of physician leadership consistent with principles of complexity to patient and organizational outcomes. Several opportunities exist with participant organizations for further research to enable development of physician leaders. These are as follows.

- Action-based learning projects within organizations that can allow for projects that are context-specific, relevant to the challenges and led by physicians that are familiar with that organization. Such projects can produce near-immediate benefits to patients and on-the-ground leadership development for physicians and their teams through shared learning, the ability to reflect and then act, and practicing leadership skills.

- Organizations that apply an organizational learning approach to encourage transfer of knowledge between administration and physicians would provide an opportunity for research on the capacity for systems thinking and the tools most effective for achieving knowledge transfer. This requires the organization to consciously create an atmosphere that encourages, and values, the variety of perspectives and rewards knowledge sharing.

- Team-based research to identify capacity to improve reliability and resiliency according to Weick and Sutcliffe's (2007) principles of high-

reliability organizations (HRO"s) could provide insight on the value of trust and relationships among health-care teams that include physicians.

Additionally, as the primary focus was on principles that were considered to be most directly associated with agent behaviour (connectivity/interdependence/feedback), and transformational processes (exploration of the space of possibilities, and co-evolution), further research would be to study how associated behaviours affect system behaviour (self-organization, emergence, far from equilibrium, historicity & time, and, path-dependence) (Milteton-Kelly, 2003).

6.6 Significance of the findings and recommendations

An organization's ability to overcome history and to create a new structure or a new order of operating can depend on the ability to identify the impact of this history and move past it. Mittleton-Kelly (2003) refers to this principle of complex systems as being "pushed far-from-equilibrium" (p 10). Moving from the status quo to another state means allowance for change. Complex organizations, like health care, that can embrace change and allow for emergence of a new design demonstrate another principle of complexity science; the capacity to self-organize. System transformation that is focussed on the best utilization of public funds and improved outcomes for patients requires physician leadership.

The ability of organizations to cultivate an atmosphere conducive to the development of physician leaders will be contingent on recognizing historical influences and capitalizing on a blend of "past choices made" and "selection

among a finite set of perceived choices" (Mittleton-Kelly, 2003, p 13). It is evident, though, that history will be re-written by patients that expect people to work in teams (Canadian Patient Safety Institute, 2011).

The need for physician leaders will continue to be difficult to address until national and provincial policy-makers remove the barriers that exist to support their development and reward them for leading in a system where they are already viewed as leaders. Out-dated medical education and reimbursement models reduce the pool of leadership candidates among physicians that could have a transformational effect on the way health care is delivered.

If better patient outcomes are the common attractor in health care then patient-centred care must be mission critical. This applies to organizations and by default, to all staff and physicians that work within them. It is about more than processes that fit patients but also about encouraging patient-centred leadership among all leaders. This is not optional. Patients are driving change within health care and that is influencing the physician-patient relationship. Health-care consumers are more informed than ever and want to be engaged in their care, expecting to be part of discussions with their health-care team, no longer shunted aside while the team steps into the hallway to discuss their prognosis.

Patient engagement and empowerment is the first of five themes identified by the Advisory Panel on Health Care Innovation (July, 2015) as critically important to address for sustainability of health care in Canada. The panel highlight the "large gap between the rhetoric of patient-centered care and the experience of many

patients and families" and note that health-care literacy and access to patient portals should be top priorities for engaging patients (p. 3).

Developing physicians to lead in today's complex health-care organizations means that they must be able to understand the nature of complex systems and acquire the skills to be effective leaders. It also requires that health-care organizations and policy makers recognize the crucial role they play in establishing the infrastructure that supports physicians to lead. Only then can patients expect to receive the well-coordinated care that they deserve from a health-care system that can sustain the increasing weight on it as the population ages.

Organizations should strive to adopt a culture of innovation in order that new ideas can come forward. CAHO hospitals in particular should demonstrate their advocacy for continual learning about new approaches by recognizing and rewarding physicians and staff for thinking creatively. Action-learning projects that can improve patient outcomes while allowing team members to explore, test and implement new models of care delivery have sustained benefits in terms of staff retention and satisfaction as well as organizational learning. If physicians and administrators are able to view the health-care organization as a complex system they can also prioritize the "culture of experimentation" that Dickens (2013) has identified as one of the seven factors to facilitate emergent change and increase innovation capacity. It may provide permission for physicians to think outside the box, which can elicit new ideas and fresh strategies. It is this capacity

to understand experimentation as being worthwhile that is a stretch for physicians accustomed to linear solutions and working within a risk-averse environment.

Embracing a culture that rewards innovative thinkers is a culture that is prepared to manage change effectively. Adjusting to change is identified as a challenge as well as a frustration for most physicians and understanding the concepts relative to change management is identified as having value for physician leaders. This can be partially explained by the high degree of frustration that exists in health care with an ever-increasing level of expectations for new types of reporting or policy changes based on governmental priorities, all of which are viewed as distracting from the work of patient care but pushing the capacity for change to untenable levels. Organizations cannot identify as innovative unless they put into place learning opportunities for all staff, physicians especially, on managing change effectively. The dynamic nature of complex systems requires leadership that can embrace, even welcome chaos, which demands innovative solutions.

Physicians require support to develop into effective leaders for today's health-care organizations. This requires the following.

- Administrators of organizations recognize the need for co-evolution with physicians and focus on knowledge transfer processes that can most effectively support shared leadership.

- Administrators place value on physician leadership and find creative ways to support and engage physicians.

- Organizations advocate to provincial and federal governments for necessary changes to reimbursement and medical training models that support physician leaders working in complex systems, which can increase their ability to work in a team-based environment.

- Leadership training models available to physicians are focused on complex system behaviour and recognize the challenges faced by physicians in accessing opportunities for skill development.

- Physicians are held accountable for embracing their inherent leadership role and advocating for patients as highly influential agents within the complex system of health care.

6.7 Concluding thoughts

Organizations that can find innovative paths to develop physician leaders for their role in complex health-care systems can set the stage for physician leaders to engage, grow and transform patient care. This study presents convincing evidence that physicians are highly influential agents, from their direct relationship with the patient to their ability to understand organizational governance and the broader systemic forces in health care that impact patient care. The potential for health-care transformation is promising if physicians can be engaged to help lead it. There are numerous examples of outstanding physician leaders and front-runner organizations that are investing in their development to ensure that health care in Canada can meet the challenges that lie ahead. There needs to be many more.

References

Anderson, R., Crabtree, B.F., Steele, D. J., McDaniel, R. R. (2005). *Case Study Research: The View from Complexity Science.* Qualitative Health Research 15(5) 669-685

Annabelle, M., Critten, P. (1998). *Chaos and complexity – the future for health care HRM.* Health Manpower Management 24(4) 139-142

Arnone, M., Stumpf, S.A. (2010). *Shared leadership: from rivals to co-CEOs.* Strategy & Leadership 38(2) 15-21

Avakian, L**.** (2011). *On the Hospital Agenda: Developing Physician Leaders.* H&HNDaily Retrieved June 4, 2012 from www.hhnmag.com

Aw, J. (2014, March 11). *Patients who question their doctors are changing the face of medicine- and physicians are embracing the shift.* Health Section. Retrieved March 14, 2014 from http://life.nationalpost.com/2014/03/11/patients-who-question-their-doctors-are-changing-the-face-of-medicine-and-physicians-are-embracing-the-shift/

Baker, G. R., Denis, J. (2011). *Medical leadership in health-care systems: from professional authority to organizational leadership.* Public Money & Management, 31(5) 355-362

Ball, T. (2012, October 4). *Health System Transformation: Five Perspectives to Consider.* [Web blog post]. Retrieved from:

http://quantumtransformationtechnologies.com/category/blog/

Baxter, Gordon. *White paper: Complexity in health care,* The UK National Research and Training Initiative, University of S. Andrews School of Computer Science, Feb 2010

Begun, J.W., Zimmerman, B., Dooley, K. (2003). Health-care organizations as Complex Adaptive Systems. In S.M.Mick and M.Wyttenback (eds), *Advances in Health Care Organization Theory.* San Francisco: Jossey-Bass, pp 253-288

Berry, K. (1999). *Hospital-physician relationships: what's working, what's not working.* Health Care Strategic Management 17 (3) 18

Billou, N., Crossan, M., Seijts, G.(2010). *Coping with Complexity.* Ivey Business Journal Online, May/Jun

Block, L.A.,Manning, L.J. (2007). *A systemic approach to developing frontline leaders in health care.* Leadership in Health Services 20 (2) 85-96

Brown, H.P, Mayer, T. (1996) *Physicians and Hospitals: New Partnerships.* Health Systems Review, 29(3) 35-37

Brugue, Q. (2004). *Review Essay: Reengineering Health Care – The Complexities of Organizational Transformation by Terry McNulty and Ewan Ferlie.* International Public Management Journal 7 (1) 133-137

Buell, J. M. (2012). *Physician Leadership Development: A Strategic Imperative for Integrated Health care Delivery.* Health care Executive 27 (1) 18-30

Cachia, M., Millward, L., (2011). *The telephone medium and semi-structured interviews: a complementary fit.* Qualitative Research in Organizations and Management: An International Journal 6 (3) pp 265-277

Canadian Patient Safety Institute (2011). *Canadian Framework for Teamwork and Communication*

CAHO, Retrieved August 25, 2012 from: http://www.caho-hospitals.com/about-us/

Council of Academic Hospitals of Ontario (CAHO). (2014) Homepage. Retrieved April 18, 2014 from: http://caho-hospitals.com/about-us/

Carlson School of Management, University of Minnesota. (2003). *Applying Complexity Science to Health and Health care*. Center for the Study of Health care Management. Retrieved Feb. 15, 2013 from: www.plexusinstitute.org/.../11261_Plexus_Summit_report_**Health**

Carruthers, C., Swettenham, J. (2011). *Physician Leadership: Necessary and in Need of Nurturing – Now.* Health care Quarterly 14(1) 6-8

Chadi, N. (2009). *Medical Leadership: Doctors at the Helm of Change.* MJM. 12(1) 52-57

Chadwick, M.M. (2010). *Creating Order out of Chao: A Leadership Approach.* AORN Journal 91(1) 154-170

Charmaz, K. (2006). *Constructing Ground Theory. A Practical Guide Through Qualitative Analysis.* SAGE Publications, London

Chaudry, J. Jain, A., McKenzie, S., Schwartz, R.W. (2008). *Physician Leadership: The Competencies of Change.* Journal of Surgical Education. 65(3) 213-220

Chreim, S., Williams, B.E., Hinings, C.R. (2007). *Interlevel Influences on the Reconstruction of Professional Role Identity.* Academy of Management Journal. 50(6) 1515-1539

Clarke, A., Collins, S. (2007). *Complexity science and student teacher supervision.* Teaching and Teacher Education 23 160-172

Clark, J. (2012). *Medical leadership and engagement: no longer an optional extra.* Journal of Health Organization and Management. 26(4) 437-443

CMA (2012). *Leadership Development for Physicians; 2012 PMI Catalogue.* Retrieved online June 15, 2011 at: https://cma.ca/pmi

CMA (2010). Fact sheets Aug., Sept.: *Health care transformation* Retrieved from: www.cma.ca

CMA (2010). *Health Care Transformation in Canada; Change that Works, Care that Lasts.* Retrieved August 19, 2012 from: http://www.cma.ca/multimedia/CMA/Content_Images/Inside_cma/Advocacy/HCT/HCT-2010report_en.pdf

CMA Physician Leadership Institute. *2014 Catalogue*. Retrieved July 13, 2014, from http://www.cma.ca/pmi

Collins-Nakai, R. (2006). *Leadership in medicine.* McGill Journal of Medicine 9 (1) 68-73

Commission on the Future of Health Care in Canada (Nov. 2002). *Building on Values: The Future of Health Care in Canada*. Retrieved August 4, 2012 fromhttp://www.cbc.ca/health care/final_report.pdf

Cooper, D. R., Schindler, P. S. (2011). *Business Research Methods. 11th edition,* McGraw-Hill, New York, N.Y.

Denis, J-L., Langley, A., Pineault, M. (2000). *Becoming a Leader in a Complex Organization.* Journal of Management Studies. 37(8) 1063-1099

Denis, J-L., Lamothe, L., Langley, A. (2001). *The dynamics of collective leadership and strategic change in pluralistic organizations.* Academy of

Management Journal 44 (4) 809-837

Dickens, P. (2010). *Power Dynamics in New Models of Care*. Unpublished. Antioch University; Yellow Springs, OH

Dickens, P.M., (2013). *Facilitating emergent change in a health care setting.* Health care Management Forum, (26) 116-120

Dickson, G. (2012). *Anchoring Physician Engagement in Vision and Values: Principles and Framework.* Regina Qu"Appelle Health Region, Canadian Policy Network. Retrieved February 18, 2013 from: http://www.rqhealth.ca/inside/publications/physician/pdf_files/anchoring.pdf

Dickson, G., Lindstrom, R., Black, C., Van der Gucht, D. (2012). *Evidence-Informed Change Management in Canadian Health-care organizations.* CHSRF, Retrieved August 19, 2012 from http://www.chsrf.ca/publicationsandresources/ResearchReports/ArticleView/12-06-29/39d0d5a8-e64e- 425e-aec2-5497c39be338.aspx

Dilworth, R. L (1998). *Action Learning in a Nutshell.* Performance Improvement Quarterly 11(1) 28-43

Dye, C. F. (1996). *Cultivating Physician Talent: 5 Steps for Developing Successful Physician Leaders.* Health care Executive, 11 (3) 18-21

Edmonstone, J. (2011). *Developing leaders and leadership in health care: a case*

for rebalancing? Leadership in Health Services 24 (1) 8-18

Edmonstone, J. (2009). *Clinical leadership: the elephant in the room.* International Journal of Health Planning and Management. 24 290-305

Eriksson, P., Kovalainen, A. (2008). *Qualitative Methods in Business Research.* Sage Publications, London, U.K.

Falcone, R. E., Satiani, B. (2008). *Physician as Hospital Chief Executive Officer.* Vascular and Endovascular Surgery 42 (1) 88-94

Falk, W., Mendelsohn, M., Hjartarson, J. (2011). *Fiscal Sustainability & the Transformation of Canada's Health care System; A Shifting Gears Report.* The Mowat Centre and the School of Public Policy & Governance, University of Toronto

Friedman, L.H., King, J.B., Bella, D. (2007). *Seeing Systems in Health Care Organizations.* The Physician Executive, Jul/Aug 20-29

Galli, E.B., Muller-Stewens, G.(2012). *How to build social capital with leadership development: Lessons from an explorative case study of a multibusiness firm.* The Leadership Quarterly 2 176-201

Garvin, D.A., Edmondson, A.C., Gino, F.(2008). *Is Yours a Learning Organization?.* Harvard Business Review (March).

Gilmore, T. N. (2010). *Challenges for Physicians in Formal Leadership Roles: Silos in the Mind.* Organisational & Social Dynamics 10(2) 279-296

Glaser, B., Strauss, A. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research.* Aldine Publishing Co., Chicago, Il.

Gocan, S., Laplante, M., Woodend, K. (2014). *Interprofessional Collaboration in Ontario's Family Health Teams: A Review of the Literature.* Journal of Research in Interprofessional Practice and Education, 3.3, 2-19

Goodall, A.H. (2011). *Physician-leaders and hospital performance: Is there an association?* Soc Sci Med. 73 (4) 535-539

Government of Canada (2015). *Unleashing Innovation: Excellent Health Care for Canada Executive Summary*.

Greenfield, D. (2007). *The enactment of dynamic leadership.* Leadership in Health Services 20(3) 159-168

Grimes, K., Swettenham, J. (2012). *Compass for Transformation: Barriers and Facilitators to Physician Engagement.* Canadian Policy Network (CPNET). Regina Qu"Appelle Health Region. Retrieved April 13, 2014 from: http://www.rqhealth.ca/inside/publications/physician/pdf_files/compass.pdf

Grobman, G. M. (2005). *Complexity Theory: A New Way to Look at*

Organizational Change. Public Administration Quarterly 29 (3) 350-382

Gronn, P. (2000). *Distributed Properties: A New Architecture for Leadership.* Educational Management Administration & Leadership. 28 317-338

Guthrie, M.B. (1999). *Challenges in Developing Physician Leadership and Management.* Frontiers of Health Services Management. 15 (4) 3-26

Hayes, C., Yousefi, V., Wallington, T., Ginzburg, A. (2010). *Case Study of Physician Leaders in Quality and Patient Safety, and the Development of a Physician Leadership Network.* Health care Quartlerly. 15, September 68-73

Health Care Innovation Working Group (2012). *From Innovation to Action: The First Report of the Health Care Innovation Working Group*. Retrieved August 4, 2012 from: http://www.health.gov.sk.ca/medicare-commission-final-report

Heine, R. P, Maddox, E.N. (2010) *Hospital management reform: a step to health care reform.* Journal of Management and Marketing Research 5 1-7

Hylton, J.H. (2008). *Does leadership matter?* Canadian Health care Manager 15 (3)

Isabella, L.A. (1990). *Evolving Interpretations as a Change Unfolds: How Managers Construe Key Organizational Events.* Academy of Management Journal. 33 (1) 7-41

Jayasinghe, S. (2011). *Conceptualising population health: from mechanistic thinking to complexity science.* Emerging Themes in Epidemiology. 8(2) Retrieved Feb. 19, 2013 from: http://www.ete-online.com/content/8/1/2

Jones, M., Alony, I. (2011) *Guiding the Use of Grounded Theory in Doctoral Studies – An example from the Australian Film Industry*. International Journal of Doctoral Studies, (6) 95-114

Kaisi, A. (2012). *A Roadmap for Trust: Enhancing Physician Engagement.* Canadian Policy Network (CPNET). Regina Qu"Appelle Health Region. Retrieved April 13, 2014 from: http://www.rqhealth.ca/inside/publications/physician/pdf_files/roadmap.pdf

Kauffman, S. (2000). *Investigations. Oxford University Press*

Kaufmann, L., Denk, N. (2011). *How to Demonstrate Rigor when presenting Grounded TheoryResearch in the Supply Chain Management Literature.* Journal of Supply Chain Management 47 (4) 64-72

Keene, A. (2000). *Complexity theory: the changing role of leadership.* Industrial and Commercial Training. 32(1) 15-18

Kofman, F., Senge, P., (1994). *Communities of Commitment: The Heart of Learning Organizations* Organizational Learning Centre, MIT, Axialent Inc.

Kumpusalo,E., Virjo, I., Mattila, K., Halila, H. (2003). *Managerial skills of*

principal physicians assessed by their colleagues; A lesson from Finland. Journal of Health Organization and Management 17(6) 457-462

LEADS in a Caring Environment, Leadership Capability Framework. Retrieved August 4, 201 from: *http://www.cchl-ccls.ca/assets/LEADS/LEADS_Communique_Feb2010_LEADS_EN.pdf*

Leatt, P., Porter, J., (2003). *Where are the Health care Leaders? The Need for Investment in Leadership Development* Department of Health Policy and Administration, School of Public Health, University of North Carolina

Lee, T. H. (2010). *Turning Doctors into Leaders* Harvard Business School Publishing Corporation, April

Leitch, K. (2010). *Dr. Kellie Leitch's Outlook: Innovation Takes Leadership.* Retrieved from: www.ivey.uwo.ca/healthinoovation/Emails/Feb2011/2011

Lencioni, P. (2002). *The Five Dysfunctions of a Team*

Letourneau, B., Curry, W. (1997). *Physicians as Executives: Boon or Boondoggle?* Frontiers of Health Services Management. 13(3) 3-25

Levy, M., Delahoussaye, M. (2000). *Reg Revans: a man of action.* Training Journal, Nov. 8-13

Lewin, R., Regine, B. (2000). *The Soul at Work.* SIMON & SCHUSTER, New York, NY.

Lincoln, Y.S., Guba, E.G. (1985) *Naturalistic Inquiry.* SAGE Publications, Newbury Park, CA

Lichtenstein, B.B., Uhl-Bien, M., Marion, R., Seers, A., Orton, J.D., Schreiber, C. 2006). *Complexity leadership theory : An interactive perspective on leading in complex adaptive systems.* E:CO 8(4) 2-12

Litaker, D., Tomolo, A., Liberatore, V., Stange, K.C., Aron, D. (2006). *Using Complexity Theory to Build Interventions that Improve Health Care Delivery in Primary Care.* Journal of General Internal Medicine, 21(S2) 30-34

Machado, C., Scavard, A., Vaccaro, G. (2014). *Lean Health care Supply Chain Management: Minimizing Waste and Costs.* Independent Journal of Management & Production 5.4 1071-1088

Markuns, J.F., Fraser, B.F., Orlander, J. D. (2010). *The Path to Physician Leadership in Community Health Centers: Implications for Training.* Family Medicine 41(6) 403-407

McCauley, C. D. (2004). *Shared Leadership: Reframing the How and Whys of Leadership.* Personnel Psychology 57(3) 802-804

McKimm, J., Swanwick, T., (2011). *Leadership development for clinicians: what are we trying to achieve?* The Clinical Teacher 8:181-185

McNulty, T., Ferlie, E. (2002). *Reengineering Health Care – The Complexities of Organizational Transformation.* Oxford, Oxford University Press

Merry, M. D. (1994). *Shared leadership in health-care organizations.* Topics in Health care Financing 20 (4) 26-31

Miles, S. A., Watkins, M. D. (2007). *The Leadership Team; Complementary Strengths or Conflicting Agenda?* Harvard Business Review, Apr. 2-9

Miller, R.H., Sim, I. (2004). *Physician's Use of Electronic Medical Records: Barriers and Solutions.* Health Affairs 23(2) 116-126

Mills, J., Bonner, A., Francis, K. (2006). *The Development of Constructivist Grounded Theory.* International Journal of Qualitative Methods 5 (1) 1-10

Minas, H. (2005). *Leadership for change in complex systems.* Australasian Psychiatry 13(1) 33-39

Misra-Hebert, A.D., Kay, R, Stoller, J. K. (2004). *A Review of Physician Turnover: Rates, Causes, and Consequences.* American Journal of Medical Quality 19 (2) 56-66

Mitleton-Kelly, E. (2003). *Ten Principles of Complexity & Enabling*

Infrastructures. In Complex Systems and Evolutionary Perspectives on Organizations: The Application of Complexity Theory to Organizations. London School of Economics. 1-31

Morgan, G, (2006) *Images of Organization* Thousand Oaks, CA: Sage Publications

Morris, Z., Wooding, S., Grant, J. (2011). *The answer is 17 years, what is the question: understanding time lags in translational research.* J R Soc Med 104(12) 510—520

Morse, J.M. (1995). *The Significance of Saturation.* Qualitative Health Research 5 (2) 147-149

Mowles, C., van der Gaag, A. & Fox, J. (2010). The *Practice of Complexity: Review, Change and Service Improvement in an NHS Department, Journal of Health Organisation and Management, Vol 24, Issue 2: 127-144*

Nicolis, G., Prigogine, I. (1989). Exploring complexity. W.H.Freeman

OdgersBerndtson (May, 2011). *Candidate Brief for the position of Chief Executive Officer, Winchester District Memorial Hospital*

OdgersBerndtson (Aug, 2011). *Executive Brief for the position of President & Chief Executive Officer Campbellford Memorial Hospital*

Ontario Hospital Association (OHA) and Ontario Association of Community Care Access Centres (OACCAC) (2011). *Four Pillars: Recommendations for Achieving a High Performing Health System* Retrieved August 4, 2012 from http://www.oha.com/CurrentIssues/Issues/Documents/Four%20Pillars%20-%20FINAL%20FULL.pdf

OHA Today (Producer) (April 9, 2013) *Interview with Charles Chan; Perspectives on Physician Leadership and Engagement.* (audiotape) (http://www.youtube.com/watch?v=VfdORSra878)

Parayitam, S., Phelps, L.D. (2007). *Strategic decision-making in the health care industry; the effects of physician executives on decision outcomes.* Management Research News 30(4) 283- 301

Parliament of Canada (Oct. 2002). *The Health of Canadians-The Federal Role*. Retrieved August 4, 2012 from http://www.parl.gc.ca/Content/SEN/Committee/372/SOCI/rep/repoct02vol6-e.htm

Parry, K.W. (1998). *Grounded Theory and Social Process: A New Direction for Leadership Research.* Leadership Quarterly 9 (1) 85-106

Partington, D. (2002). *Essential Skills for Management Research.* SAGE Publications, Thousand Oaks, California

Patterson, K., Grenny, J., McMillan, R., Switzler, A. (2012). *Crucial*

conversations.

Penprase, B., Norris, D. (2005). *What Nurse Leaders Should Know About Complex Adaptive Systems Theory.* Nursing Leadership Forum, 9 (3) 127

Physician Management Institute (2013) *Leadership and Professional Development.* Retrieved February 18, 2013 from:http://www.cma.ca/learning/leadershipdevelopment

Pinnington, A.H. (2011). *Leadership development: Applying the same leadership theories and development practices in different contexts?* Leadership 7 (3) p 335-365

Plsek, P.E., Greenhalgh, T. (2001). *The challenge of complexity in health care.* BMJ 323 (7313) 625-628

Popely, D. (2009) *Partners in Change: Physicians and Hospitals Aligning for Success.* Health care Executive, 24(4) 9-14

Reeleder, D., Goel, V., Singer, P.A, Martin, D.K. (2006). *Leadership and priority setting: the perspective of hospital CEOs.* ScienceDirect 79, 24-34

Reinertsen, J.L., Gosfield, A.G., Rupp, W., Whittington, J.W. (2007). *Engaging Physicians in a Shared Quality Agenda.* IHI Innovation Series white paper. Cambridge, Massachusetts: Institute for Health care Improvement

Report of the Premier's Advisory Council on Health (Dec. 2001) *A Framework*

for Reform. Retrieved August 4, 2012 from http://www.health.alberta.ca/documents/Mazankowski-Report-2001.pdf

Richardson, K. A. (2008). *Managing Complex Organizations: Complexity Thinking and the Science and Art of Management.* Corporate Finance Review 13(1) 23-29

Roundtable on Hospital Leadership (2006, November). Canadian Health care Manager 13 (7)

Roth, V. (2011). *Female Physician Leadership at The Ottawa Hospital.* (Master's Thesis, University of Ottawa, 2011.

Rowley, J. (2012). *Conducting Research Interviews.* Management Research Review, Emerald Group Publishing Limited, 35 (3/4) pp 260-271

Rouse, W.B. (2007). *People and Organizations: Explorations of Human-Centered Design.* New York; John Wiley and Sons

Rouse, W. B. (2008). *Health Care as a Complex Adaptive System: Implications for Design and Management.* The Bridge, National Academy of Engineering, Spring 17-25

Royal College of Physicians and Surgeons of Canada. *CanMEDS 2005 Framework.* Retrieved April 12, 2014 from: http://www.royalcollege.ca/portal/page/portal/rc/common/documents/canmeds/framework/the_7_canmeds_roles_e.pdf

Rubin, H.J., Rubin, I.S., (1995). *Qualitative Interviewing: The Art of Hearing Data.* Sage Publications, Thousand Oaks, CA

Sanders, C., Hagemann, B. (2009). *Physicians as Leaders: What's missing?* Retrieved July 10, 2012 from: http://www.healthleadersmedia.com/content/PHY-231588/Physicians-as-Leaders-Whats-Missing.html

Saskatchewan Commission on Medicare (April 2001). *Caring for Medicare: Sustaining a Quality System.* Retrieved August 4, 2012 from http://www.health.gov.sk.ca/medicare-commission-final-report

Scheck McAlearney, A., (2006). *Leadership development in health care: A qualitative study*. Journal of Organizational Behaviour. 27 967-982

Scheck McAlearney, A., Fisher, D., Heiser, K., Robbins, D., Kelleher, K., (2005). *Developing Effective Physician Leaders: Changing Cultures and Transforming Organizations.* Hospital Topics, 83 (2)

Schwartz, R.W., Pogge, C. (2000). *Physician Leadership: Essential Skills in a Changing Environment.* The American Journal of Surgery 180 187-192

Scott, E.S. (2010). *Perspectives on health care leader and leadership development.* Journal of Health-Care Leadership. 2 83-90

Seidman, I.E.(1991). *Interviewing as Qualitative Research.* Teachers College Press, New York, NY

Senge, P. (2012). *Navigating Webs of Interdependence.* Retrieved March 23, 2013 from: http://www.mutualresponsibility.org/science/what-is-systems-thinking-peter-senge-explains-systems-thinking-approach-and-principles

Silverman, D. (2010). *Doing Qualitative Research: A Practical Handbook.* SAGE, London, 3rd Edition

Simpson, P. (2006). *Organizing in the mist: a case study in leadership and complexity.* Leadership & Organization Development Journal 28(5) 465-482

Smith, M.E. (2003). *Changing an organization's culture: correlates of success and failure.* Leadership & Organization development Journal 24(5) 249-261

Snowdon, A., Shell, J., Leitch, K. (2011). *Innovation Takes Leadership: Opportunities & Challenges for Canada's Health Care System.* White paper, Ivey Centre for Health Innovation and Leadership

Stagg Elliott, V (2011, Apr. 4) *Hospitals" new Physician Leaders: Doctors wear multiple medical hats.* Retrieved Nov 12, 2012 from: http://www.ama-assn.org/amednews/2011/04/04/bisa0404.htm

Stoller, J.K. (2008). *Developing Physician-Leaders: Key Competencies and Available Programs."* The Journal of Health Administration Education pp 307-328

Stoller, J.K (2009). *Developing Physician-Leaders: A Call to Action* J Gen Intern Med 24(7) 876-878

Strauss, A. Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques.* Newbury Park, CA: Sage

Stuart, I., McCutcheon, D., Handfield, R., McLachlin, R., Samson, D. (2002). *Effective Case Research in Operations Management: A Process Perspective.* Journal of Operations Management. 20 (5) 419-433

Suchman, A.L., Sluyter, D.J., Williamson, P. R. (2011). *Leading Change in Health care: transforming organizations using complexity, positive psychology and relationship-centered care.* Radcliffe Publishing Ltd., London

Suddaby, R. (2006). *From the Editors: What Grounded Theory is Not.* Academy of Management Journal. 49 (4) 633-642

The Association of Faculties of Medicine of Canada (2010). *The Future of Medical Education in Canada (FMEC): A Collective Vision for MD Education.* http://www.afmc.ca/future-of-medical-education-in-canada/medical-doctor-project/pdf/collective_vision.pdf

The Association of Faculties of Medicine of Canada (2012). *The Future of*

Medical Education in Canada (FMEC): A Collective Vision for Post-graduate Medical Education in Canada. http://www.afmc.ca/future-of-medical-education-in-canada/medical-doctor-project/pdf/collective_vision.pdf

The Change Foundation (Nov 2011). *Winning Conditions to improve patient experiences: integrated health care in Ontario*

The Health Foundation (2010) *Report: Complex adaptive systems – Research scan.* London, UK. Retrieved August 12, 2012 from www.health.org.uk

Towers Watson (2011). *Readiness for Change: New Directions for the Hospital Industry*. Retrieved August 19, 2012 from: http://towerswatson.com/united-states/research/5398

Uhl-Bien, M., Marion, R., McKelvey, B. (2007). *Complexity Leadership Theory : shifting leadership from the industrial age to the knowledge era.* The Leadership Quarterly 18 298- 318

University of Ottawa (2012). *POP89.10 Scientific Paradigms in Population Health.* Course Notes

Vibert, C. (2004). *Theories of Macro Organizational Behaviour; a Handbook of Ideas and Explanations.* M.E.Sharpe Inc., Armonk, NY

Vimr, M. A, Thompson, G.G. (2011). *Building physician capacity for*

transformational leadership. Health Care Management Forum 24(15) 49-54

Way, D., Jones, L., & Busing, N. (2000). Implementation strategies: *Collaboration in primary care –Family doctors & nurse practitioners shared care: Discussion paper written for the Ontario College of Family Physicians.* Ottawa, ON

Weber, D.O. (2002). *The lesson of the slime mold*. Health Forum Journal, 45(2), 10-15

Weberg, D. (2012). *Complexity Leadership: A Health care Imperative.* Nursing Forum 47(4) p268-277

Weick, K.E. (2001). *Making Sense of the Organization*. Blackwell Publishing, Malden, MA

Weick, K.E., Sutcliffe, K.M. (2007). *Managing the Unexpected: Resilient Performance in the Age of Uncertainty.* John Wiley & Sons Inc.

Wheatley, M. (2011). *Leadership in the Age of Complexity: From Hero to Host.* Resurgence Magazine, Winter edition

Wood, K. M., Matthews, G. E. (1997). *Overcoming the Physician Group – Hospital Cultural Gap.* Health care Financial Management 51 (3) 69-70

Zimmerman, B. (1999). *Complexity Science: A Route Through Hard Times and Uncertainty,* Health Care Forum. 42 (2) 42-46

Zimmerman, B., Hayday, B. (1999). *A Board's Journey into Complexity Science: Lessons from (and for) Staff and Board Member*s. Group Decision and Negotiation. 8 (4) 281-291

Appendix 1 – Invitation to Participate

April 10, 2013

Dear Participant

You are invited to participate in a research project to understand how complexity science principles may inform physician leadership development and facilitate improved outcomes for health-care organizations. This research led by Colleen Grady, a doctoral candidate at Athabasca University, is designed to fulfill the dissertation requirements for the degree of doctorate of business administration. This study has received approval from the Athabasca University Ethics Review Board.

Research Proposal

The primary purpose of this research is to examine physician leadership development using the principles of complexity science. Our current understanding indicates that physicians play a valuable role in health care organization and that their leadership can provide competitive advantage to organizations that choose to invest in their development and those that are willing to be innovative in their management approaches. The timing for this research is relevant as both complexity science and health care are increasingly paired for study, and the demand for a transformation of health care increases in order that Canada can sustain an affordable and accessible system for all. This study will provide recommendations related to practical approaches that can facilitate development of physician leaders to assist organizations, and physicians in working more effectively in team-based delivery models.

Expectations of Participants

You have been identified as a person of interest to this research based on your knowledge and understanding of the current health-care context and/or physician leadership development. Your contribution to this research will assist in informing physician leadership development leading to improved patient outcomes.

You are being asked to participate in a telephone interview, for approximately 45 minutes, to take place at a time that is convenient for you, and if possible, before _____, 20__.

Interviews will be voice recorded. Participation in this study is entirely voluntary and you may withdraw at any time during the data collection phase. In addition, you can choose to answer or not answer any question and/or withdraw from this research by contacting the research team as per the contact information below.

Please respond to this invitation at your earliest convenience using the contact information below, and if you are able to indicate a preferable date, time, and method of interview that would be very helpful.

Outcomes of this research

Focusing on a clinical or administrative team that includes a physician, five questions will be explored:

1. In a natural complex system, relationships between each of the components are critical to its survival.

    a. In what ways might a physician foster the relationships within a team that might, potentially, have an impact on outcomes for patients?

    b. In what ways might a physician help to build trust between team members that could, potentially, have an impact on outcomes for patients?

    c. In what ways might a physician help to promote effective feedback processes between team members which might, potentially, have an impact on outcomes for patients?

2. How might a physician encourage team members to try new strategies that might, potentially, have an impact on outcomes for patients?

3. Often clinicians and administrators have to make adjustments to accommodate the many changes in health care. How might a physician help in facilitating ongoing change within the organization?

Confidentiality

Your participation will be held in strict confidence and known only to the researcher and her co-supervisors overseeing the research. You will not be identified in the research paper. All data will be treated confidentially and anonymity will be maintained as no direct quotes will be attributed to any one individual. Pseudonyms will be used after data collection to ensure anonymity.

All data collected will be kept in a secure location under secured electronic storage and will be kept in the databased indefinitely for research purposes.

If you have any questions concerning your rights as a possible participant in this research please contact the Chair, Research Ethics Board, Athabasca University at rebsec@athabascau.ca.

Supervisors

This work is conducted under the direct supervision of Dr. Deborah Hurst, Acting Dean, Faculty of Business, Athabasca University, and C.R. (Bob) Hinings, Professor Emeritus, Alberta School of Business, university of Alberta.

Distribution

Dissertations are published on the worldwide web and will be archived at Athabasca University. This research may be used as a base of information for academic or practitioner publications or conferences.

Thank you for your consideration of this important research.

Sincerely

Colleen Grady
Doctoral candidate
(613) 217-0662
cmariegrady@gmail.com

C.R. (Bob) Hinings
Professor Emeritus
Alberta School of Business
University of Alberta

Appendix 2 Ethics Approval

MEMORANDUM

DATE: May 25, 2013

TO: Ms. Colleen Grady

COPY: Dr. Deborah Hurst (Research Co-supervisor)

Mr. Bob Hinings (Research Co-supervisor)

Ms. Alice Tieulie, Acting Secretary, Athabasca University Research Ethics Board

Dr. Simon Nuttgens, Chair, Athabasca University Research Ethics Board

FROM: Dr. Mihail Cocosila, Faculty of Business Research Ethics Review Committee

---

SUBJECT: Ethics Proposal # FB-13-04G: *Physician Leadership Development*

I am pleased to advise that the above-noted project has been awarded **APPROVAL** on ethical grounds. This approval of your application will be reported to the Athabasca University Research Ethics Board (REB) at their next monthly meeting. There are, however, several minor revisions requested to this application prior to filing and reporting to the Athabasca University REB. Please address these revisions and resubmit the application before starting the research.

The approval for the study "as presented" is valid for a period of one year from the date of this memo. If required, an extension must be sought in writing prior to the expiry of the existing approval. **A Final Report is to be submitted when the research project is completed.** The reporting form can be found online at http://www.athabascau.ca/research/ethics/.

As implementation of the proposal progresses, if you need to make any significant changes or modifications, after consulting with your supervisor and obtaining an e-mail of support for the changes, please forward this information immediately to the Faculty of Business Research Ethics Review Committee for further review.

If you have any questions, after consulting with your supervisor, please do not hesitate to contact me or the AU Research Ethics Administrator at rebsec@athabascau.ca. Best wishes for your timely completion of this very interesting research project.

Mihail Cocosila, PhD
Associate Professor

Chair, Research Ethics Review Committee
Faculty of Business
Athabasca University
E-mail: mihailc@athabascau.ca