

Ontario's eHealth Strategy

AU MBA Applied Project
APRJ-699

Ontario's eHealth Strategy and Implications in Primary Care: Does the Strategy Have the Necessary Components to Succeed?

Frances Murphy, Student No. 2500137

May 31, 2010

Applied Project Supervisor: Teresa Rose, PhD

Word Count: 24,237

Table of Contents

| | |
|---|-----------|
| Abstract | 4 |
| 1.0 Introduction | 6 |
| 1.1 Healthcare Expenditures | 7 |
| 1.2 Information Technology: an Enabler to Health Outcomes and Efficiency | 9 |
| 1.3 Ontario’s Healthcare IT Environment..... | 11 |
| 1.4 The Role of Primary Care in Ontario’s Healthcare System..... | 12 |
| 1.5 Ontario’s eHealth Strategy | 13 |
| 1.6 Will Ontario’s eHealth Strategy Be Successful Influencing Adoption of Health Information Technology in Primary Care?..... | 13 |
| 2.0 Research Purpose, Research Questions and Assumptions | 13 |
| 2.1 Research Purpose..... | 13 |
| 2.2 Research Questions | 14 |
| 2.3 Assumptions..... | 14 |
| 3.0 Literature Review | 16 |
| 3.1 Literature Review Parameters | 16 |
| 3.2 Literature Search Sources and Criteria | 17 |
| 3.3 Literature Review Domains | 19 |
| 3.3.1 Electronic Medical Record Implementation and Adoption | 19 |
| 3.3.1.1 Implementation Success Factors | 21 |
| 3.3.1.2 EMR Adoption Barriers..... | 25 |
| 3.3.2 Change Management Models..... | 28 |
| 4.0 Ontario’s eHealth Strategy | 36 |
| 4.1 eHealth Strategy and eHealth Ontario..... | 36 |
| 4.2 OntarioMD and the Physician eHealth Program..... | 38 |
| 4.3 The Strategy and the Primary Care Change Enabler: eHealth Ontario and OntarioMD | 40 |
| 5.0 Opportunities and Challenges for Ontario | 40 |
| 5.1 Considerations and Challenges for HIT Adoption in Ontario’s Primary Care Environment..... | 40 |
| 5.2 Considerations and Challenges for HIT Adoption in Ontario’s Political Environment .. | 47 |
| 5.3 Funding Opportunities and Challenges for HIT Adoption | 49 |
| 6.0 How Does Ontario’s eHealth Strategy Measure Up? | 49 |
| 6.1 Value of the eHealth Strategy | 50 |
| 6.2 Resources and Capabilities | 55 |
| 6.3 Structure and Management Systems | 55 |
| 6.4 Environment | 56 |
| 6.4.1 Primary Care Reform and Physician Influence..... | 57 |
| 6.4.2 Pre-Election Influence..... | 59 |
| 6.4.3 Economic Influence..... | 59 |
| 6.5 eHealth Strategy Change Management and Adoption Practices for Primary Care | 59 |
| 7.0 Recommendations for Ontario | 61 |
| 8.0 Conclusion | 62 |
| 9.0 References | 63 |
| Appendix | 74 |

List of Figures

| | |
|---|----|
| Figure 1: Provincial Health Expenditures as a % of Provincial Expenditure, 1975-1976 to 2005-2006..... | 8 |
| Figure 2: Ontario Health Spending and Economic Growth as a Proportion of GDP..... | 9 |
| Figure 3: Primary Care Physician Practices – Use of High Function Electronic Information..... | 10 |
| Figure 4: Comparison of Health Information Technology in Practice Size Categories...26 | |
| Figure 5: Duncan’s Framework: Assessing Environmental Uncertainty as Applied to EMR Implementation in Ontario..... | 48 |

List of Tables

| | |
|--|----|
| Table 1: Categories of Literature Sources Reviewed..... | 17 |
| Table 2: Barriers to EMR Adoption Compiled in Development of this Research Paper..27 | |
| Table 3: Common Change Success Factors Across Models and Authors..... | 30 |
| Table 4: OntarioMD EMR Adopter Funding..... | 39 |
| Table 5: Ontario’s Primary Care Models..... | 44 |

List of Appendices

| | |
|--|----|
| Appendix: Table 6: Demonstration of Change Success Factors in Ontario’s eHealth Strategy..... | 71 |
|--|----|

Abstract

Ontario is spending 46% of its budget on health, a number that is expected to increase over the next two years (Ontario Ministry of Finance, 2010). Data shows that more Ontarians wait too long for cancer surgery, diagnostic scans, specialists, or for space in a long term care facility (Ontario Health Quality Council, 2009). Over 7% of adults in the province don't have a family doctor; the average Emergency Room visit is 7.3 hours; Ontarians experience 217,000 adverse drug events annually; and \$300,000 million in preventable hospital costs can be saved and reinvested in the health system by providing better preventative care for patients with diabetes (eHealth Ontario, 2009). One method of addressing these fiscal and health system pressures is to advance health information technology to support efficiency gains and improve the health of the citizens of Ontario.

In 2009 Ontario developed the eHealth strategy for the province, focusing on clinical and foundational priorities developed through engaging with Ontario's stakeholders and learning from the efforts of other jurisdictions. One of the foundational priority projects identified is Physician eHealth, a program that provides primary care physician offices in Ontario with electronic medical record systems (EMRs), an element the strategy suggests is an absolute requirement for eHealth to have clinical impact. Ontario's eHealth Strategy is very aligned with two other initiatives, OntarioMD's EMR Adopter Program, established by Ministry of Health and Long Term Care through collaboration with Ontario Medical Association, and the province's health strategy, which has a focus on primary care reform and chronic disease prevention and management.

Healthcare is a complex industry. Other industries such as banking and the airline industry have been able to use information technology to drive transformation, resulting in more efficient use of resources, cost-savings and increased revenues, often demonstrating increasing client satisfaction with products and services. Use of health information technology has been cited frequently as a way of improving health outcomes and generating efficiencies in health spending. And yet Canada and Ontario's ability to harness information technology in support of health system improvements is lagging behind other countries. In a 2009 Commonwealth Fund Survey of primary care physicians in eleven countries, Canada came in last in the use of EMRs in primary care practice. Only 37% of Canadian physicians use an EMR (Schoen, Osborne, Doty, Squires, Peugh & Applebaum, 2009).

The author of this research paper asserts that implementing information technology in the Ontario healthcare environment is more likely to be successful if Ontario's eHealth Strategy identifies and addresses the barriers and success factors encountered by others, and follows change management principles and practices found to be useful in previous transformation initiatives. This research paper conducts an in-depth literature review for evidence of success and failure in the implementation of health information technology, in healthcare generally and in primary care specifically. The review consists of a search of over 400 peer-reviewed journals, issue briefs, government documents,

technical and research reports, and media reports, to determine what success factors and barriers to adoption are relevant to physicians and to primary care in the Ontario healthcare environment. The author compares common change success factors across a number of change management models, and determines which success factors, change management and adoption practices are evident in Ontario's eHealth Strategy 2009-2012, using their presence as a predictor of success to the implementation of the strategy.

The results of the literature review and subsequent analysis of the strategy, in the context of Ontario's primary care reform, suggest a number of steps have been taken to mitigate or eliminate barriers documented in comparable initiatives in other jurisdictions. Given the state of Ontario's economy and the imminent provincial election, the strategy will be implemented in a highly complex and unstable environment. The author identifies some areas for improvement in the strategy, and suggests significant effort will be required to mitigate risks associated with the uncertainty in the environment. Evaluation of the key components of the strategy suggest that critical success factors have been incorporated and key principles of change management employed to engage the primary stakeholders. The eHealth strategy's clinical priorities weave a compelling story that aligns with the province's health strategies, and the sector's most influential stakeholders have been engaged and will participate in a collaborative guiding coalition to drive the agenda. The author concludes that with a renewed focus on the deployment of Ontario's eHealth Strategy, and with leadership in place, it is well positioned for success.

1.0 Introduction

Healthcare is considered by many to be information technology's final frontier. Information technology is the enabler that has brought financial institutions, airlines, and virtually every other advanced industry into the twentieth century and beyond. Through successful adoption of information technology, organizations have introduced efficiencies, empowered clients and customers, and allowed instant access to accurate information. In the late nineteen-seventies and -eighties most North American banks followed the UK lead and implemented automated tellers, allowing customers to access and manage their money without waiting in line or filling out paper withdrawal and deposit forms, and giving the customer the flexibility of conducting business outside of limited traditional banking hours (Lee, 2003, Rahman; 2007, Ravi, 2008).

In *Advances in Banking Technology and Management*, Ravi (2008) describes how the adoption of technology in banking has led to greater productivity, profitability, efficiency, faster service, customer satisfaction, convenience, flexibility, twenty-four hour operations, and space and cost savings. As a result, customers are able to pay bills, transfer funds, purchase foreign currency and modify investments without leaving home and without waiting for a bank employee to assist them. This automation has permitted banks to optimize human resource costs and reduce costly mistakes and rework due to illegible handwriting and human error (Ravi, 2008). Additionally, by providing customers with the ability to utilize automated teller systems (ATMs), banks have seen increased revenues through usage fees, and according to Sivakumaran (2005) as cited by Ravi (2008), bank services and revenues have grown with advances in technology. Automation has proved lucrative for the banks and convenient for the customer, and despite the change involved for both bank employees and customers, adoption of the change has seemed smooth and complete. Banks today benefit from efficient delivery channels, new markets, and new products, all linked to the introduction of information technology not readily available thirty years ago. This progress of technology in the banking industry has increased the volume and speed of financial activities across the globe, allowed a reduction in costs, and enabled the industry to meet increasing customer expectations for access, accuracy and speed (Rahman, 2007).

Similar progress has occurred in the airline industry. Over the last fifty years electronic scheduling and computer reservation systems have increasingly coordinated departure and arrival times at international airport destinations, scheduled landings and take-offs on available runways, arranged aircraft, crew and passengers for multiple connecting and distinct flights, and optimized travel routes, travel times and profits (Grosche, 2009; Wikipedia, 2010). More recently passengers have been able to seek out travel destinations of their choice at their preferred prices; they are now able to book all manner of travel to multiple destinations, select and confirm seats and meals, pay for extra baggage, receive itineraries and print boarding passes, all via the internet and without needing to wait in line or on the phone for an airline or travel agency employee.

The speed and seeming ease with which automation took place in the banking and airline industries serves to highlight the lack of progress in healthcare adoption of information technology. This often fuels pointed criticism at governments and the healthcare sector for not introducing healthcare information technology (HIT) more quickly and successfully. Why healthcare doesn't effectively utilize information technology sufficiently to schedule patients and clients for preventative and evidence-based care, streamline processes, reduce medical errors, trim costs, and improve health outcomes has been researched by academics, governments, management and citizen advocacy groups. And yet the adoption of information technology in health care continues to move at a snail's pace, across the globe and particularly in North America (Schoen and Osborne, 2009; Silversides, 2010).

1.1 Healthcare Expenditures

Provision of healthcare is a costly undertaking for governments worldwide, with governments in all systems struggling to find balance between costs and quality. With rising populations and a predominantly aging demographic, provision of quality healthcare will remain a top priority across the globe (Reinhardt, Hussey and Anderson, 2004). Costs of healthcare, unbridled, have the potential to bankrupt governments over the next decades unless serious systemic improvements are made. Health expenditures in Organization for Economic Co-operation & Development (OECD) countries range from 5.7% – 16% of gross domestic product (GDP) (Hillestad et al., 2005).

In Canada, access to quality healthcare services has become an entrenched value in our culture. The Canada Health Act (1984) establishes criteria and conditions that aim to ensure that Canadians have government-run insurance for and reasonable access to medically necessary services, on a prepaid basis. This coverage is required to be portable between provinces and territories, and reasonable compensation must be provided by health insurance plans to physicians, dentists and hospitals.

This level of access to quality healthcare is however costly. According to OECD statistics for 2007, in that year Canada's total expenditure on health as a percentage of gross domestic product (GDP) was 10.1%, up from 8.8 in 2000, and its total expenditure on health per capita in 2008 was \$3895, up from \$2516 in 2000. While this is comparable with some western European countries such as Austria, it is much higher than Italy and the United Kingdom (UK), with a % GDP of 8.7 and 8.4 respectively. At a recent meeting of health executives in 2010, Guerriere showed the average Canadian health expenditure, as a percentage of total expenditures, at nearly forty per cent for 2005-2006. This is compared in Figure 1 below to that of Ontario and Alberta: Ontario's health expenditure is higher than the national average, at almost forty-five percent in 2005-2006, and is trending higher in 2008-2009 (Guerriere, 2010). If this continues, and with the imminent complication of baby-boomers reaching an age where more healthcare services are required, Guerriere anticipates that Ontario's provincial health expenditures will soon pass the fifty percent mark. This is supported by a review of

Ontario's Ministry of Finance budgets (2009) and Canadian Institute for Health Information (CIHI) news releases showing data for 2006-2007.

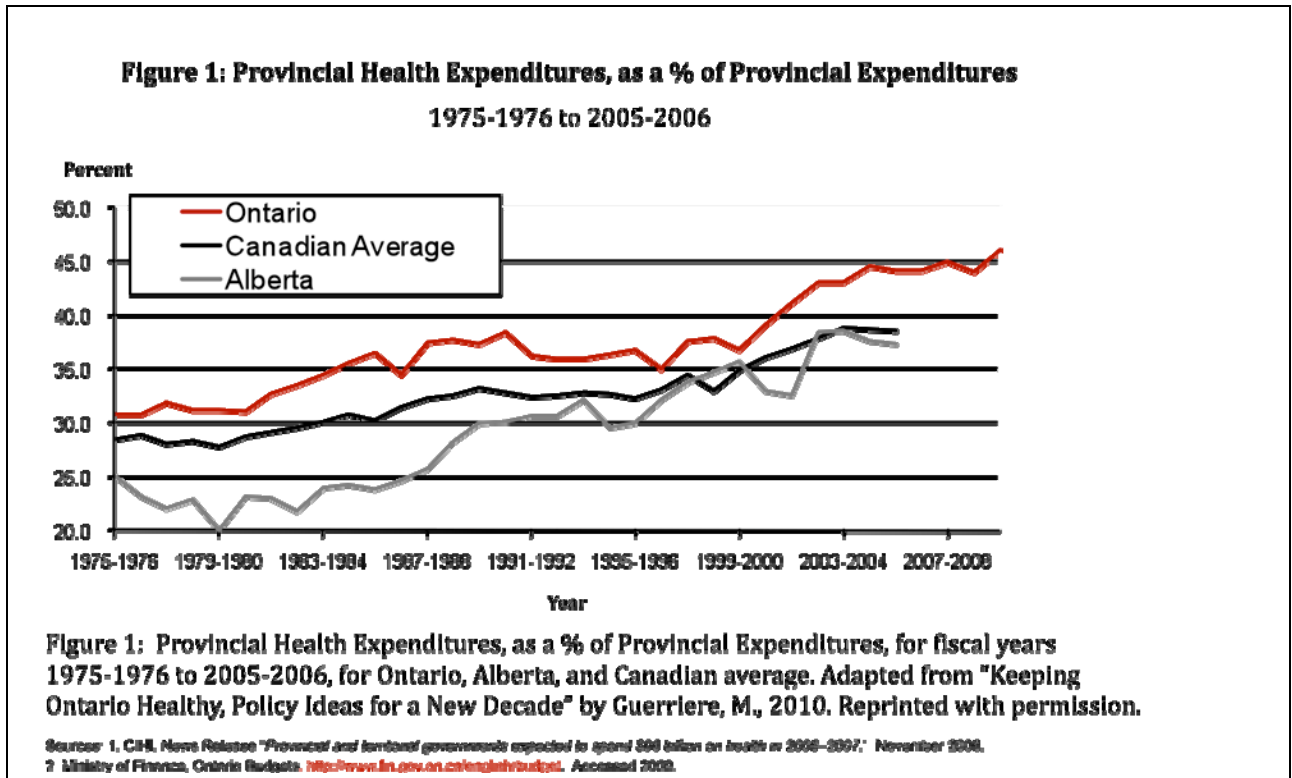


Figure 1: Provincial Health Expenditures as a % of Provincial Expenditure, 1975-1976 to 2005-2006 (Guerriere, 2010).

Continued increases in health spending, particularly during and following a flat economy, cannot be sustained. However, the cost to the health system of new drugs and treatments continues to increase. CIHI's 2006 drug expenditure overview states that drugs are one of the fastest-growing components of total health expenditures. New (and costly) technologies continue to be developed that provide improved diagnosis and treatment options, and health service consumers demand these be used to treat disease and injury, and to extend life. These scientific advances fuel the struggle between what is possible and what is affordable, and in response, while they look for ways to become efficient and cost-effective, governments in Ontario and across Canada have continued to increase health spending.

In figure 2 (below), the trend in Ontario's health spending as a percent of GDP is compared with GDP growth, demonstrating the gap between health spending and economic growth. Consequently, optimizing operational efficiency is at the top of the health agenda.

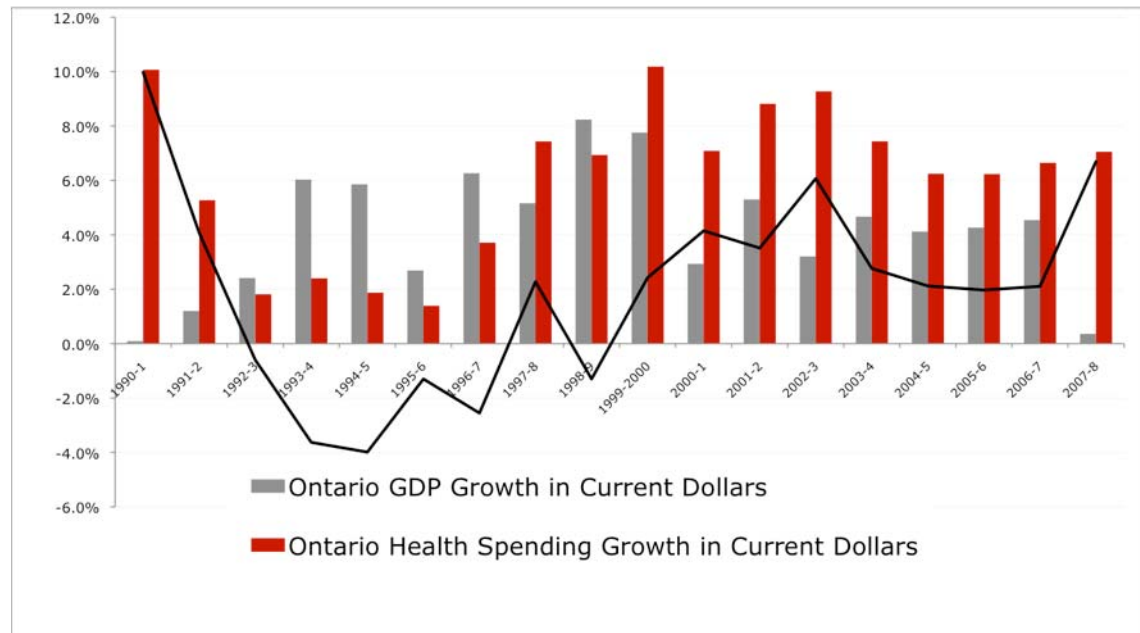
Figure 2: Ontario Health Spending as a Proportion of GDP

Figure 2: Ontario Health Spending as a Proportion of Gross Domestic Product (GDP). Adapted from "Keeping Ontario Healthy, Policy Ideas for a New Decade" by Guerriere, M., 2010. Reprinted with permission.

Sources: 1. CIHI, News Release "Provincial and territorial governments expected to spend \$86 billion on health in 2006-2007," November 2006.
 2. Ministry of Finance, Ontario Budgets. <http://www.fn.gov.on.ca/english/budget>. Accessed 2008.

Figure 2: Ontario Health Spending and Economic Growth as a Proportion of GDP (Guerriere, 2010).

1.2 Information Technology: an Enabler to Health Outcomes and Efficiency

Use of information technology has been cited by Ludwick and Doucette (2009) as a way of enabling cost efficiencies across the health system and as fundamental to quality improvement. Many international studies have indicated that use of HIT such as electronic medical records (EMRs) and computerized physician order entry (CPOE) can reduce medical errors, improve health outcomes and reduce spiraling healthcare costs. Healthcare systems around the world have acknowledged this through action, and many developed countries have made significant financial investment, successfully advancing the adoption of EMRs and other components of HIT (Bates, Ebell, Gotlieb, Zapp and Mullins, 2003; Hillestad et al, 2005; Protti, Bowden and Johansen, 2008; Protti, Edworthy and Johansen 2007; and Schoen et al, 2009). Unfortunately Canada lags far behind other developed countries in this area. In a recent survey of primary care physicians in eleven countries, Schoen et al (2009) reports that Canada is the slowest of the eleven countries surveyed, in terms of utilization of advanced health information technology functions; Canada also has the fewest number of physicians using electronic

patient records in their practise as seen in figure 3. It is also interesting to note that those countries with less than 80% high function use of electronic information also show the highest percent GDP spent on health.

Figure 3: Primary Care Physicians' Use of EMR in Practice and High Function Use of Electronic Information (%)

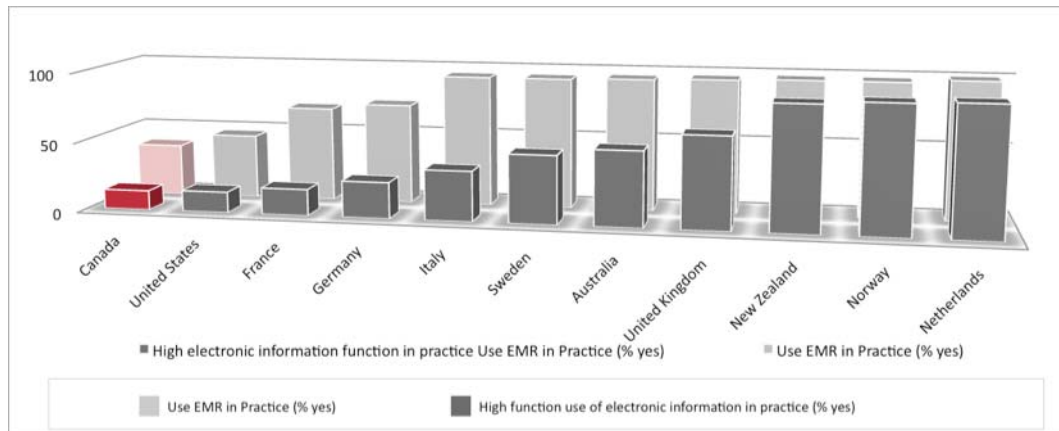


Figure 3: Primary care physicians' use of EMR in practice, and high function use of electronic information, as a percentage. Countries with less than 80% high function use of electronic information also show the highest % GDP spent on health. "High function" is 9-14 of the following EMR functions: electronic ordering of medications and test, computer access to test results and medication lists, computer alerts/prompts, and decision support; computerized reminder systems for prevention and follow-up care; computerized ability to list patients by diagnosis, lab results, and medications; and electronic entry of notes and medical histories. Adapted from "Keeping Ontario Healthy, Policy Ideas for a New Decade" by Guerriere, M., 2010. Reprinted with permission.

Sources: 1. Schoen, G., Osborn, R., Doty, M.M., Squires, D., Peugh, D. and Applebaum, S. A Survey of Primary Care Physicians in 11 Countries, 2009. Perspectives on Care, Costs, and Experiences, *Health Affairs* Web Exclusive, Nov. 6, 2009, w1171-w11832.
2. Schoen G. et al (2009) A Survey of Primary Care Physicians in 11 Countries, 2009: Perspectives on Care, Costs, and Experiences. *Health Affairs*.

Figure 3: Primary Care Physician Practices – Use of High Function Electronic Information (Schoen et al., as cited by Guerriere, 2010).

Hill and Powell in 2009 suggested that with the United States (US) facing massive healthcare cost overruns, quality problems and greater expectation from the public for universal healthcare, healthcare information technology presents the most promising opportunity for both cost reduction and quality improvement in the sector. They point to healthcare as a data-rich industry, where much patient data is necessarily collected and analysed in order to diagnose, treat and manage health and disease, any yet has one of the most antiquated systems for conducting operations with these copious amounts of data – pen and paper. Improved internal processes, reduced medical errors, faster diagnosis and improved quality of care would be the result of automating these processes. The same problems exist in Canada, and yet Canada is even further behind in making improvements through implementation of health information technology – in fact, of all OECD countries, Canada lies in last place in this effort.

1.3 Ontario's Healthcare IT Environment

Until 2009 when eHealth Ontario developed Ontario's eHealth Strategy 2009-2012, Ontario was said by some, including the Ontario Health Quality Council (2009), to be a laggard in HIT implementation and adoption. Clinical information systems (CIS) and Hospital information systems (HIS) have been in place in some fashion in many acute care/hospital settings, however not all functions are fully deployed – most hospitals still cannot declare they have a fully deployed electronic patient record. Many organizations use HIS' for admitting and registration functions and review of in-hospital lab and radiology results, and specific departments such as pharmacy use departmental business systems. However, most hospitals in Ontario do not yet employ all advanced functions such as computerized physician order entry, clinical decision support systems (including best practice guidelines, allergy and contraindications alerts), documentation of clinical assessment and treatment, bar-coding systems, and electronic referral systems (Ontario Health Quality Council [OHQC], 2009). The Quality Monitor Report published by OHQC in 2009 states that hospitals are still not all able to communicate electronically with other health service providers (HSPs), external laboratories or diagnostic imaging facilities. The implications of this lack of communication technology is that one health service provider is unaware of patient tests and results ordered by other HSPs, so duplicate tests are ordered and completed. This scenario plays out across the province, causing unnecessary costs to the healthcare system, delays in treatment, inefficiency and at minimum inconvenience to patients. In addition, without an electronic patient record in place with computerized physician order entry functions utilized, the rate of medication errors and adverse events has been shown to be greater. The Institute of Medicine's *To Err is Human: Building a Safer Health System* (Kohn, Corrigan & Donaldson, 2000) stated that in one study, physician computer order entry could have prevented 84 percent of missing doses medication errors, 86 percent of potential adverse drug events, and 60 percent of preventable adverse drug events. *To Err is Human* also made a case for implementation and adoption of computerized physician order entry:

“One study estimated cost savings attributable to preventable adverse drug events (ADEs) are estimated at more than \$4000 per event ... A computerized (physician order entry) system costing \$1 to 2 million could pay for itself in three to five years while preventing injury to hundreds of patients each year.” (Kohn et al., 2000, p. 191).

Ontario's acute care [*hospital*] sector is the most well-funded and therefore the farthest ahead in terms of technology adoption (OHQC, 2009; Cherian, 2002). Discussions with health colleagues (F. Murphy, personal communication, March, 2010) suggest that other sectors, such as long term care, convalescent care, community and home care lag even further behind, due to different funding formulae, lack of focussed effort to identify the cost and quality benefits of HIT in these sectors, and partly due to lack of technology readiness in these less-funded sectors (F. Murphy, personal communication, March,

2010; MOHLTC, 2010).¹ Primary care in Ontario falls between acute care and these other sectors in their adoption of healthcare technology. Ontario primary care consists of family/primary care physicians working in group practices; in group practices of regulated health professionals such as registered nurses, registered dietitians, family/primary care physicians and others; and physicians who work in small individual practices. While some group practices have invested in computerized healthcare information systems such as electronic patient record systems, many physician offices utilize automation only for limited purposes, and some only for billing (OHQC, 2009; Fairbrook, 2007; Lee, et al., 2005).

1.4 The Role of Primary Care in Ontario's Healthcare System

Health Canada identifies Primary Health Care as the foundation of the Canadian health care system, describing this as the first point of contact through a health professional such as a nurse or physician, and services provided through a team of appropriate professionals to individuals, families and communities. Shi et al. (2005) and Macinko and Starfield (2007) indicate evidence of a strong relationship between the primary care physician-to-population ratio and health outcomes. Having a primary care physician is associated with improved health outcomes such as increased life expectancy, reduced all-cause and many disease health outcomes, lower infant mortality, (Macinko & Starfield, 2007; Shi et al., 2005), and lower hospitalization rates (Shi et al., 2005).

Lavis and Shearer (2010) and Macinko, Starfield and Shi (2003) insist primary care physicians (PCPs) have a critical role to play in chronic disease management and prevention. Primary care has been linked particularly to the reduction of diabetes morbidity and mortality, and Ontario's diabetes strategy and primary care programs are focused on ensuring that people with diabetes or pre-diabetes have the appropriate diagnostic tests within recommended guidelines for optimal management; that they have access to education on prevention techniques and management; and that they have support if their diabetes does progress (MOHLTC, 2008; eHealth Ontario, 2009). One way of supporting this goal is to ensure that individuals have access to a primary health care provider. As the first and most consistent contact the consumer has with the health care system, PCPs are in a position to ensure their patients receive the appropriate tests and treatments before they become so ill that their risk of morbidity and mortality increases, as does the cost to the health system (Macinko et al., 2003; Health Canada, 2010). PCPs often work with a team of professionals such as dietitians who work with the consumer and the PCP to modify risk factors and prevent exacerbation of disease. Starfield (1998) indicates that using a PCP to support prevention is an approach that has demonstrated success not only in reducing the risk of devastating complications of diabetes, but in doing so also reducing cost to the health system significantly.

¹ The author has worked in management of healthcare information technology for twenty years, so has a sound knowledge of the funding for and implementation and adoption of HIT in various sectors in Ontario healthcare.

1.5 Ontario's eHealth Strategy

In the spring of 2009, with input from over 400 stakeholders, eHealth Ontario developed a strategy to deploy information technology to health care providers in the province, with a view to providing tools that would benefit both providers and consumers. In parallel the Ministry of Health and Long Term Care (MOHLTC) and eHealth Ontario developed a plan with OntarioMD, to create a strategy for adoption of technology by the physician community (eHealth Ontario, 2009). OntarioMD is an organization established by the Ontario Medical Association (OMA) and MOHLTC that works with and for Ontario physicians to leverage information technology in healthcare delivery (OntarioMD, 2009). Primary care physicians lag behind their colleagues in acute care hospitals in use of information technology in healthcare (Lee, J. et al, 2005). In the fall of 2009 OMA announced a joint EMR Adoption Program between eHealth Ontario and OntarioMD, with \$236 million to be invested to accelerate physician adoption of EMRs. A key and deliberate focus of the province's eHealth Strategy will be in the primary care sector, to improve the quality of primary health care in the province, and to increase access through a combination of electronic patient record adoption with other primary care health strategies.

1.6 Will Ontario's eHealth Strategy Be Successful Influencing Adoption of Health Information Technology in Primary Care?

Primary care and health information technology have been identified as enablers to health, however Canada and specifically Ontario's primary care physicians have so far been shown to be poor adopters of this technology. This research paper will review the documented strategies for eHealth adoption in Ontario, and using best practices and lessons learned from national and international implementations of eHealth technologies will assess the chances of Ontario's success in HIT implementation in the primary care sector. Recommendations for improvements based on a significant literature review will be provided.

2.0 Research Purpose, Research Questions and Assumptions

2.1 Research Purpose

The implementation of health information technology and electronic medical records involves significant change. In *"All Change is Personal: Why Most Change Efforts Fail and What To Do About It"*, author Pawliw-Fry (2009) recounts a sad, compelling story about a young technician living through significant change at Renault in 2006. Raymond could not handle the pressure of the changes any more, and ended his life (Rothfeder, as cited in Pawliw-Fry, 2009). Change is not easy, and neither is influencing and managing change (Pawliw-Fry, 2009). The objectives of this research paper are to:

- Conduct an in-depth review of the literature for evidence of success and failure in the implementation of health information technology, in healthcare generally and primary care specifically (where data is available);
- Determine what success factors and barriers to adoption are relevant to physicians and primary care physicians, particularly in the Canadian and Ontario healthcare environments; and
- Determine what change management and adoption principals if followed will support a successful implementation of Ontario's strategy.

Critical success factors, reasons for failure and lessons learned have been gathered and analysed during the research. Concurrently an analysis of Ontario's eHealth Strategy and the OntarioMD EMR adoption initiative was conducted. The comparison of findings in the literature, when compared with Ontario's strategies, has provided a gap analysis and led to recommendations to enhance the strategy.

2.2 Research Questions

The intent of this research is to answer the following questions.

- Primary Research Question
 - Is Ontario's eHealth Strategy positioned well to succeed in Primary Care?
- Secondary Research Questions
 - What criteria are defined in the literature to support success in the implementation of electronic medical records in primary care in the Ontario environment?
 - What barriers are identified to successful implementations that might negatively impact successful adoption and use of electronic medical records in primary care in Ontario?
 - Using the success criteria and barriers to adoption identified, what are the gaps in Ontario's strategy? *and*,
 - What are the researcher's recommendations to improve the chances of successfully implementing Ontario's eHealth Strategy in primary care?

2.3 Assumptions

Two initiatives will be considered to be Ontario's strategy for implementing electronic medical records (EMRs) in Ontario's primary care environment:

- Ontario's eHealth Strategy 2009-2012 *and*
- OntarioMD's EMR Adoption Program

While Ontario's eHealth Strategy 2009-2012 shapes the high-level strategy, timelines and foundational priorities, specific details regarding the implementation of EMRs in

primary care are not outlined. In developing this research paper, the author searched for other provincial initiatives that would perform this critical role for Ontario's strategy, and determined that the OntarioMD EMR Adoption Strategy announced in 2009, when combined with the official Ontario eHealth Strategy, would be a key foundational enabler to health care efficiencies and improved health outcomes; to the advancement of eHealth across the province; and to primary care advancement. Other documents providing insight into Ontario's approach to primary care and health reform were reviewed: Introduction to Family Health Teams; Family Health Team Guides; Q & A: Understanding Family Health Teams; and the Ontario Diabetes Strategy (MOHLTC, 2010). These documents provide context, background and supporting information to Ontario's eHealth Strategy and EMR Adoption Program.

Other organizations in Ontario have been tasked with implementing various aspects of Ontario's strategy. Cancer Care Ontario's (CCO) website indicates they are responsible for leading the delivery of the provincial Wait Times and Alternate Levels of Care (ALC) initiatives. Management of some aspects of the strategy, such as distribution of the Baseline Diabetes Dataset Initiative (BDDI) data to primary care physicians, initially implemented by eHealth Ontario, has been passed to the Ministry of Health and Long Term Care (MOHLTC, 2010, eHealth Ontario, 2009).² OntarioMD is the organization tasked with primary care physician automation, and is essentially the delivery and fund distribution arm for the Ontario's eHealth Strategy for primary care EMRs.

When searching for the topics to be reviewed in the literature (success criteria, lessons learned, barriers and change management best practices), it was recognized that an abundance of information would not be found that explicitly relates to EMR implementation in primary care specific to Canadian and/or Ontario environments. It was assumed that these topics, addressed for the broader electronic health record, or in a select number of similar countries, could be used as proxy. Literature outlining similar experiences from the following countries was reviewed:

- United Kingdom
- Denmark
- Norway
- United States
- Australia
- New Zealand

Countries selected, with the exception of US, are similar to Canada in many aspects of their healthcare systems, including universality, accessibility, comprehensiveness, and portability, as well as publically administered – similar to the principles noted in the Canada Health Act (Canada Health Act, 1984). Despite the lack of universality and accessibility in the US healthcare system, it was determined that literature found on the required topics but specific to the US healthcare system could be included, due to the

² The author led components of the diabetes registry project for a period of 12 months, and contributed to/had knowledge of the BDDI initiative at eHealth Ontario, 2009.

proximity of geographies, similarities in consumer and provider cultures, and equivalent technologies. Since some parts of the US healthcare system are publically administered, lessons from the literature in those cases was also thought to be comparable and valuable.

The author has significant experience in healthcare, with 35 years as a Registered Nurse, and 20 years in healthcare information management, and also worked for some time at eHealth Ontario. This experience could potentially bias the research, so to limit bias the author used objective indicators identified in the literature review to determine potential for success or failure.

3.0 Literature Review

3.1 Literature Review Parameters

The focus of this research was to seek out previous examples of EMR implementations, investigate critical success factors, barriers to adoption and use, and lessons learned, with a view to developing a compilation of best practices to apply to the upcoming implementations in Ontario. In addition to general best practices and barriers, the literature was reviewed for barriers and critical success factors that may relate specifically to experiences in primary care.

More EMR and EHR implementations have occurred over this last decade than the previous, so the literature search for EMR implementation, barriers, critical success factors, use and adoption was limited to the ten year period of January 2000 – March 2010.³ In seeking out best practices for change management, organizational design and leadership (success factors that cannot be considered specific to EMR implementation), the search focused on the last ten years, but included additional materials from prior years where relevant. Relevance in this case was determined if the author was aware of previous works that significantly influenced a particular field. An example that relates to HIT implementation is the Institute of Medicine's (IOM) report on preventable medical errors, *To Err is Human: Building a Safer Health System*, which was released in 1999, although published by Kohn et al. in 2000. In the field of change management, early research by John Kotter in 1990 laid the groundwork for many of the more recent change management models, so was included in this work.

The literature review covered three main areas:

- EMR implementation
 - Critical success factors and barriers to EMR adoption and use (general)

³ The author has been a Registered Nurse in Ontario for 35 years, with 15 years in critical care nursing and 20 years implementing health information management change initiatives in multiple roles and sectors, including: Educator/Planner, clinical information systems; Project Manager and Director in intra- and cross-organizational EHR initiatives; Director, information management strategic planning; Project Director, provincial diabetes registry project; Director Clinical Services, Local Health Integration Network.

- Success factors and barriers to EMR adoption and use in Primary Care
- Change management best practices including:
 - Change management strategy
 - Stakeholder engagement
 - Organizational theory and design
- Ontario's eHealth Strategy and related Ontario/Canada public documents
 - Healthcare data and information:
 - Canadian Institute for Health Information
 - Ministry of Health and Long Term Care policies, acts, programs and strategies addressing primary care, diabetes and eHealth
 - Ontario Health Quality Council Report (2009)
 - Canadian health policy documents
 - Canada Health Act (1984)
 - OntarioMD EMR Adoption Program documents and guidelines

All documents reviewed and utilized are included in the reference section.

While Ontario's eHealth strategy and the OntarioMD Adoption program provided the primary documents used to understand Ontario's plan for the eHealth and EMR implementation in the province, other documents and sources were used to understand the environments within which these programs will operate. Much information was found in public documents, such as the Canada Health Infoway change management and adoption guides, policy information in the Canada Health Act, and health data and information gathered and published in the form of Canadian Institute for Health Information (CIHI) annual studies and reports. Additionally the review included relevant trade journals, magazines and websites in the health, health information and technology fields.

3.2 Literature Search Sources and Criteria

The extensive literature search was conducted electronically through databases accessed via Athabasca University (AU) library and using the Internet for known potential sources, such as Health Affairs journal and Longwoods Publishing, and through hard copy books and journals. Table 1 below provides a list of types of literature sources included:

Table 1
Categories of Literature Sources Reviewed

| | | |
|---|--|--|
| ● Journals | ● White papers | ● Paper and Electronic Books |
| ● Newspaper articles (paper/electronic) | ● Federal government policies, papers and acts | ● Provincial government policies, papers, budgets and acts |
| ● EMR Websites | ● EMR & eHealth Podcasts | ● Issue Briefs |

Peer reviewed articles were searched on PUBMED, Sage Journals OnLine, EBSCOHOST, ProQuest Science Journal, Academic Search Complete, ProQuest Nursing and Allied Health Source, Science Direct, ABI/INFORM Global, BioMed Central, and Freely Accessible Science Journals. These databases were selected because they were found to include a greater number journals related to the topics of information technology in healthcare, change management, EMRs, HIT adoption, and HIT/EMR barriers and success factors. Databases were searched by subject first and then by author. Articles were screened through a review of abstracts, reducing the volume to be read in full. Applying inclusion and exclusion criteria produced a total of 72 suitable articles and books. Criteria for inclusion was any article which reported HIT adoption experience, barriers, key success factors to adoption and/or use of health information technology, in Canada, US, UK, Denmark, Norway, Australia or New Zealand. Similar articles with a focus on factors influencing primary care or family physician EMR experience were included. Works that provided insight into change management practices and models for successful transformation initiatives either in general or in health information technology implementations were included, and change management theory or general best practice relevant to HIT adoption was also included. Articles that used the term change management but were referring to the change control process in project management theory were excluded, since this type of reference is relevant to the change control processes used to control scope, budget or timeline changes in a project, not to those strategies and approaches used to manage individuals or organizations through change. Electronic medical record implementation and adoption materials from countries other than those listed, particularly developing countries, were excluded since the barriers might be quite different, as would success factors. Articles reviewed and included were all in English.

A variety of documents, including peer reviewed, news, government and health profession journals and websites were all found to be relevant. The majority of useful materials were found searching 'electronic medical record' and 'adoption'. Additional valuable materials were found under the search term combinations 'electronic medical record' and 'adoption' and 'use' and 'barrier', however some articles were repeats so were not counted in the totals. Common shortened acronym search terms such as 'EMR adoption', 'EMR use', 'EMR uptake', and 'EMR use in Canada' were also productive. Much success was found when searching the Athabasca University electronic journals in the Health and Biological Sciences category, in the Medicine subject heading, and particularly in the Medical and Biomedical informatics journals section. More than forty journals were found in this section, with many of them including relevant references.

More general topic searches such as 'health information technology adoption' searched in the methods above produced fewer results, however a large percentage of those found were useful. Valuable materials were also located through focused searches of website publishers known to the reader as a source for current health information articles, such as Health Affairs and Longwoods Publishing. Results of these searches often duplicated materials identified in the database searches above. Relevant material

was also found through ‘ancestry’ searches of references in previously reviewed and relevant articles and books.

Some materials were available to the reader as a member of the Canadian healthcare community, specifically Canada Health Infoway’s change management and adoption guidelines, and results of some Canadian implementations.⁴ The author’s significant professional experience in Ontario healthcare was also used to supplement materials or extrapolate information gleaned in one health sector to another.

Finally, materials used to determine and evaluate Ontario’s eHealth and health strategies, and to document research on primary care, health policy, funding and results were located on publically accessible websites: eHealth Ontario, OntarioMD, Ontario and Canadian government websites, Canada Institute for Health Information, Ontario Health Quality Council, Ontario Medical Association, College of Family Physicians of Canada, Ontario College of Family Physicians, and Institute for Clinical Evaluative Sciences sites.

3.3 Literature Review Domains

A comprehensive literature review was a critical component of this applied research project, with a high reliance on evaluations of previous HIT implementations. The primary purpose of the paper, to evaluate Ontario’s eHealth Strategy’s potential for success, requires a comparison of Ontario’s plans with successful and unsuccessful implementations in similar jurisdictions, in addition to a review of barriers and supports unique to Ontario’s environment. The literature review therefore was broken up into a number of components: research on electronic patient record implementations, including barriers, critical success factors and key change management learnings; research on general change management principles as they relate to strategy, implementation and organizational design; research into issues and challenges unique to implementing HIT in primary care in Ontario; and research on Ontario’s eHealth Strategy and associated plans. Main themes and trends in each of these areas, as they relate to the topic, are discussed in this section.

3.3.1 Electronic Medical Record Implementation and Adoption

Some general comments were noted in the literature review regarding the importance of the adoption of health informatics in general as a method of helping to meet the rising need for healthcare while avoiding burgeoning costs. The growing aging population and associated care needs was recognized as one of the drivers of increasing health costs, complicated by declining numbers of health professionals, particularly in the category of primary care physicians (Prada et al., 2004). Ludwick and Doucette (2009) published

⁴ The author has been in Information Management and Technology Strategic Planning and Implementation for 20 years, and as an employee of healthcare organizations and a clinician has access to Canada Health Infoway material intended for IM/IT leaders and clinicians (see footnote 1)

the results of their review of the literature on the topic of adopting electronic medical records in primary care across seven countries, and noted some general criteria were frequently identified as critical to successful implementations, including, use of project management, strong leadership, training and use of standardized technology. This study looked at literature up to and including 2007. Allscripts (2005) also identified project management as a key success factor. While these criteria were mentioned as important in other literature of the time, in more recent articles project management and standardized technology are noted less often. This may be due to the fact that some of these areas have seen advances, as is the case with data standards in Alberta and Ontario (Protti, Edworth & Johansen, 2007). In the case of project management, it may be that assumptions are made that project management is implicitly built into any such initiative.

More recent articles discuss the benefits, barriers and success factors more specific to primary care implementations. In a review of PCP experience with EMRs, Ludwick and Doucette (2009) examine barriers to implementation in a fee-for-service primary care environment, identifying time required away from patients to research, select and learn an EMR (and consequent loss of revenue) as the primary barrier, with computer skills, EMR interface complexity, and examination room layout also identified as barriers. Silversides (2010) in the Canadian Medical Association Journal quotes the result of the survey conducted by Schoen et al (2009), and discusses how far Canadian physicians lag behind their colleagues in other countries in the use of EMRs. Silversides suggests that key success factors in the countries where physicians use of EMRs rated higher were financial incentives, standards, and technical support provided nationally, and where these were provided, there was “near-universal takeup” of EMRs (2010). Ludwick and Doucette (2009) suggest that barriers in primary care include financial barriers: lack of funding and lack of financial benefits directed to the physician; physician concerns regarding required time investment in system selection and training; the resultant time away from patients (with negative consequences on patient wait times and on billing, especially in a fee-for service environment); lack of uniform data standards allowing data exchange between organizations, systems and providers; and a perceived negative impact on workflow and patient throughput. In his roadmap for adoption, Dixon (2007) suggests a strong business case is needed as a foundation, with a sharing of ehealth best practices by healthcare organizations, much the same way evidence-based medicine is shared by clinicians. Dixon identifies insufficient capable staff to drive the many ehealth initiatives that will be required over the next 10 years (2007), and suggests that growth in the workforce is necessary. Like Ludwick and Doucette (2009), Dixon recommends direct financial support to enable providers to successfully implement EMRs, as well as technical assistance (2007). In Nixon’s 2009 dissertation, she indicates financial barriers, inadequate data exchange standards, and privacy concerns as barriers to implementation of EMRs. Financial barriers noted include initial costs of the system as well as the cost of physician time involved in system selection, training and implementation (Nixon, 2009). The financial barrier is a common thread through all literature reviewed documenting barriers to physician EMR implementation (Bates, 2005; Dixon, 2007; Fairbrook, 2007; Nixon, 2009; Sabogal, 2004; Spratt & Dickson, 2008).

Following is a discussion of key success factors and barriers noted in literature reviewed on electronic medical records and adoption.

3.3.1.1 Implementation Success Factors

The results of the literature search reinforced a number of general change management and project management principles as key implementation success factors, and also suggested critical success factors which related specifically to physicians in primary care or general practice. The importance of project management principles is discussed Deutsch, Duftschmid and Dorda (2010), and by Saull-McCaig, Pacheco, Kozak, Gauthier and Hahn, (2006). Deutsch et al (2010) cite previous Gartner group reports that identify project planning and governance as key success factors in EHR implementations, as well as demonstration of health policy strategy and its benefit, and management of the relationship of stakeholder and supplier. Rigorous project management as a success factor in complex transformational change initiatives is stressed by Saull-McCaig et al., suggesting that efficient use of experienced project resources and use of sound change management principles, such as credible and influential physician leaders, leads to greater success than one approach alone (2006). Dedicated project management is also recognized by Protti, Bowden and Johansen (2008) as a critical success factor, particularly in primary care, where the role of the project manager and team is to teach, assist, encourage and provide operational and IT support to the physician. They suggested that implementation risks could be reduced by use of sound project management practices and methodology (Protti et al, 2008). Lessons learned in the implementation of the National Health Service (Williams, 2008) health information systems have been used to develop quality management tools and frameworks for ongoing use, building on previous successes and challenges (NHS Project Management Guide, 2006).

General key implementation success factors identified in the literature review often pointed to leadership. Cohn, Berman, Chaiken, Green, Green, Morrison and Scherger (2009) stress the integral role physician champions play in the design and implementation of systems. Physician champions need to be selected for their knowledge of clinical processes, to ensure systems are designed with the physician workflow in mind. Champions should also be able to demonstrate the benefit and value of EMR implementation to their colleagues, to help engage and influence buy-in. In particular they must be seen as credible by their physician colleagues. Poon, Blumenthal, Jaggi, Honour, Bates and Kaushal (2004) indicate their importance in successful computerized physician order entry (CPOE) initiatives, suggesting their knowledge of workflow is useful in selection and customization efforts. In addition their credibility and influence is valuable in reminding their colleagues of downstream benefits, and helping to reduce frustrations during the learning phase of implementation. In their 2006 case study of University Health Network's implementation of CPOE, Rossos, Abrams, Wu and Bray (2006) identified physician engagement as key to the success of the project. The implementation was staged, and with each new division or cluster phase, a physician champion was selected to represent physicians in that phase.

Their involvement included workflow analysis efforts, input of specific content expertise, decision-making, as well as training and selling future benefits to their colleagues. In Ludwick and Doucette's (2009) comprehensive review of the literature on adoption of electronic medical records in seven countries, they sought to understand the factors that affected information system implementations in the healthcare environment in general practice. They identified physician champions, executive support and strong leadership as key factors that lead to success, however they suggested that a team approach is critical during the design, development and implementation stages. Their research suggests that staff, not necessarily the physician, have the best knowledge of existing and optimized workflows. An interdisciplinary approach was cited in twelve documents referenced by Ludwick and Doucette (2009), including Health Canada's EMR Toolkit, a 2007 kit targeted at assisting primary care and other physicians in the selection, implementation and optimization of electronic medical records.

Other key success factors identified include involvement of stakeholders, sufficient planning and implementation time (including training time), focus on managing the change, and ease of use of the information systems (Ludwick & Doucette, 2009; Nixon, 2009). Ease of use was cited in a number of studies as a key factor in adoption. Brookstone and Braziller (2003) suggest that Canadian primary care physicians don't easily see the value of an EMR, and this leads to lack of adoption. They recommend a three-step process to help increase the value and close what they call the 'Value Gap' for physicians. One of the key recommendations in the first process is to make the EMR affordable and easy-to-use. Rossos et al (2006) also suggested ease of use as a critical success factor, citing a cumbersome and unintuitive interface as a contributor to the halt of a pilot for medication order entry. Physicians were engaged to further refine requirements, create both common order templates and customized order entry sets where necessary, and reduce what was perceived as an excessive number of alerts generated by the clinical decision support system. When the application user interface was streamlined to be easier to use and faster, and more in alignment with physician workflow, resistance lessened and the subsequent deployment was more successful.

Another common theme in the literature review was funding support for primary care physicians, particularly for independent physicians or single provider offices, but also for the group practices. Physicians operate as independent practitioners, particularly in the primarily fee-for-service environment in Canada. Following reviews of Canadian and international success factors Protti et al. (2007) suggested that funding by payers will be necessary for physicians in Canadian primary care to adopt EMRs. In the US as early as 2003, Bates (2005) noted that since most primary care is delivered through small practices, one of the most important issues to be addressed to induce successful implementation and adoption would be provision of financial incentives for providers. Bates (2005) stated that pay for performance incentives have been implemented in several US states, as well as in the UK, where he notes that 30% of a General Practitioner's salary is dependent on performance – specifically meeting certain parameters measured through their use of the EHR. Protti, Bowden and Johansen (2008) also indicate that financial incentives support ongoing adoption and use of the EMR. They indicate that the success of New Zealand and Denmark in implementing

electronic medical records is in part a result of these governments recognizing that financial incentives encourage physicians to adopt EMR systems, and using incentives to drive adoption. Based on international experiences it would seem that the use of initial financial technology investment and the ongoing requirement to achieve EMR use targets, coupled with financial incentives for meeting targets - or penalties if targets are not met - might increase the value proposition for a physician, while concurrently increasing knowledge of the system and adoption. Over time, this could improve office efficiencies, quality of care, and feed into further increases in adoption through discussion of the value proposition between physician colleagues.

Studies, peer-reviewed articles and other materials also suggest that features of the technology can trigger adoption, and therefore successful implementation. In 2008 Williams identified challenges to adoption of technology in the National Health Service [NHS] in the UK, suggesting that if the product is not easy to use, if it requires the practitioner to significantly change workflow, or if it is disruptive to the way the physician currently practices, she/he will not adopt the new technology. Identifying key provider and patient benefits of the new technology was also a key theme in the literature, noted by Dixon (2007) and Garvin (2000), and discussed further in this research paper in a discussion of change management models. In Dixon's "A Roadmap for the Adoption of e-Health", he suggests physicians are responsive to evidence-based medicine, and that dissemination of evidence-based or best practice e-health practices has a similar effect, helping physicians identify key benefits for their patients and for themselves (answering the 'what's in it for me?' question) (Dixon 2007). In practice, specific functions are recognized as being seen as more beneficial by providers, particularly those that reduce the occurrence of adverse drug events, and where functions allow physicians to find data in one system, rather than searching in multiple systems (Rossos et al., 2006, Protti et al., 2007, Cohn et al., 2009). The adoption of HIT as a function of perceived patient and provider benefit was seen in University Health Network's implementation of their electronic patient record (Saul-McCaig et al, 2006). Physicians were initially resistant to the concept of electronic order entry for laboratory and diagnostic imaging tests (F. Murphy, personal communication with physician leaders, 2004). The technology was available, physicians had access from office, clinic and patient room environments, and the clinical application had also been redesigned with significant provider input, so was perceived by physicians to be easy to use. However, physicians did not see computer order entry of laboratory, radiology or nutrition orders as their role. This was in part due to the fact that this new automated workflow provided no significant benefit to the physician; whether the physician, nurse or other professional entered these orders was largely irrelevant to the patient. Once electronic order entry of *medications* was introduced, while there was still some resistance, physicians were able to clearly see the value to the patient, and to themselves as providers (F. Murphy, personal communications, 2004; Saul-McCaig et al., 2006). Electronic medication order entry by the physician enabled immediate recognition of a patient's drug allergies, drug to drug interactions, as well as alerts recommending dosage changes or medication alternatives. Physicians recognized the value of these improvements to patient safety, and also recognized that the patient safety improvements with the new process reflected improved physician performance.

EMR ease of use and patient safety are linked; according to Ross Baker (2004), 16% of adverse drug events are due to ergonomic efficiencies, and 16% are due to inadequately trained staff. Aspects of ergonomic efficiency with EMR implementation include the ability of the clinician to quickly find patient and disease data; to enter patient data easily, accurately and quickly; and for the system to alert the clinician to potential adverse events, allergies, and to utilize decision support tools (Kohn et al, 2000). This efficiency relies on a well-designed application and user-interface, and sufficient training to ensure the physician is able to navigate the system with ease and competence. While benefits such as these will support physician engagement and adoption of technology, Protti et al (2007) highlight that even these benefits cannot drive adoption without an initial investment of funds to primary care. The Institute of Medicine's *To Err is Human* (Kohn et al., 2000) suggests there are significant financial benefits as a result of a reduction of adverse events, yet these benefits are either not quickly realized by individual physicians, or they are realized by other groups. Bates et al (2003) indicate that financial rewards of EMRs compensate payers such as governments, insurance plans or private healthcare organizations. While there are great qualitative benefits to the patient, financial benefits to the system, and professional rewards for physicians, it is not reasonable to expect physicians to bear the brunt of the cost to implement EMRs.

In comparing adoption of information technology between Denmark and Alberta, Protti et al (2007) suggest a number of factors which they considered key for adoption by primary care physicians in these jurisdictions:

- Demonstration of value, both to the physicians and to the consumers; value would include access to patient's laboratory, diagnostic imaging, medication and hospital discharge information
- Funding for EMR systems, including funds for initial purchase, for contracting professional expertise to select and implement, and for maintenance and system upgrades to meet standards
- Peer pressure via public monitoring of participation
- Culture of consensus, ensuring physician engagement and participation in decision-making (Protti et al, 2007).

Alberta and Denmark are not dissimilar in terms of population, provider challenges and funding practices, and it would seem that adoption practices that have succeeded in these two jurisdictions would provide guidance to other Canadian provinces and territories. There is general agreement in literature that physicians cannot shoulder the cost of EMRs alone, and they require a value proposition that makes sense to them – is there benefit to them as providers and individuals, and is there benefit to the patient?

3.3.1.2 EMR Adoption Barriers

Barriers to adoption are more commonly reported in recent studies than success factors. Not surprisingly, as financial support is identified as a success factor, cost and lack of financial support are noted as barriers, and more commonly in the primary care sector. Nixon (2009) groups barriers to EMR adoption into only three categories: financial barriers, privacy concerns and issues, and electronic data exchange barriers. Brookstone and Braziller (2003) also suggested a national need for data communication standards to enable data exchange between systems. National standards would eliminate some of the concern physicians have about purchasing a system that will not meet standards once they are mandated. Like Nixon (2009), Brookstone and Braziller (2003) and Fairbrook (2007) also identified cost as a significant barrier to adoption. Brookstone and Braziller (2003) describe this barrier category as including cost of purchasing and installing software; cost of ongoing operations, maintenance and upgrades; and cost of the physician and staff time to select software, undertake the project, learn the software, and modify and standardize workflow and practices. Undertakings like these require effort, and more importantly take time away from providing care and service to the patient, thus leading to additional cost to the physician's business through a reduction in revenues. Finally, as noted by Brookstone and Braziller (2003), cost is incurred through the reduced throughput of patients while the physician and staff work to become more proficient with the technology. Nixon (2009) suggests that high costs are the primary reason for physician negative attitudes to EMRs. These aspects of financial concerns are significant barriers to adoption of EMRs in primary care (Ludwick & Doucette, 2009; Nixon, 2009).

The cost of EMRs is even more burdensome for independent physicians, since they need to shoulder the cost of implementation, training, licensing and technology without the support of colleagues or through a shared infrastructure. Robinson, Casalino, Gillies et al (2009) demonstrate in figure 4 the direct correlation between physician practice size (number of physicians in a practice) to information technology capacity. Individual physician offices are far less likely to be automated or have the capacity to automate. Similarly, small group practices are less likely to be automated or have the capacity to automate than larger group practices. This has implications for jurisdictions aiming to implement EMRs to physicians.

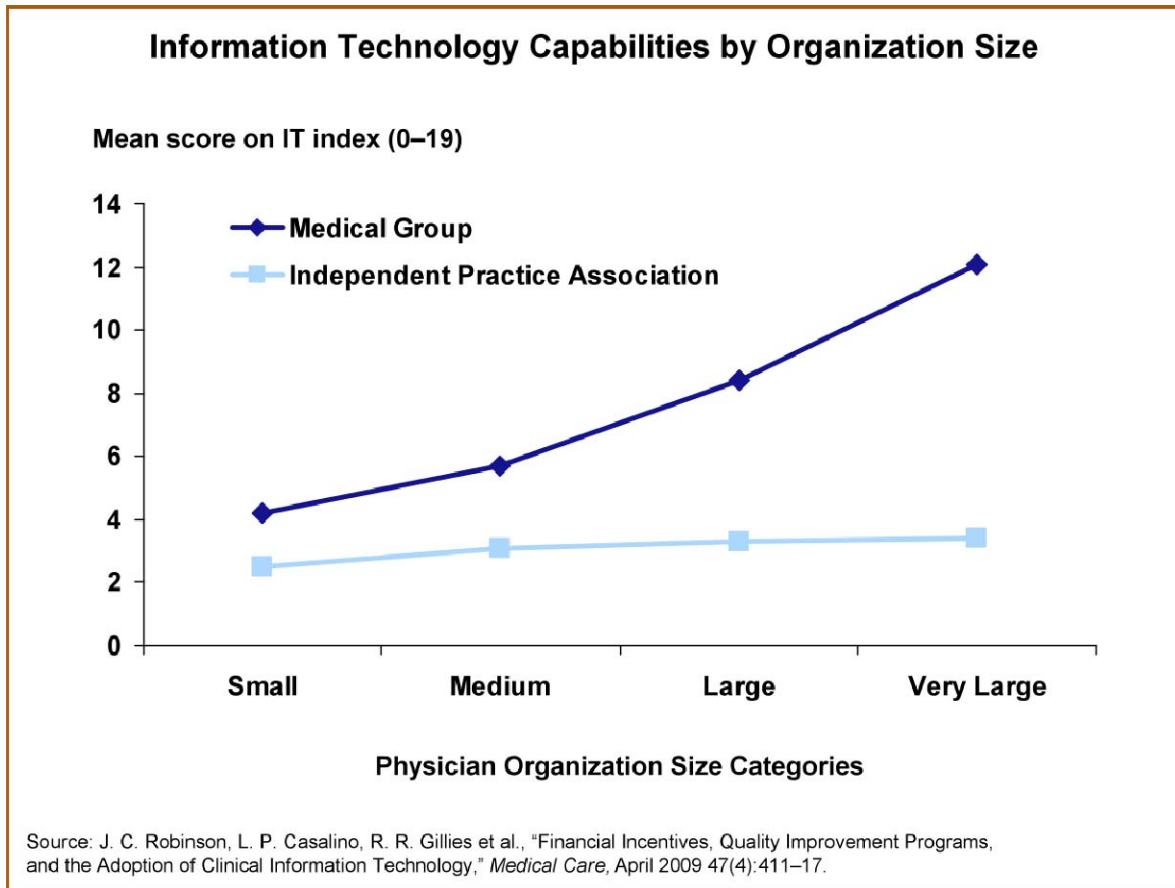


Figure 4: Comparison of HIT in Practice Size Categories

K. Fonkych and R. Taylor in *The State and Pattern of Health Information Technology Adoption* (2003) note that practices with over thirty physicians are more than three times as likely to adopt an EMR system than is a physician in a solo practitioner. These findings suggest that provider organizations and practices with lower financial means are slower to adopt EMRs. The frequency and consistency of cost cited as a barrier to adoption of EMR in primary care (Brookstone and Braziller, 2003; Bates et al., 2003; Ludwick and Doucette, 2009; Nixon, 2009; Protti et al., 2007) would suggest that physicians are significantly concerned with the financial impact of converting to an EMR, and if governments hope to influence adoption, this is one barrier that requires a funding model as the solution. Given the challenges Robinson et al (2009) articulate for small physician offices, concerns cited by Ludwick and Doucette (2009) regarding fee-for-service physicians, and the number of authors who identify funding as a barrier to adoption, this is a barrier that Ontario must consider in planning the deployment of its eHealth strategy.

In table 2 below, in a similar format to that used by Sabogal in his 2004 barrier analysis, barriers identified by the authors above (Brookstone and Braziller, 2003; Bates, 2005; Bates et al., 2003; Cohn et al, 2009; Fonkych et al., 2003; Ludwick and Doucette, 2009; Nixon, 2009; Poon et al, 2004; Protti et al., 2007; Robinson et al., 2009; & Rossos et al., 2006) have been assigned to domains and details of the specific barriers outlined.

Table 2:
Barriers to EMR Adoption Compiled in Development of this Research Paper (Murphy, 2010)

| Domain | Barrier | Barrier Detail | |
|---|---|--|--|
| Financial | Purchase cost to provider(s) | Application licensing | |
| | | Hardware | |
| | | Project management | |
| | | Operation and maintenance | |
| | | Software upgrades | |
| | Loss of revenue due to time investment | Replacement hardware | |
| | | System selection | |
| | | Workflow review & redesign | |
| | | Training | |
| | | Reduced speed while initially using application | |
| Change Management | Requirement and ability to change | Additional training to optimize use of system features | |
| | | Depending upon vendor selected and contract negotiated, obtaining technical support is time-consuming and costly | |
| | | Change in workflow - migration from paper | |
| | | Change in workflow - decision support providing diagnostic/care alternatives | |
| | Understanding of benefits/value | Change in relationship with patient | |
| | | Change in relationship with other health care providers | |
| | Perceived loss of autonomy | Financial benefits generally to system, not to physician | |
| | | Improved quality of care benefits patient, not physician directly (although indirect benefit through perceived improved performance) | |
| | Technical | Lack of standards | Undesired change in workflow or perceived threat to professional autonomy can impact acceptance/adoption |
| | | | Data communication standards |
| Identification standards for patients, providers, locations | | | |
| Lack of integration between EHRs/EMRs and registries | | Variation in standards of data capture in EHR/EMR systems | |
| | | Provider, client and user registries required to be in place | |
| | | No links between registries and EMRs | |
| Technical competence of physician, staff | | Since registries are not developed, vendors are not clear on standards to build into EMRs | |
| | | Require assistance in selection of appropriate systems | |
| | | Require assistance to define existing and enhanced workflows | |
| | | Require assistance to define needs | |
| Privacy and security concerns | Require assistance to negotiate vendor agreement | | |
| | Some providers not familiar with technology | | |
| | Providers and patients express concerns over security and confidentiality of patient health information | | |

3.3.2 Change Management Models

In the last decade of the twentieth century, much was published on the failure of change initiatives and strategies to avoid failure, and the field of change management seemed to blossom. Kotter (1990) suggested that over 70% of corporate change initiatives failed or did not fully meet objectives. A few years later, research published in the Chaos Report (the Standish Group, 1995) suggested that the project success rate for IT projects (articulated in the report as a project completed on time and on budget, and meeting all specified requirements) was only 16%. The Standish Group (1995) went on to say that more than 52% of projects were classified as challenged (defined as project completed and operational but over-budget, over time allocated, and without all features and functions originally specified); and over 30% were classified as impaired (defined as cancellation of the project at some point through the development cycle). Nearly 80% of all projects surveyed by the Standish Group and noted in the Chaos Report were unsuccessful (so, did not fall into the 'successful' category), with cost overruns on these projects averaging at 189% of the original cost estimate (1995). The Standish Group's *Chaos Report* incorporated success and failure profiles based on the survey responses, with user involvement, executive management support and a clear statement of requirements identified as the three major reasons a project will succeed (1995). Concurrently, without these three elements, Standish suggested that the chances of failure increase significantly. Kotter (1995) again reported that the majority of corporate change programs fail, and in addition to highlighting the magnitude of failures to successes, he identified the eight greatest errors made by individuals and organizations trying to manage change, and subsequently published an eight-stage change model to avoid these errors (Kotter, 1996). There are similarities between Kotter's eight stage model and Standish' success factors, and these are demonstrated in table 3.

In addition to Kotter's (1996) eight-stage model and the recommendations of the Standish Group (1995) Chaos Report, other models of change have been developed and can be found both documented in the literature and in use in organizations attempting to better manage change. General Electric (GE) is known for their seven-step change acceleration process, also known as CAP; Garvin (2000) described this successful process as a tool-kit developed for GE from best practices gleaned from previous models. Some of the seven steps noted in CAP are similar to those in Kotter's eight stage model, including committed leadership (similar to Kotter's creating a guiding coalition), creating a need for change that outweighs resistance (similar to creating a sense of urgency), shaping a vision (similar to developing a vision and strategy), and making change last, similar to anchoring new approaches in the culture (Kotter, 1996; Von Der Linn, 2009; Mento, Jones & Dirndorfer, 2002). This might suggest that GE's CAP model used Kotter's early works as a foundation and an example of best practice in change management.

Keller and Aiken, two executives with McKinsey and Company have studied organizational change, and utilized McKinsey survey data to suggest that in 2008, while there was an abundance of change management models of practice, there had been no improvement over Kotter's results in 1990: the success rate of change programs was

still only around 30% (Keller and Aiken, 2008). Keller and Aiken stated that human nature is such that “people are irrational in a number of predictable ways” and suggest “the practice of change management is in need of transformation through an improved understanding of the irrational (and often unconscious) nature of how humans interpret their environment and choose to act.” (Keller & Aiken, p. 11, 2008). Price and Lawson (2003), as cited in Keller and Aiken (2008), recommend four requirements to compel employees to change behaviour. While on the surface these conditions seem to differ somewhat from those of Kotter (2006) and the Standish Group (2005), when they are broken down into finer detail, there are similarities. Keller and Aiken (2008) utilize the basic foundational elements of previous models, suggest more focus on the human characteristics that, if addressed, reduce resistance and increase odds of success. They referenced composite data from multiple sources on this subject, suggesting that humans are often not rational in their decision-making, often, for example, making decisions that contravene their own self-interest, if their notion of fairness or other values are not met. Keller and Aiken (2008) also suggested that humans may resist change because of anxiety or discomfort due to a new workflow that requires them to draw on skills or aptitudes they do not believe they have, or that require them to be less introverted (or extroverted) than they might normally be.

Lines (as cited in Spratt and Dickson, 2008, p. 47), defined organizational change as “a deliberately planned change in an organization’s formal structure, systems, processes ... intended to improve the attainment of one or more organizational objectives” (Lines, 2005). Spratt and Dickson suggested there are several critical indicators to successful management of change, the first being high-quality effective communication in order to enlist support and commitment and to demonstrate the need for change. Employee participation and input was also identified as an element of a successful change, and related to this is employee buy-in. Chawla and Kelloway (2004) as cited by Spratt and Dickson suggested that if individuals perceive they are being treated fairly, this increases trust and commitment to change (2008). Based on results of their 2004 study, Chawla and Kelloway further articulated that job security was a direct positive predictor leading to commitment to change, and in citing this, Spratt and Dickson (2008) suggested the degree to which self-interest is met is positively related to employee buy-in. They also suggest a relationship between communication of the benefits, outcomes and implications of change, and consequently the employees’ knowledge of the change effort.

Canada Health Infoway (2010) provided several change management terms used across different jurisdictions, and suggested that the term change management describes the process and procedures associated with supporting people to use new tools, processes and technologies successfully, managing change and its effects. Canada Health Infoway (CHI) is a not-for-profit organization funded by the Canadian federal government, charged with accelerating the use of electronic health records in Canada. According to the CHI website the organization collaborates with healthcare providers, technology solution vendors and Canadian provinces and territories. As part of its vision of a pan-Canadian EHR CHI provides funding, implementation and change management toolkits, knowledge materials, lessons learned and general information

and updates to teams across the country who are planning HIT initiatives. Through their change management forum, CHI makes available templates, tools and resources in support of change management efforts underway across the country. CHI also provides change management and other implementation references to eligible health care providers, which have resulted in some of the resource materials and processes referenced in this paper. In the Change Implementation Roadmap (CHI, 2010) CHI referenced and built on the works of Bridges (2003), Cohen (2005), Hiatt (2003) and others, to provide organizations with a summary document of activities that make up their suggested change implementation plan. While CHI does not specifically reference Kotter's 1990 research, they cite his eight-stage model of change as one example of a change model (CHI, 2010).

In reviewing the literature for change management models and practices it seems that there are a great many similarities in the documented factors required for success. Many of the models build on early research and ideas from Kotter (1990; 1996) and Standish (1995). Table 3 below demonstrates the similarities.

Table 3
Common Change Success Factors Across Models and Authors (Murphy, 2010)

| Common Change Success Factors Across Models and Authors | | | |
|--|-----------------------------------|---|--|
| Change Model Author | Change Support Element | Element Notes | Similarities Between Models |
| John Kotter: Eight- Step Model (1996) | Establish Sense of Urgency | Crises, potential crises, major opportunities | √ |
| | | Environment, market and competitive realities | |
| | Create Guiding Coalition | Group with power, working as a team, to lead change | √ |
| | Develop Vision and Strategy | Vision to direct the change effort | √ |
| | | Strategies to achieve vision | |
| | Communicate the Change Vision | Use all vehicles and media to constantly communicate vision and strategies | √ |
| | | Guiding coalition role-model behaviour expected of employees | √ |
| | Empower Broad- Based Action | Eliminate obstacles | √ |
| | | Change systems or structures that undermine the change vision | |
| | | Encourage risk-taking, non-traditional ideas/activities | |
| | Generate Short- Term Wins | Plan for quick wins and visible improvements | √ |
| | | Create the wins | √ |

| | | | |
|--|--|---|---|
| | | Visibly recognize and reward people who made the wins possible | √ |
| | Consolidate Gains and Produce More Change | Use increased credibility of wins to change systems, structures, policies that don't fit the vision or together | √ |
| | | Hire, promote and develop individuals who can implement the change vision | √ |
| | | Reinvigorate the process with new projects, themes and change agents | √ |
| | Anchor New Approaches in the Culture | Create better performance through customer and productivity-oriented behaviour, more and better leadership, and more effective management | √ |
| | | Articulate connections between new behaviours and organizational success | |
| | | Develop means to ensure leadership development and succession | |
| | | | |
| Canada Health Infoway (CHI): Change Implementation Roadmap Top Eight Activities List (2006) | Develop Process Map & Conduct Impact Analysis | Analyse expertise, competencies, capabilities to manage change; analyse the new structure or organization of work, reporting relationships, description of new roles; evaluate effectiveness of tools to support effective implementation; analyse clinical and administrative workflow; analyse organization culture (values, attitudes and behaviours of people within organization; management structures, policies and communications approaches) | |
| | Develop Stakeholder Plan and Assess Readiness | Identify stakeholders, conduct analysis, plan for engagement | |
| | Conduct Training Needs Assessment | Analyse learning needs of each group of stakeholders, considering new workflow; develop training plan; link to communications planning; conduct training and evaluate | |
| | Plan Communication | Build on previous activities to develop communication plan; promote awareness and share project information; communicate the magnitude of the change | |
| | Develop Project Governance and Change Management Structure | Develop project plans from an integrated perspective, emphasizing deliverables, milestones, and activities that address people, process and technology | |

| | | | |
|--|---|--|---|
| | Develop Business Case for Change | Define why the change is important, what the drivers are and the new processes, and the value and benefits sought from the new solution | |
| | Plan and Execute Change Implementation Success Factors | Use Kotter's eight successful change implementation factors: compelling case for change; vision clarity; leadership and accountability; communication specific to change; enable action/build commitment; increase change capacity; integrate planning and teams; embed new processes and tools into the culture (Kotter, 1992) | √ |
| | Conduct Adoption and Benefits Assessment and Knowledge Contribution | Facilitate transition from current to future; involve stakeholders in testing; ensure accuracy, relevance and availability of information to system users; establish method of identifying, categorizing and resolving issues; evaluate process and apply corrective measures; understand and communicate adoption targets and report progress | |
| | | | |
| The Standish Group: Chaos Report (2005) | User Involvement | Rated number 1 reason for project success | √ |
| | Executive Management Support | Number 2 reason for project success | √ |
| | Clear Statement of Requirements | Number 3 reason for project success | √ |
| | | | |
| GE Change Acceleration Process (CAP) Model (as cited by Garvin, 2000) | Leading Change | Authentic, committed leadership, for the duration of the initiative; risk of failure increases if there is perceived lack of leadership commitment | √ |
| | Creating a Shared Need | Need for change must outweigh the resistance or inertia; must be a compelling reason for change that appeals to all stakeholders | √ |
| | Shape a Vision | Leaders articulate clear and legitimate vision of the world after the change; ensure vision widely understood (communication); the end-state described must be in observable and measurable behavioural terms, and must relate to individual behaviour ('what's in it for me?' must be addressed) | √ |
| | Mobilize Commitment | Execute influence strategy to build momentum, and leverage early adopters to pilot the project when facing resistance | √ |

| | | | |
|---|--|--|---|
| | Make Change Last | Make the changes permanent; leverage early wins, transfer learnings from pilots to broader rollouts; asses what is supporting and presenting barriers to the initiative | √ |
| | Monitor Process | Measure progress of change initiative; set benchmarks, meet them, celebrate; address lack of progress | √ |
| | Change Systems and Structures | Modify systems and structures to support the desired future state (not existing or previous state), to ensure continue to move towards future | √ |
| | | | |
| Price and Lawson: The Psychology of Change Management, (2003) (as cited by Keller and Aiken, 2003) | Compelling Story | Ensure story reaches/creates desire to change in all, through stories that centre not only on workforce (competition, industry leadership), but also on impact on society, impact on customer, impact on team, and impact on individual (answer to what's in it for me?); enable stakeholders to create their own story, increases commitment; focus on both negative (burning platform) and positive (what is already done well) rather than one approach | √ |
| | Role Modelling | Ensure role models also make the change; don't overinvest only in role models as influence leaders - sometimes timing and environment just need to be right; invest across all conditions for change - in role models, in compelling story, and in reinforcement systems and skills required for change, to maximize odds of success | √ |
| | Reinforcement Systems | Don't overestimate pay for performance - often a less costly reinforcement provides more satisfaction (and therefore more enthusiastic change); satisfaction equals perception minus expectation; Individuals will go against their own self interest (and incentives) if their notions of fairness or other elements are violated, so ensure approach is perceived as fair and just; Build sustainability into transformation | √ |
| | Develop/Acquire Skills Required for Change | Build the skills and talent needed to ensure change is successful; also focus on shifting mindsets and providing opportunities to practice in real life | √ |
| | | | |

| | | | |
|---|--------------------------------|--|---|
| Spratt and Dickson (2008) | Effective Communication | Communicate to inform and to avoid implications of lack of information (resulting in misinformation); ensure communication throughout initiative, facilitating openness and commitment, and avoiding uncertainty; frequent communication and sharing common goal engages support | √ |
| | Solicit Employee Participation | Engage employee participation to influence buy-in and commitment; if this is not done, employees feel no organizational support of employee input into change, resulting in lack of commitment and resistance | √ |
| | Apply a Just and Fair Process | Provide fair treatment can facilitate trust and commitment to the change initiative; perception of justice augments level of commitment | √ |
| Reinersten et al., Institute for Healthcare Improvement (IHI) (2007) | Discover Common Purpose | Improve patient outcomes Reduce hassles and wasted time Understand organization's culture Understand legal opportunities and barriers | √ |
| | Reframe Values and Beliefs | Make physicians partners Promote both system and individual responsibility for quality | √ |
| | Segment the Engagement Plan | Use the 20/80 rule Identify and activate champions Educate and inform structural leaders Develop project management skills Identify and work with "laggards" | √ |
| | Use "Engaging" Improvement | Standardize what can be easily standardized (such as post-op orders), but not those items which require complex knowledge and experience Use data sensibly Make the right thing easy to try Make the right thing easy to do | √ |
| | Show Courage | Provide back up all the way to the board (<i>as described by IHI, is similar to demonstrating good leadership</i>) | √ |
| | Adopt an Engaging Style | Involve physicians from the beginning Work with the real leaders, early adopters Choose messages carefully Make physician involvement visible Build trust within each quality initiative Communicate candidly, often Value physician's time with your time | √ |

Many of the factors identified by these authors are to a significant degree based on the foundations of change management success factors that Kotter (1996) and the Standish Group's Chaos Report (1995) suggested. While much additional literature exists, there are not significant changes to the original works of the nineties, other than the introduction of some new references to human behaviours such as making decisions based on a sense of lack of fairness, or on lack of confidence or comfort in the new required behaviour (Price and Lawson in Keller and Aiken, 2008). Price and Lawson (2003) also comment on pay for performance, and suggest that there are much less costly methods of influencing behaviour (cited by Keller and Aiken, 2008). While Kotter does not introduce this concept, it is also not misaligned with his eight-step model. Some of the models go into a greater level of detail than Kotter, and have a greater stress on employee input (Spratt & Dickson, 2008). Each model still seems to build on Kotter (1996) and the Standish Report (1995), adding recommendations that consider and influence employee or individual behaviour, based on ensuring engagement at all levels, rather than providing a top-down approach. By ensuring all individuals engage, contribute and 'own' the change, and create a compelling story that results in a shared story and vision, authors of the newer models such as Price and Lawson (2003) point to greater success of both moderate and transformational change initiatives. GE's CAP model has been utilized practically in the business environment, and has been said to contribute to GE's success in the industry (Garvin, 2000). Spratt and Dickson (2008) suggest similar factors for change management success, and include the additional focus on the perception of being treated fairly and justly, which really points to the quality of participation.

Canada Health Infoway's materials, while useful to health professionals in that they provide a clearing-house for change management materials relevant to initiatives in the planning or implementation stages, they do not provide any new insights into the field. Materials provided are at a more detailed level, which may be more practical for project managers and clinicians in these efforts; they really provide more a step-by-step guide to how to implement. Examples of their suggested elements of success include creation of a training plan and consider new workflow – elements of an implementation plan no doubt, but not new information on change management.

Spratt and Dickson (2008) also add that drivers for change come from both outside an organization and from within. While most authors focus on change management practices that focus internally, consideration of the external environment must not be forgotten. Although Spratt and Dickson (2008) identify expanded technology and customer value as important drivers of a transition to an EMR system, no author specifically suggested political considerations, which is perhaps an area for further research, particularly with transformational initiatives in the public sector realm.

Interestingly, while Keller and Aiken (2008), members of the McKinsey Group executive team, used McKinsey survey data and several other sources to suggest that there has been no improvement in the success of change initiatives, the works they referenced (Miller, 2002, Higgs and Rowland, 2005) are from 1990, 1994, and 1996. Keller and Aiken's conclusion, that growth in the change management field has not improved the

project success rate since Kotter's initial work in 1990, cannot be strongly supported then by the works they reference; there is no new data on which they can build their case (Keller & Aiken, 2008). The survey questions and results are not in the public domain, so neither can these be evaluated. What is clear is that Keller and Aiken (2008) do suggest that the McKinsey model of change management authored by Price and Lawson (2003) is beneficial.

Reinertsen, Gosfield and Rupp (2007) conducted a review of healthcare organizations across the globe that have achieved good results implementing change initiatives with physicians for the purpose of advancing quality. Reinertsen et al. identify many elements that are similar to the other authors noted, such as identify and work with good physician leaders, make physicians partners, and share a common purpose (2007). This work is focused on engaging physicians in the quality agenda, and the authors provide practical real-life examples of good leadership, tools for assessing culture and physician. One example used was one hospital's approach to resistance, which included temporary removal of a surgeon's privileges, a move that disrupted the hospital's trauma unit and reduced revenues, but spurred an increase in engagement because the hospital signaled they were serious in improving patient safety, regardless of resistance to change (Reinertsen et al., 2007).

Many of the elements of change management leading practice seen in these models are based on some of Kotter's early work (1996). Some models have taken a granular approach, identifying in more detail the steps to take (CHI, 2005), which could be useful in developing detailed change management plans, and is perhaps more appropriate for a new project manager leading a change in healthcare. The level of granularity in the CHI (2005) approach did not align easily with Kotter's work (1996). The model reported in IHI by Reinertsen et al., (2007). provides a practical approach with excellent examples, useful for organizations planning to engage physicians in any complex change initiatives (2007). Other models provide good theoretical approaches, grounded in many of the elements of Kotter's 1996 eight step model, all recognizing that influencing sustainable change has key steps in the journey to transformation.

4.0 Ontario's eHealth Strategy

4.1 eHealth Strategy and eHealth Ontario

In 2008 Ontario's cabinet approved the creation of eHealth Ontario as a way to provide a single point of coordination for development and implementation of a province-wide eHealth strategy (eHealth Ontario, 2009). eHealth Ontario's mandate as outlined on their website at www.ehealthontario.on.ca (2009) was to lead the introduction of information technology solutions that improve patient care, patient safety and access to care, in support of the Ontario government's health strategy, with eHealth Ontario as the single point of accountability. As part of this mandate, with significant input from a broad and diverse group of stakeholders, and following an environmental scan and gap analysis, in 2009 eHealth Ontario developed a strategy designed to focus on clinical

priorities (Ontario's eHealth Strategy, 2009). eHealth Ontario published the strategy on their website and identified a focus on enabling clinical outcomes. This focus was determined after a review of successes and failures in Ontario and in national and international jurisdictions in similar undertakings. Results of the review and lessons learned from these comparable initiatives suggested that enabling clinical outcomes, securing input and leadership from clinical experts, and measuring progress by way of clinical achievements were key success factors, and that not incorporating clinical value and adoption led to failure (eHealth Ontario, 2009). Ontario's eHealth Strategy identified three specific clinical priorities:

- Diabetes Management
 - Control and management of diabetes through implementation of a diabetes registry solution, resulting in reduction of complications and associated costs through evidence-based interventions
- Medication Management
 - Implementation of on-line management of prescription medications and reduction of preventable adverse drug reactions
- Wait Times
 - Reduction of waits specifically in Ontario's emergency departments and in the incidence reduction of inpatients in acute care settings

The strategy identified a number of key cornerstone systems critical to the success of its clinical priorities, several of which are relevant to clinician adoption. These are:

- Physician eHealth Program
This program directs funding through Ontario MD to implement EMRs in Ontario, with a goal of achieving 65% adoption by 2012. The scope includes integration of physician office EMRs with provincial systems, to enable access to patient laboratory results, diabetes results, and repositories of patient medication profiles, and a current state assessment of EMR adoption in primary care to determine use of systems in outcome improvement.
- Client, Provider, User and Consent Registries
These foundational systems enable accurate identification of patients, system users and health care providers, and ensure that only those with appropriate rights and security can access personal health information.
- Ontario Lab Information System (OLIS)
OLIS is an information system which stores lab results from private labs and hospitals, and is intended to feed results to appropriate systems and users (such as primary care physicians' EMRs). The goal is to collect all patient lab results from across the province and make them available to those providing care, to support improved care and service delivery.
- Health Information Access Layer (HIAL)
The purpose of this health technology layer is to allow systems to communicate

and share patient record information with each other. This solution will be built to international standards, supporting interoperability between systems, including EMRs. (eHealth Ontario, 2009).

Other systems identified to support the clinical strategies, but less directly critical to adoption are implementation of a portal, use of telemedicine, and implementation of consumer eHealth (patient access to their health profiles).

In addition to these cornerstone systems, Ontario's eHealth Strategy (2009) described how the three clinical priorities of Diabetes Management, Medication Management and Wait Times will influence better health outcomes, as well as how these outcomes will be measured to determine success. Articulation of the potential for reductions in complications of diabetes, adverse drug events, and hospital stays, and reduced waits for patient visits to physician offices and hospitals, emergency departments, and surgical and diagnostic procedures highlighted for stakeholders how information technology solutions enable improvements in the health system.

Ontario's eHealth Strategy (2009) also considered issues or risks in the environment that may pose a hazard to successful achievement of the strategy. High probability risks were considered, such as insufficient implementation of human resources and internal staff moral or retention issues due to the massive change, and were classified as high and medium impact risks respectively. Medium probability risks such as insufficient stakeholder buy-in and poor EMR adoption were classified as medium impact risks, with fragmentation and lack of accountability due to multiple delivery partners classified as a high impact risk. Unforeseen healthcare priorities such as a SARS-like illness were considered low probability with a high risk if it occurred. Finally, potential delays in the transition of the eHealth program (resources, operations and accountability) from Ontario's Ministry of Health and Long Term Care to the new eHealth Ontario organization were classified as medium probability and impact risks. Mitigation tactics for all risks were identified, ranging from use of sound change management, communication and engagement practices and strong accountability agreements between partners, to involvement of stakeholders in initiative governance and provision of clinically valuable data and functionality through EMRs.

4.2 OntarioMD and the Physician eHealth Program

OntarioMD is a subsidiary of the Ontario Medical Association (OMA), receiving funding from the Ministry of Health and Long Term Care. OntarioMD's purpose is noted on their website (2010): to provide funding and technical support to family practices implementing EMRs. Their parent organization, OMA, represents Ontario physicians' interests, including economic, clinical and political interests. OMA's association documents on their website (www.ontariomd.ca retrieved March 27, 2010) describe policy committees and clinical section representation, with the purpose of shaping "decision-making" and addressing "important clinical and legislative issues facing physicians and patients". OMA represents Ontario's nearly 35,000 practicing

physicians, residents and enrolled medical students in the province. Aggarwal (2009) indicates that through Bill 8, the Commitment to the Future of Medicare Act, (2003) and the Ontario Medical Association Dues Act (1991), OMA is the government-appointed representative body, and therefore receives obligatory membership dues. This puts the OMA in an influential and powerful political position, one that when used well, can influence both its physician membership and the Ontario government.

With this in mind, in a letter to Ontario physicians in October 2009, OntarioMD announced they had partnered with eHealth Ontario to implement the new EMR Adoption Program. OMA successfully negotiated \$236 million in funding, as noted in the Medical News (2009). According to the eHealth Strategy at eHealth Ontario's website, the program is intended to grow the number of family physicians with EMRs to 9,000, representing nearly two-thirds of Ontario's primary care physicians. If implemented successfully this program – named *Physician eHealth* by eHealth Ontario, and *EMR Adoption Program* by OntarioMD – will provide ten million Ontarians or nearly eighty percent of the province's population with an EMR.

A key feature of the EMR Adoption Program in influencing physician uptake is that it is a provincially funded initiative. Eligible physicians will receive funding over a three-year period to implement EMRs in their practices. The program also offers support to help physicians select the right vendor from a group of OntarioMD certified vendors, and to determine whether to select a local EMR (which requires the physician practice to ensure technology support, backup and continuity planning), or an ASP vendor (application support provider) hosted at eHealth Ontario's data centre and inclusive of support, backup and continuity planning.

Table 4
OntarioMD EMR Adopter Funding

| EMR Adopter Funding | | | | |
|--|----------------------|------------------------|--|--------------------------|
| Funding Per Participating Physician | | | | |
| Products | Total Funding | Readiness Grant | Monthly Subsidy (36 month term) | Performance Grant |
| ASP EMR | \$29,800 | \$3,500 | \$675 per month | \$2,000 |
| Local EMR | \$27,100 | \$3,500 | \$600 per month | \$2,000 |

Funding per eligible physician is outlined in table 4, and eligibility is clearly outlined in OntarioMD EMR Adoption Program FAQs and EMR Adopter Funding documents on the OntarioMD website (2010). Eligible physicians include MOHLTC primary health care groups such as many of those in table 5, Primary Health Care Models. Physicians in Community Health Centres, Comprehensive Care Models and Group Health Centres are not listed as eligible, but all other Primary Health Care Groups are. Any community-based physicians, both family practitioners and specialists can apply for new funding, unless they received EMR funding through another program in the past. Those who received *Early Adopter* funding through previous programs can apply for upgrade

funding, to encourage updating of existing EMRs to those that meet certification standards.

In addition to funding, OntarioMD provides resources to support physicians in their workflow assessment, system selection, contract negotiations, and some aspects of implementation. The organization provides a number of tools and templates, available on their website, to facilitate requests for funding, assist in needs determination, system options and selection,

Finally, OntarioMD published a standard specification for EMRs to establish baseline functionality requirements, and has worked with vendors to ensure their EMR applications meet these minimum requirements (<https://www.emradvisor.ca/compare> retrieved March 27, 2010). Only those certified by OntarioMD are eligible for physician funding, reducing the risk of applications not able to communicate with provincial information systems and reducing physician anxiety about selecting a system that will either not comply with standards, or not be eligible for funding. In addition to publishing the list of approved EMR vendors, each application is also rated, to demonstrate which have more of the features and functionality beneficial to patient care and sharing of data.

4.3 The Strategy and the Primary Care Change Enabler: eHealth Ontario and OntarioMD

The strategy published by eHealth Ontario in 2009 is a good one. It offers clinical value, learns from successes and failures in other jurisdictions in order to increase chances of success, and supports the Ontario government health priorities. In partnering with OntarioMD, the strategy is able to offer solutions that address physician funding concerns, greatly improving the opportunities for increases in penetration and adoption. It further alleviates concerns noted in the literature about data and communications standards, through identification and certification of those EMR systems that meet the baseline specifications. By addressing funding and standards concerns early in the planning, and by demonstrating the direct link between technology enabler-solutions and clinical outcomes, those planning Ontario's eHealth strategy have increased the chance of clinical stakeholder buy-in, and in turn increased the likelihood of execution success. The strategy demonstrates that information technology will be used to make improvements in patient care, access and patient safety, and puts forth a vision that clinicians, administrators and patients/consumers can understand and engage in.

5.0 Opportunities and Challenges for Ontario

5.1 Considerations and Challenges for HIT Adoption in Ontario's Primary Care Environment

The Ontario environment brings EMR adoption challenges similar to those of other provinces and jurisdictions, and its differences also introduce some unique complexities

and opportunities. In particular, the variety of primary care models in Ontario and the province's current political environment add complexity to challenges of a large provincial EMR implementation.

Primary care as described on Health Canada's website (2009) is the first (primary) place individuals go to receive health advice, care or service, and is often defined as the point of entry or gateway to health care. The Institute for Clinical Evaluative Sciences (ICES) Atlas on primary care (2006) indicates that primary care physicians and more increasingly primary care teams are generally responsible for coordinating access to the broader aspects of the healthcare system such as specialists, diagnostic testing and other procedures. CIHI's Primary Health Care (PHC) Indicator's Chartbook (2008) is a chartbook of figures and indicators on primary health care in Canada, and describes primary health care (PHC) as including:

- First point of contact with the health care system, where the majority of chronic health conditions are managed;
- Direct or indirect provision of a comprehensive range of PHC services;
- Health promotion and prevention of disease; and
- Organizations as small as one family physician/general practitioner/PHC nurse practitioner or as large as an interdisciplinary community health centre.(CIHI, 2008, p. 19)

In creating a results-based logic model for primary care, for the Centre for Health services and Policy Research (CHSPR) in British Columbia, Watson, Broemeling, Reid and Black (2004) state that primary health care is the foundation of Canada's health care system, with the first point of contact for most people being the family physician. Many definitions of primary health care exist, and in creating boundaries for their work, Watson et al (2004) offer the following features and services as consistent with PHC:

- Management of acute and episodic health conditions
- Management of chronic health conditions
- Provision of health promotion and education efforts
- Provision of first care
- Connection with/referral to more specialized services in other parts of the health care system

While family physicians are the primary caregivers in the PHC sector, Watson et al (2004) indicate that dietitians, nurses, occupational therapists, physiotherapists, pharmacists, psychologists, social workers and other health care workers also deliver PHC services.

This type of care involves a very broad scope of practice, from preventative care, to care of acute and chronic physical diseases, to mental and social health issues, and includes patients of all ages (birth to death), as described in Wikipedia, (March, 2009). In Ontario, visits to general practitioners and family physicians (GP/FP) far surpass visits to specialists, to emergency departments, and for diagnostic imaging tests. ICES Primary

Care (2006) notes that while Ontarians under 65 years visit GP/FPs an average of four times per year, those 65 years and older make seven visits annually. Seniors' use of emergency departments in Ontario is also growing. CIHI (2010) reports that in 2008-2009, seniors (individuals 65 years and older) made 960,000 visits to emergency departments, which constitutes an increase of 100,000 over five years. The majority (almost two-thirds) of Canadian seniors living in the community are also reported to use five or more classes of prescription medications (CIHI 2010). With the growing aging population and associated increases in chronic and episodic illnesses, one would expect a similar increase in visits to primary care providers to occur.

As in all Canadian provinces, GP/FPs are in short supply, particularly in rural areas. A search for physicians on the College of Physicians and Surgeons of Ontario (CPSO) returns 31242 active and inactive physicians. Eliminating inactive physicians results in only 13,860 active family doctors eligible to practice in Ontario. A review of Canada's seventeen medical schools indicates they are graduating physicians in limited numbers, with only 113 graduates expected in 2009 (Canadian Resident Matching Service, 2009). In addition to the existing shortage of GP/FPs and insufficient physicians graduating, a decrease in the numbers of physicians selecting family medicine as the choice of specialty is dropping, adding to concerns regarding the ability to meet the growing need of our aging population. The most recent National Physician Survey (NPS) completed in 2007 shows a decrease in the selection of family medicine over previous years (College of Family Physicians of Canada, 2007). In recognition of the short supply of physicians and other health care providers, the province of Ontario has developed a strategy to address the growing health human resource needs. The Ministry of Health and Long Term Care is collaborating with the Ministry of Training, Colleges and Universities, and together with input from the province's providers and consumers, identifies and implements initiatives and incentives to recruit qualified physicians into Ontario. To date they provide support with training, assist new immigrants with physician qualifications in other jurisdictions to navigate Ontario's qualification requirements, and they administer grants to allow physicians to more easily reduce education loans or relocate to geographies in need of health care providers (HealthForce Ontario, 2009).

The Ontario government's Family Health Care for All Strategy to improve access to family health care includes strategies that optimize multiple health care providers working as teams to ensure access. In 1999 the Health Services Restructuring Commission's (HSRC) provided recommendations to the Ontario government, which highlighted the following features:

- Access to a comprehensive selection of primary health care services, including better coordination, services accessible on a twenty-four hour, seven-day-a-week basis;
- Increase in primary health care group practices as a way of improving patient coverage through sharing of patient coverage and information within the group practice, while also improving working conditions for providers;

- Increase in inter-professional make-up of primary care teams, to increase quality of patient service/care, increase collaboration between professionals, and ensure receipt of service from most-appropriate care-provider; (HSRC, 1999).

The subsequent Liberal government, while not using all features of the HSRC's recommendations, did include many elements in their *Family Health Care for All Strategy* (MOHLTC, 2010). In particular, the use of inter-professional teams were highlighted to make more efficient use of a variety of health care providers working with family physicians, ensure improved access to and coverage by physicians and other primary care providers, concurrently improving quality of care and service, and enabling improved working conditions through shared coverage. Since 2001, primary health care models and their enablers have become a focus for the provincial government. Ontario's Ministry of Health and Long Term Care website outlines the strategy of a primary care model of family health teams as a way of providing greater access and improved care to more Ontarians. Table 4, below, provides a view of the primary health care models in existence in Ontario.

The author's experience in the Ontario healthcare sector, internal communication with colleagues, and MOHLTC documents reveals knowledge of at least ten different models of primary care programs developed over a period of 50 years, with most models developed and funded by Ontario over the last 10 years (Moody, 2009). These models are referenced in a number of MOHLTC incentives communication documents and in appendices to schedules of benefits for physician service agreements, so were compiled into a general reference for this paper, in table 4 (MOHLTC, 2006-2010). According to MOHLTC documents published on the Ontario government websites (2006 - 2010) family health teams are intended to improve access to health care through provision of comprehensive primary health care services by an interdisciplinary team of physicians, nurses, nurse practitioners and other healthcare providers. As outlined in table 4, each model reveals differences in program funding and operation including: health service provider types participating in the program; combinations of service provided; service availability; mechanisms of payment; and method of patient registration. Each model requires contractual agreements between physician and government that outline the different features of the model under which they operate.

Table 5: Ontario's Primary Care Models; Adapted with permission from Moody, J., *Primary Care Models in Ontario Healthcare, 2009*.

| Primary Health Care Models | Program Announced | Physician Registration | Patient Registration | Provider Types | Physician Payment | Service Availability |
|---------------------------------------|---|---|-----------------------|--|--|---|
| Comprehensive Care Model (CCM) | July 2005 Implemented October 2005 | Signed agreement: 1 physician | Sign enrolment form | Physician | <ul style="list-style-type: none"> • Fee-for-Service payment plus incentives. • Bonuses and incentives paid for services such as: <ul style="list-style-type: none"> ○ Preventive care ○ Chronic disease management ○ Unattached patient registration ○ New Patient-New Graduate and eligible services to enrolled patients during After Hours Services • Physicians also receive monthly comprehensive care capitation payments for all enrolled patients. | Regular Office Hours plus: <ul style="list-style-type: none"> • One 3 hour evening session (Mon-Thurs), or • One weekend session |
| Family Health Group (FHG) | July 1, 2003 | Signed agreement: 3 or more physicians | Sign enrolment form | Physicians | <ul style="list-style-type: none"> • Fee-for-Service plus incentives. • Bonuses and incentives are paid for services such as: <ul style="list-style-type: none"> ○ Preventive care and chronic disease management ○ New Patient ○ Unattached Patient ○ New Patient-New Graduate and eligible services to enrolled <i>and</i> assigned patients during After Hours Services • Physicians also receive monthly comprehensive care capitation payments for all enrolled patients. | Regular Office Hours & telephone health advisory service plus: <ul style="list-style-type: none"> • 3 hour evening sessions (Mon-Thurs), or • Weekend, depending on number of physicians, and up to a maximum of 5 sessions Extra sessions can be added as required by patient volume/needs |
| Family Health Network (FHN) | November 2001 | Signed governance and FHN agreement: 3 or more physicians | Sign enrolment form | Physicians, Nurse Practitioners (NPs), Office Practice Nurses | <ul style="list-style-type: none"> • Capitation, based on a defined basket of primary care services provided to <i>Enrolled Patients</i> based on age/sex of each patient. • Fee-for-service paid for other services. • Bonuses and incentives are paid for services such as: <ul style="list-style-type: none"> ○ Preventive care, prenatal care and home visits for enrolled patients, and ○ Hospital visits obstetrical care and palliative care for all patients. | Regular Office Hours and phone advisory service (THAS) plus: <ul style="list-style-type: none"> • 3 hour evening sessions (Mon-Thurs), or • Weekend, depending on number of physicians, and up to a maximum of 5 sessions Extra sessions can be added as required by patient volume/needs |
| Community Health Centre (CHC) | Mid- 1970's | Physicians are salaried employees | Signed enrolment form | Physicians, NPs Nurses, Counselors, Dietitians, Chiropractors, Health Promoters and others | <ul style="list-style-type: none"> • Complement based salary, plus incentives | Regular Office Hours plus: <ul style="list-style-type: none"> • After hours care will be provided based on minimum of 3 hours/full time equivalent (FTE) physician up to 15hr/week • 24/7 on-call requirement • Professional development funds |

| Primary Health Care Models | Program Announced | Physician Registration | Patient Registration | Provider Types | Physician Payment | Service Availability |
|---|---|---|---|--|---|--|
| RNPGA Group 2 formerly Community Sponsored Contracts (CSC) | Effective April 2004 (previously CSC) | Signed group agreement | Sign enrolment form; Regardless of enrolment status all patients of community are served | Physicians Office Practice Nurses | <ul style="list-style-type: none"> • Complement based base remuneration, plus bonuses and incentives • Overhead component paid separately from base remuneration • Emergency Department or on call funding as applicable | 40 hours per week plus on call/ ED coverage/or 24-hour emergency on call coverage, plus THAS |
| Family Health Team (FHT) | December 2004 | Member of a PHC model affiliated with one of the 150 FHTs | Sign enrolment form | Physicians, and depending on community need, other interdisciplinary health providers | Through one of the existing Non-FFS models (e.g. Family Health Network/FHN, Family Health org./FHO, BSM, RNPGA) FHT funding is provided for salary, benefits, overhead and one-time transition funding support, for approved FHT staff: interdisciplinary health providers, administrative staff, and salaried physicians. Includes one-time for space renovation/ infrastructure and support for information technology. | Regular Office Hours plus: <ul style="list-style-type: none"> • After hours care will be provided |
| Family Health Organization (FHO) | Harmonized HSO and PCN model implemented November 1, 2006 | Signed governance and FHO agreement: 3 or more physicians | Sign enrolment form | Physicians, NPs, Office Practice Nurses. Through Individual Service Plan (ISP) grants: Nurses, Dietitians, Chiropodists, Social Workers, Mental Health Workers (MHWs) | <ul style="list-style-type: none"> • Capitation based on a defined basket of primary care services provided to enrolled patients. • Bonuses and premiums similar to FHN. • Fee-for-service paid for other services. | Regular Office Hours and THAS + <ul style="list-style-type: none"> • 3 hour evening sessions (Mon-Thurs), or • Weekend, depending on number of physicians, and up to a maximum of 5 sessions. Extra sessions can be added as required (patient volume/needs) |
| Rural & Northern Physician Group Agreement (RNPGA) | Effective April 2004 | Signed group agreement | Sign enrolment form; Regardless of enrolment status patients of community are served | Physicians, Office Practice Nurses. Through FHTs' grants for other allied health professionals (Registered Nurses Dietitians, Chiropodists, Social Workers, MHWs) | <ul style="list-style-type: none"> • Complement based base remuneration, plus bonuses and incentives • Emergency Department or on call funding as applicable | 40 hours per week plus on call/ emergency department (ED) coverage/or 24-hour emergency on call coverage, plus THAS |
| Group Health Centre (GHC) | ~1960 | Physician agreement to form a group practice | Consumer sponsorship; Sign enrolment form | Physicians, nurses and NPs, other interdisciplinary health providers | Prepayment of medical insurance; physicians are shareholders | Regular Office Hours |

The implementation of Family Health Teams is part of the Ontario government's health strategy, and is purported to be a successful model of improved access to care. MOHLTC's Family Health Team Guides (2010) indicate that the model provides care to 270,000 more Ontarians since they introduced the model in 2003. Family Health Teams are interdisciplinary in nature, however primary care models are still primarily physician managed. With the introduction of EMRs in Ontario's primary care environment, finances and impact on operating costs will be a concern for physicians, and even more so if physicians are responsible for managing salaries of administrative staff, dietitians, nurses and others. While the provincial models provide funding for these resources, the physician(s) will still manage the business. Cost of the application licenses, computer hardware, implementation and support will increase with the number of providers using the system. Additionally, if the primary care model is a fee-for-service model, as Ludwick and Doucette (2009) suggest, physicians will be reluctant to invest sufficient time in system selection, training and redesign, based on the revenue losses they will experience. The number of staff in a primary care model team and the different payment models will need to be considered in planning for successful adoption of information technology and EMRs.

Through the transformational *Family Health Care for All* strategy for primary care reform, Ontario is committed to providing healthcare to Ontarians in their communities, around the clock, while attempting to reduce the need for emergency services and the wait for other health services, and to reducing the spiraling costs. As in all provinces, emergency and other waiting times are long, and Ontario's strategy to remedy is multi-pronged, with significant reliance on primary care reform and family health teams. Primary care reform has been identified as a way of providing health care for all Ontarians, ensuring access to primary care physicians and other professionals as a way to better prevent and manage chronic and episodic disease. Through greater access to interdisciplinary care, this contributes to a reduction in emergency department congestion as well easing the alternate level of care (ALC) pressures in hospitals. Many patients in acute care hospitals fill beds that are designed and funded for patients with high acuity levels, however the less acute patients cannot be discharged because there is insufficient ambulatory, home or community care available. By fortifying primary care, in combination with strengthening home care, Ontario's reform strategy is driving to ensure that as each patient has improved access to a primary care physician to help them prevent and better manage disease, this will reduce emergency and hospital admissions, and also enable earlier care to home and community on discharge from acute care. There is an opportunity for Ontario to increase the potential for primary care reform through implementation of EMRs. If all primary health care providers in a practice use EMRs to record patient transactions, the improved interdisciplinary communication noted by Protti (2008), and Bates, Ebell, Gotlieb, Zapp, and Mullins (2003) will at a minimum result in more accurate and timely services, and fewer transcription errors. If EMRs with computerized physician (medication) order entry (CPOE) and clinical decision support tools are utilized, patient safety is improved (Kohn et al., 2000), and more optimized

diagnosis and care will be achieved, with the potential to improve patient outcomes and reduce cost to the health system (Bates et al. 2003). It can then be suggested that if EMRs with complex functions such as CPOE and decision support are used province-wide, transmitting and sharing patient information between organizations and providers, this will further optimize efficiency by reducing unnecessary duplication of diagnostic tests, increasing the speed of delivery of results between organizations, and potentially improving both health outcomes and reducing unnecessary costs to the system.

5.2 Considerations and Challenges for HIT Adoption in Ontario's Political Environment

Another challenge in Ontario's environment is the timing of the upcoming provincial election, to be held in October 2011. Ontario's Liberal party, led by Dalton McGuinty, is nearing the end of its second term in office, and was initially successful with their focus on health, primarily through public posting of reducing wait times and increasing the number of Ontarians with a family physician. Last summer, in the early lead up to the election the PC caucus and the media submitted dozens of Freedom of Information requests (FOIs) to surface what were portrayed as 'scandalous' procurement irregularities with eHealth Ontario practices, resulting in embarrassment for the Liberal government and eHealth Ontario. Examples of these irregularities were the sole-sourcing of some work to consulting firms without public tendering, a process which at the time did not contravene any organizational policies; approving expenses that were portrayed by the media and opposition as irregular, despite these falling within the rules of existing policies; and citing that the use of organizational funds (public money) to renovate the CEO's office was inappropriate. The furor surrounding these reports was compounded by the fact that over the previous six-year period (starting within the previous government's tenure) nearly one billion dollars in taxpayer's money had been spent on IT infrastructure, with no clinical deliverables as a result. The media and opposition-fueled outrage that followed halted the implementation of almost all provincial eHealth initiatives underway not only at eHealth Ontario, but in the province. While no unlawful activity was proven and no charges laid, the furor caused the resignation of two well-respected senior eHealth executives and the Minister of Health, David Caplan (The Toronto Star, 2009).

It is unlikely that the Progressive Conservatives will cease activities that generate anti-Liberal sentiment in advance of the 2011 election, and if this continues in the eHealth forum, further delays in the implementation and adoption of eHealth may occur, including the implementation of EMRs in support of the Primary Care Strategy. The potential for ongoing political mud-raking, media coverage and public outrage is a significant risk for the implementation of the strategy.

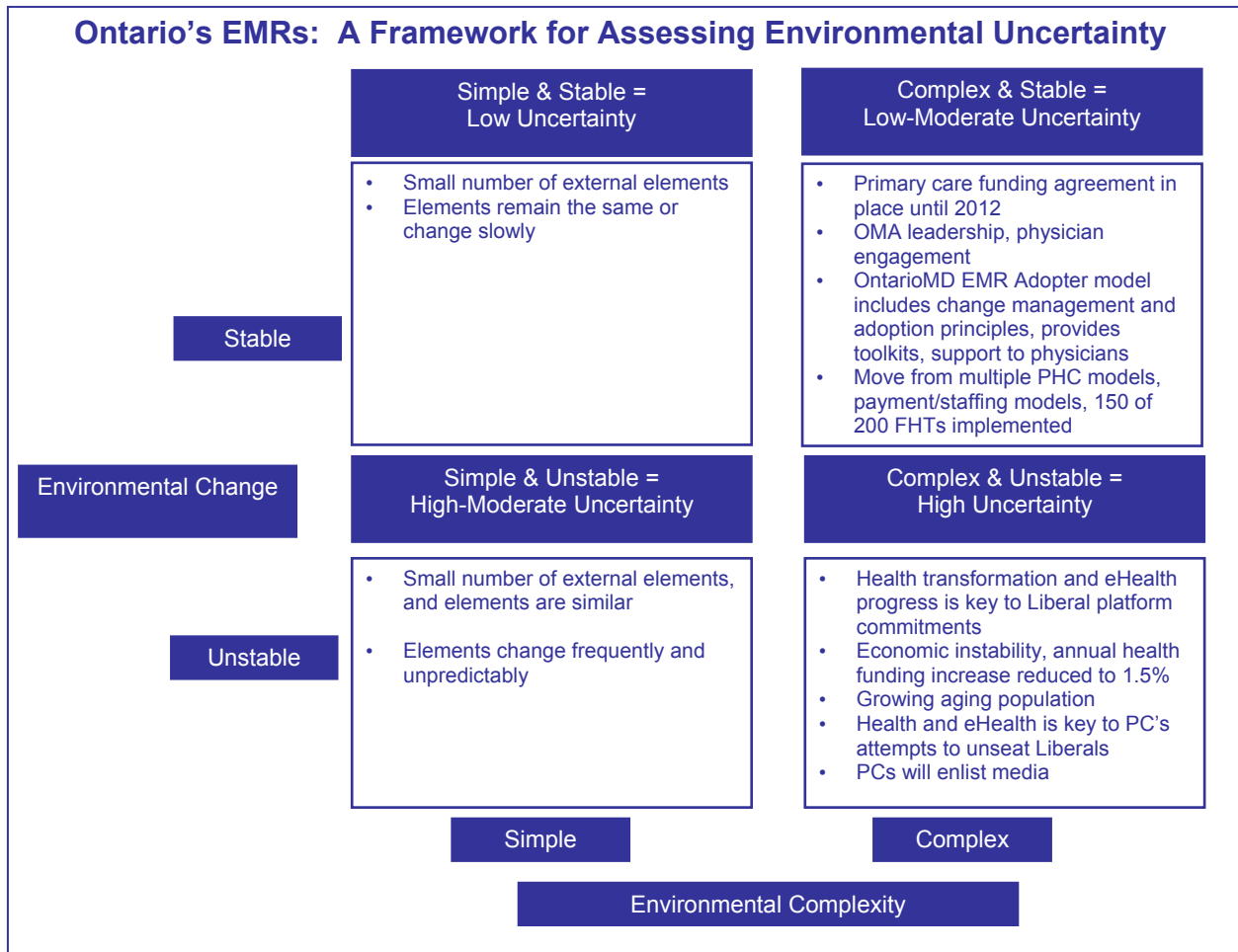


Figure 5: Duncan's Framework (Daft, 2007): Assessing Environmental Uncertainty As Applied To EMR Implementation In Ontario

With shortages of primary care physicians and other care providers, multiple primary care payment models, a growing population of seniors requiring health care, large rural and complex urban geographies to contend with, and a still unstable economy, Liberals are looking for ways to demonstrate progress. However with the political uncertainty of an upcoming provincial election, using the implementation of Ontario's eHealth strategy as an enabler to healthcare reform and cost optimization will be challenging. While this pressure to meet primary health care reform deliverables including implementation of EMRs will be significant, there will be the concurrent push from the Progressive Conservative opposition to reduce any success seen by the Liberals.

As cited in Daft (2007), by using Duncan's framework for assessing environmental uncertainty to review the environment in which Ontario's eHealth Strategy will be implemented, particularly EMRs in the primary care sector, it could be construed as a complex and moderately stable environment. There is progress in transforming primary care, with 150 of 200 family health teams in place already. Key stakeholders are collaborating on adoption of EMRs in primary care, and funding and tools are in place for support. However the highly political nature of

the pre-election environment introduces significant uncertainty, and according to Duncan's model would be classified as complex and unstable.

5.3 Funding Opportunities and Challenges for HIT Adoption

Primary care is the next bastion of reform for Ontario's health system – it is also the most challenging. As noted earlier, primary care reform and implementation of HIT are linked. In the *International Journal of Medical Informatics* in 2009, Ludwick and Doucette suggest that “the adoption of health information systems is seen world-wide as one method to mitigate the widening health care demand and supply gap” (2009, p. 23). In order to influence successful adoption in primary care, funding of EMRs is required, however the province like the rest of the world has been experiencing economic turmoil, and is struggling with a \$25-billion deficit (CBC, 2010). In light of this, and also following on the political and media scandal of 2009, Ontario will need to demonstrate value for money in eHealth, if it is to be allowed by the public to continue to strive to meet the agenda. Luckily contracts between government, eHealth Ontario and the OMA have been signed, and the OntarioMD distribution of \$236-million in funds for EMR implementations has started (Medical News, 2009).

6.0 How Does Ontario's eHealth Strategy Measure Up?

In evaluating Ontario's eHealth Strategy, it is first beneficial to review the definition of the word strategy. Andrews (1971) as noted in Grant defines strategy as “a pattern of objectives, purposes or goals and the major policies or plans for achieving these goals, stated in such a way as to define what business the company is in or is to be in, and the kind of company it is, or is to be.” (2005, p. 39). Many authors and sources share some aspects of Andrew's definition, variously describing strategy as a plan of action or attack (Wikipedia, 2010), a series of actions designed to achieve goals or effect (Wordsmyth dictionary, 2010), a long term action plan for achieving a goal (Investor Words, 2010), and the determination of long term goals, adoption of courses of actions and allocation of resources to achieve these (Chandler, 1962). The commonalities of these various definitions and descriptions are long-term goals, patterns, and high-level methods of achieving these goals. Mintzberg (1998) suggests there are five Ps of strategy: plan, position, pattern, perspective and ploy, and using similar definitions as a foundation, Grant (2005) suggests that strategy is not a detailed plan, and deviates somewhat from the other authors when he describes strategy as a way of winning. Grant articulates four key components of a strategy analysis:

- Value
- Resources and capabilities
- Structure and management systems
- Environment (2005).

In examining Ontario's eHealth Strategy's potential for success in Primary Care then, these components have been used as an initial framework to analyse Ontario's eHealth Strategy (Grant, 2005). The results of the literature review, specifically the common barriers and success factors identified in tables 2 and 3, and leading practices in change management were considered in the assessment and recommendations. Finally, in evaluating the strategy, the enabling components of OntarioMD's EMR Adoption Program were thought to be an enabler, as was the province's primary care reform, so these were considered as part of the overall strategy and an environmental influence respectively. Ontario's eHealth Strategy 2009-2012 is an enabler to the province's improved health access and outcomes goals, however the way the provincial health reforms in primary care are implemented will likewise have an effect on the success of the eHealth Strategy implementation. Consequentially all of these elements together were considered in evaluating Ontario's eHealth Strategy, since all would contribute to the 'win'.

6.1 Value of the eHealth Strategy

While profitability is often a goal of revenue-generating firms, Grant (2005) argued that profit generation alone does not ensure success, and quotes Dennis Bakke, founder of the international power company AES:

Profits are to business as breathing is to life. Breathing is essential to life, but is not the purpose for living. Similarly, profits are essential for the existence of the corporation, but they are not the reason for its existence. (Grant, 2005, p. 57).

Grant identifies values, goals, mission and vision as critical in the success of any organization and venture (2005). eHealth Ontario, the creator of Ontario's eHealth strategy is a publicly funded crown corporation, providing services to a publically funded system (health). Although value for money is important to both, the value to eHealth Ontario is not profitability, so common models for consideration of profitability and value, such as surplus revenues over costs, accounting profit, or economic profit have not been used to determine value. Value has been assessed as the value to different direct and indirect stakeholders, as demonstrated through the guiding principles of the strategy and grounded in eHealth Ontario's vision and mission. eHO's vision for eHealth in Ontario is to achieve excellence in healthcare through harnessing the power of information, and the mission is to deliver "a comprehensive, patient-focused, secure and private electronic system that will improve the way patients receive care" (eHealth Ontario, 2009, p. 1). Given this, the primary beneficiary of value from a successful provincial eHealth strategy will be Ontarians, who will benefit from improved healthcare access and outcomes, as an output of improved technologies and health information capture, transfer and sharing. These benefits were built into Ontario's eHealth Strategy 2009-2012 directly as two of its guiding principles:

- eHealth Ontario will focus on enabling clinical outcomes (value) for better patient care, not technology for its own sake
 - eHealth Ontario will understand its customers and identify where patient care gaps exist
 - eHealth Ontario will, over time, provide patients with the means and the information necessary to participate in the management of their own care in a privacy-protective manner. (eHealth Ontario, 2009, p. 5), and
- Early clinical benefits are the key to building and sustaining support for the eHealth Strategy. (eHealth Ontario, 2009, p. 5).

By indicating the strategy would address patient care gaps as one of the long-term goals in its foundational guidelines, and articulating clinical outcomes as a core value, eHealth Ontario (eHO) has associated patients as the recipient of that value, and the ultimate stakeholders (eHealth Ontario, 2009). In doing this, eHealth Ontario immediately removed technology as a goal, making it only a supporting player. This approach suggested a much more meaningful goal, one that could be more easily understood by Ontarians, one that could more easily and clearly be communicated to stakeholders, thus allowing for improved understanding of benefits, and starting to answer the stakeholder question GE's CAP model suggests is so crucial, "*what's in it for me?*" (Garvin, 2000). Additionally these foundational elements of the strategy, through reference to building *and* sustaining support would start to appeal to those political elements supportive of the strategy. Through demonstration of wins in clinical outcomes, the strategy would enable continued support, both in the form of political will and continued funding, to an initiative that is multi-faceted, complex and crosses multiple years and potentially government political parties. The strategy also describes with some specificity how each of the clinical projects will benefit Ontarians, through simple examples such as receiving reminders from their providers for tests, prescription renewals and visits, to reduced wait times in emergency departments and for surgical and diagnostic procedures, to reduced complications of disease, fewer hospital stays and improved access to non-hospital care. In addition eHealth Ontario outlines how each of the clinical priority projects, Diabetes Registry, Medication Management and Wait Times will reduce disease and complications (2009). The Diabetes Registry (DR) initiative tells a compelling story. By targeting a gap in prevention and management of care for diabetes, the DR solution suggests a reduction in the numbers of complications: lowering Ontario's current 3200 annual deaths, 2300 heart attacks, 1100 amputated limbs, and 350 cases of blindness, all due to this disease (eHealth Ontario, 2009). Medication Management is equally compelling: *preventable* adverse drug events (ADEs) have proven to be the fourth leading cause of death in the province, with 4,000 deaths annually. eHealth Ontario estimates that electronic medication order entry can reduce significantly the current 394,000 ADEs, concurrently reducing the associated number of physician office visits, hospitalizations and deaths (2009). The strategy presents a

case for the third clinical priority, Wait Times, to achieve reduction in the length of time patients wait in ERs for treatment, the wait for appropriate care such as long term care or complex continuing care, and increasing access to community services to allow patients to be treated at home (eHealth Ontario, 2009). Use of these clinical priorities is a compelling story, and demonstrates Price and Lawson's suggested impact on society, impact on customer (patient), and impact on individuals, in addition to the positive impact on team, providers and industry that improving health outcomes might make (2003). At the same time the strategy focuses on improvements in health outcomes, it underscores the converse negative 'burning platform' of death, disease, long waits and unintended errors, and demonstrates value to Ontarians.

Healthcare providers are another group of stakeholders critical to the success of the strategy. Through improvements in access to patient information via technology use, it is evident that providers can benefit from prompter access to patient information, streamlined efficiencies, and safer and more current patient care. However, changes required in workflow, impact on financial compensation and expenses associated with those improvements will also provide cause for concern in the physician community. Ontario's eHealth Strategy addressed these concerns a number of ways, starting with the guiding principles and throughout the clinical initiatives identified in the strategy:

Clinical content of solutions must be relevant and complete

- Valuable clinical content is the key to clinician engagement; functionality is of lesser importance
- Complete databases are more compelling for clinicians to use, as this increases the likelihood of finding useful data on a patient
- Systems and processes that are relevant to the clinical workflow allow clinicians to do their job more efficiently
- Technology must be used to be effective and deliver value

Clinicians will be engaged early and often to ensure project success

- eHealth Ontario will engage clinicians early and consult regularly to gain a deep and profound understanding of clinician needs
- Clinical Expert Panel leadership will be critical to the success of each initiative and the Strategy as a whole
- Clinical users will become knowledgeable partners for delivering solutions
- Clinician engagement is a key metric for measuring the success of the Strategy (eHealth Ontario, 2009, p. 6).

Although the term clinicians can be used to refer across a spectrum of health professions such as nursing (including nurse practitioners and advanced practice nurses), medicine, pharmacy, and allied health, the stakeholders who will

experience the most significant change with the advancement of Ontario's eHealth Strategy ("the strategy"), and those who are also most influential, are physicians. The strategy linked the value of clinical content to engaging clinicians, and this is particularly important to physicians. Protti et al (2007) indicated that complete databases including important patient data such as diagnostic tests, medications and hospital discharge information have been critical success factors in jurisdictions such as Alberta and Denmark. Not only did Ontario's strategy recognize in the guiding principles that complete databases are more valuable to physicians, it also stated that systems would not require physicians to login to multiple systems to secure information, and systems would be integrated. These strategy elements signal to physicians that they need not look in multiple places for critical patient information, increasing the likelihood of engagement and adoption. Like many professionals, physicians place value in the expertise and credibility of their colleagues trained in an evidence-based medical approach (Rossos et al, 2006). The strategy's commitment to engaging clinicians early and regularly; to use of panels of clinical experts providing expertise in clinical subject areas and guiding key initiatives; and the identification of clinicians as partners, all are components of an ongoing approach that talks to this credibility element, and starts to share ownership with the clinician/physician group, setting the stage for successful engagement. Additionally the strategy identifies a Physician eHealth Council, to be co-chaired by the CEOs of eHealth Ontario and the Ontario Medical Association. As previous passages in this research paper noted, physicians generally manage their own businesses, and the cost to select, plan, implement, operate and maintain systems, if not supported by government funding, is high. Protti et al (2007) and Brookstone and Braziller (2003) stressed the importance of funding for physicians in order to help reduce the value gap and incent adoption. Ontario's eHealth Strategy addresses the incentive elements in a number of ways. While the guiding principles did not refer specifically to financial incentives, they did make a number of statements that indicate an understanding of physician concerns, such as "stand alone legacy systems with strong clinician loyalty make integrated provincial solutions difficult to deploy", "if not integrated with local systems [*meaning primary care physician office EMRs and hospital systems*], provincial initiatives will have difficulty engaging clinicians", and "wherever possible, legacy systems will be leverages to achieve provincial goals" (eHealth Ontario, 2009, p. 6). The implication here is that primary care physicians will not be burdened with the cost of replacing their existing EMRs where possible; systems will be integrated to enable patient data flow between local EMRs and provincial systems; where local EMR systems cannot be leveraged, replacements will be funded; and use of provincial interoperability standards will result from collaboration between EMR vendors and government, ensuring vendor EMR systems meet standards, and physicians are not burdened with concerns regarding whether the system they select will meet provincial needs. These concepts are reinforced and elaborated on in the strategy when the Physician eHealth project is described, outlining the process of contracting with OntarioMD to provide direct funding for adoption of electronic medical records, and working with OntarioMD and clinical advisors to develop and test robust specifications for

integration of systems (eHealth Ontario, 2009). By addressing this in the strategy, eHealth Ontario serves to alleviate physicians' funding, interoperability and standards concerns noted in the literature (Ludwick and Doucette, 2009; Silversides, 2010; and Dixon, 2009).

One can also ascribe organizational and employee value to the strategy. While there is no profitability in not-for-profit organizations such as eHealth Ontario and OntarioMD, they do stand to benefit from success in terms of organizational growth, or in the case of eHO, *survival* as an arm's length government organization; they each stand to gain or lose political strength. Despite what was initially perceived as a strong strategy, eHealth Ontario lost significant credibility due to the media debacle of 2009 and the alleged procurement scandal. eHO has undergone leadership changes three times in the past year (one inaugural leader, two interim), and has recently recruited a fourth CEO (eHealth Ontario, 2010). Priority projects have been delayed due to the release last fall of approximately 300 eHealth Ontario consultants, with initially few resources left to implement the initiatives outlined in the strategy, and a slower than anticipated recruitment effort to replace consultants with full time employees (F. Murphy, personal communication, November, 2009).⁵ Existing and new eHealth Ontario employees may value the strategy, may feel value as part of the team implementing the strategy, but the full benefit to individuals and teams will be slow to be recognized, due to the previous events and environmental factors. Employees at OntarioMD may more readily benefit from their part implementing the strategy, since their organization was not tainted with the events of 2009. Over time employees in both of these organizations will undergo growth in numbers, changes in processes, workflow and personal influence as the strategy is deployed and success or failure encountered, and so should be considered as having a stake in the strategy.

Ontario politicians and political parties are also stakeholders, since the success of the strategy will benefit one political party to the detriment of others, and conversely the failure of the strategy will benefit opposition parties and damage the incumbents. The value of a successful implementation to politicians as Ontarians who will utilize the health care system can be recognized, however it is likely this value is overridden by the political party affiliation. The real value to politicians on each side is in winning the competition.

Although the strategy does not exclude other clinical professionals as stakeholders, by not specifically mentioning others, it misses an opportunity to engage them. A focus on physicians is required to ensure success factors are incorporated, recognizing the power, influence and uniqueness of the physician stakeholder group, and mitigating any risk associated with this group. The clinical priority projects primarily will involve physicians, so this is another reason to justify use of the physician group as key stakeholder. However, using the term *physician* 61 times in the strategy, the term *pharmacist* once, and not using the words *nurse*,

⁵ The author was a consultant on a project during the time eHealth Ontario was attempting to recruit staff (2009).

nursing, physiotherapist, social worker, or dietitian at all may be perceived as effectively excluding these stakeholders from the largest eHealth initiative in the province. Addressing the greatest stakeholder-related risk is a key factor in the potential success of any strategy, however with provincial health priorities moving towards inter-professional teams in order to distribute health services more appropriately and improve patient access to care, ignoring other stakeholders and potentially alienating them may not be politically wise.

6.2 Resources and Capabilities

eHealth Ontario in 2009 acknowledged that the complement of experienced eHealth human resources was not sufficient to implement all initiatives over the three-year timeframe of the strategy. A 2009 Ontario Hospital Association survey cited by eHealth Ontario indicated that approximately 2000 individuals were then involved in delivering ehealth solutions in Ontario's hospitals and healthcare organizations (2009). An accounting of other specialized eHealth delivery organizations suggested an additional 2000 individuals dedicated to various provincial initiatives (eHealth Ontario, 2009). Despite these numbers, the complement was deemed by eHealth Ontario to be insufficient for delivery of the strategy (2009). Two approaches were taken to address this shortcoming. First the strategy identified opportunities to expand the number of skilled professionals, through developing programs internally and with Ontario universities and colleges. Secondly, the strategy proposed working collaboratively with eHealth implementation teams from multiple diverse organizations across the province to find opportunities to increase the compliment of skilled staff, including enabling capabilities such as apprenticeship and on-the-job training. Creatively increasing the number of trained skilled individuals and working together to create efficiencies are sound approaches to addressing resource shortages, however the strategy does not address a functional analysis of capabilities and interactions needed to achieve success. With 4000 plus individuals working together to deliver multiple initiatives across the province, it is assumed that the specialized functional capabilities required would be many and complex, and integration of cross-functional capabilities would be needed (Grant, 2005). This is not addressed in Ontario's eHealth Strategy, and the gap would need to be addressed prior to implementation.

6.3 Structure and Management Systems

Grant stipulates a strong link between strategy formulation, implementation, and the structure and systems of an organization (2005). It is reasonable to agree with that implementation of a successful strategy relies on a robust and flexible organization and integrated processes, particularly in a time of chaos rather than predictability. Stanford (2007) suggests that all organizations fail in some aspect of the business, resulting in low performance. She defined organization design as

“the outcome of shaping and aligning all the components of an enterprise towards the achievement of an agreed mission” (Stanford, 2007, p. 4), and like Grant, she suggests organization design is driven by the business strategy, and is a critical business process that needs attention early and regularly (Stanford, 2007).

eHealth Ontario’s 2009 published strategy for Ontario did not offer a plan for its organizational structure or processes as part of the strategy. The strategy document did indicate that collaboration and integration of implementation resources was considered, and identified that one risk to the strategy and to the projects is the potential delay of eHealth Program transition from the Ministry of Health and Long Term Care to eHealth Ontario (2009). The strategy was developed prior to completion of the transition from one organization to the other, and the document outlines continued collaboration between the organizations as a risk mitigation tactic. However, no other reference was made to the importance of or plan for a thoughtful structure or processes within the organization, or across participating organizations. While there was mention of collaboration between teams across the province as mentioned in the discussion of resources and capabilities in section 6.2 above, the lack of discussion of organizational structure, design and processes demonstrates a gap area for the strategy, particularly with the presumed instability of an organization in transition, taking on a huge transformational undertaking, with dependencies on other organizations. Focusing on the internal design in this situation would be critical to success, and may be one of the reasons that the organization was susceptible to the media storm and underwent such turmoil in 2009.

6.4 Environment

Organizations and projects need to consider the environment in which they operate, both internal and external, and plan for risks their environmental assessment uncovers (Grant, 2005). Without proactively planning for risk in the environment, projects and organizations are susceptible to uncertainties in the environment and experience a higher incidence or degree of failure. eHealth Ontario (2009) outlined results of a high-level risk assessment in their strategy, identifying a number of risks, the probability and impact, and their mitigation tactics. Internal and external risks to projects and to the strategy were identified, with some of the more important risks being:

1. Insufficient human resources to execute strategy
2. Internal staff upheaval or unrest
3. Retention and morale issues
4. Limited buy-in from stakeholders
5. Delays in transition (eHealth Ontario, 2009).

While risk two, internal staff upheaval, was identified as having a high probability of occurrence, the strategy identified the impact as medium. Similarly risk three,

retention and morale issues, was identified as high probability and medium impact. Risks four and five were categorized as medium/medium. The cause of the internal upheaval and the retention and morale issues was in part due to the transition of the eHealth Program (MOHLTC) to the new eHealth Ontario organization, however other factors should have been considered. The new organization was rising out of another organization, the Smart Systems for Health Agency (SSHA), an organization that the Toronto Star later reported had spent \$647 million over six years, with no clinical results from this investment (The Toronto Star, 2009). Prior to the development of the strategy a number of senior SSHA executives were replaced, adding to the uncertainty within eHealth Ontario (CTV, 2009). While some the assessment of impact of risk is subjective, in a situation where there is a merging of human resources from two pre-existing organizations, with presumably different cultures; where one of the organizations [SSHA] has been dismantled for spending significant financial resources over a six year period with little to show for the investment; where a number of the pre-existing resources at SSHA remain in the new organization; and where there is a provincial election looming, it seems that identifying the risks of staff upheaval and morale issues as a medium risk is grossly underestimating the impact of the risk. Hampton (2009) describes enterprise risk as varying with the line of business, the nature of the entity, and political and economic issues. He suggests there is an upside or opportunity to some aspects of risk, and there is also a relationship between risks which can minimize or magnify the impact of the risk, depending upon steps taken (Hampton, 2009). eHealth Ontario (2009) identified a number of risks in the strategy, but seemed to underestimate the individual impacts, missed identifying one risk (pre-election fact-finding), or at least did not identify it in the strategy, and seemed to not consider the combined force of these risks. This may have contributed to the difficulty eHealth Ontario had managing and adapting to the media and political maelstrom last summer and fall, and the ensuing project delays.

6.4.1 Primary Care Reform and Physician Influence

Primary care generally refers to the act of a physician providing services to patients, with the term primary health care representing the broader view of providing services by multiple or varied providers to a population of patients, and with a greater focus on prevention. Primary care reform is the advancement from primary care to primary healthcare (Aggarwal, 2009). In her 2009 dissertation on primary care reform in Ontario, Aggarwal suggests that based on her findings, there is a reluctance on the part of physicians both individually, and as groups represented by the Ontario Medical Association (OMA) and the College of Family Physicians of Canada (CFPC), to embrace aspects of primary care reform that are perceived to negatively affect autonomy. Aggarwal suggested that resistance to primary care reform in Ontario is due to concern over redistribution of political power and resources from individual physicians to non-physicians, community and/or to patients; and from medical associations to government (2009). She

proposed that the primary care models that impact the balance of power are less likely to succeed, and hypothesized that FHOs, FHNs and FHTs, which are all coordinated professional models, will be more readily adopted (Aggarwal, 2009).

The historical analysis conducted by Aggarwal in her 2009 dissertation indicated that the OMA has the power to negotiate on behalf of all Ontario physicians on the subject of reimbursement, with veto power on allocation of physician funding. At the time of Aggarwal's interviews, when questions about factors with the greatest impact of the pace of change in primary care, three-quarters of respondents identified the politics of power between the provincial government and the OMA (Aggarwal, p.170, 2009). Aggarwal also identified the Coalition of Family Physicians (COFP) as a powerful and vocal group representing the majority of Ontario's family physicians (2009), and noted that COFP has been seen to oppose primary care reform. Alternatively Aggarwal identified the Ontario College of Family Physicians (OCFP) as supporting the reform efforts (2009).

Implementation of information technology in primary care is related to and will be influenced by the political power struggle to advance primary care reform. Aggarwal (2009) identified information technology as an important enabler of key elements of primary care reform, including system coordination, collaboration between health care providers, and disease prevention and health promotion (p 224, 2009). More than 80% of the key informants to her case study supported implementation of IT as a key element of primary care reform, with 65% agreeing that IT is a clinical management support that allows the collection and sharing of patient information between providers (Aggarwal, 2009). Interestingly, those least supportive of both questions were found in the academic category [for primary care reform], and academic and bureaucrat categories [for IT as clinical management support], not the organized medicine, primary health care organization or other provider key informant categories (Aggarwal, p 224, 2009).

Aggarwal (2009) concludes that physician resistance is directly related to how the key primary care reform elements [coordination of care, information technology, alternative funding mechanisms, collaborative practice and health care team settings, rostering patients, system coordination, community participation, and 24/7 access to care] impact on professional autonomy.

eHealth Ontario and OntarioMD are working towards a common purpose: providing the enablers to support physician EMRs to advance patient care. Through the collaboration that seems to be in place (eHO provides funds and holds accountability and OntarioMD implements the process, provides support and distributes funds to physicians), the strategy seems well-positioned to harness the influential position of the OMA (parent-organization to OntarioMD), use their political influence if needed, while at the same time eHO manages reporting back to MOHLTC and integrating the EMR adoption program with other provincial eHealth initiatives. This approach will both encourage adoption and through the

power of the OMA, somewhat provide a mitigating tactic as the political environment heats up leading up to the election.

6.4.2 Pre-Election Influence

Given the experience of eHealth Ontario in the summer and fall of 2009 at the hands of the media and the opposition parties' persistent demands for resignations of eHO leaders and the then Minister of Health and Long Term Care, and attempts to tarnish the current Premiere, the pre-election influence cannot be underestimated. This should factor into any environmental scan and risk assessment and continue to be monitored. While it's likely that most damage to the eHealth strategy and projects has occurred already in the existing project delays, the organization would do well to continue to focus, follow provincial procurement and other policies, and try not to give the opposition reason for more eHealth attacks in parliament and in the media.

6.4.3 Economic Influence

Ontario has been experiencing economic turmoil, and currently has a budget deficit of \$25-billion (CBC, 2010). In the March 2010 provincial budget announcement, MOHLTC projected the interest on debt to be \$10-billion in fiscal year 2010-2011, and rising in the subsequent two years. Ontario LHINs and healthcare organizations have not yet been allocated their budgets for the 2010-2011 fiscal year, and will be experiencing relative reductions on allocations compared to previous years. These challenges will impact the funding of any provincial initiatives for which funds have not yet flowed, and pose a risk to ongoing funding for those that have been promised and expected. The \$236-million for OntarioMD's EMR Adoption Program has been allocated, contracts with OntarioMD have been signed, the initiative is underway and funds are being dispersed (OntarioMD, 2010). It would appear that funding to EMR adoption is not a risk at this time, however attention should be addressed to the end date of contracts, to ensure as many physicians take advantage of the initiative as funding permits. If the full allocation is not used, the government process is that unused funds return to government for reallocation. In the current economic environment, it is also anticipated that future funding will be more challenging to secure.

6.5 eHealth Strategy Change Management and Adoption Practices for Primary Care

The literature review identifies a number of change management practices, barriers to adoption, and success factors that are relevant to all change initiatives, but in particular these will be of value to the implementation of EMRs in Ontario's primary care environment. In reviewing Ontario's eHealth Strategy in the context

of physician funding and support for EMR implementations, and in view of the government's drive to advance primary care as a method of health outcome improvement, efficiency and cost mitigation, the strategy and initiatives outlined within it seem well-positioned for success.

Common change management approaches and practices identified through the literature review are listed in table 3, interspersed with success factors of each model. Barriers common to HIT and EMR projects are outlined in table 2. To assess the strength of Ontario's eHealth Strategy, the change management approaches identified in table 3 have been compared with elements of the strategy and placed in table 5 in an appendix due to size. The table allows for identification of change support elements within specific change models, whether the details of these elements are present in Ontario's strategy, and how they are being addressed. If a change element was not demonstrated, this was stated. Organizations responsible for carrying out the change elements are also detailed where possible. The content of table 5 evidences the number of change management elements demonstrated by the combined approach of Ontario's eHealth Strategy, OMA and OntarioMD's political, funding and technical support, and funding enabled by MOHLTC.

Collaboration between MOHLTC, eHealth Ontario and OntarioMD is a key part of the strategy. Virtually all change management models recommend engaging users early on, and utilizing influential, credible clinical leaders. The collaborative approach taken here not only engages stakeholders and gives them some ownership, but it potentially reduces anxiety regarding loss of power or autonomy, and with OMA and OntarioMD involved as partners in the initiative, physicians are less likely to be resistant and more likely to be engaged.

Although most success factors and barriers are addressed, and all of them are important to the success of a transformational initiative such as this, there are some that this author deems to be of such a critical nature in influencing adoption of the primary care's EMRs, that without them it would not be worth starting. These are:

- Funding for physicians to purchase and operate their EMRs
- Early and ongoing physician engagement
- Enlistment of key influential physicians, representing clinical and political perspectives

Without these, adoption would likely only reach physicians with an affinity for technology, and would likely halt there. This is likely a contributing factor to the low usage of EMRs in Canada today, since countries with these features built into their health systems are more advanced (Schoen et al, 2009; Protti et al., 2007). Funding is a key feature that enables greater numbers of physicians to engage, by financially compensating for actual costs and lost revenue. Collaboration with the OMA, eHealth Ontario, as well as the MOHLTC demonstrates a strong guiding

coalition, strongly influenced by the powerful clinical and political leadership of the OMA. This avoids physician concerns over loss of control and loss of professional and clinical autonomy (Walter and Lopez, 2008; Ford, Menachemi, Peterson & Huerta, 2009). Engaging physicians early and often is a stated guiding principle in the eHealth Strategy, in the use of clinical experts, advisors and front-line physicians involved in requirements definition, implementation planning or peer support.

Another key feature of the strategy is the compelling story of clinical value, combined with the harsh realities of the health system costs, inefficiencies and challenges with access and wait times. When layered with the economic issues, this provides Kotter's sense of urgency (1996). The strategy seems also to have been developed to build incrementally. By selecting only three clinical priorities, not only does it contribute to a vision and compelling story, but it also seems achievable. Compartmentalizing it this way with subsets of projects allows multiple initiatives to advance at once, allowing potentially for some quick wins in some initiatives while others take a longer time (Reinersten et al., 2007). Overall, the strategy addresses the majority of critical factors identified as necessary to succeed. When combined with the opportunities of timing – younger physicians expecting to use computers, and more patients with the expectation that they be used – as well as an environment where the Liberal party must see success if it has any chance to stay in power, all of this has the effect of a burning platform, a superb opportunity for success.

7.0 Recommendations for Ontario

Unfortunately there are also a few gaps identified through this research. The fact that the original strategy did not accurately identify and plan for the significant internal organizational risk at eHealth Ontario was a significant omission. Grant (2005) suggests a thorough understanding of the internal and external environments as part of any strategy development, but the pre-election environment was not considered, or at least not documented (eHealth Ontario, 2009). Additionally the strategy almost totally focused on physicians – a critical stakeholder group to be sure, but not the only group of professionals involved in HIT implementation and use. To give the perception of ignoring other clinicians can be considered a slight – and clinicians other than physicians also have long memories (Reinersten et al., 2007). While not an overwhelming challenge, this will need to be addressed prior to implementation by other types of clinicians. Finally, a risk that is the result of the eHealth issues of 2009 is the fact that there is now a new CEO in charge of eHealth Ontario. Much needs to be rebuilt in terms of trust, with the broader stakeholder group of Ontarians. While this too is not insurmountable, it will be time-consuming and will need a thoughtful, inclusive and decisive leader.

The benefits of a revised strategy should be considered, and would serve several purposes. Updating the strategy to address any gaps would lend support to a more successful outcome, strengthening the strategy. Modifications to the strategy should include results of a realistic assessment of the internal and external environment, mitigating risks of internal conflict and of external politics. A revision would also provide an opportunity to describe the involvement of other clinical professionals in Ontario's eHealth environment, allowing for a more inclusive approach. Finally, this would provide the new eHealth Ontario CEO an opportunity to put his mark on the strategy, to demonstrate that the work continues, and to begin to generate trust in a post-scandal environment.

8.0 Conclusion

Ontario is facing a real opportunity. Critical issues in the healthcare system can be overcome with greater use of information technology – improved clinical outcomes, increased efficiencies, greater access in the system, and better cost management, all potentially leading to improved sustainability in the system. The concurrent transformation in primary care aligns with the planned health information technology advances; use of EMRs in primary care is closely linked to an increase in family health teams and other government health strategies. Physician stakeholder concerns have been heard and addressed, with funding, EMR standards, and technology support provided. A highly influential and politically astute group of physicians has been engaged to help advise and navigate, working to a common purpose with the eHealth Ontario team and the Ministry of Health and Long Term Care. A province-wide communication plan targeting the physician stakeholder group has been implemented, allowing physicians to take advantage of the EMR opportunities.

That funding is available for this effort at a time when there is also the political will, a compelling story and a burning platform is a situation that does not emerge often, and it is up to the collaborative efforts of eHealth Ontario, OMA, OntarioMD and MOHLTC to successfully harness this opportunity to drive transformative change in primary care and in Ontario's health system in general. Key change management and success factors are built into the strategy, and barriers have been considered and mitigated. If the new leadership at eHealth Ontario is up to the challenge and the coalition of leaders can manage the politics of the next twelve months, the strategy has the necessary components incorporated to succeed. Much now depends on leadership, and the ability to predict and adjust to the political environment.

9.0 References

- Aggarwal, M. (2009). *Primary care reform: a case study in Ontario* (Unpublished doctoral dissertation). University of Toronto, Toronto ON.
- Allscripts Healthcare Solutions (2005). *Driving physician adoption through physician-centric design*. Retrieved from <http://www.theelectronicphysician.com/html/TEP.html>
- Allscripts Healthcare Solutions (2005). *The Electronic Physician: Guidelines for implementing a paperless practice*. Retrieved from <http://www.theelectronicphysician.com/html/TEP.html>
- Ambler, G. (2006, June 11). Organizational change and the neuroscience of leadership [Overview of article on organizational change]. Retrieved from <http://forums.infoway-inforoute.ca/webx?14@1013.gPwawntD4M.6@.ef20e9c>
- B. Von Der Linn. (2009, May 25). Overview of GE's change acceleration process [HPT blog post]. Retrieved from <http://bvonderlinn.wordpress.com/2009/01/25/overview-of-ges-change-acceleration-process-cap/>
- Baker, R., Carr, D., Guerriere, M., MacLean, S. & Morgan, M., (2004, October). *Patient safety: enabling the clinicians*. Paper presented at the meeting of Healthcare Rounds, Toronto, ON. http://www.longwoods.com/website/events/healthcarerounds/HCR-1004/Patient_Safety_Next.pdf
- Bates, D. (2005). Physicians and ambulatory electronic health records. *Health Affairs* 24(5), 1180-1189. Doi: 10/1377/hlthaff.24.5.1180. Retrieved from <http://www.healthaffairs.org/>
- Bates, D.W., Ebell, M., Gotlieb, E., Zapp, J., and Mullins, H.C., (2003). A proposal for electronic medical records in U.S. primary care. *Journal of the American Medical Informatics Association*, 10(1), 1-10. Doi: 10.1197/jamia.M1097
- Brookstone, A. & Braziller, C. (2003). Engaging physicians in the use of electronic medical records. *Electronic Healthcare* 2(1), 23-27. Retrieved from <http://www.longwoods.com/content/16188>
- Brown, H. (2010, February). eHealth Ontario: Changing the way patients receive care across Ontario. *Hospital News*. Retrieved from http://www.ehealthontario.on.ca/pdfs/News/HospitalNews_Feb2010.pdf
- Canada Health Act (1984). *Overview of the Canada health act*. Retrieved from <http://www.hc-sc.gc.ca/hcs-sss/medi-assur/cha-lcs/index-eng.php>
- Canada Health Infoway (2010). *EHR 2015: Advancing Canada's next generation of healthcare*. Retrieved from <http://www.infoway-inforoute.ca/lang-en/>

Canada Health Infoway (2010). *Change implementation roadmap*. Retrieved from <http://www.infoway-inforoute.ca/lang-en/>

Canadian physicians playing “catch-up” in adopting medical records (2010, February). *Canadian Medical Association Journal*, 182(2), 103-104. Retrieved from CMAJ website: www.cmaj.ca

Canadian Resident Matching Report and Statistics (2009). Retrieved from Canadian Resident Matching Service website: http://www.carms.ca/pdfs/2009R1_MatchResults/47MatchReport_E.pdf

Canadian Institute for Health Information (2010, March). *Nearly two-thirds of seniors using five or more types of prescription drugs*. Retrieved from CIHI website: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=media_20100218_e

Canadian Institute for Health Information (2010). *Emergency department visits by seniors in Ontario increased by 100,000 over five years*. Retrieved from CIHI website: http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=media_20100218_e

Canadian Institute for Health Information (2008). *National drug expenditure in Canada 1985 to 2008*. Retrieved from CIHI website: http://secure.cihi.ca/cihiweb/products/drug_expenditure_1985_2008_e.pdf

Canadian Institute for Health Information (2008). *National health expenditure trends 1975 to 2009*. Retrieved from CIHI website: http://secure.cihi.ca/cihiweb/products/National_health_expenditure_trends_1975_to_2009_en.pdf

Canadian Institute for Health Information (2009). *Health care in Canada, 2009: A decade in review*. Retrieved originally from <http://secure.cihi.ca/ews/en/index.jsp> and subsequently from http://www.cihi.ca/cihiweb/googleSearch.jsp?lang_CODE=ENG&q=a+decade+in+review

Canadian Institute for Health Information Media Release (November 2006). *Provincial and territorial governments expected to spend \$96 billion on health in 2006-2007*. Retrieved from CIHI website: http://www.cihi.ca/cihiweb/dispPage.jsp?cw_page=media_01nov2006_e

Canadian Institute for Health Information, Primary Health Care (PHC) Indicators Chartbook: An Illustrative Example of Using PHC Data for Indicator Reporting (Ottawa, Ont.: CIHI, 2008). Retrieved from http://secure.cihi.ca/cihiweb/products/phc_chartbook_en.pdf

Cancer Care Ontario (2009). *Ontario's Wait Time Strategy*. Retrieved from Cancer Care Ontario website: <http://www.cancercare.on.ca/cms/One.aspx?portalId=1377&pageId=8836>

CBC, (2010). Ontario budget to tackle \$25B deficit. Retrieved from <http://www.cbc.ca/canada/toronto/story/2010/03/24/ont-budget.html>

- Chaiken, B. (2002). Physician adoption of technology linked to providing benefits. *Journal of Quality Healthcare* 1(2), 1-3.
- Chandler, A. (1962). *Strategy and structure*. Cambridge, MA: MIT Press.
- Cohm, K. H., Berman, J., Chaiken, B., Breen, D., Green, M., Morrison, D., & Scherger, J. E. (2009). Engaging physicians to adopt healthcare information technology. *Journal of Healthcare Management*, 54(5), 291-300.
- Collins, J. (2005). Level 5 leadership: the triumph of humility and fierce resolve. *Harvard Business Review*, 83(7/8), 136-146.
- Criticism of the Ontario Medical Association continues unabated. (2008, December). *Canadian Medicine*. Retrieved from <http://www.canadianmedicineneews.com/2008/12/criticism-of-ontario-medical.html>
- CTV, (2009, October 8). *Millions dolled out as severance to health agency execs*. Retrieved from http://toronto.ctv.ca/servlet/an/local/CTVNews/20091008/ehealth_severance_091008?hub=TorontoNewHome
- Cutler, D. M., Feldman, N.E. & Horwitz, J. R. (2005). US adoption of computerized physician order entry systems. *Health Affairs* 24(6), 1654-1663.
Doi: 10.1377/hlthaff24.6.1654
- Daft, R. (2007). *Organization theory and design*. Mason, OH: South-Western Cengage Learning.
- Deutsch, E., Duftschmid, G., & Dorda, W. (2010). Critical areas of national electronic health record programs – is our focus correct? *International Journal of Medical Informatics* 79, 211-222.
- Dixon, B. E. (2007). A roadmap for the adoption of e-health. *e-Service Journal*, 3-13.
- eHealth Ontario and OntarioMD partner to implement the “EMR Adoption Program” (2009, October). *The Medical News*. Retrieved from <http://www.news-medical.net/news/20091029/eHealth-Ontario-and-OntarioMD-partner-to-implement-the-EMR-Adoption-Program.aspx>
- eHealth Ontario (2009). *Ontario’s eHealth Strategy 2009-2012*. Retrieved from <http://www.ehealthontario.on.ca/about/strategy.asp>
- Fairbrook, D., (2007). The winding road to EMR adoption. *Health Management Technology*, 28(12), 34-37.
- Ford, E. W., Menachemi, N., Peterson, L. T., & Huerta, T. R. (2009). Resistance is futile: But it is slowing the pace of EHR adoption nonetheless. *Journal of*

American Medical Informatics Association, 16, 274-281. Doi: 10.1197/jamia.M3042

Garvin, D. (2000). *Learning in action: A guide to putting the learning organization to work*. Boston: Harvard Business School Press.

Grant, R.M., (2005). *Contemporary strategy analysis*. Malden, MA: Blackwell Publishing.

Grosche, Tobias, (2009). *Computational intelligence in integrated airline scheduling*. Retrieved from <http://0-www.springerlink.com.aupac.lib.athabascau.ca/content/>

Guerriere, M., (March, 2010). *Keeping Ontario healthy: policy ideas for a new decade*. Presented at the meeting of Breakfast with the Chiefs, Toronto, ON. Retrieved from <http://www.longwoods.com/events.php?mode=past>

Hackbarth, G. & Milgate, K. (2005). Using quality incentives to drive physician adoption of health information technology. *Health Affairs*, 24(5), 1147-1149.

Hampton, J. (2009). *Fundamentals of enterprise risk management: How top companies assess risk, manage exposures, and seize opportunities*. [Books 24x7]. Retrieved from <http://ezproxy.athabascau.ca:2050/toc.asp?bookid=30551>

Health Canada. (2007). *Health care system delivery*. Retrieved from <http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/index-eng.php>

Health Canada. (2007). *Primary health care*. Retrieved from http://www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2004-fmm-rpm/fs-if_08-eng.php

HealthForce Ontario (2009). About us. Retrieved from HealthForce Ontario website: <http://www.healthforceontario.ca/Glossary.aspx>

Health Services Restructuring Commission (1999). *Primary health care strategy, advice and recommendations to the honourable Elizabeth Witmer, Minister of Health, December 1999*. Retrieved from <http://www.search.gov.on.ca/FSS/ProcessSearch.do?>Comprehensive Primary Health Care

Hill, J.W., & Powell, P. (2009). The national healthcare crisis: Is ehealth a key solution? *Business Horizons*, 52(3), 265-277.

Hillestad, R., Bigelow, J., Bower, A., Girosi, F., Meili, R., Scoville, R., and Taylor, R. (2005). Can electronic medical record systems transform health care? Potential benefits, savings and costs. *Health Affairs* 24(5), 1103-1117. Retrieved from <http://0proquest.umi.com.aupac.lib.athabascau.ca:80/pqdweb?index=2&did=899710741&SrchMode=1&sid=2&mt=3&VInst=PROD&VType=PQD&RQT=309&VName=PQD&TS=1274724414&clientId=12302>

Jha, A., Doolan, D., Grandt, D., Scott, T., & Bates, D. (2008). The use of health information technology in seven nations. *International Journal of Medical Informatics*, 77, 848-854.

Investor Words (2010). Retrieved from <http://www.investorwords.com/4775/strategy.html>

Keller, S. & Aiken, C. (2008, May). The inconvenient truth about change management: why it isn't working and what to do about it. *McKinsey Quarterly*. Retrieved from http://www.mckinsey.com/client-service/organization-leadership/The_Inconvenient_Truth_About_Change_Management.pdf

Kohn, L.T., Corrigan, J.M., & Donaldson, M.S. (editors), Committee on Quality of Healthcare in America, Institute of Medicine (2000). *To err is human: building a safer health system*. National Academies Press. Retrieved from <http://www.nap.edu/openbook.php?isbn=0309068371>

Lee, J., Cain, C., Young, S., Chockley, N., & Burstin, H. (2005). The adoption gap: Health information technology in small physician practices. *Health Affairs*, 24(5), 1364-1366. Doi:10.1377/hlthaff2451364

Lee, M., (2003, March 18). The ATM from invention to innovation [Commentary]. Retrieved from <http://www.atmmarketplace.com/article.php?id=3081>

Lines, R. (2005). The structure and function of attitudes to organizational change. *Human Resources Development Review*, 4(1), 8-24.

Ludwick, D. A., (2010). *Why does it take so long to adopt an EMR?* *ElectronicHealthcare*, 9(1), 10-13. Retrieved from www.longwoods.com

Ludwick, D.A. & Doucette, J. (2009). Adopting electronic medical records in primary care: Lessons learned from health information systems implementation experience in seven countries. *International Journal of Medical Informatics* 78, 22-31.

Ludwick, D. A. & Doucette, J. (2009). The implementation of operational processes for the Alberta electronic health record: Lessons for electronic medical record adoption in primary care. *Electronic Healthcare*, 7(4), 103-107. Retrieved from <http://www.longwoods.com/content/20570>

Ludwick, D. A. & Doucette, J. (2009, December). Primary care physician's experience with electronic medical records: Barriers to implementation in a fee-for-service environment. *International Journal of Telemedicine and Applications* 1, 1-9. Doi: 10.1155/2009/853524

MacMaster Health Forum. (2010, January). *Issue Brief: Strengthening Primary Healthcare in Canada*. Hamilton, ON: Lavis, J.N. & Shearer, J. Retrieved from

http://www.healthsystemsevidence.org/documents/Strengthening%20Primary%20Healthcare%20in%20Canada_issue-brief_2010-01-08.pdf

- Macinko, J., Starfield, B., & Shi, L. (2007). Quantifying the health benefits of primary care physician supply in the United States. *International Journal of Health Services*, 37(1): 111-26. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/17436988>
- Macinko, J., Starfield, B., & Shi, L. (2003). The contribution of primary care systems to health outcomes within Organization for Economic Cooperation and Development (OECD) countries. *Health Services Research*, 38(3), 831-865.
- Manuel, D. G., Maaten, S., Thiruchelvam D., Jaakkimainen, L., & Upshur, R. E. G. (2006). Primary care in the health system. In: Jaakkimainen L., Upshur R., Klein-Geltink J.E., Leong A., Maaten S., Schultz S.E., Wang L., editors. *Primary Care in Ontario: ICES Atlas*. Toronto, ON: Institute for Clinical Evaluative Sciences. Retrieved from http://www.ices.on.ca/file/PC_atlas_prelims_complete.pdf
- Marshall, M., Klazinga, N., Leatherman, S., Hardy, C., Bergmann, E., Pisco, L., Mattke, S., & Mainz, J. (2006). OECD health care quality indicator project: the expert panel on primary care prevention and health promotion. *International Journal for Quality in Health Care*, 18(1), 21-25. Retrieved from http://intqhc.oxfordjournals.org/cgi/content/full/18/suppl_1/21?ijkey=BT8Q5QCoHyR1w&keytype=ref&siteid=intqhc
Doi: 10.1093/intqhc/mzl021
- Meaney, M. & Pung, C. (2008, July). McKinsey global survey results: creating organizational transformations. *McKinsey Quarterly* 1-7.
- Medical News, (2009). *eHealth Ontario and OntarioMD partner to implement the "EMR Adoption Program"*. Retrieved from <http://www.news-medical.net/news/20091029/eHealth-Ontario-and-OntarioMD-partner-to-implement-the-EMR-Adoption-Program.aspx>
- Mento, A.J., Jones, R.M., & Dirndorfer, W. (2002). A change management process: Grounded in both theory and practice. *Journal of Change Management*, 3(1), 45-59. Retrieved from <http://0-www.informaworld.com.aupac.lib.athabascau.ca/smpp/title~content=t713703618~db=all>
- Ministry of Health and Long Term Care, (2010). *New family health teams*. Retrieved from MOHLTC website: http://www.health.gov.on.ca/transformation/fht/fht_newfht.html
- Ministry of Health and Long Term Care, (2010). *Family health teams: information for family health teams*. Retrieved from MOHLTC website: http://www.health.gov.on.ca/transformation/fht/fht_guides.html
- Ministry of Health and Long Term Care, (2010). *Ontario wait times: emergency rooms*. Retrieved from MOHLTC website: http://www.health.gov.on.ca/transformation/wait_times/public/wt_public_mn.html#

- Ministry of Health and Long Term Care, (2009, September). *Family health teams: Guide to physician compensation v.3*. Retrieved from MOHLTC website: http://www.health.gov.on.ca/transformation/fht/guides/fht_compensation.pdf
- Ministry of Health and Long Term Care, (2008). *ColonCancerCheck Physician Incentives bulletin*. Retrieved from MOHLTC website: <http://www.health.gov.on.ca/english/providers/program/ohip/bulletins/4000/bul4482.pdf>
- Mintzberg, H., Ahlstrand, B., & Lampel, J. (1998). *Strategy safari: a guided tour through the wilds of strategic management*, (1), pp. 1-21. New York, NY: The Free Press.
- Moody, J. (2009). *Primary Care Models in Ontario Healthcare*. Adapted with permission.
- Nagle, L. & Catford, P. (2008). Toward a model of successful electronic health record adoption. *Healthcare Quarterly* 11(3), 84-91.
- National Coalition on Healthcare, (May, 2009). *Fact sheet – cost*. Retrieved from <http://www.nchc.org/facts/cost.shtml>
- Nixon, D. L. (2009). *Barriers to electronic medical records (emr) adoption by selected primary care physicians in Arizona: a case study (Doctoral dissertation)*. Retrieved from UMI(UMI number 3379675).
- Ontario Health Quality Council. (2009). *Qmonitor: 2009's report on Ontario's health system*. Retrieved from Ontario Health Quality Council website: http://www.ohqc.ca/pdfs/ohqc_2009_report_-_english.pdf
- Ontario Ministry of Finance (2010). *2010 Ontario Budget: Chapter II: Ontario's economic outlook and fiscal plan, section e: Fiscal plan*. Retrieved from <http://www.fin.gov.on.ca/english/budget>
- OntarioMD, (2009). *Company overview*. Retrieved from OntarioMD website: https://www.ontariomd.ca/portal/server.pt?space=CommunityPage&cached=true&parentname=CommunityPage&parentid=0&in_hi_userid=2&control=SetCommunity&CommunityID=571&PageID=0
- OntarioMD, (2009). *EMR adoption program*. Retrieved from OntarioMD website: <https://www.ontariomd.ca/portal/server.pt?space=CommunityPage&cached=true&parentname=CommunityPage&parentid=0&control=SetCommunity&CommunityID=204&PageID=0&landingPage=login>
- OntarioMD, (2009). *EMR funding*. Retrieved from OntarioMD website: https://www.ontariomd.ca/portal/server.pt?space=CommunityPage&cached=true&parentname=CommunityPage&parentid=0&in_hi_userid=2&control=SetCommunity&CommunityID=566&PageID=0
- OntarioMD, (2009). *Transition support program*. Retrieved from OntarioMD website: https://www.ontariomd.ca/portal/server.pt?space=CommunityPage&cached=true&parentname=CommunityPage&parentid=0&in_hi_userid=2&control=SetCommunity&CommunityID=554&PageID=0

- OntarioMD, (2009). *CMS specification v3.0 update*. Retrieved from OntarioMD website:
https://www.ontariomd.ca/portal/server.pt?space=CommunityPage&cached=true&parentname=CommunityPage&parentid=0&in_hi_userid=2&control=SetCommunity&CommunityID=555&PageID=0
- Organization for Economic Co-operation and Development, (2007). *OECD health data: health expenditure: 2007*. OECD Stats Library. Retrieved from <http://stats.oecd.org/index.aspx>
- Pawliw-Fry, J.P. (2009). All change is personal: why most change efforts fail and what to do about it. *Institute for Health and Human Potential*. 2009.
- Poon, E. G., Blumenthal, D., Jaggi, T., Honour, M. M., Bates, D. W., & Kaushal, R. (2004). Overcoming barriers to adopting and implementing computerized physician order entry systems in US hospitals. *Health Affairs*, 23(4), 184-190.
- Prada, G., Grimes, K., McCleery, A., Nguyen, D., Pomey, M., Reed, V, Stonebridge, C. & Roberts, G. (2004). *Challenging health care system sustainability: Understanding health system performance of leading countries*. Retrieved from the Conference Board of Canada website:
<http://www.conferenceboard.ca/e-library/abstract.aspx?did=755>
- Protti, D. (2009, October). Integrated care needs integrated information management and technology [Special issue]. *Healthcare Quarterly* 13, 24-27.
- Protti, D., Bowden, T., Johansen, I. (2008, December). Adoption of information technology in primary care physician offices in New Zealand and Denmark, part 3: medical record environment comparisons. *Informatics in Primary Care*, 16(4), 285-90.
- Protti, D., Bowden, T., Johansen, I. (2008, December). Adoption of information technology in primary care physician offices in New Zealand and Denmark, part 4: benefits comparisons. *Informatics in Primary Care*, 16(4) 291-6.
- Protti, D., Edworthy S., Johansen I. (2007). Adoption of information technology in primary care physician offices in Alberta and Denmark. Part 1. Historical Technical and Cultural Forces. *Electronic Healthcare* 6(1), 95-102. Retrieved from <http://www.longwoods.com/content/18936>
- Protti, D., Edworthy S., Johansen I. (2007, May). Adoption of information technology in primary care physician offices in Alberta and Denmark. Part 2. A novel comparison methodology. *Healthcare Quarterly* 10, 1-16. Retrieved from <http://www.longwoods.com/>
- Quality service and improvement tools: Project management guide (2006). Retrieved from the National Health Service (NHS) website:

http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/project_management_guide.html

- Rahman, Ilyas-Ur, 2007. Role of information technology in banking industry. *Review of Business Research*. Retrieved from <http://www.britannica.com/bps/additionalcontent/18/31381517/ROLE-OF-INFORMATION-TECHNOLOGY-IN-BANKING-INDUSTRY>
- Ravi (ed), Valamani, (2008). Advances in banking Technology and Management: Impacts to ICT and CRM. IGI Global c 2008. Books24x7. <http://ezproxy.athabascau.ca:2050/toc.asp?site=D5RID&bookid=23251/book.asp>
- 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, MA: Institute for Healthcare Improvement.
- Reinhardt, U., Hussey, P. & Anderson, G.F. (2004). *US Health Care Spending in an International Context: Why US spending is so high and can we afford it?* Health Affairs 23(3), 100-25. Retrieved from <http://content.healthaffairs.org/cgi/reprint/23/3/10>
- Robinson, J.C., Casalino, L.P., Ph.D., Gillies, R.R., Rittenhouse, D.R., Shortell, S.S., & Fernandes-Taylor, A. (2009, April). *Medical Care*, 47(4):411–17. Retrieved from http://journals.lww.com/ww-medicalcare/Abstract/2009/04000/Financial_Incentives,_Quality_Improvement.6.aspx
- Rossos, P. G., Abrams, H., Wu, R., & Bray, P. (2006). Active physician participation key to smooth MOE/MAR rollout [Special issue]. *Healthcare Quarterly*, 10, 58-65.
- Rowe, W.G. (2001). Creating Wealth in Organizations: The role of strategic leadership. *The Academy of Management Executive*, 15(1), 81-94.
- Sabogal, F. (2004). EHR adoption: A barrier analysis. *Doctor's Office Quality: Information Technology*, 1-5. Retrieved from http://docs.google.com/viewer?a=v&q=cache:vfYxlbTme1QJ:archive.healthit.ahrq.gov/portal/server.pt/gateway/PTARGS_0_890598_0_0_18/EHR%2520Adoption%2520A%2520Barrier%2520Analysis.pdf+EHR+adoption+sabogal&hl=en&gl=ca&pid=bl&srcid=ADGEEESjyyyKhmv9HaKzyNMKQqo8EMa7ZROak77QX9XBYX82q_21pLJOD2sLV8RycgN6LP5yCZuAuWQiRq2l0ZP8pksk1Ld7q_CE3AHuXnsdHVeuLAdeYhY8sSn1pvEUXj63s9lu-Ewq1&sig=AHIEtbQjI-6_IUfq5Td3uuMX5RGyRLfb3Q
- Saull-McCaig, S., Pacheco, R., Kozak, P., Gauthier, S., & Hahn, R. (2006). Implementing Moe/MAR: Balancing project management with change management [Special issue]. *Healthcare Quarterly*, 10, (27-39). Retrieved from <http://www.longwoods.com/search>
- Schoen, C. & Osborne, R. (2009). *The Commonwealth Fund 2009 International Health Policy Survey of Primary Care Physicians in Eleven Countries*. [Chartpack download]. Commonwealth Fund, 2009. Retrieved from

<http://www.commonwealthfund.org/Content/Publications/In-the-Literature/2009/Nov/A-Survey-of-Primary-Care-Physicians.aspx%20>

Schoen, C., Osborne, R., Doty, M.M., Squires, D., Peugh, J. & Applebaum, S. (2009, November). A survey of primary care physicians in 11 countries, 2009: Perspectives on care, costs, and experiences. [Web exclusive]. *Health Affairs*, 28(6), 1171-1183. Doi: 10.1377/hlthaff.28.6.w1171

Retrieved from <http://content.healthaffairs.org/cgi/content/abstract/28/6/w1171?ijkey=46Z9Be2ia7vm6&keytype=ref&siteid=healthaff>

Shi, L., Macinko, J., Starfield, B., Politzer, R., Wulu, J. & Xu, J. (2005). Primary care, social inequalities, and all-cause, heart disease and cancer mortality in US counties, 1990. *American Journal of Public Health*, 2005 April; 95(4), 674-680.

Doi: 10.2105/AJPH.2003.031716

Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1449240/?tool=pmcentrez>

Silversides, A., (2010, February 9). Canadian physicians playing “catch-up” in adopting electronic medical records. *Canadian Medical Association Journal*, 182(2).

Doi: 10.1503/cmaj.109-3126

Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/issues/184664/>

Spratt, A. & Dickson, K. E. (2008). Change factors accepting the transition to an EMR system in a private physician’s practice: An exploratory study. *Academy of Health Care Management Journal*, 4(2) 41-88.

Stanford, N. (2007). *Guide to organization design: Creating high performing and adaptable enterprises* [ebrary Reader version]. Retrieved from <http://0-site.ebrary.com.aupac.lib.athabasca.ca/lib/athabasca/docDetail.action?docID=10235176>

Starfield, B. (1998). *Primary Care: Balancing Health Needs, Services and Technology*. Oxford: Oxford University Press.

The Toronto Star, (2009). *eHealth facts and figures*. Retrieved from <http://multimedia.thestar.com/acrobat/15/e4/9885f8a54bc799460bcbcb279203.pdf>

The Toronto Star, (2009). *Ontario health minister David Caplan quits*. Retrieved from <http://www.thestar.com/news/ontario/article/706403--health-minister-caplan-quits>

The Toronto Star, (2009). *Sarah Kramer: my advice has been ignored*. Retrieved from <http://www.thestar.com/article/705375>

Vishwanath, A. & Scamurra, S. (2007). Barriers to the adoption of electronic health records. Presentation to the annual meeting of the International Communication Association, San Francisco, CA.

- Walter, Z. & Lopez, M. S. (2008). Physician acceptance of information technologies: Role of perceived threat to professional autonomy. *Decision Support Systems* 46, 206-215
- Watson, D., Broemeling, A., Reid, R., & Black, C. (2004). *A results-based logic model for primary care*. Retrieved from UBC Centre for Health Policy Research website: <http://www.chspr.ubc.ca/research/phc/logicmodel>
- Watson, D., Broemeling, A., Reid, R., & Black, C. (2004). A results-based logic model for primary health care: Laying an evidence-based foundation to guide performance measurement, monitoring and evaluation. Vancouver, BC: Centre for Health Services and Policy Research.
- Webster, C. (2010, March). Electronic health records: An asset or a whole lot of hype? *Canadian Medical Association Journal*, 182(4), E194-95. Retrieved from <http://www.cmaj.ca/cgi/reprint/182/4/E193> DOI:10.1503/cmaj.109-3164
- Wikipedia (2010). Retrieved from http://en.wikipedia.org/wiki/Computer_reservations_system
- Williams, I. (2008, October). How can technology adoption be speeded up in the NHS? *British Journal of Health Care & Information Management*. Retrieved from <http://www.bjhcm.co.uk/features/2008/810006.htm>
- Wordsmyth Dictionary (2010). Retrieved from <http://www.wordsmyth.net/>

Appendix

Table 6 *Demonstration of Change Success Factors in Ontario's eHealth Strategy (Murphy, 2010)*

| Common Change Success Factors Across Models and Authors | | | Ontario's eHealth Strategy Components Demonstrated ⁶ | |
|---|-------------------------------|--|---|--|
| Change Model Author | Change Support Element | Element Notes | Present in Ontario's eHealth Strategy | Detail |
| John Kotter: Eight-Step Model (1996) | Establish Sense of Urgency | Crises, potential crises, major opportunities | √ | Health system issues, costs, economic crisis |
| | | Environment, market and competitive realities | | Patient/consumer expects HIT |
| | Create Guiding Coalition | Group with power, working as a team, to lead change | √ | MOHLTC, eHO and OMA/OnarioMD |
| | Develop Vision and Strategy | Vision to direct the change effort | √ | Ontario's eHealth Strategy, Ontario health reforms |
| | | Strategies to achieve vision | | Collaboration, engagement, funding |
| | Communicate the Change Vision | Use all vehicles and media to constantly communicate vision and strategies | √ | OMA, OntarioMD, MOHLTC, paper, web, media |
| | | Guiding coalition role-model behaviour expected of employees | √ | OntarioMD peer support program, physician leadership |
| | Empower Broad-Based Action | Eliminate obstacles | √ | Involved OMA, OntarioMD |
| | | Change systems or structures that undermine the change vision | | Engaged and involved OMA; MOHLTC developed OntarioMD with OMA |
| | | Encourage risk-taking, non-traditional ideas/activities | | <i>Not demonstrated</i> |
| | Generate Short-Term Wins | Plan for quick wins and visible improvements | √ | Started with pilots, used early adopters to demonstrate wins, benefits |

⁶ Change management elements demonstrated in OntarioMD toolkits, funding and communication materials, in Ontario's eHealth Strategy, and OMA materials referenced throughout this research paper and viewed on these three organizations' websites (2010).

| | | | | |
|--|---|---|---|---|
| | | Create the wins | √ | Developed and communicated standards, worked with vendors to ensure met, pilots with sufficient support to succeed |
| | | Visibly recognize and reward people who made the wins possible | √ | Used early adopters for peer support, communicate success on OMA and other professional websites and at meetings, on eHO website, on MOHLTC website, medial releases |
| | Consolidate Gains and Produce More Change | Use increased credibility of wins to change systems, structures, policies that don't fit the vision or together | √ | Communicate wins as above |
| | | Hire, promote and develop individuals who can implement the change vision | √ | Use of physician peer support |
| | | Reinvigorate the process with new projects, themes and change agents | √ | <i>Not demonstrated</i> |
| | Anchor New Approaches in the Culture | Create better performance through customer and productivity-oriented behaviour, more and better leadership, and more effective management | √ | Communicate wins and benefits |
| | | Articulate connections between new behaviours and organizational success | | Communicate wins and benefits |
| | | Develop means to ensure leadership development and succession | | <i>Not demonstrated</i> |

| | | | | |
|--|--|---|--|--|
| Canada Health Infoway (CHI): Change Implementation Roadmap Top Eight Activities List (2006) | Develop Process Map & Conduct Impact Analysis | Analyse expertise, competencies, capabilities to manage change; analyse the new structure or organization of work, reporting relationships, description of new roles; evaluate effectiveness of tools to support effective implementation; analyse clinical and administrative workflow; analyse organization culture (values, attitudes and behaviours of people within organization; management structures, policies and communications approaches) | | Not demonstrated |
| | Develop Stakeholder Plan and Assess Readiness | Identify stakeholders, conduct analysis, plan for engagement | | Readiness tools and support from OntarioMD |
| | Conduct Training Needs Assessment | Analyse learning needs of each group of stakeholders, considering new workflow; develop training plan; link to communications planning; conduct training and evaluate | | Readiness tools and support from OntarioMD |
| | Plan Communication | Build on previous activities to develop communication plan; promote awareness and share project information; communicate the magnitude of the change | | OntarioMD communications lead, OMA communications, eHO communications |
| | Develop Project Governance and Change Management Structure | Develop project plans from an integrated perspective, emphasizing deliverables, milestones, and activities that address people, process and technology | | Readiness tools and support from OntarioMD |
| | Develop Business Case for Change | Define why the change is important, what the drivers are and the new processes, and the value and benefits sought from the new solution | | Ontario's eHealth Strategy; OMA and OntarioMD communication of shared purpose and funding opportunity |
| | | | | |

| | | | | |
|--|---|--|---|--|
| | Plan and Execute Change Implementation Success Factors | Use Kotter's eight successful change implementation factors: compelling case for change; vision clarity; leadership and accountability; communication specific to change; enable action/build commitment; increase change capacity; integrate planning and teams; embed new processes and tools into the culture (Kotter, 1992) | √ | Funding flowed, readiness tools and support from OntarioMD |
| | Conduct Adoption and Benefits Assessment and Knowledge Contribution | Facilitate transition from current to future; involve stakeholders in testing; ensure accuracy, relevance and availability of information to system users; establish method of identifying, categorizing and resolving issues; evaluate process and apply corrective measures; understand and communicate adoption targets and report progress | | Readiness tools and support from OntarioMD include issue resolution, lessons learned, target indicators for funding |
| The Standish Group: Chaos Report (2005) | User Involvement | Rated number 1 reason for project success | √ | OMA, OntarioMD eHealth Ontario – all involve physicians |
| | Executive Management Support | Number 2 reason for project success | √ | OMA senior leadership engaged in change |
| | Clear Statement of Requirements | Number 3 reason for project success | √ | eHealth Ontario and OntarioMD articulated requirements and indicators for funding, success |
| GE Change Acceleration Process (CAP) Model (as cited by Garvin, 2000) | Leading Change | Authentic, committed leadership, for the duration of the initiative; risk of failure increases if there is perceived lack of leadership commitment | √ | <i>At risk – eHO CEO replaced, three interim, final (assumed) now in place</i> |
| | Creating a Shared Need | Need for change must outweigh the resistance or inertia; must be a compelling reason for | √ | Ontario's eHealth Strategy, OntarioMD, Financial crisis, patient, young MDs expect HIT |

| | | | | |
|--|-------------------------------|---|---|--|
| | | change that appeals to all stakeholders | | |
| | Shape a Vision | Leaders articulate clear and legitimate vision of the world after the change; ensure vision widely understood (communication); the end-state described must be in observable and measurable behavioural terms, and must relate to individual behaviour ('what's in it for me?' must be addressed) | √ | Ontario's eHealth Strategy; new CEO will need to engage; OMA engaged, communicates vision to membership; OntarioMD engaged, communicates vision to membership |
| | Mobilize Commitment | Execute influence strategy to build momentum, and leverage early adopters to pilot the project when facing resistance | √ | OntarioMD, MOHLTC, OMA & eHO communicate to physicians, government, public, utilize & leverage early adopters |
| | Make Change Last | Make the changes permanent; leverage early wins, transfer learnings from pilots to broader rollouts; asses what is supporting and presenting barriers to the initiative | √ | EMR Adopter Program funding includes upgrades to existing systems, operational funds; refines and re-uses plans, tools and materials based on lessons learned |
| | Monitor Process | Measure progress of change initiative; set benchmarks, meet them, celebrate; address lack of progress | √ | OntarioMD published funding and reporting criteria; milestone-driven |
| | Change Systems and Structures | Modify systems and structures to support the desired future state (not existing or previous state), to ensure continue to move towards future | √ | <i>At risk: physicians must commit to registering patients, no demonstrated commitment to use of complex functions, ongoing use</i> |

| | | | | |
|--|-----------------------|--|---|---|
| Price and Lawson: The Psychology of Change Management (2003) (as cited by Keller and Aiken, 2008) | Compelling Story | Ensure story reaches/creates desire to change in all, through stories that centre not only on workforce (competition, industry leadership), but also on impact on society, impact on customer, impact on team, and impact on individual (answer to what's in it for me?); enable stakeholders to create their own story, increases commitment; focus on both negative (burning platform) and positive (what is already done well) rather than one approach | √ | Ontario's eHealth Strategy, supported by financial and health system crisis, involvement/engagement of key physician influencers (OMA), use of peer support and demonstration of benefits of implementation (from peers) |
| | Role Modelling | Ensure role models also make the change; don't overinvest only in role models as influence leaders - sometimes timing and environment just need to be right; invest across all conditions for change - in role models, in compelling story, and in reinforcement systems and skills required for change, to maximize odds of success | √ | OntarioMD and eHO engage physicians through key credible physicians, demonstrate evidence (practical Ontario results from peers, international research), provide planning aids, training, support, funding |
| | Reinforcement Systems | Don't overestimate pay for performance - often a less costly reinforcement provides more satisfaction (and therefore more enthusiastic change); satisfaction equals perception minus expectation; Individuals will go against their own self interest (and incentives) if their notions of fairness or other elements are violated, so ensure approach is perceived as fair and just; Build sustainability into transformation | √ | Funding mitigates physician revenue loss; certification standards for EMRs mitigates concern re ongoing utility of EMR selection; early engagement of both physician leaders and front-line physicians mitigate concerns re not being heard; operational funding eases concerns for future costs |

| | | | | |
|---|--|--|---|--|
| | Develop/ Acquire Skills Required for Change | Build the skills and talent needed to ensure change is successful; also focus on shifting mindsets and providing opportunities to practice in real life | √ | <i>At risk: OntarioMD EMR Adopter Program includes training, peer support, benefits demonstration, ongoing operational funding, but no ongoing commitment to complex use of EMRs demonstrated</i> |
| Spratt and Dickson (2008) | Effective Communication | Communicate to inform and to avoid implications of lack of information (resulting in misinformation); ensure communication throughout initiative, facilitating openness and commitment, and avoiding uncertainty; frequent communication and sharing common goal engages support | √ | Communications strategies in place at OMA, eHO, OntarioMD |
| | Solicit Employee Participation | Engage employee participation to influence buy-in and commitment; if this is not done, employees feel no organizational support of employee input into change, resulting in lack of commitment and resistance | √ | Ontario's eHealth Strategy, OMA and OntarioMD engaged physicians early |
| | Apply a Just and Fair Process | Provide fair treatment can facilitate trust and commitment to the change initiative; perception of justice augments level of commitment | √ | Early engagement, funding contribute to perception of fair treatment |
| Reinersten et al., Institute for Healthcare Improvement (IHI) (2007) | Discover Common Purpose | Improve patient outcomes Reduce hassles and wasted time Understand organization's culture Understand legal opportunities and barriers | √ | Ontario's eHealth Strategy, OntarioMD & OMA focus on clinical outcomes AND physician requirements, support |
| | Reframe Values and Beliefs | Make physicians partners Promote both system and individual responsibility for quality | √ | Physicians are partners through OMA/OntarioMD collaboration with eHO and MOHLTC |
| | Segment the Engagement | Use the 20/80 rule Identify and activate | √ | OntarioMD EMR Adopter Program targets those |

| | | | | |
|--|----------------------------|---|---|--|
| | Plan | <p>champions</p> <p>Educate and inform structural leaders</p> <p>Develop project management skills</p> <p>Identify and work with "laggards"</p> | | <p>who are interested, later utilizes as peer support, provide presentations, support to colleagues</p> |
| | Use "Engaging" Improvement | <p>Standardize what can be easily standardized (such as post-op orders), but not those items which require complex knowledge and experience</p> <p>Use data sensibly</p> <p>Make the right thing easy to try</p> <p>Make the right thing easy to do</p> | √ | <p>OntarioMD rates vendor EMRs for meeting standards, functionality and ease of user interface (ease of use)</p> |
| | Show Courage | <p>Provide back up all the way to the board (as described by IHI, is similar to demonstrating good leadership)</p> | √ | <p><i>At risk: new leadership at eHO; OMA leadership seems stable; Ontario government changes possible, add risk</i></p> |
| | Adopt an Engaging Style | <p>Involve physicians from the beginning</p> <p>Work with the real leaders, early adopters</p> <p>Choose messages carefully</p> <p>Make physician involvement visible</p> <p>Build trust within each quality initiative</p> <p>Communicate candidly, often</p> <p>Value physician's time with your time</p> | √ | <p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>Indirectly with physician and OMA engagement</p> <p>√</p> <p>√</p> |