Implementation of Electronic Medical Records in Primary Care: Case Study of Québec Health Policy

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THESIS ABSTRACT

Background: Electronic medical record (EMR) implementation has presented a challenge for health policy decision-makers and administrators worldwide. EMRs are associated with improved quality and efficiency of primary healthcare delivery and are essential for offsetting the increasing cost and complexity of health service delivery. Suboptimal implementation of EMRs can result in delays and wasted resources, and hinder healthcare providers' use of advanced features, and interoperability with other health information technology (HIT) systems. Contextually-embedded knowledge regarding policy decisions and actions surrounding EMR implementation is needed to help policy decision-makers optimize their implementation initiatives. Since the province of Québec's primary care EMR adoption lagged behind the rest of Canada, valuable knowledge is gained from an in-depath examination of this case to help policy-makers avoid similar pitfalls. Therefore, to provide insight into the optimization of EMR and HIT implementation policy, this thesis aimed to understand and explain the policy decisions and actions concerning primary care EMR implementation in Québec. **Methods:** The research design consisted of a merged qualitative case study and narrative inquiry. Data were obtained from archival documents, including Québec health policies, Auditor General reports, and Minister of Health reports and strategic plans; and in-depth interviews with 15 purposively-selected expert informants. These data were triangulated in the iterative construction of a historical narrative. **Results:** Policy decisions and actions surrounding EMR implementation in Québec primary care were organized into three sequential periods between 1991 and 2016 that depict the influences behind the Ministry of Health and Social Service's eventual prioritization of EMRs. Québec's delayed implementation of EMRs was attributed to the Ministry of Health's exclusion of EMRs from their vision regarding health network digitalisation and the challenges it faced concerning the development of a provincial electronic health record (EHR), *Dossier santé Québec*. The

Ministry of Health and Social Services decided to revise the DSQ implementation strategy to include EMRs. Following a change in project leadership, the challenges were eventually overcome. An incentive program was devised in collaboration with family physicians and EMRs and the DSQ were successfully implemented throughout the province. **Conclusion:** This thesis provides contextually-embedded knowledge about EMR implementation policy decisions and actions in Québec. It highlights the role of political will and leadership, government expertise, private sector accountability, and change management in determining the success of HIT policy. Finally, the knowledge generated by this research provides valuable insight for policy decision-makers worldwide regarding widespread EMR implementation and a deeper understanding of the components and complex processes involved in HIT implementation.

RÉSUMÉ

Contexte : L’implantation des dossiers médicaux électroniques (DME) présente un défi pour les décideurs et les administrateurs du monde entier. Les DME sont associés à une amélioration de la qualité et de l'efficacité des soins de santé primaires et sont essentiels pour compenser le coût et la complexité croissants de la prestation des services de santé. L’implantation sous-optimale des DME peut entraîner des retards et un gaspillage de ressources, et entraver l'utilisation par les cliniciens des fonctionnalités avancées et limiter l'interopérabilité avec d'autres systèmes de technologies d’information en santé (TIS). Des connaissances contextuelles concernant les décisions et les actions politiques entourant l’implantation des DME sont nécessaires pour aider les décideurs à optimiser leurs initiatives. Comme l'adoption du DME en soins primaires dans la province de Québec a pris du retard par rapport au reste du Canada, les connaissances acquises par un examen approfondi de ce cas sont précieuses pour aider les décideurs à éviter des embûches similaires. Par conséquent, afin de fournir des indications sur l'optimisation de la politique concernant l’implantation des DME et TIS, cette thèse visait à comprendre et à expliquer les décisions et les actions politiques concernant l’implantation des DME en soins primaires au Québec. **Méthodes :** Le devis de recherche combinait une étude de cas qualitative et une enquête narrative. Les données ont été obtenues à partir de documents d'archives, incluant les politiques de santé du Québec, les rapports du Vérificateur général et les rapports et plans stratégiques du Ministère de la Santé et des Services sociaux, ainsi que des entrevues approfondies avec 15 experts expressément sélectionnées. Ces données ont été triangulées dans la construction itérative d'une narrative historique. **Résultats :** Les décisions et actions politiques concernant l’implantation des DME en soins primaires au Québec ont été organisées en trois périodes séquentielles entre 1991 et 2016 qui décrivent les influences derrière la priorisation éventuelle des DME par le ministère de la Santé. L’implantation tardive des DME au Québec a été attribuée à l'exclusion des DME de la vision du ministère de la Santé concernant la numérisation du réseau de la santé, ainsi qu'aux défis confrontés lors du développement d'un dossier de santé électronique (DSE) provincial, le Dossier santé Québec (DSQ). Le Ministère de la Santé et des Services sociaux a décidé de réviser la stratégie d'implantation du DSQ pour y inclure les DME. À la suite d'un changement de leadership au sein du projet, les difficultés ont finalement été surmontées. Un programme d'adoption a été développé en collaboration avec des médecins de famille et les DME et le DSQ ont implantés avec succès à travers la province.

Conclusion : Cette recherche fournit des connaissances contextuelles sur les décisions et les actions politiques d'implantation des DME au Québec. Elle met en évidence le rôle de la volonté et du leadership politique, de l'expertise gouvernementale, de la responsabilisation du secteur privé et de la gestion du changement dans la détermination du succès des politiques gouvernant technologies de l'information. Enfin, les connaissances générées par cette recherche fournissent des enseignements précieux pour les décideurs politiques du monde entier concernant les stratégies d'implantation à grande échelle du DME et permettent une compréhension plus approfondie des composantes et les processus inhérents à l'implantation des TIS.

List of Abbrevitions

ACHI	Advisory Council on Health Infostructure
Agence	*Agence de la santé et des services sociaux (ASSS)*
Bureau de programme	*Bureau de programme pour l'information du réseau de la santé et des services sociaux*
CANARIE	Canadian Network for the Advancement of Research, Industry and Education
CIHI	Canadian Institute of Health Information
CIS	Clinical information system
Comité consultatif	*Comité consultatif sur l'autoroute de l'information*
CSSS	*Centre de santé et des services sociaux*
DSQ	*Dossier Santé Québec*
EMR	Electronic Medical Record
EHR	Electronic Health Record
EPSEBE	*Environnement pour la promotion de la santé et du bien-être*
FMOQ	*Fédération des médecins omnipraticiens du Québec*
FMSQ	*Fédération des médecins spécialistes du Québec*
F/P/T	Federal/Provincial/Territorial
HIT	Health Information Technology
ICT	Information and Communication Technology
IHAC	Information Highway Advisory Council
Infoway	Canada Health Infoway
IOM	Institute of Medicine
IT	Information Technology
MSSS	*Ministère de la santé et des services sociaux*
MOXXI	Medical Office of the 21st Century
OECD	Organisation for Economic Co-operation and Development
OHIH	Office of Health and the Information Highway
PHR	Personal Health Record
PIBE	*Plateforme informationnelle sur le bien-être des enfants*
PQADME	*Programme Québecois d'adoption des dossiers médicaux électroniques*
RAMQ	*Régie d'assurance maladie du Québec*
SIDOCI	*Système d'information de données cliniques intégrées*
SI-RIL	*Suite informationnelle du réseau intégré de Laval*
SOGIQUE	*Société de gestion informatique*

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STATEMENT OF ORIGINALITY AND AUTHOR CONTRIBUTIONS

The research in the present doctoral dissertation constitutes original scholarship and contributes substantially toward the advancement of knowledge regarding primary care electronic medical record and health information technology implementation. Primary care electronic medical records have the potential to improve the quality and efficiency of primary care services and are considered essential for offsetting the increasing cost and complexity of health systems. Implementation of electronic medical records has been the object of extensive research for over a decade. Despite their potential to enhance primary care and the volume of evidence and learnings from past initiatives, however, the rate of implementation failure remains high, suggesting that there is yet more to learn from previous efforts. Research in this area has sought to produce generalizable, one-size-fits-all solutions for optimizing implementation, yet this does not always translate into effective policy.

This thesis provides a historical narrative about a single case with intrinsic and instrumental value. It involves an in-depth examination of policy decisions and actions spanning three decades surrounding the implementation of primary care electronic medical records in the province of Quebec, with an appreciation of how policies were shaped by their context. The inclusion of rich contextual detail supports policy decision-makers', researchers', managers' and other readers' relation and adaptation of these findings to their own contexts. With the knowledge and insights generated from this thesis, policy decision-makers will be able to deepen their understanding of the components and complex processes involved in national electronic medical records and health information technology implementation programs.

This thesis also makes a substantial contribution to social science research methodology and the advancement of the discipline of health service and policy research. This thesis's research design combines the single retrospective case study with narrative inquiry as a way of generating an in-depth understanding about a single, unique case. It involves an examination of archival documents and key informants' accounts and their configuration as a chronological narrative. This thesis makes a methodological contribution in its integration of hermeneutics and narrative inquiry to explain and justify the iterative construction of a historical narrative. The resulting narrative is increasingly refined by every interaction with the data, which then influences subsequent data-generating interactions. This methodological innovation led to the publication of a manuscript entitled: *Using narrative construction to prepare the ground for hermeneutic dialogue* (Appendix II).

For this doctoral dissertation, Justin Gagnon was responsible for: conceiving the topic of study, the objectives, the research design, data analysis, interpretation of findings, and writing the text. My supervisory committee members, who represent different areas of relevant expertise, provided regular feedback regarding the research proposal and the revision of the text. Dr. Gillian Bartlett and Dr. Charo Rodriguez provided guidance throughout the doctoral research process, especially regarding the elaboration of the scope of the research, the study design and research methods. Mr. David Levine, who had been a health administrator and was involved in Québec health policy, provided feedback regarding the interpretation of findings and the accuracy and credibility of the narrative. Dr. George Weisz, a medical historian, provided feedback on the documentation of data analyses and presentation of results.

CHAPTER 1. INTRODUCTION

Over the last three decades, policy decision-makers worldwide have undertaken initiatives to implement health information technology (HIT) to enhance health service delivery. HIT offers the potential to improve the quality and continuity of care, increase clinical and administrative efficiency, and reduce operational costs (Paré et al., 2014). In particular, electronic medical records (EMR) have been increasingly utilized to offset the growing cost and complexity of health service delivery and are considered essential for high performing healthcare systems (Kruse, Stein, Thomas, & Kaur, 2018).

There are different terms in the literature that signify different aspects of a person's digital health record. The literature refers to "electronic medical records" (EMR) and "electronic health records" (EHR) (Canada Health Infoway, 2015). In this thesis, I distinguish these terms in the following manner. EMRs (*Dossier Médical Électronique* in French) are the digital version of an individual's medical chart from a single point of care (Office of the National Coordinator for Health Information Technology, 2016). They are typically described as the provider-centric record of a person, as they contain the portion of the health information about a person over their lifetime that is relevant to a particular healthcare provider at a single point of care (Canada Health Infoway, 2015). In a hospital setting, these are typically called Clinical Information Systems – CIS (*Dossier Clinique Informatisé* in French). EHRs, on the other hand, contain relevant health information about a person's health and health care history over their lifetime and portions of the record may be shared among different institutions and points of care (Canada Health Infoway). EHRs contain or virtually link records from various sources including hospitals and clinics, combined with data from pharmacies, radiologists, and laboratories to provide a longitudinal representation of the person's health and healthcare pathways (OECD, 2015; Office of the Auditor General of Canada, 2010b). They are described as the person-centric health record

(Canada Health Infoway, 2015). As EHRs are specifically designed for the real-time sharing of health information, they require standardized data and information infrastructure (Office of Health and the Information Highway, 2001). This is not required for EMRs, which are designed to be used by healthcare providers at a single practice site. In this thesis, as per the above definitions, “EMR” will be used to signify the patient health data used by a healthcare provider at a particular point of care, and “EHR” will refer to the patient record or data repository that combines information from multiple sources through an electronic health information network.

The adoption of EMR systems is increasingly common among primary healthcare providers as they are particularly advantageous in primary care settings, where the majority of chronic diseases are identified and treated (Peckham, Ho, & Marchildon, 2018; Peckham, Kreindler, Church, Chatwood, & Marchildon, 2018; Whitacre, 2017). Given their capacity to organize, manage and track patient information, they can improve the screening, monitoring, and surveillance of disease and coordination among healthcare providers (Broemeling et al., 2008; Carbone et al., 2020; Friedberg et al., 2009; Manca, 2015; Rothman & Wagner, 2003). While the project to implement EMRs in primary care settings demands a significant investment of resources on the part of governments, administrators, and healthcare providers, the benefits are expected to outweigh the costs once the system is installed and providers have adapted (Chaudhry et al., 2006; Wang et al., 2003).

Despite the expected benefits, policy decision-makers and administrators worldwide have faced challenges regarding the implementation of EMRs in primary care settings. It is estimated that up to 80% of EMR implementation programs fail (Manos, 2009). Even when implementation programs are successful, their benefits often remain below expectations (Paré et al., 2014; Tsai et al., 2020). Suboptimal implementation strategies can contribute to delays, wasted resources, products that do not meet users' needs, and limited interoperability with other systems (Greenhalgh et al., 2009; Jones et al., 2017; Kreps & Richardson, 2007). The optimization of EMR implementation strategies is therefore critical if their full potential is to be realized.

While a relatively high volume of research has been published on the topic of HIT implementation, the majority of research has focused on local implementation challenges related to cost, time, technical issues, and healthcare providers' resistance, whereas the role of policy decision-makers in establishing the conditions for adoption has been largely overlooked (Jones et al., 2017; Paré et al., 2014). Policy decision-makers play a fundamental role in initiating or enabling change in the healthcare sector, especially in a publicly administered system. Regarding EMR implementation, they can play a role in the initiation of national and regional programs, allocation of resources, governance structures, project management, information infrastructure development, and the definition of data standards, vendor regulations, and legislation safeguarding patient information (The College of Family Physicians of Canada, 2016). In addition to the insufficient emphasis on policy within the scientific literature on HIT implementation (Desveaux et al., 2019), adequate consideration of the evidence's context is also lacking (Sarkies et al., 2017). The research in this domain has sought to generalize recommendations, but successful interventions may not achieve the same results in other settings (Andermann et al., 2016). Policy decision-makers require knowledge and evidence that is more contextually-relevant and adaptable to their own settings.

Primary care EMR implementation in Canada stands out as having been particularly slow compared to other Organisation for Economic Co-operation and Development (OECD) nations (Bonomi, 2016; Schoen et al., 2012). Furthermore, the province of Québec has lagged behind most other provinces and territories (Paré et al., 2014; The College of Family Physicians of Canada et al., 2014). Given this delayed progress, the purpose of this thesis was to undertake an in-depth examination of the history of policy decision-making surrounding primary care EMRs in Québec to understand and explain the policy decisions and actions concerning EMR implementation in Québec primary care and provide contextually-embedded knowledge that may be related to other healthcare systems so that similar pitfalls may be averted.

This work is divided into the following sections. Chapter 2 consists of a review of the literature and provides a description of the benefits of EMRs, knowledge about facilitators and barriers to adoption of EMRs at the practice level and national strategies employed by policy makers in countries where EMR implementation was considered most successful. Chapter 3 describes the methodology used in the conduct of this research. Chapter 4 describes the conceptual framework employed in this research, which served to bound my investigation around concepts related to policy making. Chapters 5 to 7 comprise the results of this research. Chapter 5 describes events and policy decisions surrounding health sector digitalisation, initiated at the federal level between 1991 and 2001. This chapter provides context for many of the policy decisions that occurred in Québec subsequently. Chapter 6 describes the Québec policy decisions made between 2001 and 2008 regarding the digitalisation of the Québec health system which, in turn, contextualizes subsequent decisions regarding the digitalisation of primary care practices. Chapter 7 describes the Québec policy decisions regarding the provincial strategy and policy decisions surrounding the implementation of EMRs in primary care, which occurred between 2008 and 2016. Chapter 8 provides a discussion of the results of this research and considerations for policy decision-makers, limitations of this research, and implications for future health policy and research in Québec and in other healthcare settings.

CHAPTER 2. LITERATURE REVIEW

2.1. Electronic Medical Records

Early versions of EMRs date back to the 1960s (Evans, 2016). They enabled the presentation of a patient's medical history in a structured manner, facilitating healthcare providers' interpretation of clinical notes and enabling its analysis (Weed, 1968). EMRs began being more widespread throughout the 1980s, as the emergence of low-cost personal computers improved the feasibility of integrating them into practice. In 1991, the American Institute of Medicine (IOM) published a seminal, comprehensive report in which they contended that EMRs were critical to contemporary healthcare as they would help offset healthcare's increasing cost and complexity, given the expected rise in chronic disease and multimorbidity (Dick et al., 1991). They were considered instrumental to increasing administrative efficiency and they began being exploited for their human resource management and billing capabilities (Saeed, 2010). Throughout the 1990s, an increasing number of clinical systems were developed for specialized domains, such as laboratory, radiology, and surgery (Evans, 2016). Over the last two decades, the shift toward more patient-centric, evidence-based and collaborative care prompted more widespread uptake of EMR systems, as their capacity for the storage, access, analysis and exchange of health information supports the enhancement of care delivery. This shift also precipitated decision-makers' interest in ensuring that these systems integrated clinical and administrative data and enabled sharing of this information across various points of care (Saeed, 2010).

The potential benefits of EMRs over paper charts are well documented. EMRs can provide advantages for patients, providers, as well as health administrators. Evidence suggests that EMRs can have a significant impact on the quality and efficiency of healthcare services

(Bates, 2010; Bates et al., 2003; Bodenheimer & Grumbach, 2003; Buntin et al., 2011; Paré et al., 2013). They can also have a positive impact on patient health outcomes and their experience of care (Finney Rutten et al., 2014; Ralston et al., 2004). A presentation of some of their benefits follows.

In terms of quality, by providing timely access to evidence and guidelines (Chaudhry et al., 2006; Jamal et al., 2009) and integrating decision support tools (Staroselsky et al., 2006), EMRs can improve providers' effectiveness and patient safety (Alvarez, 2004; Commission on the Future of Health Care in Canada, 2002). In addition, with the integration of evidence and analytics, EMRs can contribute to improving the appropriateness of diagnostic testing (Canada Health Infoway, 2013). They can be used to enable communication between providers and thereby improve multidisciplinary care coordination across health networks (Canada Health Infoway and Health Council of Canada, 2006; Delpierre et al., 2004; Erstad, 2003). Furthermore, their digital format facilitates the analysis of EMR data for research and quality assurance purposes (Gliklich et al., 2014). For instance, health administrators can utilize these data to track indicators, identify suboptimal practices, and allocate resources accordingly (Birkhead et al., 2015; Williamson et al., 2014).

In terms of efficiency, both clinical and organizational, EMRs can significantly decrease the time spent on numerous clinical and administrative tasks, such as data entry, chart pulls, scheduling, referrals, billing, medication prescription, and information transmission (Delpierre et al., 2004; Holroyd-Leduc et al., 2011; Hunt et al., 1998; Wang et al., 2003). This time-saving contributes toward lower operating costs (Holroyd-Leduc et al., 2011; Raymond et al., 2015). Additionally, EMRs can improve the quality of documentation (Hippisley-Cox et al., 2003; Wager et al., 2000) because compared to paper charts, EMRs are more likely to be legible, accurate, secure, and accessible (Noraziani, Nurul'Ain, et al., 2013). An advantage of improved documentation quality is that it better supports collaborative care. Furthermore, EMRs can enhance productivity and workflow (Noraziani, Nurul'Ain, et al., 2013) by reducing the number of unnecessary or duplicate tests and services (Chaudhry et al., 2006; Makoul et al., 2001; Raymond et al., 2015). A reduction in unnecessary services supports the optimization of patient flow and can consequently improve access to care (Chen et al., 2009; Holroyd-Leduc et al., 2011).

While EMRs are expected to provide advantages in all sectors of healthcare delivery, they are particularly useful in primary care settings, where most non-communicable, chronic conditions are identified and treated. Primary care EMR data are particularly valuable for chronic disease surveillance and research, primary healthcare service research, and informing public policy (Birtwhistle & Williamson, 2015). Typical functionalities of primary care EMR systems include medical consultation notes, problem lists, allergies, vaccinations, vital signs, prescriptions and automated alerts, and medical appointments (Paré et al., 2014). More advanced features include diagnostic test results, communications tools, analytics, decision-support tools and patient portals (Rahal et al., 2021). With the integration of longitudinal analysis capabilities, EMRs can enhance disease screening and enable primary care providers to monitor their patients' health chronic conditions and test results, identify problematic fluctuations, and intervene accordingly. They can also be used to improve patients' understanding of their health condition and better engage them in decision-making processes (Makoul et al., 2001; Ueckert et al., 2003). Data visualization, for instance, can be used to engage patients in shared decision-making and self-care (Broemeling et al., 2008; Foraker et al., 2015; Friedberg et al., 2009; Rothman & Wagner, 2003; Ryu et al., 2017). Furthermore, EMRs can assist researchers and policy-makers in identifying endemic health conditions, exploring associations with social and environmental factors, and devising population-level interventions. Finally, EMRs can be used to support patient-centred primary care delivery by facilitating multidisciplinary communication and care coordination. When EMR systems have integrated communications and information sharing capabilities, care coordination between healthcare providers is further enhanced (Manca, 2015).

2.2. State of Evidence Regarding Factors that Influence Electronic Medical Record Adoption by Primary Care Providers

Despite the documented benefits, implementation of EMRs in primary care has been a challenge worldwide. It has a relatively high up-front cost without immediate returns on investment (Noraziani, Nurul'Ain, et al., 2013). It implies a transformation of clinical and administrative workflows and demands an investment of time and resources (Boonstra & Broekhuis, 2010; El-Kareh et al., 2009; Mason, 2011; Paré et al., 2014). It is estimated that between 50% and 80% of EMR implementation projects are unsuccessful, both in primary care and other settings (Manos, 2009). Successful implementation signifies that after 12 months, physicians use the EMR to document their encounter with at least 80% of their patients (Streamline MD, 2009). Even when EMR implementation is successful, their full potential is not always realized as the use of advanced features remains relatively low (Jones et al., 2017; Osborn et al., 2015; Paré et al., 2014). Research has demonstrated that suboptimal implementation of EMRs can result in delays, escalation of costs, scope creep, and can inhibit the provision of products that meet users’ and administrators’ needs (Greenhalgh et al., 2009; Kreps & Richardson, 2007). The quality of the implementation process can also delay or hinder interoperability with other systems and healthcare providers’ use of more advanced features (Jones et al., 2017).

The scientific literature on EMR implementation in health settings is extensive, which is a reflection of its complexity and limited success. A significant portion of the research involves quantitative surveys and qualitative descriptive studies that focus on healthcare providers' perceptions of local implementation challenges and factors associated with EMR adoption (Boonstra & Broekhuis, 2010; Fennelly et al., 2020; Fritz et al., 2015; Hoerbst & Schweitzer, 2015; Jones et al., 2017; Paré et al., 2014). The following summarizes some of the more commonly cited barriers to providers' adoption of EMRs in primary care settings.

One of the most commonly cited barriers is the cost of EMR systems (Boonstra & Broekhuis, 2010; El-Kareh et al., 2009; McGinn et al., 2011). EMR implementation requires computer equipment, EMR licenses, training and support. Given the high initial costs, provision of adequate human, material and financial resources is considered imperative to facilitate the transition and minimize users' resistance (Boonstra & Broekhuis, 2010; Deloitte, 2015).

Time was also another major barrier cited in the literature (Ajami & Bagheri-Tadi, 2013). Providers devote time toward selecting and purchasing the new software, learning to use it, and digitising their patients' records (Boonstra & Broekhuis, 2010; El-Kareh et al., 2009). This represents a significant modification of their workflow (Healthcare Financial Management Association, 2006; Paré et al., 2014). It also implies a new manner of charting, since information entry is more structured than paper charts and the input fields are not necessarily organized intuitively or in a manner to which they are accustomed (Mason, 2011). This barrier may be offset in part by the providers' skills as the more adept at learning the system tend to be better at overcoming technical challenges. The best practices, therefore, recommend ensuring adequate training and support so that providers might more rapidly reap the system's benefits (Denomme et al., 2011; Noraziani, Ahayalimudin, et al., 2013). To offset costs and the requisite investment of time, incentives and adequate compensation have also been identified as key facilitating factors (Lau et al., 2012).

Providers have expressed reservations about the impact of EMRs on the quality of their communication and relationship with their patients (Alkureishi et al., 2016; Ludwick & Doucette, 2009b). Interaction with the computer, especially when a provider is unfamiliar with the system, can represent a major disruption of the clinical encounter and has been associated with physicians' abandonment of the system (Ludwick & Doucette, 2009b). Concerns regarding the stability of the software and hardware were also identified as important barriers, as system crashes and intermittent downtime are inevitable (Cano et al., 2017; Gamm et al., 1998; McGinn et al., 2011).

In terms of the technology itself, providers have reported dissatisfaction with user interfaces and with systems' limited capacity to capture all relevant data (Wager et al., 2000). Their limited interoperability and compatibility with other systems and organizational practices have also been found to hinder adoption of EMRs as these can contribute toward the introduction of additional processes and decrease system efficiency (Paré et al., 2014).

Despite high initial costs and concerns, there is generally a return on investment once the providers have adapted to the new technology, learned to use it more effectively, and when their patients' medical histories are entered (Chaudhry et al., 2006; El-Kareh et al., 2009; Wang et al., 2003). It is estimated that primary care clinics recover their investment between 10 and 36 months (Jang et al., 2014). Clinicians' concerns and dissatisfaction also tend to diminish over time as they begin reaping the benefits of the system.

2.3. State of Evidence Regarding Policy Decision-Making and Electronic Medical Record Implementation

While most evidence has focused largely on end-users and barriers to physicians' adoption of EMRs, a selection of EMR implementation studies have discussed the relevance of system-level factors such as policy and legislation (Fennelly et al., 2020; Goldberg et al., 2012; O'Donnell et al., 2018). However, research on this topic is limited. Furthermore, evidence regarding policy-level and organizational interventions tend to focus on addressing barriers and the role of policy decision-makers is often overlooked (Desveaux et al., 2019). While healthcare providers play an essential role in integrating the technology in practice, policy decision-makers can establish social, organizational, economic and legislative conditions that shape their adoption. In addition to the allocation of resources (human, material and financial), policy-makers can play a role in establishing the data standards, technological infrastructure, HIT governance structures, and regulations regarding health information and HIT vendors (Keshavjee et al., 2006; Salzberg et al., 2012).

Policy decision-makers worldwide have employed different strategies for developing national digital health information networks and integrating EMRs in their primary healthcare settings. National implementation strategies from around the world are primarily documented in retrospective international comparative case studies of different countries' approaches and in the evaluations intended to inform strategic plans and policy briefs (Bonomi, 2016; Carbone et al., 2020; Deutsch et al., 2010; Fragidis & Chatzoglou, 2018; Ludwick & Doucette, 2009a; Morrison et al., 2011; Schoen et al., 2012). These international comparisons and evaluations have given rise to recommendations based on successful strategies. The majority of the scientific literature devoted to the extrapolation of recommendations is concentrated around 2010, when national health information infrastructure development appears to have been at its apex (Boonstra &

Broekhuis, 2010; Carbone et al., 2020; Fennelly et al., 2020; Rahal et al., 2021). EMR research has since shifted toward an examination of mature and meaningful use and the unification of fragmented systems within national HIT infrastructures (Hamade et al., 2019; Jones et al., 2017).

Australia, the Netherlands, New Zealand, Norway and the United Kingdom each devised national strategies and were among the most successful nations in terms of primary care EMR implementation. By 2012, over 95% of family physicians in these nations were using EMRs (Schoen et al., 2012). Their success is attributed in part to their comprehensive and long-term visions regarding the integration of local and regional systems within national information systems (The Commonwealth Fund, 2013). In each of these settings, variations of a national EHR were established while local EMRs were retained. Their computerization of primary care practices and conception of EHR systems were also developed relatively early compared to other nations. Their EHR systems complimented their local EMRs and instigated their developing data infrastructure standards, interoperability frameworks, shared datasets, and national patient identifiers. These would enable the eventual expansion of their EHR systems to integrate larger subsets of patient information include additional service providers.

In 2001, the Australian government announced the creation of a national health information network, HealthConnect (Gunter & Terry, 2005). HealthConnect was an internet-based network that supported the collection, storage, and sharing of summary information regarding patients. This EHR did not contain a longitudinal record of patient data; patients and providers would choose which elements would be extracted from their local EMRs and added to their EHR (Gunter & Terry, 2005). In Norway, the government established the National Health Network to provide an efficient and secure electronic exchange of patient information between authorized providers within the health sector. The National Health Network established a central telecommunications platform for health providers (Fragidis & Chatzoglou, 2018), while local EMR solutions were retained. In the United Kingdom, a national program for information technology was launched in 2002 (Hayes, 2010). It involved the simultaneous development of five independently-operated regional systems involving different providers, to ensure that if one failed the others could still thrive. Similar to Australia, they also developed a national EHR that contained summary records accessible anywhere by authorized healthcare providers (Fragidis & Chatzoglou, 2018). In the Netherlands, the Dutch authorities developed a national virtual EHR and nationwide HIT infrastructure called AORTA (Fragidis & Chatzoglou, 2018). The system enabled the transmission of information between authorized providers. It was considered safer than the central storage of information and allowed providers to retain their local EMR systems. Here, an electronic medication record and family physician summary were also developed. In New Zealand, the country's national health network, Health Link, was introduced in 1993. Like the Dutch system, it was conceived as a virtual EHR enabling the storage and transfer of digital information between authorized providers throughout the network (Fragidis & Chatzoglou, 2018; Selwyn Jebaraj, 2016). Both the Netherlands and New Zealand used vendor accreditation as a way of ensuring that EMR solutions were compatible with the health information network.

In addition to the definition of interoperable national information infrastructure, whether it be a central or virtual EHR, the federal government's subsidization of computer equipment and software was identified as a key factor in family physicians' adoption of EMRs. For instance, in the United Kingdom, computer equipment and software were fully subsidized to address access to the technology (Jha et al., 2008). In addition, New Zealand also used mandatory electronic billing as a way of indirectly driving uptake (Jha et al., 2008) and the government offered a one-time grant for family physicians' purchase of computers in support of their making electronic claims (Selwyn Jebaraj, 2016). While many countries used incentives or penalties to drive EMR adoption (OECD, 2013), some countries also imposed incentives on the quality of EMR use. Quality measurement and improvement requirements, which were said to have fostered more rapid adoption, were utilized in the United Kingdom and New Zealand (Benson, 2002; McMillan et al., 2018). Finally, another strategy that was considered successful in Australia included contracting a national infrastructure partner and a national change management partner, with expertise in these areas, to support the government in their development and implementation initiatives (Wrighton, 2011).

While the above strategies provide guidance for decision-makers, the successes observed in these settings may not necessarily be replicated when the same strategies are applied in other contexts, as health systems around the world are relatively heterogeneous in terms of financing, organization and governance, which can have a significant impact on EMR implementation (Andermann et al., 2016; Desveaux et al., 2019; The Commonwealth Fund, 2015). For instance, the top-down centralized approach considered to have been successful in the Netherlands resulted in disengagement on the part of family physicians when this approach was used in the United Kingdom (Fragidis & Chatzoglou, 2018; Wrighton, 2011). The factors and successful strategies must be interpreted in relation to the national context to provide guidance about their relevance in other settings (Erskine et al., 2013). In-depth investigations that integrate fine contextual detail and examine how or why strategies were successful or unsuccessful are insufficient (Fennelly et al., 2020). There is also immense value in studying unsuccessful strategies to help avert failure. Understanding the policy processes and specific contexts where implementation has lagged is, therefore, essential for guiding optimal HIT implementation policy (Dunlop, 2016).

2.4. The Implementation of Electronic Medical Records in Québec Primary Care

The adoption of EMRs by primary care providers in Canada was relatively slow compared with other OECD nations (OECD, 2013). In 2012, Canada ranked 10th out of 11 countries regarding family physicians' use of EMRs according to the Commonwealth Fund International Health Policy Survey of Primary Care Physicians (Schoen et al., 2012). Canada's health administration is decentralized and falls under provincial and territorial jurisdiction (Chang & Gupta, 2015). While efforts were made to coordinate provincial and territorial initiatives, each of the provinces and territories developed distinct systems and strategies according to their priorities and resources (Noseworthy, 2015). As a result, Canada's EMR landscape comprises a patchwork of systems with limited interoperability.

Within Canada, EMR use among family physicians in the province of Québec lagged behind most other provinces and territories (Figure 1) (Paré et al., 2013; Schoen et al., 2012; The College of Family Physicians of Canada et al., 2007, 2010, 2014). According to the College of Family Physicians of Canada et al.'s 2007 National Physician Survey, the provinces with the highest rates of EMR adoption were Alberta (55.9%), Newfoundland and Labrador (47%), and Nova Scotia (40%). The lowest rates of adoption were observed in Prince Edward Island (13%) and Québec (20%) (The College of Family Physicians of Canada et al., 2007). In 2014, the survey results indicated that the highest EMR adoption rates were found in Nova Scotia (87%), Alberta (87%), and British Columbia (85%), whereas New Brunswick (62%) and Québec (64%) had the lowest rates (The College of Family Physicians of Canada et al., 2014). The literature suggests that Québec's delayed EMR implementation may be attributed to: 1) limited financial investment in practices' acquisition of computer equipment and EMR solutions, 3) healthcare providers' resistance toward the integration of this technology within their core clinical activities (Paré et al., 2014), and 3) inadequate change management (Rozenblum et al., 2011). However, a detailed investigation of the policy decisions and actions surrounding EMR implementation, which might help explain Québec's their delayed adoption in Québec, is lacking.

Québec is an ideal case to examine to better understand the critical role played by policy decision-makers. In addition to lagging behind the rest of Canada, its legal system is unique in Canada. With the exception of Québec, public and private law in Canada follow a common law tradition. In Québec, private law, which includes healthcare, follows a civil law tradition and is governed by the Québec civil code (Government of Canada, 2017; Yates et al., 2016). An investigation of the Québec policy-makers' decisions and the unique challenges they faced may provide valuable insight into health policy in Québec. Their examination will help elucidate not only what strategies were effective or ineffective in this context, but also why some strategies may not be as effective in other contexts.

2.5. Summary of Evidence and Research Objectives

In summary, there is an over-emphasis in the literature on end-users and the examination of barriers and facilitators regarding physicians' adoption of EMRs, whereas the significance of macro-level policy decision-making has been largely overlooked (Fennelly et al., 2020; Hoerbst & Schweitzer, 2015; Jones et al., 2017; Paré et al., 2014). This emphasis on end-users implicitly assumes that users' resistance to change represents one of the most significant barriers. Accordingly, interventions to optimize EMR implementation have focused primarily on establishing proof-of-concept, minimizing user resistance, incentivizing change and providing compensation for the requisite investment of time and money (Desveaux et al., 2019; Jones et al., 2017; Markus & Benjamin, 1997). These strategies alone tend to demonstrate limited success (Desveaux et al., 2019). Furthermore, in the numerous studies and systematic reviews that focus on implementation, those that do consider the role of policy decision-making in EMR implementation over-emphasize the implementation phase and undervalue the initial planning that supports it (Paré et al., 2014). This further reinforces the emphasis on minimizing end-users' resistance, rather than considering the macro-level decisions that establish the conditions surrounding implementation, such as resources, incentives, vendor regulation, data standards, and system infrastructure (Keshavjee et al., 2006; Salzberg et al., 2012).

Several descriptive comparisons of different countries' national strategies have been conducted with the aim of distilling recommendations for optimal EMR implementation. While these might guide policy decision-makers in other settings, successful strategies may not be generalizable from one setting to another. Despite the extensive research on EMR implementation and global examples to draw from, a large number of policy decision-makers faced unanticipated challenges and their implementation initiatives failed to thrive (Moat et al., 2013). This suggests a gap between evidence and policy. One of the primary reasons for this gap is attributed to policy makers' difficulty interpreting what is relevant and useful, stemming from a lack of contextually-relevant knowledge (Andermann et al., 2016). Scant research emphasizes the actions of policy decision-makers in sufficient depth to help understand how different strategies may be applicable or applied to their contexts (Andermann et al., 2016; Fennelly et al., 2020; Pawson et al., 2005; Sarkies et al., 2017). As policy-makers draw on scientific evidence to inform their decisions, the need for contextually-relevant evidence is increasingly recognized (Tsai et al., 2020). Therefore, to assist decision-makers in avoiding mistakes and replicating the successes observed in other settings, more research involving an in-depth examination of health policy in context is needed. In light of Québec's delayed adoption of EMRs, an in-depth examination of the policy decisions and actions surrounding the implementation of EMRs in primary care will be informative for Québec and other health healthcare systems by providing a comprehensive example of HIT implementation components and processes and insight into different strategies, particularly those that were less successful.

Thus, my thesis was guided by the following research question:

> *How have policy decision-makers, at the macro Québec healthcare institutional level, shaped the implementation of EMRs in Québec primary care over the last three decades?*

The specific objectives of this thesis were to:

1. develop a detailed description of the events and decisions, at the level of health policy, that have shaped the implementation of EMRs in Québec primary care; and
2. understand and explain the decisions and actions undertaken by Québec policy decision-makers relating to the implementation of EMRs in primary care.

CHAPTER 3. METHODOLOGY

This research was grounded in an interpretivist paradigm (Green & Thorogood, 2011; Guba & Lincoln, 1994). Interest in explaining social phenomena and understanding the subjective meaning individuals attribute to their experiences is foundational to interpretive research. My investigation was motivated by an interest in developing an understanding of policy decisions and actions regarding EMR implementation in Québec, grounded in the meanings that influential or knowledgeable actors attributed to the policy decisions and actions that make up its history. Therefore, I employed a methodological approach suited for weaving together events and explanations in the retrospective examination of policy decisions and actions with an appreciation of their context.

The research protocol for this project was reviewed by the McGill Faculty of Medicine Institutional Review Board. Ethics approval was granted on January 25th, 2019. Interview subjects were asked to provide informed written consent before participating. Given the participants' status (many of which were administrators and policy-makers), I coded the interview subjects' names so that they might not be directly identifiable. However, given the distinctiveness of particular roles and positions, some subjects may be identified using the descriptions provided. In case subjects may be identified, I asked for their permission to attribute specific comments to them, even though I do not directly identify them. I also assured them that I aimed to provide a neutral account of past events and that I would exclude comments that might cast others in a negative light.

3.1. Study Design

The methodological framework in which this interpretive research was grounded consisted of a qualitative case study design (Grandy, 2018; Stake, 1995; Vaara, 2016) combined (Sonday et al., 2020) with narrative inquiry (Polkinghorne, 1995). According to Stake (1995), case study research aims to achieve a greater understanding of a particular case or cases and appreciate its uniqueness and complexity and its embeddedness and interaction with its contexts (Stake, 1995). An advantage of the case study design is its capacity to explain the process and outcome of social phenomena through reconstruction and analysis of the studied case (Zainal, 2007). In addition, the value of this research design is that it combines data from multiple sources of data that converge on the study’s object (Creswell, 2012). Narrative inquiry involves the use of stories to describe human action. This research design enabled my construction of a chronologically organized narrative that explains the policy decisions and actions surrounding the implementation of EMRs in Québec primary care.

Case study research is ideal for investigating complex, contextually embedded social phenomena and was thus well-suited for the retroactive examination of policy processes and their outcomes as they pertain to EMR implementation (Schoch, 2019). Case study research can provide decision-makers with an opportunity to deepen their understanding of implementation policy and better grasp the complexity and constituent components involved in implementation projects, and thereby optimize policy (Greenhalgh et al., 2011; Langlois et al., 2018). Given the temporality of the case, this research required a study design suited for understanding and organizing events unfolding through time and their meanings for key actors across continually changing contexts. Narrative inquiry was an ideal complimentary design as it enabled my interpretive configuration of this process data. It enabled my organization of contextually situated decisions and actions within a chronological narrative (Sonday et al., 2020).

3.1.1. Case Study of Macro-Level Policy Decisions and Actions Surrounding Electronic Medical Record Implementation in Québec Primary Care

Case study research is described as "the study of an issue explored through one or more cases within a bounded system" (Creswell, 2012). This study examined a single case: the macro-level policy decisions and actions surrounding EMR implementation in Québec primary care. This research was thematically, conceptually, contextually and temporally bounded. It was thematically bounded by my research objective to understand and explain policy decisions and actions surrounding EMR implementation. It was conceptually bounded around themes relevant to health policy development following the Policy Analysis Framework (described in Chapter 4). This ensured that the data collection, analysis, interpretation and organization of results remained focused around themes pertinent to the object of study. This research was also contextually bounded by the macro-level policy decisions and actions of Québec Ministry of Health actors (*Ministère de la santé et des services sociaux* - MSSS) (e.g. the Minister of Health, Deputy Ministers, sponsors of relevant legislative acts, and members of Ministry-mandated commissions, working groups and offices). The period of interest for this research project spanned 25 years (1991-2016). The publication of the Institute of Medicine report in 1991, "The Computer-Based Patient Record: An Essential Technology for Health Care" (Institute of Medicine, 1991) is widely considered one of the major catalysts for the global trend to digitise health records (Atherton, 2011). Therefore, I selected this date as the starting point of my research. Québec's EMR adoption program spanned from 2012-2016; therefore, I selected 2016 as the end date.

Using the categorization of cases defined by Stake (1995), this case is both *intrinsic* and *instrumental*. An intrinsic case study is typically motivated by an interest in better understanding a particular case. As the researcher seeks to uncover particularities and unique qualities of the case under investigation, this kind of research tends to be exploratory (Grandy, 2018). Welch et al. (2011) referred to this application of the case study as "interpretive sensemaking." Implicit in this way of theorizing from case studies, they contended, is the "appreciation of how the social context imbues human action with meaning" (Welch et al., 2011, p. 747). This case is interesting, in and of itself, as its exploration reveals how Québec's unique context (cultural, social, political, legal and economic) and the actions taken by policy actors shaped the implementation of EMRs in primary care. This case's intrinsic value is its capacity to explain the policy decisions and actions surrounding EMR implementation in Québec primary care that contributed to its suboptimal outcome.

Stake (1995) characterized the instrumental case study as motivated by an interest in providing insight into a particular issue or supporting its transferability to other similar contexts. Research into the case involves the more practical aim of understanding and describing a case to inform the application of the generated knowledge elsewhere. The instrumental value of examining policy decisions and actions regarding EMR implementation is that it provides insight into the conditions that supported or hindered their successful integration into primary care practices. The knowledge generated from this research, particularly regarding suboptimal strategies, may help policy decision-makers avoid similar pitfalls and optimize policy initiatives in Québec and other contexts.

3.1.2. Narrative Inquiry to Configure Process Data and Explain the Case

Narrative inquiry was used to organize and interpret the temporal data gathered and generated in examining the case. Bruner (1985) distinguished two streams of narrative inquiry: *paradigmatic-type* and *narrative-type*. The former involves the analysis of narratives to produce typologies or categories. The latter refers to studies whose data includes actions and events and whose analysis produces stories (Polkinghorne, 1995). In *Narrative-type* narrative inquiry (Bruner, 1985), events and happenings serve as data and narrative configuration is used for their analysis to generate a chronologically organized explanation (Polkinghorne, 1995). Since my objective involved explaining policy decisions and actions, this type of inquiry guided my research.

In narrative construction, the researcher chronologically configures and links events and actions within a story to give meaning to the data as contributors to a particular end (Polkinghorne, 1995; Sandelowski, 1999).

> *In [narrative configuration], the researcher's task is to configure the data elements into a story that unites and gives meaning to the data as contributors to a goal or purpose. The analytic task requires the researcher to develop or discover a plot that displays the linkage among the data elements as parts of an unfolding temporal development culminating in the denouement. (Polkinghorne, 1995, p.15)*

In stories, the effects of actions may be intentional and unintentional (Polkinghorne, 1995). There is a particularly formal character to decision-makers' intentions underlying policy decisions, however, since the rationale behind actions as contributors to particular ends tends to be made explicit in policy documents. An advantage of a retrospective investigation of past policy decisions and actions, such as this, was that it enabled my investigation of intended effects that spanned long periods of time.

While this investigation was thematically, temporally, contextually and conceptually bounded, narrative construction also comprised an exploratory component. I generated new data as I analyzed the archival data and conducted interviews. My iterative triangulation and integration of these data increasingly refined my understanding, which increasingly focused my subsequent data-generating interactions. As my understanding was refined, it took the shape of an increasingly coherent, chronologically organized story. An advantage of using narrative configuration is that it enables the integration of complex temporal data concerning contextually embedded actions and subjective meanings to explain events. Research designs involving the identification of themes or patterns would not have been able to adequately capture the case's depth and complexity.

3.2. Data Collection

Data for this research was obtained from two sources: 1) archival documents from government sources, and 2) in-depth interviews with key informants. The archival documents I analyzed (described in greater detail below) consisted of Canadian (federal) and Québec (provincial) government reports, strategic plans and policies that influenced or structured activity surrounding the implementation of EMRs in Québec primary care (Table 2 and Table 3). The informants interviewed comprised purposively selected experts involved in or knowledgeable about important macro-level policy decisions regarding EMRs in Québec (Table 4). Altheide (1996), in his conception of historical case studies, suggested that the data sample should not be established in advance. Instead, the sampling strategy should "emerge as the researcher inspects and reflects on some initial materials (Altheide, 1996, p. 33)." Accordingly, I employed a combination of snowball sampling and theoretical sampling. The former was utilized to identify a comprehensive list of relevant data sources. I began with an initial set of data sources (documents or interview subjects) that helped me identify additional sources. The latter strategy involved the analysis of data to generate a working theory which then directed my subsequent data collection. In other words, the data were iteratively collected and integrated into an increasingly refined narrative, which then increasingly directed my inquiry around gaps in my understanding and thus informed subsequent data-generating interactions and analyses. Each intermediate narrative or working theory generated a list of data sources to be examined, combined with a set of questions that deepened my investigation (Altheide, 1996). Therefore, I purposively ordered my reading of archival documents and conduct of interviews, beginning with those that provided a broad outline of context and events and ending with those that provided insight into particular policy decisions and actions. Given the impossibility of exhausting all possible sources, as some may no longer exist or may be unfeasible to obtain, theoretical sampling was particularly valuable since it ensured the collection of relevant data for generating a sufficiently comprehensive and coherent narrative.

3.2.1. Archival Documents

3.2.1.1. *Document selection*

The documents that served as my sources of data comprised Canadian and Québec reports, strategic plans and policies. To establish my data set, I began with archival documents identified from my review of scientific research literature and a keyword-based search (Table 1) of the Québec National Library and Archives (*Bibliothèque et archives national du Québec* – BANQ), the Québec National Assembly, Canada Health Infoway, and Québec Ministry of Health websites. I then examined these initial data sources and identified additional sources using a snowball sampling strategy. Accordingly, I included documents referenced in my initial review of the identified material and during my interviews. The Québec Auditor General reports tended to provide the most thorough overview of the relevant material. From this, I compiled a comprehensive list of federal and provincial (Québec) reports and policy documents that addressed Québec health network digitalisation, EHRs and EMRs (Table 2 and Table 3).

3.2.1.2. *Archival Document Sources*

The federal and provincial reports and policy documents I reviewed are as follows. At the federal-level (Table 2), I reviewed: final reports from working groups whose aims included planning and strategizing the development of a digital health information infrastructure and digital health records across the country (n=8); 2) strategic plans from Canada Health Infoway (n=2); 3) the Romanow commission report (2002); 4) one Auditor General report (2010); and 5) First Ministers' agreements regarding healthcare (n=3). At the provincial level (Table 3), I reviewed: 1) Ministry of Health Strategic plans between 2000 and 2020 (n=4); 2) reports and strategic plans that specifically addressed health information system development and implementation (n=7); 3) commission reports that addressed health information system development (n=3); 4) Auditor General reports between 1990 and 2016 (n=78); 5) the Ministry of Health's annual management reports between 1990 and 2016 (n=20); and 6) provincial legislation that addressed health information infrastructure, the protection of personal information, EMR adoption, and the collection, use, storage and transfer of electronic health information (n=4).

3.2.2. <u>In-depth Interviews</u>

3.2.2.1. *Informant Selection and Initial Contact*

My preliminary analysis of archival documents led to my developing a list of ideal informants who could provide insight into the relevant events and policy decisions and actions described in my narrative outline. Additional interview subjects were identified using a snowball strategy. During my interviews, my informants recommended other actors with whom I should speak. In particular, they helped identify the project managers, representatives of stakeholder organizations and Deputy Health Ministers who were directly implicated in health network digitalisation and EMR implementation. Using a theoretical sampling strategy, guided by my iteratively refined narrative, I purposively selected a combination of informants whose knowledge and experience could speak more broadly to the chronology of events and those more specifically knowledgeable about the relevant policy decisions and actions. I continued to recruit interview subjects until I had reached data saturation (Patton, 2005). In this research, I considered data saturation to have been reached when I had obtained sufficient material to construct a credible narrative combining a broad accounts of the history of EMR implementation in Québec and explanations for the key policy decisions.

Contact with potential interview subjects was facilitated by one of my thesis committee members (Mr. David Levine, Healthcare administrator) and the Department of Family Medicine Chair at McGill University (Dr. Howard Bergman). My interview subjects who had been colleagues with my intended subjects facilitated contact. Informants were recruited by e-mail or telephone. My use of interview subjects as gatekeepers (Van Maanen, 1988) was critical to my getting interviews with higher-status policy-makers since they could attest to my credibility as a scientist and unbiased investigator and to the significance of my research. All those I approached for interviews graciously accepted.

3.2.2.2. *Interview Subjects*

I conducted in-depth interviews with 15 purposively selected key informants (Table 4) (Patton, 2002; Silverman, 2006). The roles represented by the 15 informants I interviewed were as follows: Québec Ministry of Health digitalisation project managers/consultants (n=4), Health establishment administrators (n=2), representatives of a Canadian health information technology organization (n=3), Canadian health system digitalisation policy expert (n=1), Québec professional association representatives (n=2), researchers with expertise in Québec health system digitalisation (n=2), physician and EMR adoption champion (n=1), and EMR vendor representative (n=1)[1].

3.2.2.3. *Interview Guide Development*

Following the traditions of in-depth interviewing (Silverman, 2006) and theoretical sampling (Altheide, 1996), I researched my interview subjects' backgrounds and developed an interview guide tailored to each according to their relevant experience and the working theory that I had so far developed. Thus, I purposively ordered my interviews, befitting the iterative construction of an increasingly refined historical narrative (Sandelowski, 1999). I began with subjects whose knowledge and experience could speak to the broad sequence of events. Once I had established a broad outline of events, my subsequent interviews provided more profound insight into particular policy decisions. I framed my questions to specifically address the domains of the Policy Analysis Framework (Buse et al., 2005), described in Chapter 4, to ensure that my discussions centred around concepts pertinent to policy development.

3.2.2.4. *In-depth Interviews Following a Hermeneutic Approach*

I conducted my interviews following an unstructured hermeneutic approach (Geanellos, 1999; Moules et al., 2015). As is typical of unstructured (or *in-depth*) interviews, I aimed to elicit stories of experience (Silverman, 2006). My discussions aimed to produce accounts of policy decisions and actions that contributed toward my better understanding the history of EMRs in Québec. I relied on the interview guides only to help direct the conversation to ensure that the key points were addressed. To validate my understanding, I regularly asked clarifying questions.

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[1] One interview subject was both a Québec Ministry of Health digitalisation project manager/consultant and a Québec professional association representative

The hermeneutic approach supported my elicitation of stories. This approach is ideal for iteratively constructing a narrative understanding of social phenomena that weaves together diverse perspectives because of its emphasis on subjective meanings and the co-construction of understanding through interaction (Gagnon, 2019)(Appendix II). Implicit in the hermeneutic approach is the role of conversation in bridging the gap between interlocutors' different worldviews. Following this approach, I sought to limit the imposition of my understanding on the conversation as it would have restricted the range of possible directions the discussion could have taken. Accordingly, I remained aware of the conversational flow and open to the transformation of my understanding. To situate the conversation and establish common ground about the topic, I employed a visual representation of the timeline I had established so far (Shenton, 2004). This technique favoured natural conversation while holding the topic of interest in focus.

My interviews were conducted in person (n=10), by videoconference (n=4) or by telephone (n=1). Interviews were audio-recorded and transcribed. During my interviews, I focused on being present and attentive. Therefore, I took only rough field notes. Once the interview was complete, I took more elaborate and detailed notes. Following each, I integrated my field notes into an evolving narrative outline, which informed my subsequent data-generating interactions. My interviews ranged in duration from 47 and 176 minutes, with a median duration of 81 minutes.

3.3. Data Analysis

My research involved an iterative analysis of archival and interview data toward an increasingly refined and coherent chronological narrative of policy decisions and actions surrounding EMR implementation in Québec. In constructing this narrative, I oscillated between broad and specific details. I established a timeline, integrated finer details, adjusted the timeline, and so on. My analysis comprised four stages: reconstruction of the case's history, analysis of narratives, thematic analysis of federal plans, and in-depth review of policies. My analysis first established a broad outline of events and then progressively focused on the finer details such as the content of policy documents and interpretations of decisions and actions. The evolving narrative formally structured my understanding, which played a role in my interactions and interpretations.

My analyses began with the reconstruction of a working theory about the case. I coded the government reports and strategic plans identified from my archival document search to establish a timeline of relevant events and policy actions. In other words, I identified potentially relevant events and chronologically ordered them, noted details about each event, and interpreted meaningful links between them. Following the Policy Analysis Framework (Buse et al., 2005), I noted details regarding context, process, content and actors for each event. In addition, Using NVivo (QSR International Pty Ltd., 2020) I assigned thematic codes (tags) to the content of the relevant data sources regarding the timeline of events. This facilitated my returning to these texts to identify relevant passages and more specific details.

From my analysis of archival documents, I delineated three time periods demarcated by events that increasingly shifted focus toward EMRs in Québec primary care: 1991-2001 (Federal and inter-jurisdictional strategies for digitalising Canadian health systems); 2001-2008 (Québec strategy for digitalising the health system); and 2008-present (Québec strategy for implementing EMRs in primary care). Each period focused on a distinct policy objective, represented by a formal strategy or strategic plan. This supported my analysis and interpretation of actions in relation to prior activity, which centred around a specific set of policy objectives. For each of the three time periods defined by a specific strategic plan, I chronologically structured the narrative according to stages of policy development that I defined following an adaptation of the Policy Cycle Framework (Lasswell, 1956; Leon, 1999). This provided the structure of my three results chapters. The Policy Cycle Framework comprise different numbers of stages, it is commonly depicted as a cycle involving the following: 1) problem identification and issue recognition, 2) policy formulation, 3) policy implementation, and 4) policy evaluation (Buse et al., 2005). While, in actuality, policy processes do not necessarily follow this framework, the Policy Cycle is commonly used to order complex policy-making processes to facilitate its examination (Capano & Pritoni, 2020). Problem identification refers to the process of identifying issues as being of concern for policy-making and the setting of a policy agenda. Policy formulation refers to the process by which actors involved in policy formulation (such as governments and interest groups) develop, agree upon and communicate policies. Policy implementation refers to the way policies are enacted and the mechanisms or instruments it utilizes to effect change and achieve its objectives. Policy instruments include: laws and regulation; privatization, taxes, investments and fees; contracts; standards; information and education; and partnerships and networks (Treasury Board of Canada Secretariat, 2007). Finally, policy evaluation refers to the ways that policy outcomes are assessed. This includes monitoring intended and unintended consequences, what happens once a policy is enacted, and the means of measuring and asserting the extent to which a policy achieved its objectives. I utilized this final stage (which I labelled "outcomes") to present the implementation outcomes and reflections on the policy process and explanations about what contributed to these outcomes.

Following my establishment of a working theory, I constructed an increasingly refined narrative through my interactions with expert informants. Using a snowball sampling technique, I identified expert informants knowledgeable about Québec health network digitalisation initiatives from the timeline of events. My narrative understanding of the case's history informed my interview guides. Each interview guide was tailored according to the expertise and experience of the informants. In my interviews, I sought to elicit detailed accounts that would confirm and expand on decisions and actions that I had established, or fill gaps in my understanding. Following each interview, I analyzed my transcripts and field notes, integrating relevant information into the narrative. Using NVivo (QSR International Pty Ltd., 2020), I also assigned thematic codes to passages in the interview transcripts representing explanations of processes or interpretations of outcomes.

Following my conduct of interviews, I performed a thematic analysis of 7 federal reports and strategic plans published between 1997 and 2006 (Table 5). As digital health information began getting attention worldwide, federal and provincial representatives collaborated on strategizing the development of a pan-Canadian health information network. These actors developed reports and strategic plans that played an influential role in establishing the vision and strategies later adopted by the provinces and territories. I selected this analytic technique to track how the discourse surrounding health system digitalisation at the federal level evolved throughout these initial conversations. I first established an initial grid of themes typically presented in strategic plans regarding health system digitalisation based on my literature review. Then, following an iterative approach (Creswell, 2012), I coded several reports, revised the coding grid, re-coded those reports and continued in this manner until I made no new additions to the grid. With this grid, I established a matrix of broad themes that indicated their presence or absence within the strategic plans (Huberman & Miles, 1983). I then referred to this matrix in constructing the historical narrative and re-examined the individual documents in greater depth to compare how the more pertinent themes differed in their presentation.

Next, I performed an in-depth review of relevant legislative acts that established the rules and resources regarding collecting, storing, accessing, transferring, and using electronic health information. For each, I reviewed the content of the bill itself and the process surrounding their passage into law through an examination of National Assembly transcripts. In particular, I noted details about the legislative process, its key features, explicit objectives, and major objections. This review deepened my understanding of the issues debated, actors' different positions, and how these policies shaped EMR implementation and adoption in Québec.

Finally, after my in-depth review of transcripts, government reports and policies, I integrated the results into the narrative. I then integrated explanations and illustrative passages from the coded archival documents and interview transcripts within the text and revised the text for continuity and coherence (Weick, 1995).

3.4. Methodological Rigour and Trustworthiness

To ensure that my research was conducted following rigorous scientific standards, I followed the criteria for trustworthy qualitative research proposed by Lincoln and Guba (1985) and expanded upon by Shenton (2004), which are categorized according to four domains: *credibility*, *transferability*, *dependability* and *confirmability*. *Credibility* refers to the quality of the research design, the soundness of the analytic techniques and the extent to which the findings were logically derived from the data (Lincoln & Guba, 1985; Ravitch & Carl, 2016; Shenton, 2004). *Transferability* refers to the capacity for others to apply the findings to their own contexts. *Dependability* refers to the quality of the research process. It means that data collection and analysis are well-reasoned and that the data support the argument. Finally, *confirmability* refers to the legitimacy of one's claim that findings reflect the informants' perceptions and experience (Shenton, 2004).

In support of the credibility of my research, I utilized a conceptual framework (Chapter 4) to guide my data collection, analysis, and interpretation. Regarding case study methodology, I drew on Stake (1995) and Creswell (2014). In addition, I drew on Langley (1999) and Polkinghorne (1995) regarding narrative inquiry and narrative analysis. For the conduct of in-depth interviews, I drew on Patton (2002) and Silverman (2006). In addition, drawing on Moules et al. (2015), I developed upon methodological theory concerning hermeneutic interviewing and iterative narrative construction (Appendix II). To ensure that the findings were logically derived from the data, data were triangulated between sources (historical documents and interviews) and within sources (Golafshani, 2003). In addition, my thesis committee members, with expertise in methodology, history and health administration, have made valuable contributions toward my study design, research methods and interpretations. Furthermore, my interview subjects played a significant role in interpreting the meaning and implications of policy decisions and action. Finally, I utilized a combination of snowball sampling and theoretical sampling to ensure that I had a sufficiently exhaustive sample of data with which I could develop a credible and coherent narrative (Altheide, 1996).

My research's emphasis on the relationship between context and the policy decisions and actions surrounding EMR implementation supports the transferability of my findings to other contexts. As explained by Lincoln & Guba (1985, p. 316) regarding the transferability of qualitative research, "It is […] not the naturalist's task to provide an index of transferability, it is his or her responsibility to provide the data base that makes transferability judgements possible on the part of potential appliers." Since my research focused on understanding a single case, I aimed to provide rich contextual detail to enable others to relate and apply it to their contexts, rather than present generalizable knowledge (Ravitch & Carl, 2016). While generalizable knowledge may be helpful to policy decision-makers, policy development processes (agenda setting, policy formulation, implementation, and evaluation) are dependent upon context-specific situational, structural and cultural factors. The provision of contextual detail, thus, enables the reader to judge its pertinence and ascertain how its findings may be applied or adapted.

To ensure the dependability of my research, I collected and analyzed my data iteratively and purposively sequenced my data collection toward the development of an increasingly refined working theory (Sandelowski, 1999). In qualitative research, the researcher plays a critical role in data generation and interpretation. Reflexivity and transparency are therefore essential (Ravitch & Carl, 2016). Accordingly, I thoroughly reflected on the choices I made in terms of conceptual framework, study design, methodological approach, data collection and analysis. An advantage of hermeneutic interviewing and unstructured dialogue is that they enable more natural flow, which fosters honesty and openness and stimulates the subjects' memory retrieval (Schultz & Hernes, 2013). Since the literature on iterative narrative construction and hermeneutic interviewing was scant, I expanded upon existing methodological theory to provide guidance regarding the scientific rigour of this approach (Appendix II). Given the transformative potential of conversation, I argued that hermeneutic conversation involves practicing reflexivity and limiting the extent to which one's understanding might narrow the range of unforeseen directions the conversation may take.

Finally, I aimed to ensure that the narrative that I constructed sufficiently reflected and integrated the facts regarding historic events and their meaning according to the key actors' I interviewed. Accordingly, the case study design was ideal given its appreciation of the case's complexity and its capacity to understand and explain processes and outcomes using multiple data sources. The triangulation of data around the case from various sources and using and using different data collection methods helped to ensure that the narrative created by weaving these together was sufficiently coherent and consistent (Golafshani, 2003). A major advantage of the narrative approach to synthesizing data is that it embraces the complexity and ambiguity surrounding different interpretations by permitting the inclusion of multiple accounts and interpretations (Langley, 1999). Furthermore, to ensure that my interpretations reflected my informants’ perspectives, I regularly verified my understanding during my interviews and asked for clarification (Birt et al., 2016).

CHAPTER 4. CONCEPTUAL FRAMEWORK

This research focused on explaining macro-level policy decisions and actions. Buse et al. (2005) define policy as “the broad statement of goals, objectives and means that create the framework for activity” (p. 4). Policy includes the formal and informal rules that frame human activity through policy instruments such as laws, regulations, guidelines, advocacy, agenda setting, policy development and resource allocation (Institute of Health Economics, 2012). Buse et al. (2005) define public policy as “the deliberate decisions – actions and non-actions – of a government or an equivalent authority toward specific objectives” (p. 2). As this thesis focused on macro-level health policy in Québec, I considered public health policy to refer to the decisions and actions specifically undertaken by the Québec Ministry of Health that affected the institutions, organizations, services and financing of the healthcare system.

4.1. Policy Analysis Framework

To conceptually frame the data collection and analysis of my investigation, I adopted a health policy framework, the Policy Analysis Framework (Buse et al., 2005; Walt & Gilson, 1994). Following the Policy Analysis Framework, I considered policy-making an interactive process involving four interrelated elements: 1) process, 2) context, 3) actors, and 4) content. This broad framework, described in greater detail below, was used to ensure that my research was bounded according to concepts pertinent to policy development. Accordingly, I used the framework to frame my data collection and analysis and to ensure the relevance and coherence of the narrative output.

The policy process refers to the stages of policy-making. More specifically, following the definition put forward by Buse et al. (2005), it refers to the systematic and bureaucratic ways that policies are initiated, formulated, negotiated, communicated, implemented and evaluated. In my investigation of public health policy decisions and actions surrounding EMR implementation, I specifically examined the policy development processes surrounding strategic plans that framed this activity. Accordingly, I adapted the Policy Cycle Framework (Lasswell, 1956; Leon, 1999) to frame my depiction of these processes and my explanation of the Québec Ministry of Health’s policy decisions and actions. Following this framework, I conceived the policy processes in terms of agenda setting, policy formulation, policy implementation and outcomes.

The context behind policy actions refers to systemic and situational influences on policy. For instance, these might include political, economic, social and cultural conditions. Buse et al. (2005) distinguished four predominant contextual dimensions: situational, structural, cultural and international. Situational influences refer to the more transient and circumstantial conditions, such as public opinion, political conflict and economic depression. Structural influences refer to society’s more stable, relatively unchanging elements, such as its political system and how citizens and political actors can influence and participate in policy decision-making. It also includes economic systems or other institutional norms. Cultural influence on policy consists of a society’s values and norms, such as the policies they prioritize and their values about criticizing decision-makers or private-sector involvement. Finally, international influence refers to collaboration with international bodies in policy or the influence of debates and reforms outside the local jurisdiction.

Policy actions may alse be included within context, as they can play a role in structuring subsequent activity (Langley, 2010). Following the characterization elaborated by Anthony Giddens in his conceptualization of agent-structure duality, there is a recursive relationship between actors and social structures. Accordingly, agents’ actions shape social structures, such as norms, cultures, rules, laws, organizations and institutions (Langley, 2010). These, in turn, influence the rules and resources of activity (Giddens, 1984; Langley, 1999). Giddens explained that structures provide the "rules and resources drawn upon in the production and reproduction of social action […] that can allow for regularities in actions to occur over time and across space" (Giddens, 1984, p. p.19). Viewed in this manner, policy-makers are accorded a role in structuring citizens' activity in their capacity to enact legislation following institutionalized systems practice and employ policy instruments as mechanisms by which they might achieve their objectives (Buse et al., 2005.). In this research, I organized policy decisions and actions surrounding health system digitalisation in Canada according to three distinct time periods, inductively delineated following my data analysis. These periods established a chronology of policy decisions and actions increasingly focused around implementing EMRs in Québec primary care. Thus, in my examination of policy actions for each period, I interpreted the decisions and actions of previous periods as having had a structuring influence on subsequent policy actions.

Policy actors include the individuals, organizations and institutions that play a role in the policy process. This dimension also refers to their actions and the extent and manner of their influence over policy. Governments might influence policy by establishing groups and imposing mandates to elaborate policy agendas, formulate policies and oversee their implementation. Other non-governmental groups of actors (such as professional orders, advocacy groups, the public or the media) may try to influence policy at the local, regional, national or international levels. The capacity of actors to influence policy is a function of power, which is inherently intertwined with the social structures that reinforce it (Giddens, 1984). My investigation focused on the macro-level policy decisions and actions surrounding provincial strategies to digitalise the Québec health network and implement EMRs in primary care. Therefore, this research concerned primarily the policy decisions and actions of the Québec Ministry of Health (*Ministère de la santé et des services sociaux* – MSSS) surrounding EMR implementation. This included the

Québec Minister of Health, Deputy Ministers associated with the MSSS's projects, and the teams, committees and working groups that received their mandates from the MSSS. In my examination of these decisions and actions, I considered how they were influenced by the activities (represented by reports, articles or formal debates within the national assembly) of groups of actors inside or outside Québec, such as other government actors, professional associations, private sector partners, researchers, and the media.

Finally, the policy content refers to the substance of policy. This includes its objectives, the issues it addresses and their conceptualization, and the means by which its objectives are to be achieved (through the institution of rules and regulations and the policy instruments that support them). In this research, I present two types of provincial policies: strategic plans and legislation. Each of the three results chapters (chapters 5 to 7) concerns the development of a particular strategic plan. Strategic plans present visions, directions and strategic objectives and frame subsequent activity around their achievement. Legislation, on the other hand, concerns the rules, regulations, and instruments intended to structure activity to achieve particular policy objectives. For each of the strategic plans and policies I reviewed in my investigation, I considered their context, the actors implicated in their development, and the process regarding their presentation to the national assembly.

CHAPTER 5. RESULTS: FEDERAL HEALTH SYSTEM DIGITALISATION INITIATIVE

Preface to Chapter 5

In Canada, health system administration falls under the jurisdiction of the provinces and territories (Government of Canada, 2019b). Regarding health system digitalisation, policy decision-makers of each jurisdiction devised and implemented their own strategies, with different outcomes in terms of implementation, upake rate, and system interoperability. The vision that influenced health system digitalisation in Canada, however, was elaborated by collaborations between health sector actors, industry partners and federal, provincial and territorial government decision-makers. Throughout the 1990s, several key organizations and working groups advanced the discourse regarding the establishment of a pan-Canadian health information system, which shaped the content of the provinces' and territories' strategic plans addressing health information system infrastructure and EHR implementation. These visionary reports gave rise to a blueprint delineating the pan-Canadian information infrastructure: *Blueprint and Tactical Plan for a Pan-Canadian Health Infostructure* (F/P/T Advisory Committee on Health Infostructure, 2000). A federal entity, Canada Health Infoway Inc. (henceforth "Infoway"), was then established to support (through leadership, expertise, and advocacy) the provinces and territories in their EHR system implementation efforts and to help direct local initiatives around strategic priorities with financial incentives.

The present chapter describes the development of the federal strategy for digitalisation of provincial and territorial health systems in Canada between 1991 and 2001. More specifically, I describe the contributions of private sector, government and health sector actors in progressively elaborating the vision of an interoperable pan-Canadian health information highway that influenced the jurisdictions' health system digitalisation initiatives. Table 5 provides an illustration of the themes, inductively identified from my review of the literature, regarding the vision that was addressed. This chapter begins with the contextual factors that influenced federal decision-makers’ interest in health system digitalisation. This is followed by the influences behind the federal government’s policy agenda, which involved the creation of an interoperable pan-Canadian health information highway. I then describe some of the decisions and actions surrounding the formulation of Canada’s strategy to foster the development of provincial and territorial EHRs. Next, I describe how this plan was enacted and the influential role played by Infoway in supporting the jurisdictions. Finally, I discuss the outcomes of Canada’s EHR implementation initiative and the challenges Infoway encountered. This chapter establishes the context for Québec’s health network digitalisation strategy, which is presented in Chapter 6.

5.1. Context Behind Federal Initiatives to Address the Digitisation of Health Information

The government of Canada had been investing in computers and information technology (IT) since at least the mid-1980s (Government of Canada, 2007; Longford, 2001). “Data processing and computer equipment and services” was the largest federal procurement category in 1989-1990 (Government of Canada, March 1993). The initial impetus behind Canadian federal initiatives to address the digitisation of health information may be attributed to two major factors: the state of the Canadian economy and advances in information and communication technology (ICT). In brief, the growing national debt in the early 1990s instigated a shift in the federal government’s administrative approach (Gaumer, 2008). This shift was accompanied by several interventions that aimed to streamline and render more efficient the provision of government services. At the same time, there were important developments in ICT infrastructure that enabled and improved the storage and exchange of digital data. These conditions prompted progressive investment in information technology and an expansion of its role in support of service delivery to reduce administrative costs while enhancing government service delivery (Brown, 1997). These influential conditions are described in greater detail below.

5.1.1. Economic Situation in Canada

In the early 1990s, economic growth in the United States of America brought about a global recession. This, combined with moderate inflation rates, contributed to a growing debt in Canada (Department of Finance Canada, 1995). This condition was aggravated by Prime Minister Brian Mulroney’s (Prime Minister between 1984 and 1993) tax cuts targeting businesses, which were expected to stimulate economic growth. In addition, the Bank of Canada dramatically increased their interest rates to achieve a 0% inflation target (Gaumer, 2008).

To address the growing national debt, major government reorganization was initiated in 1993, under Prime Minister Kim Campbell (Gaumer, 2008). This reorganization was shaped by the principles of New Public Management, which involved the adoption of private sector management models to improve the efficiency of public service delivery (Lapuente & Van de Walle, 2020). As part of this initiative, the position of Chief Informatics Officer (CIO), later renamed the Chief Information Officer, was created within the Treasury Board Secretariat. Among the CIO's tasks included promotion of the use of ICT throughout the branches of government, especially in service delivery (Brown, 1997; Government of Canada, 2007).

When elected in the fall of 1993, Prime Minister Jean Chrétien implemented additional strategies to contain the national debt, including a formal examination of the efficiency and effectiveness of federal departments and agencies (Paquet & Shepherd, 1996). This strategy came to be known as *Program Review*. The Chrétien government aimed to achieve a reduction of $17 billion in expenditures over three years to meet the government's deficit target of 3% gross domestic product by 1996-97. To achieve this target, their strategy involved: streamlining administrative processes, eliminating programs and services deemed non-essential, and imposing structural, administrative changes (Longford, 2001). These structural changes included: increased privatization, commercialization, and adoption of *alternative service delivery* schemes (the provision of public service through, or in partnership with, organizations outside the public service) (Longford, 2001). The Treasury Board's strategy for streamlining administrative processes relied heavily on ICT. In 1994, the Treasury Board published the *Blueprint for Enhancing Government Services Using Information Technology*. This document outlined the role of information technology in: 1) improving the quality of services using technologies that improve access (such as call-centres, self-serve kiosks, internet websites); and 2) improving cost-effectiveness, by cutting labour costs by increasing automation and integrating disparate systems (Government of Canada, 1993).

5.1.2. Developments in Information and Communications Technology

The early 1990s were marked by major advancements in ICT and the expansion of communications infrastructure. While the federal government increasingly turned to information technology as a way of rendering services more efficient and cost-effective, its commercial partner, the Canadian Network for the Advancement of Research, Industry and Education (CANARIE), developed the technological infrastructure that would provide the information and communications backbone of the country (Federal HIT policy expert, Interview)(Government of Canada, 2012b).

CANARIE was a not-for-profit corporation, primarily supported by investment from the federal government and membership fees. A large portion of CANARIE'S membership comprised members of Industry Canada. Industry Canada (later named Innovation, Science and Economic Development Canada) was a federal department whose mandate included enhancing trade and market competition and whose membership included executives from the information technology telecommunications and cultural industries in Canada (Industry Canada, 2005). CANARIE was created to "stimulate industrial research and development on broadband network facilities and applications" (Industry Canada, 2015). It was charged, in part, with upgrading the capabilities of the foundational network behind the internet (CA*net) and improving connectivity to the National Research and Education Network (NREN), an information-sharing network that connected universities, colleges, research hospitals, and government research laboratories (Shade, 1994).

The expansion of ICT and network infrastructure revolutionized data transfer and communications capabilities and enabled collaboration and sharing of information across Canada and worldwide (Industry Canada, 2015). In addition to helping establish the ICT infrastructure in Canada, CANARIE and Industry Canada were heavily involved in conversations with government and health sector organizations regarding the establishment of a Canada-wide communications infrastructure that would connect people in numerous sectors, including health. These initial conversations contributed to the development of a vision of an interoperable pan-Canadian digital health information highway.

5.2. Setting the Agenda for a Pan-Canadian Health Information Infrastructure

The increasing interest in utilizing ICT to improve the quality and cost-effectiveness of government services and the advances in ICT infrastructure in Canada provided a foundation for instrumental reports that projected a vision regarding the applications of the information infrastructure in the health sector. These reports, described below, contributed toward the establishment of a policy agenda regarding the development of a pan-Canadian health information highway.

5.2.1. Canadian Information Highway

One of the earliest discussions at the federal level about how the expanding ICT infrastructure could be leveraged to establish a pan-Canadian health information network took place with the Information Highway Advisory Council (IHAC) (1994-1997). IHAC's membership consisted primarily of members from Industry Canada. It was created in 1994 to advise the federal government in its development of a Canadian information highway, as Canada was beginning its transition to a knowledge and information-based society (Industry Canada, 1994a), and to undertake research and discussions on the development and use of the information highway (Longford, 2001). Its aims were to: 1) devise a strategy that would create jobs through innovation and investment, 2) reinforce Canadian sovereignty and cultural identity, and 3) ensure universal access to essential services at a reasonable cost (Industry Canada, 1994b).

In September 1995, IHAC submitted a report entitled *Connections, Community, Content: the Challenge of the Information Highway*. In this report, IHAC emphasized that, if Canadians are to thrive in an information-based economy, timely access to information would be vital (Government of Canada, 2004a). Among IHAC's 300 recommendations was the creation of a national health information infrastructure and the creation of an advisory council to identify applications for new IT in the health sector (Government of Canada, 2004a). They envisioned that this infrastructure would: 1) drive the development of a standardized health information database that would be accessible to researchers and policy makers; 2) foster telehealth solutions; 3) provide essential health services to under-served populations; 4) improve access to care; and 5) better inform citizens about their health and the healthcare system (Government of Canada, 2004a).

In 1996, IHAC submitted a subsequent report, *Building the Information Society: Moving Canada Into the 21st Century* (Industry Canada, 1996), which further elaborated on how emerging ICT may be leveraged to meet stakeholders' needs, appealed to decision-makers in particular regarding the information highway's capacity to render more effective the delivery of government services (Industry Canada, 1996). They also further appealed to decision-makers regarding the information highway's capacity to render more cost-effective the delivery of government services. In this report, they highlighted the significant role that the government of Canada should play in driving the information highway's development (Industry Canada, 1996).

5.2.2. Applications of Information and Communications Technology in the Health Sector

As Industry Canada envisioned applications of a pan-Canadian information infrastructure, appealing to the federal government's priorities of improving access to information and the efficiency and quality of government services, the federal Ministry of Health formed numerous committees involving various health sector actors (i.e. healthcare providers, managers, and provincial and territorial health policy makers) to discuss leveraging the emerging technology in support of health reform, healthcare delivery and citizens' engagement in self-care. These discussions were foundational to the vision of a harmonized pan-Canadian health information network. Described below are the contributions of two key groups that helped establish the agenda for policy surrounding the pan-Canadian health information highway: the National Forum on Health and CANARIE.

In October 1994, the Chrétien government established the National Forum on Health to "advise the federal government on innovative ways to improve our health system and the health of Canada's people" (National Forum on Health, 1997a). Their role was to examine issues regarding the Canadian healthcare system and identify priorities for improvement (Government of Canada, 2004c). The forum was chaired by Prime Minister Chrétien, with the federal Health Minister (Minister of National Health and Welfare), Diane Marleau, serving as Vice-Chair. Membership included 22 Canadians with expertise in health and the healthcare system. They were given a four-year mandate and a budget of $12 million. The members organized themselves by forming various steering committees to address priority issues: determinants of health, evidence-based decisions, societal values, and resource balancing (Ham, 2001).

In February 1997, the National Forum on Health published its two-volume final report: *Canada Health Action: Building on the Legacy. Vol. I: Final Report* (National Forum on Health, 1997a) and *Canada Health Action: Building on the Legacy: Vol. II: Synthesis Reports and Issue Papers* (National Forum on Health, 1997b). Their reports were informed by two phases of intensive consultation, deliberation, and research taking place over 30 months (National Forum on Health, 1997a). The National Forum on Health's first volume identified several priorities for addressing some of the Canadian health system's prevailing issues. Their priorities included improving the capacity to transform knowledge into action and using evidence to make better decisions (National Forum on Health, 1997a). They argued that better quality evidence would improve decision-making by healthcare providers, administrators, policy makers, patients and the public. In support of establishing an evidence-based health system, the Forum recommended the rapid development of a nationwide health information system. Like the IHAC, the Forum insisted that the federal Health Minister take leadership in this regard (Government of Canada, 2004b). They argued that political will, leadership and champions are critical to its development (National Forum on Health, 1997b). The Forum identified many of the foundational elements that would need to be addressed in the development of the health information system, foremost: privacy and security, standards, and strategic investment (National Forum on Health, 1997b). Groups of industry and health sector actors that followed elaborated on these elements and advanced the discourse regarding a pan-Canadian health information system.

In 1997, CANARIE released a report called *Towards a Canadian Health I-Way: Vision, Opportunities and Future Steps* (CANARIE, 1997). This report played an important role in elaborating the need for a national strategy to realize the vision of a pan-Canadian health information highway. It projected a range of applications for the Canadian health information highway and identified the elements that were considered critical to its successful development. Their report was informed by industry and health sector representatives with the aim of "[accelerating] discussions among potential stakeholders and other public and private sector organizations in Canada leading to the development of a Canadian Health Iway" (CANARIE, 1997). To preserve the quality and cost-effectiveness of the Canadian health system, while addressing citizens' needs, they argued that effective use of HIT is required to improve self-care, health promotion, disease prevention, and home care services (CANARIE, 1997).

> *We are moving from a focus on acute care and cure to a broader vision that includes health promotion and disease prevention; from a focus on central control of institutions to regional support of home and self-managed care; and from a reliance on medical specialists to a recognition by all citizens of the need to assume greater responsibility for their own health. At the same time, we are developing a broader perspective of health determinants and the need to integrate into our health system the social, environmental, genetic, physical and personal factors which influence health status (CANARIE, 1997, p. iv).*

CANARIE's vision of the information highway was that it would be an accessible, yet sufficiently secure, "virtual information center" to assist health professionals and patients in decision-making, support research and training, enable improved health system management, and respond to citizens' information needs.

Among their conclusions was that a national strategy and framework were needed to maximize the potential for interoperability. They contended that because the provinces and territories have their own systems for ensuring the protection of personal information, the development of common standards, regulatory frameworks and privacy legislation would be paramount. To establish a national strategy, they highlighted the need for federal, provincial, and territorial leadership and collaboration. They proposed that key partnerships involving federal, provincial, territorial officials, and industry and health sector actors should create the information highway. CANARIE also recommended the involvement of the Canadian Institute of Health Information (CIHI) in standards development and consolidation. CIHI was a non-profit organization comprising health and health information technology experts from the private and public sectors whose mandate included developing standards for the national health infostructure

(Canadian Institute for Health Information, 1999). Furthermore, CANARIE recommended that professional associations, licensing bodies and multi-disciplinary research initiatives should play a role in encouraging uptake and providing training. They asserted that the public and private sectors should play a critical role in financing the information highway's development. Finally, they recommended the creation of a 'council of senior leaders' (involving CANARIE, IHAC, the Minister of Health, and the Minister of Industry) to coordinate the development of the information highway.

5.3. Formulation of the Plan for a Pan-Canadain Health Information Network

Building on the reports described above, several working groups and organizations involving federal, provincial and territorial governments, industry and health sector actors devised increasingly robust strategic plans that shaped the digitalisation of healthcare systems across the country. These groups were supported by a series of federal investments, beginning in 1997 (Table 6), following recommendations from the National Forum on Health, toward information infrastructure development. The following provides a description of the formulation of Canada's increasingly refined vision of a pan-Canadian health information highway and how this vision shaped the health information highway "Blueprint".

5.3.1. Establishment of Priorities and Components of the pan-Canadian Health Information Highway

The Advisory Council on Health Infostructure (ACHI) was foundational to the formulation of a strategy for developing the health information highway and defining the key priorities and recommendations (Morris, 2005). The Minister of Health established the ACHI in 1997, following IHAC's recommendation, to "consider how information technologies and systems could best support and promote more informed decision making by health professionals, physicians, administrators, planners, policymakers and individual Canadians" (Advisory Council on Health Infostructure 1999, p. 15). Its membership included Health Canada, federal, provincial and territorial decision-makers, and health professionals, administrators, and academics. The ACHI's objectives were to address strategic planning, telehealth, protection of personal health information, health surveillance, and electronic health records. More specifically, their objectives included: 1) developing a Canadian vision of a health information highway and identifying essential needs; 2) generating a federal agenda to implement priority components; 3) suggesting collaborative mechanisms to achieve a collective framework and strategy; and 4) identifying issues, challenges and barriers, and recommending possible solutions.

In September 1998, the ACHI released its interim report *Connecting for Better Health: Strategic Issues*. The ACHI's interim report further elaborated on the vision of an interoperable pan-Canadian health information system. It emphasized that the information highway should address the needs of healthcare providers, researchers, administrators, patients, and policy-makers. It framed the health information highway as essential to addressing the complexity and challenges of the health system and public health concerns in Canadians, as well as improving citizens' engagement in self-care through access to information and services and The interim report presented the results of consultations with roughly 500 stakeholders across Canada on the need for a national health infostructure and applications toward improving the health of Canadians (Advisory Council on Health Infostructure, 1998; Government of Canada, 2007).

In their report, the ACHI drew attention to the lack of concertation among the myriad local and regional initiatives. They, as others before, advocated for pan-Canadian interoperability and highlighted the need for a common strategy and framework, and harmonized data and infrastructure standards and privacy legislation. They expressed concern that as a result of differences in legislation governing privacy and security amongst the provinces and territories interoperability may not be possible.

> *In Council's view, a real danger exists that Canada could end up with many different approaches to privacy. Diversity could render difficult, if not impossible, improvements in the portability of services or the creation of information resources needed for accountability and continuous feedback on factors affecting the health of Canadians. In some cases, any exchange of information might be prohibited by law – unless the recipient jurisdiction is able to show that its regime provides protection as effective as that of the potential sender of information (Advisory Council on Health Infostructure 1998 p.32).*

To address the potential disharmony of standards and privacy laws across the provinces and territories, the council recommended that the federal Minister of Health encourage an accord among federal, provincial, and territorial governments, to address health system digitalisation within their jurisdictions and collaborate on harmonizing the provincial and territorial health information systems (Advisory Council on Health Infostructure, 1998).

Meanwhile, to better understand the needs of stakeholders groups regarding the information infrastructure, Health Canada organized a series of workshops. The *Federal/Provincial/Territorial (F/P/T) Chief Information Officer Forum*, held in February 1998, comprised senior officials from the federal, provincial and territorial governments. Together, they discussed issues impeding the application of information technology within Canada's health system (Morris, 2005). Next, in October 1998, a workshop was held on citizen engagement and accountability as it pertains to the national health information infrastructure to discuss how health information could be used to empower citizens. Finally, in October 1998 the *Federal/Provincial/Territorial Workshop on Privacy* was held to discuss with stakeholders the information security protocols that would enable secure storage and transfer of personal health information across Canadian jurisdictions (Morris, 2005). These workshops provided strategic direction for federal and provincial and territorial health policy makers.

Following these workshops, in February 1999, the ACHI published their final report entitled *Canada Health Infoway: Paths to Better Health* (Advisory Council on Health Infostructure, 1999). In this report, they provided a detailed strategic vision of the health information highway's role in improving Canadians' health and the health system.

> *The Canada Health Infoway will be a strategic infrastructure that will transform and have impacts on the Canadian health care system and the health of Canadians in the long term. It is a positive revolution in the making. Investments in health infostructure – and in its essential building blocks at the provincial and territorial levels – must take the long-term view. Through such investments, we will help to create the Canadian health care system of the 21st century – one in which the public attains a new level of empowerment, health care services are stronger and much more integrated, new information resources enhance accountability and decision making at all levels, and privacy protection is significantly improved (Advisory Council on Health Infostructure, 1999, p.14).*

The ACHI specified that the four strategic goals for the Canadian health information highway should be to: 1) empower the public by rendering accessible reliable health information; 2) improve healthcare services by improving portability and providing healthcare professionals with information and communication technologies (i.e. electronic medical records, telehealth); 3) provide the resources for evaluation of health services and health surveillance; and 4) improve privacy protection within the health sector by advancing privacy protection technology and by harmonizing federal, provincial and territorial legislation. They commended the numerous initiatives that were underway in the provinces and territories and contended that the Canadian health information highway should be built upon these existing systems and networks. They recommended, however, that these should be coordinated and concerted around a common vision and strategic priorities.

5.3.2. Blueprint for the pan-Canadian Health Information Infrastructure

The *F/P/T Chief Information Officer Forum* evolved into the *F/P/T Advisory Committee on Health Infostructure* (henceforth "Advisory Committee") in June 1999. Their mandate was to "develop a national strategy to enhance the utility and use of information and information technology in the health sector (Government of Canada, 2007)." Building on the vision, priorities and strategic directions put forward by the organizations and working groups described above, the Advisory Committee (1999-2002) developed the "blueprint" for provincial and territorial health information infrastructure development in December 2000. This would help establish interoperable provincial and territorial EHRs as the foundation of the information infrastructure. The Advisory Committee devised working groups to address the following five strategic priorities: strategic planning, telehealth, protection of personal health information, health surveillance, and EHRs.

The "Blueprint and Tactical Plan for a pan-Canadian Health Infostructure" (F/P/T Advisory Committee on Health Infostructure, 2000) was drafted over 18 months. It expanded upon the vision of a pan-Canadian infostructure and was intended to provide priority strategic orientations for achieving it and influence further planning and consultation. It was conceived in response to the previously expressed need to foster ICT leadership and inter-governmental collaboration around a common framework and comprehension of the required components for establishing the health information highway. It emphasized the value of the information highway for improving efficiency, effectiveness, access, quality, and accountability within the health sector. The aims of the document were to: 1) identify essential information and technology components for establishing the information highway, 2) elaborate how ICT contributes to the information highway, 3) identify key gaps, and 4) provide strategic orientations by building on existing federal, provincial and territorial investments and initiatives (F/P/T Advisory Committee on Health Infostructure, 2000).

Based on input from stakeholders, previous reports, and a scan of international activities, they identified 11 key directions (organized under four headings: empower the public, strengthen and integrate healthcare services, create information resources, and improve privacy protection and standards): 1) health information for the public, 2) information for health providers, 3) clinical decision support, 4) electronic health record, 5) health surveillance, 6) self-care/telecare, 7) telehealth, 8) health data holdings, 9) health information analysis and reporting, 10) privacy protection, 11) standards. They identified five strategic elements for the implementation of the information highway: organization and people, processes, information, technology, and standards. They conducted a gap analysis, looking at each of the 11 key directions individually. Their primary finding was that health information was still not easily accessible, nor of sufficient quality to support the activities of the information highway. Additionally, access to technology (computer hardware and software) was still limited among healthcare providers in Canada, and the requisite infrastructure was not yet in place. Furthermore, privacy policies were not yet harmonized. Beyond the issues discussed in the gap analysis, they stressed the importance of addressing organizations and people, including partnerships, stakeholders, uptake, and change management.

The report suggested that provincial, territorial and local initiatives should address missing components and motivate health professionals' use of the information highway. The Blueprint argued for the need to situate the myriad initiatives underway throughout the provinces and territories around a broader strategic objective. The Advisory Committee contended that provincial and territorial initiatives should focus on the following strategic orientations: health information for the public, integrated healthcare provider solutions, and electronic health records (including privacy, data and technological standards). They envisioned that with a web portal, the public could access comprehensive and trustworthy health information that could be used to support decision-making and telehealth. They also envisioned a suite of solutions for healthcare providers including a provider portal, clinical decision support tools, and telehealth applications. Finally, the Advisory Committee suggested that EHRs represent an important exploit of the information highway and should be prioritized. To achieve this end, data holdings, privacy harmonization, security, EHR standards and an EHR implementation strategy would need to be established. The Advisory Committee recommended that, as next steps for significant advancement, decision-makers should make strategic investments, enable and support the change management process, coordinate and foster EHR implementation in priority settings where leadership and organizational commitment is more prominent, and devise a comprehensive approach to privacy and security (F/P/T Advisory Committee on Health Infostructure, 2000).

5.4. Implementation of Canada's Blueprint and Tactical Plan for a pan-Canadian Health Infostructure

As described above, the work of the organizations and working groups between the mid-1990s and early 2000s laid the conceptual groundwork for the development of a pan-Canadian health information infrastructure. They projected the vision that this health information highway would improve evidence-based care, support decision-making and self-care, and enable secure access to information by authorized personnel. EHRs were considered one of the most significant exploits of the information infrastructure. At this time, provincial and territorial HIT projects were relatively local in scope and did not necessarily reflect the priority components that would provide the foundation for the proposed infrastructure. The working groups recommended that the provinces and territories work toward the development of EHRs in their jurisdictions and that they should be shaped by a common framework and strategy involving common data and technology standards, to achieve interoperability and favour transferability of knowledge and experience gained from individual initiatives. They contended that its successful development would require centralized leadership, strategic investment, collaboration between governments and health sector and industry actors, commitment from healthcare decision-makers and administrators, and effective change management strategies. The following provides an account of the federal government's efforts to enact this strategy.

5.4.1. Legislation Governing the Protection of Personal Health Information

As explained, the federal working groups discussed above highlighted the need for legislation governing the protection of personal information, in light of the novel conditions engendered by digital information and ICT infrastructure. In 2000, the federal government passed the *Personal Information Protection and Electronic Documents Act* (PIPEDA). This was drafted, in part, to provide a legislative framework for the protection of personal information when the provinces and territories did not have their own. PIPEDA addressed primarily the safeguarding of personal information (including demographic data, medical histories, and credit information) principally in the context of electronic commerce, and detailed conditions for security and consent. This act was not intended to serve as a foundation for creating a health information infrastructure, nor was it sufficient to serve this purpose. It did, however, prompt many of the provinces and territories to develop their own legislative frameworks governing the protection of personal information. Others had already begun the process (Table 7).

> *The privacy legislation initiative was mainly provincial. The PIPEDA was the default federal approach when the province didn't have effective provincial legislation of its own. The PIPEDA was meant to patch the holes in the boat, for those who didn't have one of their own, if you didn't have the health information act in your province. I never believed that that had any value for creating the conditions of a national health infostructure. What it did do was incentivize some of the provinces to get their shit together to write up proper provincial legislation so they would not have to defer to PIPEDA (Federal HIT policy expert, Interview).*

Despite efforts to harmonize provincial legislation, the jurisdictions did not follow a common framework and legislation governing health information ultimately differed in terms of comprehensiveness and how they addressed essential EHR components (e.g. data storage, data access, uses of health data, security protocols, vendor regulation, custodianship, and consent) (HIT Organization Representative 1, Interview). As this would significantly hinder the interoperability and portability of health records within Canada, the federal government sought to encourage collaboration between the jurisdictions.

5.4.2. Coordination of Provincial and Territorial Initiatives

The First Ministers conference held on September 11, 2000, involving the Prime Minister (Jean Chrétien) and First Ministers representing each of the jurisdictions, marked an important moment when provincial, territorial and federal policy makers committed to working together on developing the pan-Canadian health information highway and provincial EHRs (Canadian Intergovernmental Conference Secretariat (CICS), 2000). As the technology was relatively novel, expertise at the provincial government level was limited and this affected their capacity to manage these initiatives and ensure that they strategically addressed areas that best supported the broader vision. Federal, provincial and territorial decision-makers recognized the need for support and expertise in health information system development (Morris, 2005). Accordingly, to support the jurisdictions in their development of a health information infrastructure and EHR system, Health Canada announced that it would invest $500 million in Infoway. Infoway was an independent not-for-profit corporation whose mandate involved fostering and accelerating the development and implementation of interoperable electronic health solutions throughout Canada (Canadian Intergovernmental Conference Secretariat, 2000; Government of Canada, 2012a; Office of the Auditor General of Canada, 2010a).

Infoway was created to establish the conditions for a national infrastructure integrating provincial and territorial EHR systems, handle the distribution of investments, and support the jurisdictions in their coordination of initiatives (Federal HIT policy expert, Interview). Infoway remains active to this date, however, its mandate and focus evolved over the years. Between 2001 and 2010, Infoway's primary focus was to establish standards and support the provinces and territories in their health system digitalisation and EHR implementation initiatives. Since 2016, as focus shifted from implementation to advanced EMR and information system features (Hamade et al., 2019; Jones et al., 2017), Infoway has been more involved in developing provider solutions and patient-centred systems such as appointment scheduling, e-prescribing, e-visits, e-referrals, and e-discharge summaries (Saeed, 2010).

Infoway designated representatives who worked with regional, provincial and territorial decision-makers in support of various projects and initiatives. Membership included the 14 Deputy Health Ministers of the federal, provincial and territorial governments (Vérificateur général du Québec, 2011a). These members reported directly to their ministers about Infoway's activities, implying that all governments across Canada were kept appraised of progress. Infoway's board of directors was appointed by its members. The board included seven public-sector representatives made up of two from the federal level and one from each of the five regions of Canada. There were also private sector representatives including directors with finance, information technology, and clinical backgrounds. The board met quarterly to discuss strategic issues (Saeed, 2010). Annually, the members would endorse the Corporate Business Plan after the board of directors had approved it (Saeed, 2010).

Infoway played many roles. They acted as strategic investors, directing investments toward projects based on their strategic value in supporting the implementation of EHRs and the transfer and scale-up of innovations. In addition, they led and coordinated several national projects including the definition and advocacy of national standards (i.e. HL7), pricing agreements with vendors, user adoption strategies, and benefits evaluation methodologies (HIT Organization Representative 1, Interview). They were e-health advocates and collaborated with both public and private partners. They also participated in national, provincial, territorial and local health reform initiatives and were involved in planning and monitoring the jurisdictions' various projects. Finally, they facilitated the free exchange of knowledge, lessons, and expertise between stakeholder partners and fostered adoption and spread by facilitating leadership among healthcare providers and highlighting best practices, particularly concerning change management (Saeed, 2010).

In 2003, Infoway released a 218-page document called the *Electronic Health Record Solution Blueprint version 1.0* (business and technology architecture blueprint) (EHRS Blueprint v.1.0). It was developed with the involvement of health sector stakeholders and HIT vendors and built on the *Blueprint and Tactical Plan for a pan-Canadian Health Infostructure* and provided an infrastructure blueprint for an interoperable EHR system, to support the jurisdictions' adoption of standards in the development of their systems. Infoway's EHRS Blueprint sought to address the priorities of their primary audience: decision-makers and HIT vendors. Accordingly, the perspectives on the architecture that they present consisted of: business value, business architecture, conceptual architecture, services architecture, integration models, deployment models, and applications.

The EHRS Blueprint Version 1.0 represented a first iteration of the architectural vision of the pan-Canadian interoperable EHR information infrastructure and assisted in the definition of Infoway's investment strategies (Canada Health Infoway, 2003). It provided a common foundation in terms of vision, values and benefits. It also provided technical schematics of infrastructure components and interoperable solutions, and potential applications of the infrastructure. The EHRS Blueprint identified key EHR system components that the provinces and territories would need to address, including data and technology standards, patient and provider registries, and repositories for laboratory, medication and diagnostic imaging information. It also provided suggestions of the kinds of data that may be used to support clinical or administrative tasks, such as demographics, encounter histories, laboratory results, diagnostic imaging, clinical documents, pharmacy records, home care notes, discharge plans and summaries, and immunization records.

In 2006, Infoway released a 390-page revised version of their Blueprint (EHRS Blueprint v. 2.0). It expanded the focus of the Blueprint to address the planning and execution of EHR systems. Version 2.0 included a discussion of privacy security architecture and EHRS reference architecture (requirements for interoperable EHR and components and mechanisms to meet them) (Canada Health Infoway, 2006). Additionally, since the first version of the Blueprint, Infoway's mandate was broadened to include telehealth and public health surveillance, therefore these were also addressed in the revised Blueprint.

The establishment of Infoway's governance and operations took several years. Upon its founding, Health Canada appointed Duncan Sinclair, a leader in Canadian healthcare reform and a previous participant in the National Health Forum, as Chair and acting CEO of Infoway. Infoway was initially proposed to have a corporate structure, with significant private sector involvement (HIT Organization Representative 1, Interview). This proposal was rejected by the Deputy Ministers. The Deputy Ministers requested that they play a more prominent role. Eric Maldoff, a lawyer and political advisor, replaced Duncan Sinclair and served as Chair between 2001 and 2004, after which he was replaced by Richard Alvarez, previous Chair and CEO of CIHI, who remained Chair until 2014. Eric Maldoff played an important role in establishing a conditional funding model that would incentivize the development of key EHR infrastructure components identified in the EHRS Blueprint. The provinces and territories would receive a 20 percent seed funding, that they were expected to supplement with their own resources (Noseworthy, 2015). They would receive additional funding only once specific criteria were met.

> *Eric Maldoff […]said: "we're not just going to give you the money. I'll tell you what we're going to do. We're going to put a strategy together. You work within that strategy in terms of your business plan, we will fund you a portion for that business plan. […] You go out and choose your own vendors; we're not going to choose your vendors. […] You negotiate with them, within the limits. Because this is what we're going to give you. If you want a Cadillac system or whatever else, you pay for it yourself. Otherwise, this is what we're going to give you. So we'll fund the capital cost; we'll fund the up-front cost. But we'll give you a portion. Then when we see usage, we'll give you the further portion." (HIT Organization Representative 1, Interview).*

The conditional strategic investment model had the advantage of enabling the monitoring of these large, high-risk investments and holding the jurisdictions accountable to a degree. The provincial and territorial health authorities were initially reluctant to accept the proposition of conditional funding.

> *That [money with strings] didn't go down particularly well with any province because it was difficult for them to now understand that we were now giving money with strings. I don't think before then there was any precedent. […] They didn't want the strings. But we stuck to our guns and said: "unless you sign this contract, with strings, you're not going to get the money." So, eventually, one by one, they needed the money, they signed the contract and we started to get them on board (HIT Organization Representative 1, Interview).*

It took more than two and a half years before money began to flow from Infoway. Once the mechanisms were in place, however, Infoway played a critical role in shaping EHR development in Canada.

5.5. Outcomes and Challenges

Infoway helped the jurisdictions achieve numerous targets. They provided the blueprint upon which the jurisdictions based their strategic plans. They facilitated the adoption of data and technology standards and supported the implementation of EHR systems through strategic investment in projects that addressed priority components, including patient and provider registries and repositories for medication, laboratory and diagnostic imaging information. By funnelling its expenditures through Infoway, federal investment in HIT was rendered more accountable, transparent, and strategic. Infoway's use of performance indicators enabled them to demonstrate to Health Canada the value of investments in information technology. From the outset, Infoway established a business case for each of its investment strategies in terms of its impact on access, quality, and productivity in particular (Canada Health Infoway, 2010). This provided reassurance to provincial and territorial health authorities that there were measurable benefits to information technology implementation. By as early as 2009, Infoway had approved funding for 283 ongoing projects, totalling more than $1.5 billion. All projects addressed one of nine priority domains: diagnostic imaging systems, medication systems, information infrastructure, innovation and adoption, EHR interoperability, laboratory systems, public health surveillance, patient and provider registries, and telehealth (Saeed, 2010).

Despite the provinces' and territories' achievements regarding their development of essential EHR system components, Infoway faced numerous challenges that contributed toward a deviation from the initial vision of an interoperable pan-Canadian system. Despite efforts to harmonize provincial and territorial initiatives around a common framework and common standards, the jurisdictions ultimately devised distinct strategies. Furthermore, provincial EHR implementation was more costly and took longer than initially projected. Infoway was initially intended to have a 3 to 4 year mandate to oversee the federal government's strategic investment, but it was required to remain in operation play a more active role in orienting the myriad local initiatives (Noseworthy, 2015). The following describes some of the challenges the jurisdictions faced and explains the divergence of their strategies.

As highlighted by numerous working groups discussed above (ACHI, Advisory Council, CANARIE, etc.) collaboration was critical to the success of developing an interoperable pan-Canadian health information infrastructure was collaboration. These groups contended that the provinces and territories should work together on developing common standards and a common strategy that would involve the prioritization of key elements that would establish the foundation of provincial and territorial EHR systems. While Infoway offered ICT expertise and leadership. Policy decision-makers had minimal experience with ICT. Although Infoway's mandate involved helping to direct the provincial and territorial initiatives, their authority and their influence over provincial decision-making was limited. Their influence was largely achieved through conditional funding and attempts to convince decision-makers of the benefits of following a common strategy involving common standards and infrastructure (HIT Organization Representative 2, Interview). As [HIT Organization Representative 1] explained, "we had to bring the people to water; we couldn't put their heads under to get them to drink; we had to coax them as best we can to get them to start to drink" (HIT Organization Representative 1, Interview). Ultimately, the provinces and territories adapted Infoway's blueprint and addressed health system digitalisation according to their own values, priorities, and resources (Saeed, 2010). As a result, despite Infoway's support, their strategies diverged in terms of the scope of their vision, adoption of data standards, and their prioritization of system components.

In terms of scope, EHR systems were meant to represent but one component of the jurisdictions' broader digitalisation strategies. The intention was for the provincial and territorial decision-makers to invest in complementary areas (i.e. telehealth, EMRs, patient portals, provider portals and decision-support tools, surveillance and research) to coordinate these initiatives (HIT Organization Representative 1, Interview). Given the differences in scope and strategy, EHR systems within the provinces developed at different rates, thereby hindering interjuridictional interoperability. Furthermore, as their strategies diverged, the capacity to share relevant lessons among the provinces was limited.

Regarding differences in data standards, while the provinces’ and territories’ adopted common data standards, they were not strictly followed. Deviation from established data standards consequently limited the comparability of data between the jurisdictions as well as system interoperability.

> *The root of the problem of data quality starts right from day 1, when the people developing these products did not understand the importance of constraining the data that goes into them, to be structured, the data elements needing certain acceptable values and certain ranges. This is all something that in well-designed systems would be handled up-front and would prevent a lot of the bad data that goes in now. (HIT organization representative 2, Interview)*

The differences in the jurisdictions’ application of data standards may be attributed in part to decision-makers and developers not understanding the value and benefit of applying standards at the outset. As [HIT organization representative 2, Interview] explained, leadership and expertise regarding the HIT was generally lacking among provincial and territorial decision-makers which affected their capacity to plan appropriately.

Finally, the jurisdictions established essential system components at different rates. The intention was for the base system components to be prioritized (i.e. infrastructure and patient and provider identifiers), followed by other dependent components. According to [Federal HIT policy expert], some jurisdictions did not adequately address the base components at the outset and attempted to develop interdependent components simultaneously, which consequently delayed subsequent stages.

Among the unanticipated challenges respecting Infoway’s support of the provinces and territories, change management was considered the most significant. The need for effective change management in health information system development is well established (HIT Organization Representative 1, Interview). Although the provinces and territories addressed this component in their strategic plans, and despite the support Infoway provided regional health authorities, instigating rapid and expansive change was more challenging and complex than anticipated, and the cost of change management was thus grossly underestimated.

> *I don't think it was a surprise how much it was going to cost. And the money was never going to be enough. What was a surprise was the cost of change management, and the opposition to it. What was a surprise was the status quo would come out and find ways of keeping the status quo and find all sorts of ways of not moving with this agenda (HIT Organization Representative 1, Interview).*

5.6. Conclusion

I will summarize what I established above regarding federal-level influence on digital health information system development in Canada. First, discourse around health information technology emerged from a context of the federal government's interest in using this technology and their partnerships with the private sector to increase the efficiency of government services, as there was pressure to constrain spending. Health administrators and ICT experts saw potential in HIT to render health system administration more efficient and to improve Canadians' health, the quality of service delivery, and engagement of citizens in self-care. The vision projected by groups comprising healthcare and industry stakeholders and federal, provincial, and territorial policy decision-makers consisted of an interoperable, pan-Canadian health information highway. It was to be built upon and integrate the projects and initiatives that were underway in the provinces and territories. These actors argued that they should aim to achieve interoperability to support portability, evidence-based care, performance measurement, comparison across regions, and accountability. EHRs were seen as one of the most promising exploits of the health information highway, and their development was considered a way to help drive innovation and investment in complimentary HIT projects.

Consultations with stakeholders and ICT experts and an examination of international initiatives led to the identification of key components that provincial and territorial policy decision-makers should address in their development of EHRs. For the most part, the same themes were reiterated as the discourse developed. These themes include: coordinated vision and strategy, data and technology standards, and harmonized privacy legislation. Several organizations highlighted the need for planning regarding governance, partnerships (with public institutions, the private sector, academic centres, and professional associations), change management, interoperability with other HIT systems, strategic investment and resource allocation.

Infoway was created to support the provinces and territories by providing leadership and expertise in ICT and strategic funding for EHR system development. They published two versions of a blueprint (addressing the business aspect and tactical deployment, respectively) to assist decision-makers in their endeavours. While they provided the outline for strategic planning, results-based investment, as well as leadership on numerous projects, their influence on provincial and territorial strategies and their deployment was limited.

Despite Infoway’s support, the provinces and territories faced unanticipated costs and delays. My interview subjects provided several explanations. First, provincial and territorial decision-makers championed HIT innovation according to their own values, understanding, available resources, legislative conditions, and accountability to not misuse public funds without sufficient short-term returns. The jurisdictions’ strategic plans ultimately differed in terms of scope, prioritization, integration of other HIT systems, privacy policy, and roll-out process. In addition, provincial and territorial decision-makers' expertise in ICT was limited, as was their capacity to coordinate and concert the myriad small-scale HIT initiatives throughout their regions. Finally, change management and uptake by decision-makers and health professionals were said to have been underestimated.

This chapter established the role of the federal government in shaping Québec's health network digitalisation strategy and describes the support provided by Infoway and explains the provinces' divergence from the initial vision of an interoperable pan-Canadian health information highway. The content of Infoway's EHRS blueprint and the way Infoway influenced and supported provincial EHR development establishes the context behind the policy decisions and actions covered in the subsequent chapter regarding the prioritization of a provincial EHR in Québec and the MSSS's exclusion of primary care EMRs from their plan.

CHAPTER 6. RESULTS: DIGITALISATION OF THE QUÉBEC HEALTHCARE NETWORK

Preface to Chapter 6

The previous chapter illustrated the evolution of federal and inter-jurisdictional discourse about information and communications technology and health system digitalisation. Through interactions with the private sector, government, and health sector actors, a vision of an interoperable pan-Canadian health information network took shape. To support interoperability, the Advisory Committee on Health Infostructure established a blueprint defining a common infrastructure and data and technology standards, which would provide the foundation for provincial and territorial Electronic Health Records (EHR). Canada Health Infoway (Infoway) was created to oversee the disbursement of federal funds and support the jurisdictions in their health system digitalisation initiatives. They established an EHR blueprint and then assisted the provinces and territories in its development and implementation. This provided context for Québec's health network digitalisation strategy.

Before it is possible to directly address my research question regarding primary care Electronic Medical Record (EMR) implementation in Québec, it is necessary to understand the policy decisions and actions surrounding Québec's health network digitalisation strategy as these determined the prioritization of EMRs and the resources allocated toward their implementation. Throughout the 1990s, discussions were taking place globally about the benefits of health system digitalisation and governments began developing policies and action plans addressing the use of HIT to improve the delivery of public services, including EHRs, EMRs, telehealth systems, analytic tools, decision aids, patient portals, and healthcare provider portals (Evans, 2016). In the early 2000s, the Québec Ministry of Health (*Ministère de la santé et des services sociaux* – MSSS) began formulating a provincial strategy for establishing a digital health information network. Influenced by Infoway, a key component of Québec's provincial health network digitalisation strategy involved an interoperable EHR.

This chapter provides a description of the events and macro-level policy decisions and actions in Québec, between 2001 and 2008, surrounding the development and implementation of their health network digitalisation plan, the *plan d'informatisation du réseau de la santé et des services sociaux* and interoperable provincial EHR, *Dossier Santé Québec (DSQ)*. I begin by describing the events that contributed to the MSSS's decision to initiate health network digitalisation planning and to become official members of Infoway. Next, I elaborate some of the actions and government reports that helped shape the agenda regarding health system digitalisation. Following this, I describe the development and evolution of Québec's health network digitalisation plan. Then, I describe the decisions and actions that surrounded its implementation. Finally, I discuss the outcomes in terms of what had been achieved by 2008 when the MSSS leadership changed hands. At this time, the DSQ was being called a "costly disaster", and there were concerns about the mismanagement of public funds. I discuss some of the criticisms and explanations that emerged in my investigation, which provide context for the subsequent policy actions in Québec that sought to address these issues and advance the integration of EMRs in primary care practices throughout the province. This chapter establishes the context for the Québec policy-makers' decisions regarding the implementation of EMRs in primary care, which will be discussed in Chapter 7.

6.1. Context Behind Québec's Health Network Digitalisation Strategy

In Canada, the provinces and territories were involved in a variety of eHealth initiatives. At the federal level, inter-jurisdictional discussions were taking place with respect to the development pan-Canadian health information highway and the benefits of health information networks. In Québec, two contextual conditions in particular influenced policy decisions and actions regarding health network digitalisation. These conditions, described in greater detail below, included the economic situation in Québec and the backdrop of HIT projects that were underway. The growing national debt in the early 1990s contributed to budgetary constraints in Québec. This resulted in a restriction of health sector resources and several health reform bills that impeded local and regional actors' engagement in improvement initiatives (Gaumer, 2008). It also precipitated the MSSS's membership in Infoway, which played a key role in driving Québec's health network digitalisation strategy. Meanwhile, local and regional HIT projects framed the discourse, demonstrated their clinical value, generated momentum, and established knowledge about logistics. These helped demonstrate the value of health information and network interoperability for improving the quality of health services and reducing costs. These conditions are described in greater detail below.

6.1.1. Economic Situation in Québec

Health service delivery is managed by the provincial and territorial governments, and a portion (21%) of healthcare funding is provided by the federal government according to conditions defined under the federal *Canada Health Act* (1984) (Government of Canada, 2019a; Parliament of Canada, 2020). The growing national debt in the early 1990s resulted in reduced healthcare funds for the provinces and territories (Madore, 2003). As one of the interventions to address the growing national debt, Canada's 1995 Budget Plan (Department of Finance Canada,

1995) proposed the consolidation of federal cash and transfers, called the Canada Health and Social Transfer (CHST), which provided funding for healthcare, post-secondary education and welfare in the provinces and territories and imposed a cap on entitlement growth (Government of Canada, 2019a). As the growth in CHST entitlement was lower than that of the economy, this consolidation represented a significant reduction in federal healthcare funding for the provinces and territories (Madore, 2003). In response, Québec Premier Lucien Bouchard (1996-2001) and Minister of Health Jean Rochon (1994-1998) implemented cuts to the health care budget. These cuts were so drastic that they precipitated a nurses' strike in 1999 and contributed to growing frustration among citizens as the capacity for timely access to care for urgent medical problems was limited (Gaumer, 2008). These conditions instigated a series of healthcare reforms that aimed to address the financing and organization of healthcare while protecting and improving the quality of services (Pelchat, 2008).

Three healthcare reform acts, in particular, established the conditions for the enhancement of Québec's health and social services network. First, the *Act to amend the Act respecting health services and social services and amending various legislative provisions* (Bill 404), introduced in 1998, was intended to refine the rules governing the organization and operation of health institutions and regional authorities to simplify administrative formalities in support of more decentralized authority. Areas addressed by this act included: the appointment of regional board members and composition of committees, the creation of contracts by institutions, and holding public institutions and regional boards more accountable to the public. Next, the *Act to provide for balanced budgets in the public health and social services network* (Bill 107), passed in 2000, formally restricted health institutions from accumulating debts. This meant that any additional budgetary restriction or increase in cost further reduced the health network's capacity to address the population's needs (Pelchat, 2008). Finally, to realize the MSSS's aim of optimizing and standardizing the health services and their organization, the *Act respecting local health and social services network development agencies* (Bill 25), introduced in 2003, legislated the creation of local networks (*Réseaux locaux de service* - RLS) by merging institutions into 95 health and social services centres (*centres de santé et des services sociaux* – CSSS). It also legislated the redefinition of the regional health authorities. The *régies régionales* (1992-2003), were abolished and 18 *Agences de développement de reseaux locaux de services de santé et de services sociaux* (henceforth "*Agences*") were created. The *Agences* (2003-2015) would be responsible for ensuring that their networks offered the requisite set of integrated services for their population (Powers, 2012). Four university health networks (*Réseaux Universitaires intégrés de santé* – RUIS) were also created in 2003 to enhance the health network and enhance health institutions' training and research capacity (Bergeron, 2006). The three acts described above contributed to a centralization of decision-making, an increase in service standardization, and a decentralization of managerial responsibility to regional and local authorities while ensuring that they operated within predetermined budgetary parameters. These would consequently restrict local innovation and adaptation and limit institutions' flexibility to meet population needs. It would also indirectly implicate the MSSS as the decisional authority regarding innovation in the health sector (Gaumer, 2008). This would become the contextual backdrop for HIT projects in Québec.

In addition to budgetary restrictions instigating healthcare reforms that aimed to restructure the organization of healthcare and restrict the accumulation of debt, the MSSS became more receptive to external sources of funding. For instance, while Québec decision-makers had been staunchly opposed to attributing a greater role to the private sector in the provision of health services since the 1960s (Pelchat, 2008), the MSSS recognized that they could not afford to provide the necessary services with public money alone (Gaumer, 2008).

Accordingly, the MSSS began to explore public-private partnerships to better address the needs of the population (Assemblée Nationale, 2004). Budgetary restrictions also prompted the MSSS's decision to join Infoway after being initially opposed to it. Québec had a history of resistance toward federal interference in provincial policy (Secrétariat du Québec aux relations canadiennes, 2020), particularly under the *Parti Québecois* (the sovereignist provincial party that had formed a majority government between 1994 and 2003). Prime Minister Mulroney's interventions to address the national debt (i.e. tax cuts for businesses and raised interest rates) aggravated the economic situation in Canada and consequently exacerbated an already tumultuous relationship between Québec and Canada (Gaumer, 2008). This contributed to Québec decision-makers' initial refusal of membership in Infoway in 2001, when the other provinces had joined. However, in light of the budget cuts to Québec healthcare, Québec government actors were more receptive to the money being offered and joined Infoway in 2004, after the *Parti Libéral du Québec* (PLQ) had taken office in 2003. The conditions tied to the federal funds disbursed through Infoway would play a significant role in driving and shaping Québec's provincial health network digitalisation strategy.

6.1.2. Development of eHealth Solutions

In the late 1990s and early 2000s, there had been numerous HIT initiatives in Québec. In select clinics and hospitals, EMRs and clinical information systems (CIS) were implemented, however they were often initiated at the individual or institutional levels. Implementation was not widespread and adoption rates were relatively low (Powers, 2012; The College of Family Physicians of Canada et al., 2007). In some instances, they were scaled across institutions within a regional health network through coordinated procurement of vendor products. The regional health authorities had been primarily responsible for allocating resources toward computer equipment (Vérificateur général du Québec, 2002). They were also responsible for the interoperability of regional systems (e.g. institutional laboratory and diagnostic imaging systems).

By the early 2000s, numerous HIT projects, predominantly initiated by healthcare providers, regional administrators and researchers, were underway. They collaborated on the development of health indicators and surveillance projects (e.g. a regional databank concerning child welfare called PIBE, an aggregate information platform for surveillance and research called EPSEBE, a disease management system called MOXXI). They also worked with vendors on developing analytic tools, decision-support aids, and user-centred, locally-relevant EMR products (e.g. a Montreal-based EMR called SIDOCI, a Sherbrooke-based EMR called ARIANE, a Laval-based EMR called SI-RIL). These set the stage for HIT development in Québec, demonstrated clinical and administrative value, and generated momentum. They also generated valuable knowledge about development and implementation challenges, technological requirements, data standardization (particularly in establishing minimum common datasets of clinically relevant data), and organizational processes.

One particular project that had a significant impact on the MSSS's subsequent HIT projects was a chip card-based patient health record (PHR) called *Carte Accès Santé Québec*. During the 1990s, Québec had invested a great deal of energy and resources into the *Carte Accès Santé Québec*. The PHR, which was to contain specific pieces of health information (e.g. laboratory results, medications, medical history, risk factors, medical interventions, vaccination records, and allergies), was stored on a microprocessor chip card. The chip card program was initiated in 1990 (by Minister of Health Marc-Ivan Côté) and ultimately abandoned in 2002. The first pilot was conducted in Rimouski and ran from 1993 to 1995. Its primary aim was to examine the receptivity and implementation challenges (Allard, 2015a). Despite the technological challenges and users' reported frustrations, the reception was favourable among healthcare providers (Allard, 2015b). Administration of the program was given to the public health insurance body (*Régie de l'assurance maladie du Québec* – RAMQ) in 1999 (Sicotte, 2002). A second pilot was conducted in Laval in 1999 to test the technology and validate the security protocols (Allard, 2015a). Feedback on the second pilot was not as conclusively positive. The reported concerns included loss of information, centralization of data, control over the work of health professionals and confidentiality of personal information (Allard, 2015b). Given concerns over security and confidentiality, the *Commission d'acces à l'information* (the governing body responsible for reviewing access to information in Québec) imposed stringent protocols regarding the exchange of health information which would hinder the chip card program's implementation and contributed to its abandonment, despite the tens of millions of dollars invested (Coalition Solidarité Santé, 2010). This influenced the need for greater caution regarding the handling of health information in Québec. The experiences with the chip card program, the concerns it raised and the subsequent barriers imposed by the *Commission d'accès à l'information*, influenced the formulation of Québec's EHR strategy, specifically regarding the notion of informed consent and the storage of health information in a single, central data repository (Coalition Solidarité Santé, 2010).

6.2. Setting the Agenda for Québec's Health Network Digitalisation Strategy

The conditions discussed above precipitated the MSSS's planning of a provincial digital health network strategy. They would prioritize the development of an EHR as the centrepiece of their strategy. Several conditions influenced the MSSS's agenda including the evolving discourse regarding the use of the information highway in support of government services and advocacy from federal and provincial health commissioners. These are described below.

6.2.1. <u>The Information Highway in Québec</u>

In the mid-1990s, discussions took place regarding the establishment of an information highway in Québec and its use in support of government services. Several reports, strategic plans and policies, presented by industry stakeholders and government actors, helped shape the vision of an information highway in Québec and its applications toward the enhancement of health services (Comité consultatif sur l'autoroute de l'information, 1995; Conseil de la science et de la technologie, 1996; Gouvernement du Québec, 1998; Secrétariat de l'autoroute de l'information, 1996). These influential reports projected a vision about the information highway's role in promoting not only economic development but also cultural and social development, as well as the information highway's applications in the health sector. Some of the more influential documents are described below.

In 1995, the Information Highway Advisory Committee (*Comité consultatif sur l'autoroute de l'information* - henceforth "*Comité consultatif*") led by Louis Berlinguet (president of the Science and Technology Council), released an action plan entitled *Inforoute Québec: Plan d'action pour la mise en œuvre de l'autoroute de l'information* (Comité consultatif sur l'autoroute de l'information, 1995). The *Comité consultatif* was primarily composed of private sector representatives, as well as academic and government stakeholders. Their mandate from the Québec government (under Premier Jacques Parizeau) was to provide implementation recommendations, propose an action plan and address modes of financing for the development of an information highway in Québec. Like the IHAC at the federal level, the *Comité consultatif* recommended capitalizing on the emerging information technology to improve government service provision and enable citizens' access to information. They also attributed an important role to the private sector in its development. Among the domains that could benefit from the information highway, they highlighted how the highway could be leveraged to improve the quality and efficiency of healthcare services, despite the budgetary restrictions they began to observe at the time. They envisioned that the information highway could link health institutions and enable the sharing of health information across health networks.

> *[Translated from French[2]] The information highway provides instant access to information from anywhere in the network. This information, gathered at the operational level, can be tactical and strategic and provide managerial information at all levels: institutions, regional boards, Ministry. [...] The information highway will allow rapid access to the complete file of a citizen who needs urgent care outside his region. Caregivers will be able to intervene promptly by consulting the person's digital file remotely. This file will contain all the up-to-date information required on consultations, interventions or analyses that the person has had in the healthcare institutions in their region. [...] An authorized provider will be able to have immediate access to all required information, up to date and in real-time (Comité consultatif sur l'autoroute de l'information, 1995, p. p.27).*

In addition, they envisioned that the collection of health information could support administrative decision-making and telemedicine and that citizens' access to reliable information could improve disease prevention.

The *Comité consultatif* urged the government to begin acting immediately. They recommended that the MSSS ramp up their funding of research and pilot projects, particularly those that would visibly improve health system performance and efficiency through the use of HIT. They also recommended that the MSSS offer funding to institutions and health networks to

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[2] [Original text] *L'autoroute de l'information permet d'accéder de façon instantanée à l'information à partir de n'importe quel point du réseau. Cette information recueillie au niveau des opérations peut devenir tactique et stratégique et servir comme information de gestion à tous les paliers: établissements, régies régionales, Ministère. […] l'autoroute de l'information permettra d'accéder rapidement au dossier complet d'un citoyen qui aurait besoin de soins urgents à l'extérieur de sa région. Le personnel soignant pourra promptement intervenir en consultant à distance le dossier informatisé de cette personne. Ce dossier contiendra toute l'information à jour requise sur les consultations, interventions ou analyses que la personne aura eues dans les établissements de santé de sa région. […] Un intervenant autorisé pourra avoir un accès immédiat à toute l'information requise, à jour et en temps réel*

support their connecting to the information highway once it was established. Given the potentially sensitive nature of health information, the *Comité consultatif* emphasized the need to ensure that the public is informed about the advantages of the information highway and reassured about the security of their personal information to mitigate any of their concerns.

Following this action plan, the position of Information Highway Secretariat (*Secretariat de l'Autoroute d'information*) was created to provide guidance to the government for deploying the information highway in Québec and ensure that the information highway in Québec was optimally leveraged to promote economic, social and cultural development (Secrétariat de l'autoroute de l'information, 1996). A few months after its creation, this position was attached to the Ministry of Culture and Communications. In 1998, Louise Beaudoin (Minister of Culture and Communications and Minister responsible for the information highway) and Jacques Léonard (Minister Delegate for Administration and the Civil Service and Chair of the Treasury Board) released a policy document entitled *La Politique québécoise de l'autoroute de l'information: Agir Autrement* (Gouvernement du Québec, 1998). They called the document at once an action plan, strategic plan and policy recommendation. Their report envisioned five main objectives: 1) spread the use of the information highway, 2) prepare the younger generation for the technological revolution, 3) ensure that a portion represents and promotes Québec culture, 4) accelerate the transition to an information-based economy, and 5) enhance public and private services to better meet the needs of citizens. They framed the information highway as a catalyst for social and cultural transformation, as well as for the transformation of information sharing media and public and private services.

Health sector applications were elaborated with the section of the document devoted to a discussion of the information highway's impact on the economy. The report recommended that the MSSS should enhance the communications network between institutions to facilitate the exchange of information and foster preventive self-care by making information and services available to citizens, in collaboration with the RAMQ, *Régies régionales* and the *Société de gestion informatique* (SOGIQUE), a non-government group of HIT experts established in 1996 to help coordinate the development and evolution of Québec's information systems. The report also recommended that the MSSS develop telemedicine services and implement tools to support citizens and healthcare providers.

6.2.2. Advocacy from Health Sector Actors

The agenda regarding health network digitalisation and the flow of information was advanced by federal and provincial health commissioners. In the early 2000s, as health system administrators worldwide were discussing possible applications of emerging HIT and developing plans to digitalise healthcare and establish large-scale EHR systems, two significant commission reports made the case that provincial health policy-makers should immediately begin prioritizing the development of EHRs. At the federal level, the 'Romanow report' (Commission on the Future of Health Care in Canada, 2002), provided recommendations concerning a broad range of issues to ensure the sustainability of Canada's healthcare system, including the development of EHRs for every citizen. In Québec, the 'Clair commission' report (Commission d'étude sur les services de santé et les services sociaux, 2001) addressed the financing and reorganization of the Québec health and social services network. Among its recommendations included attributing a more significant role to the private sector, enhancing primary care, and investing in HIT including the integration of computers into medical practices. These reports are briefly summarized below.

In 2002, the Royal Commission on the Future of Health Care in Canada, chaired by Roy J. Romanow, submitted its final report, *Building on Values: the Future of Health Care in Canada* (Commission on the Future of Health Care in Canada, 2002). The Commission was asked to engage Canadian citizens in dialogue and make recommendations for policies to enhance Canadian health systems' sustainability and the quality of healthcare services. Recommendations in this report covered various areas, including sustainability and improvement of publicly-funded health care, better access to information and evidence, enhancing the workforce of the health sector and the role of primary care in disease prevention, and improving access to services. Its recommendations regarding the financing of the Canadian healthcare system were integral in establishing conditions for an increase in federal transfers to the provinces and territories for healthcare.

The section entitled "information, evidence and the electronic health record" made up a significant portion of the report. The report projected a vision involving more extensive use of information technology and a personal EHR for each Canadian, building on work already underway in the provinces and territories. It highlighted that EHRs could benefit citizens, health providers, researchers, and policy-makers and improve diagnoses, treatments, results, the accuracy of health information, administrative efficiency, security, and aggregate data for research and surveillance. The report explained that while eHealth initiatives were underway in the provinces and territories, Infoway was uniquely poised to catalyze essential information management and technology initiatives and harmonize ongoing initiatives around a collective vision. Its authors contended that decisive and timely action from provincial, territorial and federal policy decision-makers was needed.

As federal entities advocated for provincial and territorial coordination of EHR implementation, Québec health sector actors also advocated for the integration of HIT in support of healthcare delivery and enhancement of the health and social service network. The 2001 Commission of study on health and social services report, *Emerging Solutions*, marked an important shift in Québec's vision for healthcare and its investment in HIT (Commission d'étude sur les services de santé et les services sociaux, 2001; Powers, 2012). The Commission, led by Michel Clair, was formed in 2000 to discuss healthcare reform in light of the reduction of federal transfers, and examine the financing and organization of the healthcare system, and provide recommendations for its optimization. The report organized its discussion of issues according to four areas: the organization of health care services, the development of human resources, the accountability of governments to their citizens, and the public financing of health and social services. Key recommendations of this report included reorganizing primary healthcare delivery and developing family medicine groups (FMG). Their final recommendation focused on promoting the expanded use of HIT to support clinical decision-making, healthcare management, and performance measurement. They encouraged investment in HIT, computerization of medical practices, information network infrastructure development, and creating a shareable patient record to enable more efficient communication and the sharing of information between practices.

6.2.3. Applications of the Information Highway in the Health Sector

The above recommendations were reflected in the MSSS's 2001-2004 strategic plan, in which they established objectives pertaining to health network digitalisation. Heeding recommendations from the Clair commission and reports discussed above, the MSSS expressed that they aimed to develop an information infrastructure. They proposed to complete the infrastructure's design between 2001 and 2002, which would involve inventorying existing systems and needs and defining the structure of data repositories. Then, between 2003 and 2004, they expected to have established the infrastructure enabling access and exchange of information between users and an access portal for healthcare providers in clinical and institutional settings. Other objectives regarding the information highway included the progressive development and implementation of telehealth applications and administrative information systems.

Following the MSSS 2001-2004 strategic plan, in 2001, the MSSS communications department elaborated objectives regarding the digitalisation of the health network in a report called *Orientations technologiques du réseau sociosanitaire: pour un accès intégré et sécurisé à l'information* (La Direction des ressources informationnelles du ministère de la Santé et des Services sociaux, 2001). The report provided a framework for establishing a health information infrastructure, including a shareable regional health record for which they synthesized some of the key technological requirements. They explained that the global information infrastructure should serve as the foundation of the network and build on the existing health telecommunications network. They established that key system requirements for enabling the sharing of patient information across the network should include: a patient identifier, standardized data, chart querying tools, and the means of obtaining users' consent. The report also asked HIT vendors to play a role in identifying health organizations' needs, features and interoperability requirements in particular, so that they might anticipate and provide services that meet future demands. The communications department suggested that government certification might help ensure that vendors' products meet specific standards.

Following the MSSS's 2001-2004 strategic plan, the Québec Auditor General commented on the state of planning regarding the health information infrastructure. They also provided some strategic direction regarding what should be addressed. In their 2001-2002 report (Tome II), the

Auditor General remarked that the objectives proposed by the MSSS were unrealistic and too ambitious (Vérificateur général du Québec, 2002). Broadly, they asserted that planning was still rudimentary and investments were insufficient and inadequately regulated (Vérificateur général du Québec, 2002). They remarked that data was not sufficiently standardized and existing legislation inhibited the transfer of health information. They also noted that a structured change management plan was lacking and the MSSS did not have the mechanisms in place to monitor progress and ensure accountability. Finally, they contended that the roles of actors implicated in information resource governance were not sufficiently clear. For instance, the SOGIQUE was responsible for coordinating the development, implementation and maintenance of HIT solutions throughout the network but lacked the authority to impose directions, norms and national or regional strategies (Québec HIT policy expert 1, Interview).

The Auditor General provided several key recommendations to ensure the success of the health information infrastructure initiative. They suggested that improved coordination was needed and that the governance structure should be reorganized. They recommended that the MSSS develop a comprehensive long-term plan that includes: 1) a governance framework involving various stakeholders, 2) data architecture and terminology standards, 3) a common transition plan for deployment in the different regions, and 4) an examination of lessons learned from other health systems regarding policies and practices (Vérificateur général du Québec, 2002). The Auditor General highlighted the importance of central management and improved coordination to ensure that information systems development projects remained oriented around the MSSS's objectives. They argued, however, that the *régies régionales* could be better utilized to play a role in deploying information resources within each of their networks. They also emphasized the need for more detailed process information to track progress and ensure that the various entities were held accountable for achieving their mandates. Finally, the Auditor General reiterated the importance of change management, as the integration of HIT implies a radical transformation of the way users work.

6.3. Formulation of Québec's Health Network Digitalisation Strategy

By the early 2000s, the Québec government had established a vision of an interoperable health information network that would support telehealth applications and the secure exchange of patient records among authorized personnel throughout the health network. They had not yet formally established that their strategy specifically involved EHRs. The primary focus had been on defining the technological requirements for national infrastructure. Planning regarding the requisite resources, governance structures, accountability, and change management was rudimentary at this stage. Québec's membership in Infoway would solidify their plan around the establishment of a provincial EHR. The following briefly explains Infoway's influence and the formulation of the *Plan d'informatisation du réseau de la santé et des services sociaux.*

6.3.1. Infoway's Influence on Québec's Health Network Digitalisation Strategy

With the exception of Québec, the provinces and territories became members of Infoway in 2001. As described above, resistance toward federal interference and a desire for political autonomy contributed to Québec policy-makers' refusal to join Infoway [HIT organization representative 1, Interview]. They also refused membership in the Canadian Institute of Health Information (CIHI) for the same reason. According to [HIT organization representative] the Québec government said, with respect to Québec's CIHI representative: "he can sit in the room, but he's not going to represent us. Not only that, he's not representing us and we won't send you our data." Québec did not join Infoway until 2004. This occurred following the change in provincial government in 2002, with the election of the Québec Liberal Party (*Parti Libéral du Québec* - PLQ), led by Premier Jean Charest (2003-2012). During their campaign, healthcare system reform was high among the PLQ’s campaign promises. They were, therefore, pressured to act on these promises. Given the budget cuts, Québec policy-makers were receptive to other sources of funding, including the federal government. As that Québec was already devising plans to digitalise its health system and had envisioned an infrastructure enabling the sharing of health information across the network, Infoway’s funding was welcomed. [HIT organization representative 3] stated that it was no secret that one of Québec’s primary motivations for joining Infoway was the money being offered.

Infoway established specific conditions for funding based on the establishment of critical EHR infrastructure components (Vérificateur général du Québec, 2011b). Infoway’s criteria included a proportional investment from the provincial government. The cost of establishing an EHR in Québec was estimated at $563 million. Infoway agreed to commit $303 million toward health system digitalisation in Québec, and the Québec government agreed to commit $259 million (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). While the implication was for the EHR system partially funded by Infoway to represent a portion of a broader health network digitalisation plan that included the computerization of practices and institutions, and integration of EMRs and CISs, budget constraints and scrutiny from the political opposition contributed to Québec’s provincially coordinated strategy focusing predominantly on the EHR.

> *[Translated from French[3]] Well, there was money on the table, so they were under pressure to get as much out of Infoway as possible, while doing the minimum. That was pretty much their vision. And their vision was "We're going to do an EHR..." And I swear that was it. [...] "We're going to do an EHR, and we won't have to do an EMR, and we*

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[3] [Original text] *Bon, il y avait de l’argent à la table, alors ils avaient de la pression pour aller chercher le maximum d’Inforoute, en produisant le minimum. C’était à peu près ça leur vision. Et leur vision était « On va faire un DSE [EHR]… » Et là, je te jure que c’était ça. […] « On va faire un DSE, et on n’aura pas besoin de faire de DME [EMR], et on n’aura pas besoin de faire de DCI [CIS]. Alors ça va être super! On va faire ça. »*

> *won't have to do a CIS. So it's going to be great! We're going to do that." (HIT organization representative 3, Interview).*

6.3.2. Plan d'Informatisation du Réseau de la Santé et des Services Sociaux

Québec health network digitalisation plan, the *Plan d'informatisation du réseau de la santé et des services sociaux*, was released in September 2004. It was developed by a working group established by the MSSS. It conducted its work between 2003 and 2004. The plan's development was informed by a series of consultations with the *Agences*, professional associations, industry partners and HIT product vendors (Dagenais, 2004; Ministère de la Santé et des Services sociaux, 2005).

The plan was divided into three parts: summary, vision and implementation. The plan began by acknowledging the deficiencies and recommendations outlined in the 2001-2002 Auditor General report (Tome II): the need for a comprehensive plan, a structured change management strategy, risk management and evaluation, mechanisms for managing investments and more clearly defined roles and responsibilities. The plan proposed the following priorities: enhancing the exchange of information between institutions across RLS, standardization of data in support of interoperability, optimization of information resource dissemination, improving central and regional governance and resource investment, and supporting the *Agences*, RLS and RUIS in their implementation initiatives by providing expertise. Their proposed deliverables included: an enhanced health and social services telecommunications network better adapted to users' needs, record querying systems, better integration of information among physicians and pharmacists, clinical decision-support tools and an EHR.

The MSSS envisioned an infrastructure virtually linking local EMR databases and regional EHRs containing certain pieces of information accessible to authorized personnel throughout the regional network. They also envisioned databases containing health statistics and performance indicators that may be used for public health research, administrative decision-making, research and teaching. The EHR, influenced by Infoway's blueprint, was to be the "centrepiece" of Québec's health system digitalisation plan and would include laboratory, medications and diagnostic imaging systems, and telehealth and public health functions (Ministère de la Santé et des Services sociaux, 2004). The authors proposed the following actions to enhance the digitalisation of the health network: harmonizing of the government's online services, adoption of Infoway's EHR blueprint, concerting investments and activities around essential infrastructure components, and establishing vendor certification to ensure that products met users' needs. In terms of priority data, they identified those for which Infoway provided funding: laboratory data, diagnostic imaging, pharmacy data, telehealth, service plans and public health data.

The plan delineated the responsibilities of key actors who would play a role in the governance of information resources. The MSSS would be responsible for coordination and implementation, relation with other ministers and government organizations, financing of projects, and collaboration with other Québec and Canadian organizations. The *Agences* would be responsible for developing regional plans, managing regional projects regarding the deployment and evolution of services, using information resources, and reporting the results of development projects to the MSSS. The RLS and RUIS would create local networks and develop annual service plans and development projects. The RAMQ would manage the databases and the standardization of data, establish identification and authentication protocols and manage consent. The treasurer was to be responsible for the provision of online government services. The RAMQ was responsible for overseeing the alignment of priorities. The SOGIQUE would ensure that the networks adopted a common approach by coordinating provincial activities and assisting the *Agences* and RLS with implementation. Finally, vendors would be responsible for delivering the development projects, evolving their products according to technological progress, and managing operations of service delivery and security protocols to ensure the protection of personal information. The plan announced that the MSSS would establish a governance council led by a Deputy Health Minister and comprise representatives from MSSS, RAMQ, SOGIQUE, the *Agences*, the RUIS, private sector partners, and professional associations. The governance structure also included several project offices (*bureaux de projets*), which would be responsible for the follow-up of projects and assurance of their conformity with objectives, policies and norms. It also included the Information Resource Management department (*le service de gestion des resources informationnelles)*, which would be responsible for developing the governmental business architecture, proposing action plans, developing policies, monitoring progress and ensuring digitalisation initiatives followed the ministry's priorities.

The plan presented an ambitious 6-year timeline with a list of deliverables. In the first year, they proposed to focus on organization, planning, preliminary architecture, and the establishment of norms and standards. They hoped to rapidly establish the infrastructure and information resources that could support the RLS in their provision of services (some tangible benefits to demonstrate the outcome of their investments).

In brief, the MSSS's health network digitalisation strategy emphasized the development of an EHR virtually linked regional and local repositories. The digitalisation initiative was conceived as a concerted project coordinated by the MSSS, involving a diversity of strategic projects managed by the MSSS, RAMQ, and the *Agences*. This initial plan, although not very detailed, provided the vision that would initiate the establishment of a governance structure, infrastructure development, and the amendment of privacy laws to enable the exchange of information. While the implementation of this plan was underway, the MSSS developed a more comprehensive strategic plan that more explicitly elaborated their EMR system development and implementation strategy.

6.4. Implementation of Québec's Health Network Digitalisation Plan

Québec's *Plan d'informatisation du réseau de la santé et des services sociaux* provided a broad vision of government service enhancement and how the information network could support the RLS in their provision of services that better address citizens' needs. It also provided strategic priorities and established the responsibilities of key actors. As work was underway to implement this plan, the projects conceived to address the MSSS' objectives took shape. Québec's strategy was substantially shaped by its new collaboration with Infoway, which would focus the MSSS's efforts on establishing EHRs. As Québec worked to implement the EHR, their strategy was refined. The following provides a description of some of the ongoing activities and the events that surrounded the implementation of Québec's plan and its evolution: an amendment to privacy legislation (2005), the publication of a strategic plan for the *Dossier Santé Québec* (2007), a second amendment to privacy legislation (2008), and an experimental pilot of the DSQ in the Capitale Nationale region (2008-2009).

Following the MSSS's health network digitalisation plan, the MSSS's 2005-2010 strategic plan established new objectives. These were further elaborated and shared with stakeholders (healthcare providers, decision-makers, HIT vendors, researchers, etc.) at the *Colloque Informatique Santé* conference in 2005 (Dagenais, 2005). As of 2005, the MSSS's priorities regarding the establishment of a health network infrastructure were categorized as follows: standardization of data and technology, optimization of systems and services, improvement of telecommunications services and technologies to support government and health service network infrastructures, and enhancement of security protocols. Their strategic objectives included establishing an interoperable EHR in three regions (Laval, Montreal and Montérégie) and strategic visions regarding diagnostic imaging systems, laboratory results, access to pharmaceutical data and electronic prescription, telehealth, and public health (Dagenais, 2005). By this time, the MSSS foresaw several challenges, the most prominent being change management and the integration of the myriad disparate systems. They recognized the organizational impact of HIT implementation and the need to address administrative, financial and change management challenges. They also recognized the need to regulate and standardize vendor products and better integrate the numerous fragmented systems. There were already many different HIT systems (i.e. EMRs, CISs, laboratory, pharmacy, imaging), which rendered more complex the task of sharing information across institutions. They would need to conduct an inventory of existing systems and, in collaboration with Infoway and CIHI, establish and impose data and technology standards.

6.4.1. Amendment of Legislation Governing Personal Health Information

The protection of health information was governed by two laws: *the Act respecting health services and social services* (LRQ c.S-4.2) and *the Act respecting access to documents held by public bodies and the protection of personal information* (LRQ c.A-2.1). These laws restricted the capacity to share health information electronically among providers at different points of care as custodianship of health records was primarily attributed to the patient or their caregiver. The specific conditions under which the transfer of health information was permissible (i.e. user identification, consent management, governance and location of data repositories, etc.) had not yet been defined (Agence de développement de réseaux locaux de services de santé et de services sociaux de Montréal, 2004). Therefore, to enable the establishment of EHRs and the sharing of health information between institutions, the MSSS needed to amend this legislation.

An Act to amend the Act respecting health services and social services and other legislative provisions, was drafted while the *Plan d'informatisation du réseau de la santé et des services sociaux* was being prepared. The bill was sponsored by Minister of Health Philippe Couillard (2003-2008). It was introduced to the National Assembly in December 2004. It contained 282 articles, including numerous amendments to existing legislation. General consultation was conducted by the Social Affairs Commission (*Commission des affaires sociales*) and spanned 13 sessions (between February and April 2005). Detailed study of the bill and discussion of amendments also spanned 13 sessions (between September and November 2005). The commission's report was reviewed over three sessions, and the bill was finally approved on November 30th, 2005.

The bill introduced different measures concerning the digitalisation of the health network and the sharing of health information. Bill 83 established the conditions under which health information may be accessed and shared between authorized personnel throughout the health network. More specifically, it established the mechanisms for regional storage services, consent protocols, secure access protocols, and access profiles based on professional responsibilities and qualifications (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). The bill defined the categories of data collected: allergies, laboratory results, medications, immunization, healthcare provider information and emergency contacts. Furthermore, it established that the RAMQ would be responsible for creating the data repositories, and the *Agences* would manage them.

This bill caused concern regarding ethics and information security and was heavily debated. In his presentation, Minister Couillard acknowledged the controversial nature of the proposition, recognizing that citizens might be concerned about the security of their personal information, stating “[Translated from French[4]] And I want to say that we hear, and with good reason, that citizens are concerned about the security and privacy issue, and that's an aspect about which we don't want to make any compromises” (Journal des débats de l'Assemblée nationale - Étude détaillée du projet de loi n° 83, 2005). He explained that the chip card program left citizens feeling like the government would use the health record to monitor and control the population. He highlighted the importance of ensuring that citizens understood that the proposed EHR was a clinical tool intended to improve the quality and efficiency of health services.

The prime ethical concern that dominated the discussions concerning Bill 83 was whether a patient’s consent to their health information being shared should be implicit or explicit. While the opposition, represented by Minister Jean-Pierre Charbonneau, recognized the added challenge of obtaining explicit consent from every citizen, they suggested that the National Assembly should find a balance between the risks and advantages: “[Translated from French[5]] So it would be a matter of balancing the real threats with the actual threats, and essentially the effectiveness of a healthcare system (Journal des débats de l'Assemblée nationale - Étude détaillée du projet de loi n° 83, 2005). As a consequence of this concern, the initially proposed implicit consent model was replaced with an explicit consent model. This would introduce the added challenge of developing and managing a user consent system.

6.4.2. Development of the Dossier Santé Québec

Working with Infoway, the MSSS formalized a more robust EHR implementation strategy. On April 25th, 2006, Minister of Health Couillard and Premier Jean Charest announced

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[4] [Original text] *Et je tiens à dire qu'on entend, avec raison, les citoyens s'inquiéter de l'aspect de sécurité et de confidentialité, et c'est un aspect sur lequel nous ne voulons faire aucune... aucun, pardon, aucun compromis.*

[5] [Original text] *Alors, il s’agirait de trouver l’équilibre entre les menaces réelles puis les menaces effectives, et aussi dans le fond l’efficacité d’un système de santé*

the *Dossier Santé Québec* (DSQ), Québec's EHR solution. The DSQ was conceived as a system involving regional databanks accessible via a common visualizer. The EHR would contain select pieces of information considered by healthcare professionals to be the most useful for clinical treatment, especially for emergency procedures: laboratory test results, diagnostic imaging results, medications and dosage schedules, allergies and intolerances. It would also include an electronic medication prescription function (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007).

To oversee the coordination the DSQ's development and implementation, the MSSS created the *Bureau du DSQ* in 2006 (Vérificateur général du Québec, 2008). Deputy Minister Maurice Boisvert served as director of the *Bureau du DSQ* between 2006 and 2008. He had the responsibility of authorizing projects and ensuring their congruency with the MSSS's objectives, government policies and investments. The *Bureau du DSQ*'s membership primarily comprised private sector consultants. In 2007, the DSQ's governance structure was expanded to validate processes and ensure that its users' needs were met (Ministère de la Santé et des services sociaux, 2007). A consulting committee (*comité consultative)* provided advice regarding directions, needs, regulatory frameworks, consent management, implementation strategies and change management. It comprised representatives of users from clinical settings, health professional orders, health professional federations and associations, system users and academic medical settings. The peer support and valiudation network (*réseau de soutien et de validation par les pairs*) involved family physicians from the 18 regions and a specialist physician. It aimed to accelerate the integration of HIT in clinical processes. The clinical users committee (*comité d'utilisateurs cliniques*), which included representatives from clinical sites, provided input regarding system processes and HIT system functionalities. Finally, the clinical-administrative user committee (*comité d'utilisateurs clinic-administratifs*) engaged administrators in the validation of processes and administrative tools.

In 2007, the MSSS released a business plan for the DSQ (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007), in which they provided more comprehensive details regarding the DSQ's infrastructure and its implementation. They planned to complete the DSQ in four years (2006-2010). Their proposed roll-out involved the following phases: 1) promotional tours (*tournée de sensibilisation*) with the 18 *Agences*, 2) data collection (organizational, human, technological, clinical, legal and financial domains) to measure the preparedness of the regions, 3) planning, 4) preparation (establishing in the base components), 5) technological deployment and 6) operation (use of DSQ by users) (Ministère de la Santé et des services sociaux, 2008b). The *Agences*, supported by the *Bureau du DSQ* and regional project leads, would play a critical role in managing organizational, clinical, human and technological resources and supporting implementation initiatives at the institutional level.

The DSQ plan included a breakdown of estimated costs totalling $562 million (Figure 2). Infoway's investments went toward nine components: 1) information access technology (*couche d'accès à l'information de santé*), 2) diagnostic imaging, 3) client registries, 4) medications, 5) provider registries, 6) integrated services for the elderly, 7) public health surveillance (Panorama), 8) telehealth, and 9) a visualizer. Québec's DSQ would have two additional projects beyond those funded by Infoway: a consent management and provider authorization systems (Vérificateur général du Québec, 2008). Not included in this estimate were costs associated with local implementation, security frameworks development, training, workstations and computer equipment, and DSQ operations, which represented a significant additional cost (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007).

Before deploying the DSQ throughout the entire province, the MSSS planned to conduct an experimental pilot in the Capitale Nationale region. As preparations were underway, it was evident that obtaining explicit consent from every citizen would represent an extremely onerous task. The MSSS acknowledged the need for an additional amendment to legislation governing health information (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). As Minister Couillard explained:

> *[Translated from French[6]] It soon became apparent, particularly from the information or statements provided by the medical profession and its representatives, that this mode of operation was the only one of its kind in the world - there is not a single country in the world that has implemented a computerized medical record that has this form of consent - and that it would certainly be cumbersome, costly and difficult to implement (Journal des débats de l'Assemblée nationale - Projet de loi 70, 2008).*

Accordingly, in 2007, Minister Couillard sought to reintroduce the notion of implicit consent with respect to the sharing of health information for medically appropriate purposes, which would improve the feasibility of the DSQ.

6.4.3. Amendment of Legislation Governing Citizens' Consent to Participate in the Dossier Santé Québec

Minister Couillard introduced *An Act to amend the Act respecting health services and social services, the Health Insurance Act and the Act respecting the Régie de l'assurance maladie du Québec* (Bill 70) on December 18th, 2007. The bill aimed to modify the consent

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[6] [Original text] *Il est rapidement apparu, notamment par les informations ou les interventions de la profession médicale et de ses représentants, qu'il s'agissait là d'un mode de fonctionnement qui d'abord est unique au monde - il n'y a pas un seul pays au monde qui a mis en place un dossier médical informatisé qui a ce type de consentement là - et qu'il allait certainement être lourd, onéreux et difficile à mettre en place.*

requirement for participation in the DSQ from an explicit to an implicit consent model. Adoption in principle was obtained on April 3rd, 2008. Its review by the Commision des affaires sociales spanned three sessions, and the presentation of amendments was completed in one session (May 22nd, 2008). The bill was adopted on May 27th, 2008 and assent was given on May 28th, 2008.

In his introduction of the bill, Minister Couillard explained that when reviewing Bill 83, they did not have an adequate opportunity to debate the issue of consent at length. In preparation for the review of Bill 70 with the National Assembly, Minister Couillard conferred with several intervening parties, including the *Commission d'accès à l'information*, to obtain their approval. This contributed to its relatively swift acceptance. However, the intervening parties imposed certain conditions. First, for consent to be considered "informed" the MSSS would need to provide a rigorous information campaign targeting citizens (*Journal des débats de l'Assemblée nationale - Projet de loi 70*, 2008). The specifics of what citizens' consent entailed would also need to be explicitly written. This implied that no blanket approvals could be obtained for the conduct of research using EMR data, for instance. In addition, it was required that the *Commission d'accès à l'information* be involved in the DSQ pilot to closely monitor its operations.

6.4.4. DSQ Pilot Project in the Capitale Nationale Region

An experimental pilot project of the DSQ was conducted in the Capitale Nationale region between 2008 and 2009. The objectives of the experimental project were to: 1) validate the clinical value of using the DSQ and the approval of healthcare providers, 2) confirm that the collection of different components functioned in practice, 3) obtain participation from the population, establish the different modes of functioning, 4) determine the appropriate conditions for implementation and utilization (for other regions), and 5) define best practices

(Gouvernement du Québec, 2008b). The pilot prioritized the establishment of an infrastructure for patient and provider registries, laboratory, medication and imaging, as well as the implementation of the visualizer and users' adoption.

A progressive deployment had been planned. In the first phase, patients from one FMG and one local community health centre (*centre local de services communautaires* - CLSC) were included, after which they would add other clinics and hospitals. In the second phase, the MSSS proposed that depending on progress, they could expand the pilot to include patients from additional sites elsewhere than those initially projected. By May 2008, they expected to have the client and provider registries in place and linkage to one pharmacy. By November of that same year, they expected to have linked several pharmacies and integrated recent laboratory results. Then, throughout 2009 they hoped to integrate the majority of the region's remaining systems (Ministère de la Santé et des Services sociaux, 2008a). As I explain below, these projections would not be met.

6.5. Outcomes and Challenges

The development and deployment of the DSQ pilot faced numerous challenges and progressed more slowly and was more costly than anticipated (Canadian Healthcare Technology, 2011). Auditor General, Renaud Lachance, stated in 2009 that the MSSS's digitalisation project was 'going poorly' and that it seemed doubtful that the timeline and costs would be respected (Allard, 2015a). The plan for all citizens to have a partial EHR by 2010 would not be realistic (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). The regional pilot in Capitale Nationale was initially projected to begin in 2007, and deployment across Québec would begin by 2008 (Ministère de la Santé et des services sociaux, 2007). The pilot was delayed by one year and progressive implementation in other select regions only began in 2010. By the fall of 2009, the regional DSQ pilot project only contained 29,000 charts, instead of the 680,000 initially targeted. The integration of medications and diagnostic imaging had progressed, albeit more slowly than expected. Laboratory results proved to be more challenging than anticipated, however. An inventory was conducted within the 125 public laboratory systems and identified 1725 different procedures (tests and analyses) (Ministère de la Santé et des services sociaux, 2008b). Given the large number of different procedures, coding and standardization were complex and time-consuming. Pharmacy data was least complex since the RAMQ already managed the data and they were thus relatively standardized.

The components of the DSQ ended up being delayed between 2 and 4 years from their initial projections (Vérificateur général du Québec, 2011b). Given these delays, as Infoway's funding was conditional, Québec had still not received a large portion of federal funds by 2010. Citizens' expression of disapproval of delays and misuse of public funds was reflected in the numerous scathing newspaper articles that emerged in 2009 and 2010 (Chouinard, 2009; Lessard, 2009b; Radio Canada, 2010), which were followed by a detailed critical report from the Auditor General in 2011 (Vérificateur général du Québec, 2011b). As a consequence of these delays, implementation of the DSQ into practice was also delayed as the MSSS focused on first resolving issues concerning the data infrastructure (Québec HIT policy expert 1, Interview).

My informants provided several explanations, at the macro decision-making level, for Québec's delayed implementation of the DSQ. I categorized the most prominent explanations given as follows: 1) expertise and investment, 2) vision, 3) project management, 4) change management, and 5) Québec culture and external influence.

6.5.1. Expertise and Investment

One of the most prominent reasons my informants gave for the DSQ's delays was policy decision-makers' lack of expertise in HIT. Digitalisation of a provincial health network was a complex task. It was uncharted territory and relevant experience was scarce among government actors. [Health administrator 1] explained that Québec policy-makers tended to place public service actors in leadership positions, over private sector actors, despite lacking the necessary experience and expertise.

> *They didn't have, I think, the skills to do it, the depth to do it – you need a lot of depth. They weren't willing to pay the amounts of money required to get the type of people that had the skills to do it. They wanted people within the public service framework. And that was Québec (Health administrator 1, Interview).*

For this expertise, they often relied on consultants from telecommunications giants like Bell, IBM and Telus. The limited expertise among decision-makers and project managers hindered Québec's capacity to devise sufficiently comprehensive plans, oversee the DSQ's implementation, and anticipate the resources that would be required to achieve their aims. The implicated actors did not have an adequate grasp of what the project would entail and could not devise an accurate timeline nor accurately estimate its cost.

> *[Translated from French[7]] Well, I think that in the beginning - and this is not a criticism, it's an observation - there was no one who knew how long it would take, and who knew, from A to Z, all the steps to take. No one knew how long it would take. Not even the IT companies! It didn't exist! We were creating something new. So how do you say " We'll do it in four years?" I think we probably committed too quickly to the analysis of how long it would take. I think it was probably underestimated - the time it took to evaluate [...] I think it was a project that was poorly evaluated from the*

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[7] [Original text] *Bien moi, je pense qu'au départ – et ce n'est pas un blâme, c'est un constat – il n'y a personne qui savait combien ça prendrait de temps, et qui savait, de A à Z, toutes les étapes à franchir. Il n'y a personne qui savait combien de temps ça allait prendre. Même pas les firmes informatiques! Ça n'existait pas! On inventait quelque chose. Donc, comment tu fais pour dire « On va faire ça en quatre ans. » Je pense qu'on s'est probablement commis trop vite sur l'analyse de la durée des étapes à franchir. Je pense que ça a probablement été sous-estimé – le temps qu'on a mis à évaluer […] moi, je pense que c'est un projet qui a été mal évalué au départ, parce qu'on manquait d'expertise là-dedans – tout le monde*

> *start, because we lacked expertise in this area - everyone (Québec HIT policy expert 1, Interview).*

As discussed above, initial cost estimates did not include workstations, computer equipment and software, training and operational costs (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). The *Agences* were responsible for overseeing resource management and implementation initiatives. However, a significant portion of the omitted costs fell under regional budgets, which were already constrained (Vérificateur général du Québec, 2008). As a consequence, the *Agences* differed in their prioritization of the DSQ.

> *[Translated from French[8]] Despite the MSSS's intention to implement the DSQ throughout Québec, the decision to carry out the work is the responsibility of each [Agence], which will determine which establishments and medical clinics will implement it, based on its regional and local priorities (Vérificateur général du Québec, 2008, p. 175).*

The MSSS had given the *Agences* a great deal of responsibility in terms of the regional planning and implementation of HIT. Yet expertise regarding HIT varied a great deal between them. Many of the *Agences* faced significant challenges establishing and managing data repositories and supporting the DSQ roll-out, and the MSSS provided insufficient resources.

The MSSS’s limited experience in HIT also influenced their choice of technology, such as the use of portable hardware (USB dongles) to access the DSQ. [Health Administrator 2] explained that the MSSS’s decision to use this device demonstrates their inexperience. Given concerns regarding privacy and security, the MSSS sought to ensure that only actors with the appropriate authorizations could access patient data. Actors within the MSSS were familiar with

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[8] [Original text] *Malgré la volonté du MSSS d’implanter le DSQ partout au Québec, la décision d’effectuer les travaux relève plutôt de chaque ASSS qui déterminera en fonction de ses priorités régionales et locales les établissements et les cliniques médicales qui le mettront en œuvre*

portable hardware and considered it secure. In actuality, it was already outdated and less secure than web-based interfaces that enabled regular updates as security measures were improved.

> *[Translated from French[9]] In Europe this has not been done for a long time, but here we decided to continue using the famous USB key. There are always people who are... The problem I have is that in the Ministry, you always have people who are a little bit behind in terms of technology. So, they chose a technology that they knew about instead of a technology we were headed towards. [...] they decided to use a technology that they already knew. They were sure it was safe. They didn't see the bigger picture. That's why they chose it (Health administrator 2, Interview).*

6.5.2. Vision

Another explanation given by my informants for the DSQ's delay was the MSSS's limited vision, which focused on the DSQ but overlooked other aspects of health network digitalisation. The MSSS chose to prioritize the components funded by Infoway. The MSSS's strategy did not address the integration of computer equipment and HIT software in the various health institutions.

> *[Translated from French[10]] It comes back to the question that several decisions that were made historically that influenced... the most important one is that at the beginning, we were not looking to have a strategic plan for Québec; we were looking to get funding from Infoway. We were influenced by what Infoway could provide, and what Infoway wanted (HIT researcher 2, Interview).*

Most of the other provinces treated Infoway's EHR project as one of many complimentary components of a broader vision that included computer equipment and EMRs and CISs. This enabled a more rapid digitalisation of their network (Vérificateur général du Québec, 2011b).

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[9] [Original text] *En Europe ça ne se fait pas depuis bien longtemps, mais ici on a décidé de continuer à utiliser la fameuse clé USB. Il y a toujours des gens qui sont… Moi, le problème que j'ai c'est qu'au ministère, tu as toujours du monde qui est un peu en retard sur les technologies. Donc, ils ont pris une technologie qu'ils connaissaient au lieu de prendre une technologie vers laquelle on s'en allait. […] Donc, ils ont décidé de prendre cette technologie qu'ils connaissaient déjà. Ils étaient sécures que c'était sécure. Ils ne voyaient pas la vision plus large que ça. C'est pour ça que ça a été pris.*

[10] [Original text] *Ça revient à la question que plusieurs décisions qui ont été prises de façon historique, qui ont influencé… la plus importante est qu'au départ, on ne cherchait pas à avoir un plan stratégique pour le Québec, mais on cherchait à aller chercher le financement d'Inforoute. On était toujours influencé par ce que peut donner Inforoute, et ce que veut Inforoute.*

Decision-makers in Québec expected that once the EHR was established, this would generate sufficient momentum and interest that local and regional actors would be compelled to address the components without the MSSS needing to coordinate it (Québec HIT policy expert 1, Interview). When it came time to implement the DSQ, it was discovered that the lack of computer equipment and staff accustomed to working with computers in clinics and hospital settings were major barriers.

6.5.3. Project Management

Suboptimal project management was cited by my interview subjects as another explanation for delays regarding the DSQ. Governance, lack of clear deliverables and accountability were highlighted as issues. DSQ development and implementation was extremely complex as it involved simultaneous coordination of several projects, agreements with public and private sector entities, data management and harmonization of regional deployment. While the MSSS had delegated responsibilities to various entities, the Auditor General remarked on several occasions that their roles were insufficiently clear and their responsibilities were sometimes incompatible with their expertise or decisional authority. For instance, the MSSS delegated to the 18 *Agences* the responsibility of developing and managing regional data repositories, despite their limited resources and expertise in this regard. Although the MSSS and *Agences* met regularly to ensure that regional plans were aligned with the global architecture (Dagenais, 2005), the MSSS did not provide the *Agences* with adequate support and a standardized approach for them to follow (EMR vendor, Interview). In my view, this highlights the importance of managerial expertise and effective coordination among the provincial-level entities responsible for governing the DSQ (i.e. the MSSS, *Bureau du DSQ*, RAMQ, SOGIQUE).

The Auditor General remarked on several occasions that the MSSS devoted insufficient resources toward DSQ project management (Vérificateur général du Québec, 2010). In 2008, they remarked that the MSSS often lacked clear deliverables and change management strategies (Vérificateur général du Québec, 2008). They expressed concern that the MSSS did not have the means of monitoring and evaluating progress and ensuring actors' accountability and alignment of the various sub-projects with their objectives (Vérificateur général du Québec, 2008). In addition to government actors' lack of expertise in HIT, inadequate monitoring and accountability of private and public sector actors involved in the DSQ governance structure were seen as major factors in not meeting estimated timelines and costs (Québec HIT policy expert 1, Interview).

6.5.4. Change Management

Many of my informants suggested that change management was grossly underestimated. While it was acknowledged in Québec's plans, change management was excluded from initial estimates and a comprehensive strategy was lacking. [Québec HIT policy expert 1] explained that no one had evaluated the cost of change management in the beginning (Québec HIT policy expert 1, Interview). [HIT researcher 1] suggested that the omission of change management was the consequence of the techno-centric paradigm of the HIT vendors that advised the MSSS.

> *[Translated from French[11]] How can you conceive digitalising a health system without addressing the organizational challenges? It doesn't make sense! There's something that doesn't work. But it was... people who had the silo approach, IT systems and information*

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[11] [Original text] *Comment tu peux imaginer informatiser un système de santé sans avoir une préoccupation en termes de regard sur les enjeux organisationnels?... Ça n'a pas de bon sens! Il y a quelque chose qui ne marche pas. Mais c'était… des gens qui avaient l'approche silo, systèmes TI et des systèmes d'information, des gens qui avaient ce cadre-là. Parce que la majorité des gens qui travaillent en TI et en systèmes d'information ont une logique bidule… Ils ont une logique très silo de techno, de l'information, et de toutes ces affaires-là. Mais les fournisseurs, les gros, sont extrêmement pesants dans le système. Et en même temps, le ministère - une bonne partie des décisions… était orientée bidules. […] Toute la mécanique était faite - la partie TI, et le ministère étaient très centré bidules - et influencé par les fournisseurs*

> *systems, people who were within that framework. Because the majority of people who work in IT and information systems have a very siloed logic of technology, information, and all that stuff. But the vendors, the big ones, are extremely influential in the system. And at the same time, at the Ministry - a lot of the decisions... were gadget-oriented. [...] The mechanics were done - the IT part, and the Ministry was very gadget-centric - and influenced by the vendors (HIT researcher 1, Interview).*

Lemire (Lemire, 1999) contended that discourse surrounding the implementation of IT tends to be dominated by technological determinism, which focuses primarily on technological requirements and tends to devalue the agency of those adopting the technology (Lemire, 1999). In this vein, the change management strategies employed in Québec at this time relied heavily on implementation guides and demonstrating usefulness: "[Translated from French[12]] 'We'll design a little model, we'll do three or four advertising campaigns, we'll make guides' - that's not change management!" (Québec HIT policy expert 1, Interview). [Physician and HIT Champion] explained that in their region, physicians were simply given the portable hardware to access the DSQ and basic information about how to use it. They said that they did not receive any training or any sustained support.

> *[Translated from French[13]] When they started handing out DSQ keys, well... You were given a key, and you were given minimal information about how to access it... Implementation was basically a lady with a cart going around, handing out keys, and collecting signatures. After that, to my knowledge, there was no plan where there were reminders or opportunities to provide feedback on the difficulties of use (Physician and HIT champion, Interview).*

One of the more prominent explanations for physicians' slow uptake of the DSQ was its incompatibility with EMRs. The DSQ, as conceived at this time, involved a distinct visualizer

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[12] [Original text] *On met un petit modèle, on va faire trois ou quatre campagnes de publicité, on va faire des guides - Ce n'est pas ça, la gestion du changement!*

[13] [Original text] *Quand ils ont commencé à distribuer les clés de DSQ, bien… On te donnait une clé, et on te donnait le minimum d'information sur comment y accéder […] L'implantation, c'était vraiment une madame avec son charriot qui se promenait, et qui remettait les clés, et qui faisait signer les formulaires. Et après ça, il n'y a pas eu à ma connaissance, effectivement, de plan où on avait des rappels, ou des possibilités de donner du feedback sur des difficultés d'utilisation.*

that healthcare providers would have open alongside their EMR. Providers considered EMRs more directly relevant to clinical practice and their implementation ensured that the requisite computer equipment was in place. Many of the *Agences* had already devoted resources toward EMR and CIS implementation. The Ministry-mandated DSQ was in direct competition over these limited regional resources and this was not immediately addressed.

> *[Translated from French[14]] A number of regions are currently putting a lot of effort into EMRs and have made them a priority. The EMR is the local electronic patient record. It is a provider- or facility-owned record that, in addition to containing the information needed for the DSQ, includes summaries from patient encounters, such as diagnoses and professionals' notes. In brief, it includes all of a facility's or service provider's local clinical data about a patient (Vérificateur général du Québec, 2010, p. 6.13).*

6.5.5. Québec Culture and External Influence

Several informants explained that HIT implementation in Québec tends to be slower and more costly than the rest of Canada due to vendor product requirements. In Québec, HIT products required French-language interfaces. Few of the vendors that dominated the market in the other provinces adapted their products for a French market. In addition, Québec policy decision-makers favoured local or government-owned products. Therefore, HIT solutions tended to be developed from scratch, by small and less experienced Québec-based companies or by government entities, rather than well-established vendors with products that have gone through numerous iterations.

> *We didn't take something off the shelf. We were trying to develop something new, in-house. Contracts were given to certain vendors, who were being asked to develop*

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[14] [Original text] *Un certain nombre de régions fournissent actuellement beaucoup d'efforts relativement au DPE et elles en ont fait une priorité. Le DPE est le dossier informatisé local du patient. Il s'agit d'un dossier appartenant à un prestataire de services ou à un établissement qui, en plus de contenir les informations nécessaires au DSQ, inclut les conclusions des interactions avec le patient, comme le diagnostic et les notes des professionnels. Bref, il comprend l'ensemble des données cliniques locales d'un établissement ou d'un prestataire de services concernant un patient.*

> *something for us that they had not done before. And it was managed by people who were new to the game (Health administrator 1, Interview).*

In addition, interview subjects reported that Québec culture and politics had a significant impact on the MSSS's capacity and willingness to draw on external expertise and sources of knowledge. As mentioned above, receptiveness among government actors toward federal influence fluctuated. Thus, for political reasons, sharing and collaboration with the other jurisdictions were occasionally restrained.

> *Along the way, Québec's participation in the National Forum on Health was meaningful, was real. There were at least four members of the national forum, of the 16 members, that were from Québec. Québec's voice was very much heard. As we got into the advisory council, then Advisory committee and the F/P/T structures, that was a very big time in Québec politics where the Québec government did not want to participate. But did not want to be left out. So for the advisory council and the F/P/T processes that followed, Québec was always in the room, but not as an active participant. […] Let me be very clear here that it was obvious to all of us that Québec had a lot to say and a lot to offer. They had smart people doing interesting things […] But we weren't in an information-sharing mode. People were in the room not as competitors or contenders, but there weren't there in partnership or as a coalition working together to get things done. That certainly did impede, I believe, the richness of the conversation (Federal HIT policy expert, Interview).*

Additionally, English-language proficiency was limited among many Québec government actors. This restricted their capacity to attend international conferences, read about successes in other systems and collaborate with the other Canadian jurisdictions (HIT organization representative 3, Interview). Moreover, several government actors in Québec dismissed what was being done elsewhere as being inferior or inappropriate for the Québec context.

> *[Translated from French[15]] The problem we have in Québec is the attitude that "we are not like the others." That's not true. Ontario has problems too [...] And we don't want to know what others are doing! "Oh, it's done by Ontario? Nope, it's not good. Well, you didn't even look! "No, it's not good." (Health administrator 2, Interview).*

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[15] [Original text] *Le problème qu'on a au Québec, c'est le « on n'est pas comme les autres. » Ce n'est pas vrai. L'Ontario a des problèmes aussi […] Et on ne veut pas savoir ce que font les autres! « Ah, c'est fait par l'Ontario? Ah non, ce n'est pas bon. » Tu sais, tu n'as même pas regardé! « Ah non, ce n'est pas bon. »*

As a consequence of Québec not being a part of the same vendor market as the rest of Canada and their limited willingness or capacity to collaborate with the other jurisdictions, Québec did not benefit from the expertise developed elsewhere. Moreover, as HIT solutions in Québec tended to be developed in-house, with minimal consideration given to best practices and recommendations established outside Québec, these were occasionally outdated by the time they were implemented and required numerous revisions before they were functional. This raised the cost of Québec's HIT systems and hindered the MSSS's capacity to achieve its objectives within the expected timeframe.

6.6. Conclusion

Throughout the 1990s, Québec policy decision-makers engaged in discussions regarding the application of ICT within the health sector to enhance health services. In light of healthcare budget cuts, health service organization reforms in Québec sought to strengthen regional and local service networks. The improved capacity for the flow of information within and between institutions would enhance these networks. As Québec policy decision-makers planned the digitalisation of their health network and commissions and working groups advocated for information sharing solutions, Infoway offered to fund the development of an interoperable provincial EHR system, which would become the DSQ. The MSSS devoted substantial resources to developing the DSQ and established a governance structure comprising central coordination and regional information infrastructure development and deployment.

Despite the massive investment of funds and resources, the DSQ faced numerous costly delays in the first few years of its development. Government actors, who were the decisional authorities for the project, lacked the experience and expertise regarding HIT. The nature, scope, timeframe and cost of the project were, therefore, underestimated. Moreover, while other

Canadian jurisdictions viewed EHRs as a component of their health system digitalisation strategy, Québec focused primarily on the EHR. Complimentary initiatives, such as integrating computer equipment and EMRs into practice, were not coordinated at the provincial level in Québec. Management of the DSQ was heavily criticized. Certain actors were assigned responsibilities incompatible with their expertise or authority, and measures to monitor their progress and hold them accountable were inadequate. The DSQ competed over resources devoted toward more locally-relevant solutions, such as EMRs and CISs, and change management was not attributed sufficient importance, which contributed to slow uptake among primary care providers. Finally, Québec policy decision-makers were limited in their capacity to interact with decision-makers outside the province and favoured locally-developed solutions. Consequently, they did not draw on the best practices of other systems or capitalize fully on established vendors' expertise.

This chapter established the events and policy decisions and actions that contributed to the development and deployment of the DSQ. It contextualizes the subsequent chapter, which examines the policy decisions and actions that sought to address the issues encountered regarding DSQ deployment. In light of these issues, Québec policy decision-makers drastically reorganized their governance structure and modified the nature of the DSQ project to better integrate with EMRs. In doing so, primary care EMR implementation would finally be established as one of the MSSS’s priorities.

CHAPTER 7. RESULTS: IMPLEMENTATION OF ELECTRONIC MEDICAL RECORDS IN QUÉBEC PRIMARY CARE

Preface to Chapter 7

The previous chapter illustrated the development and implementation of Québec's health network digitalisation plan, the *plan d'informatisation du reseau de la santé et des services sociaux*. It described how the Québec Ministry of Health's (*Ministère de la santé et des services sociaux* – MSSS) collaboration with Canada Health Infoway Inc. (henceforth "Infoway") contributed to the evolution of Québec's plan toward the *Dossier Santé Québec* (DSQ), a province-wide electronic health record (EHR) involving regional repositories that would contain laboratory, medication, diagnostic imaging data accessible through a dedicated visualizer. Given their limited budget, focused vision, and political pressure to restrain spending, the MSSS prioritized the DSQ and did not initially address electronic medical record (EMR) implementation in their provincial strategy. The computerization of primary care practices and the implementation of EMRs fell under the responsibility of regional health authorities. While many practices had begun investing resources toward EMR implementation, the DSQ demanded an investment of additional time and resources, for which primary healthcare providers were not adequately compensated. The lack of necessary equipment and inadequate compensation contributed to providers' low uptake of the DSQ. Furthermore, DSQ infrastructure development proved to be more costly and complex than anticipated. To repair this costly and controversial project, the MSSS revised their strategy to simultaneously address EMRs and the DSQ. This was the backdrop against which the MSSS would come to include EMR implementation among its priorities.

The present chapter describes the policy decisions and actions surrounding the formalization and implementation of Québec's primary care EMR implementation strategy, the

Programme Québecois d'adoption des dossiers médicaux électroniques (PQADME). It specifically highlights the significant role played by the *Bureau de programme pour l'informatisation du réseau de la santé et des services sociaux* (henceforce "*Bureau de Programme*") in driving Québec's successful implementation of EMRs and the DSQ. I first describe the political and organizational context behind the MSSS's decision to include EMRs in their provincial strategy. Next, I detail some of the actions and influences that shaped the MSSS's EMR implementation policy agenda. Then I describe the decisions and actions concerning the formulation and implementation of the PQADME by the *Bureau de programme*. Finally, I discuss the outcomes following the enactment of the PQADME and the insights revealed by my investigation. In particular, I explain why the *Bureau de programme*'s intervention was so successful and discuss some remaining concerns about Québec's EMR implementation strategy.

7.1. Context Behind a Provincially-Coordinated Electronic Medical Record Implementation Strategy in Québec

Québec's health network digitalisation did not initially include EMRs, unlike in the other provinces. Until 2010, EMRs were not among the MSSS's priorities and their implementation was primarily the responsibility of the regional health authorities (*Agences de la santé et des services sociaux* from 2003-2015 – henceforth "*Agences*"). Two contextual factors contributed to the revision of Québec's strategy: the change in provincial government in 2008 and the initiation of an ongoing effort to appropriate governance over health information technology (HIT) and the DSQ from private sector entities. These would result in an increased interest in EMRs, concentrate authority regarding HIT implementation and improve the MSSS's capacity for coordination, progress monitoring, evaluation and accountability.

7.1.1. Change in Leadership at the Ministry of Health

The change of administration within Québec's Ministry of Health played an essential role in health network digitalisation governance restructuring and helped establish the conditions that precipitated the development of a provincial EMR implementation strategy. On June 25, 2008, Yves Bolduc (Minister of Health 2008-2012) succeeded Philippe Couillard (Minister of Health 2003-2008) as Minister of Health. The PLQ had formed a majority government in Québec between 2003 and 2012, except between 2007 and 2008 when they held a minority government.

Minister Bolduc had a keen interest in information technology (Québec HIT policy expert 1, Interview). Minister Couillard's health network digitalisation strategy was closely tied to the conditional funding from Infoway. Minister Bolduc recognized that the MSSS's vision regarding health network digitalisation would need to be broadened to include EMRs and hospital clinical information systems (CIS) (Ministère de la Santé et des Services sociaux, 2009b, 2009a). The vision would need to go beyond the minimum requirements for Infoway's funding. He recognized that additional investment was needed. He was a family physician, unlike Minister Couillard, who was a specialist. Minister Bolduc better understood the needs of primary care providers (Québec HIT policy expert 1, Interview). In addition to a personal interest in using HIT to enhance primary care practice, when Minister Bolduc took office, he was under a great deal of pressure to renovate the heavily criticized DSQ project. These contributed to Minister Bolduc's receptiveness toward recommendations to redefine Québec's digitalisation strategy and his political will to advocate for a broader vision and an investment of additional resources.

7.1.2. Integration of Dossier Santé Québec Management within Public Administration

One of the first significant actions Minister Bolduc took to address the DSQ involved a reorganization of governance and transfer of responsibility from private sector actors to government entities. The transfer of DSQ sub-project authority to government entities better ensured that the decisional authority rested with the MSSS and the responsible actors worked in concert. This would become a recurring theme between 2009 and 2012 that would facilitate the coordination of sub-projects and ensure the accountability of the responsible actors, as they would then be covered by laws governing contracts, public administration and public service (*Public administration act, Act respecting contracting by public bodies, Public service act*) (Québec HIT policy expert 4, Interview).

As mentioned above, the *Bureau du DSQ* had comprised primarily private sector consultants, with a Deputy Minister serving as director. Many of the DSQ's sub-components were outsourced to the private sector, and the coordination of the various public and private entities implicated in the DSQ proved to be challenging. This limited the MSSS's capacity to monitor progress, ensure accountability, and contain costs. In 2008 (2007-2008 Tome III) and 2009 (2009-2010 Tome I), the Auditor General recommended that the MSSS address the coordination and progress monitoring of the DSQ sub-projects. In line with this recommendation, the *Direction générale des technologies de l'information* was created in October 2009 to coordinate the government's digitalisation, standardization and security projects (Vérificateur général du Québec, 2010). Their responsibilities included: decisional authority regarding project management, authorization of project deliverables and timelines, budget allocation, financial monitoring, and endorsing contracts with vendors. The *Bureau du DSQ* was absorbed within the DGTI and the *Bureau du DSQ* was dissolved shortly thereafter. Other entities responsible for IT, such as the *Direction des ressources informatiques* and *Service des orientations stratégiques et des architectures*, were also absorbed within the DGTI. Finally, in 2013, the *Société de gestion informatique* (SOGIQUE) was dissolved and its responsibilities were transferred to the DGTI.

In the same vein, in 2010, several project components that private sector entities and the *Agences* had managed were transferred to the *Régie de l'assurance maladie du Québec* (RAMQ). As controversy mounted surrounding DSQ project delays, the MSSS was pressed to show results. The RAMQ volunteered to help (Québec HIT policy expert 4, Interview). They were recognized for their vast experience in data management and information security (Journal des débats (Hansard) of the Committee on Health and Social Services, 2011). The RAMQ had been managing health and medication insurance for over a decade, as well as physician remuneration and pharmacy data, and They were also responsible for user and patient registries, consent management, encryption, and location services. In April 2010, an agreement between the MSSS and RAMQ was announced whereby the RAMQ would acquire the responsibilities regarding medication prescriptions, laboratory results, access requests, and the operational management of the visualizer (Vérificateur général du Québec, 2011b). The transfer of responsibility involved challenging negotiations with the private entities who held the rights to some of these assets (e.g.

Bell concerning the visualizer). These challenges contributed to government actors' subsequent caution regarding contracts with HIT vendors and their interest in developing their own products.

7.2. Setting the Agenda for Québec's Electronic Medical Record Implementation Strategy

The political and organizational changes provided the landscape for the DSQ's renovation. There was interest and political will to address the needs of primary care providers and the consolidation of governance within public administration improved the MSSS's capacity to manage and coordinate the project. As this took place, several actors played an important role in setting the agenda regarding the prioritization of EMRs. The contributions of key actors who revised the MSSS's health network digitalisation strategy are described below.

7.2.1. Advocacy from Health Sector Stakeholders

Among the more influential advocates of EMR implementation were the Québec federation of general practitioners (*Fédération des médecins omnipraticiens du Québec* – FMOQ), Task Force on Health Funding ('Castonguay commission'), the Québec Health and Welfare Commissioner and Infoway. The FMOQ lobbied the MSSS on behalf of family physicians to obtain additional compensation for the implementation of EMRs. The Task Force on Health Funding report (Groupe de travail sur le financement du système de santé, 2008) argued for the prioritization of EMR implementation and connecting patient records across healthcare institutions (ref: Task Force on Health Funding 2008). The Québec Health and Welfare Commissioner's 2009 Appraisal Report on the Performance of Québec's Health and Social services system provided a similar conclusion, recommending that the MSSS support both the implementation of EMRs and the DSQ (Health and Welfare Commissioner 2009). The Auditor General highlighted issues regarding the deployment of the DSQ and provided the MSSS with recommendations to harmonize EMRs and the DSQ. Finally, in 2009, Infoway recommended that Québec should modify its strategy to address EMR implementation alongside EHR development and worked to obtain additional funds for the provinces and territories to this end.

In 2007, the rate of adoption of EMRs among Québec family physicians was estimated at 20%. In comparison, the rate in Alberta was 55.6%. Physicians were generally favourable toward EMRs; however, their adoption demanded an investment of their time and resources, leaving less to invest in their clinical practice (Québec HIT policy expert 1, Interview). After the establishment of family medicine groups (FMG) in 2002, the MSSS and FMOQ reached an agreement in 2004 whereby the MSSS would enable the *Agences* to provide funding for computer equipment and clinical and administrative software (Rodrigue & Blanchette, 2006). Compensation, however, did not adequately cover the costs and investment of time. While some physician 'champions' mobilized their colleagues to adopt EMRs, the requisite investment and inadequate compensation contributed toward physicians' reluctance. On numerous occasions, the FMOQ requested additional funding, but the MSSS denied their request (Québec HIT policy expert 1, Interview). Thus it remained that a small subset of family physicians adopted EMRs.

Meanwhile, the Task Force on Health Funding was commissioned in 2007 to provide recommendations about the funding of the healthcare system. The general election in Québec had reduced the PLQ to a minority government, opposite *Action Démocratique du Québec* (Policy Options, 2008). Healthcare reform was a priority on the agenda. Premier Jean Charest recruited Claude Castonguay, former Minister of Health and 'father' of Québec's public health insurance plan, to lead the task force. Its objectives involved proposing additional funding sources to the government, specifying the private sector's role in improving access and wait times while maintaining the values of a public system, and proposing amendments to the Canada Health Act (Gouvernement du Québec, 2007).

The Task Force on Health Funding released its report, entitled *Getting our Money's Worth* (*En avoir plus pour son argent*), in February 2008. Its authors argued that a significant issue facing the Québec healthcare system was a widening gap between government revenues and healthcare costs. Among their recommendations to address this gap, they proposed that the MSSS take action to slow the growth of expenses, expand the role of primary and ambulatory care services, re-examine public health insurance coverage, optimize health system governance, use performance measures and financing strategies to encourage efficiency, invest in HIT like EMRs and the DSQ, and expand the role of the private sector in providing health services (Gouvernement du Québec, 2008a). As the Québec Auditor General had previously asserted, the Task Force found that planning and coordination of health network digitalisation were lacking. In particular, they recommended that priority be given to the computerization of all Québec health institutions and clinics and the implementation of EMRs and CISs.

> *Despite the interest aroused by the Québec Health Record, the priority must be to continue and accelerate the deployment of information technology tools, and particularly the local electronic patient record in all Québec institutions (Groupe de Travail sur le Financement du Système de Santé, 2008, p. 211).*

They argued that the computerization of institutions is a foundational prerequisite for the DSQ, yet this was not directly addressed by the MSSS. They also remarked that change management was lacking and argued that it too needed to be adequately addressed. Furthermore, they recommended creating, within the MSSS, an entity responsible for planning, standards-setting and deployment of HIT throughout the provincial network (this proposed entity would become the *Direction générale des technologies de l'information* - DGTI).

In 2009, the Québec Health and Welfare Commissioner released a four-volume report on the performance of the health and social services system. Their examination involved research documents, analytic studies, dialogue with stakeholders and unpublished data comparing Québec with other settings. Although they found that Québec's healthcare quality ranked relatively high, they identified several issues. The more prominent issues included citizens' lack of access to care, resulting in long wait times, lack of affiliation with family physicians, and variability between regions in terms of care quality. They also reported that Québec was lagging in their establishment of group medical practices and implementation of information and communications technology (The Health and Welfare Commissioner, 2009).

The Health and Welfare Commissioner provided ten broad recommendations that centred around improving access to primary healthcare services as well as optimizing and enhancing them. Their recommendations comprised four dimensions: 1) organization of care and resources, 2) clinical practices and health service provision, 3) planning and management of clinical activities, and 4) funding. One of these recommendations involved supporting the implementation of EMRs and the DSQ. They argued that EMRs were essential for fostering collaborative, preventive care and enhancing primary care services. They noted that Québec had fallen behind the other Canadian provinces and argued that Québec's remuneration (predominantly fee-for-service) was not conducive to the purchasing of such systems. They recommended that the MSSS support the implementation of EMRs in all FMGs throughout Québec. Accordingly, they recommended partnering with the FMOQ and health authorities to foster the introduction of EMRs, developing an incentive program, providing training at local and regional levels, and harmonizing EMRs and EHRs to support the circulation of information throughout the health network.

The Auditor General reports that evaluated the MSSS's development and deployment of the DSQ had a significant impact on Minister Bolduc's handling of the digitalisation project and were influential in orienting the MSSS's strategy toward the prioritization of EMRs (Québec HIT policy expert 1, Interview). Four reports between 2007 and 2011 comprised an audit of the DSQ: 2007-2008 tome III (2008), 2009-2010 tome I (2010), 2010-2011 tome I (2011a), and 2010-2011 Tome II (2011b). Throughout these reports, the Auditor General remarked on the delays in the development and implementation of the DSQ. For instance, in their 2007-2008 Tome III report, they asserted that the MSSS's timelines were unrealistic and that the extent of costs and the work required to establish the data infrastructure were underestimated. They recommended improving project management, leadership and expertise to successfully coordinate the institutions and private sector partners. Regarding the importance of coordination, [Québec HIT policy expert 2, Interview] explained:

> *[Translated from French[16]] It's about channelling the initiative. Starting at the Ministry level. When you have five or six branches that don't talk to each other and work on the same project, it doesn't work. The lines of authority aren't there. The vision is not clear, the objectives are not clear, and the initiatives go in circles. [...] You [must have] a line of authority, a line to make decisions. After that, it's being in concert to work with other partners that you don't have authority over. They are all independent bodies, addressing the same dossier, but each from their own side. To engage them in a common project, with, again, the same vision and the same objectives, the same timetable with clear objectives... is not easy (Québec HIT policy expert 2, Interview).*

Before Minister Bolduc's announcement that the DSQ would be revised, the Auditor General's second report on the DSQ (Vérificateur général du Québec, 2010) remarked that the

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[16] [Original text] *C'est de canaliser l'initiative. En commençant au niveau du ministère. Quand tu as cinq ou six directions qui ne se parlent pas et qui travaillent sur le même projet, ça ne marche pas. Les lignes d'autorité ne sont pas là. La vision n'est pas claire, les objectifs ne sont pas clairs, et les initiatives tournent en rond. […] Il [faut avoir] a une ligne d'autorité, une ligne pour prendre les décisions. Après ça, c'est d'être en concertation pour travailler avec d'autres partenaires sur lesquels tu n'as pas d'autorité. Ce sont toutes des affaires indépendantes, qui s'adressent au même dossier, mais chacun de leur bord. Les embarquer dans un projet commun, avec, encore là, une même vision et les mêmes objectifs, le même calendrier avec des objectifs clairs… ce n'est pas évident*

pilot project was facing major delays and needed to be reduced in scope. A significant portion of the data, especially laboratory results, was not sufficiently standardized. Consequently, Infoway's disbursements slowed as they retained funds associated with the milestones that were not yet achieved (Québec HIT policy expert 1, Interview). This report also drew attention to the challenge of user adoption. The rates of adoption were lower than anticipated. They explained that many clinics and institutions were simultaneously engaged in the integration of EMRs, which were more clinically relevant, and therefore detracted from DSQ adoption. The MSSS had requested that healthcare providers adopt the DSQ and that the *Agences*, clinics and providers devote time and resources toward it, dividing their priorities, attention and limited resources. The Auditor General suggested that the MSSS's health network digitalisation strategy should harmonize the DSQ and EMRs.

In December 2009, recognizing the issues Québec was facing with physicians' adoption of the DSQ, Infoway representatives recommended that the MSSS devise a provincial plan to support EMR implementation, as the other provinces had done. Even though Infoway did not initially fund EMR implementation, the other provinces' strategies included it among their priorities (Vérificateur général du Québec, 2011b). Infoway representatives suggested that the MSSS change its strategy for digitalising the health network. They recommended beginning with the prioritization of EMRs and then integrating the DSQ subsequently (Allard, 2015a). This proposition was formally rejected by the MSSS in February 2010 (Vérificateur général du Québec, 2010).

In an attempt to help secure resources to support the provinces, Infoway had spent years lobbying the federal government to provide additional funds specifically for EMRs (HIT organization representative 1, Interview). This request was initially met with resistance. The timing was not ideal, as the Auditor General of Canada was in the process of conducting an audit looking at Infoway's management of funds (Office of the Auditor General of Canada, 2010a) following an eHealth scandal in Ontario (CBC News, 2009). Health Canada finally agreed to allocate funds toward EMRs in 2010. However, given the controversy, Infoway was accountable for showing results based on an evaluation of their implementation processes and adoption rates.

To ensure the success of their investment, since it was ultimately up to the provinces and territories to decide how they would invest these funds, Richard Alvarez, CEO and Chair of Infoway, proposed a business plan to the board of directors, which included representatives of each of the jurisdictions. The board did not approve the proposal. Nevertheless, the funds were provided without a strategic investment framework. Funding was provided in the form of a matched investment. Québec would receive $60 million, which the MSSS earmarked for EMRs (Québec HIT policy expert 2, Interview). The acquisition of additional funding specifically intended for EMRs precipitated the change in Québec's DSQ strategy and the development of the PQADME.

7.2.2. Harmonization of Electronic Medical Records and the Dossier Santé Québec

In 2010, in response to lobbying from the FMOQ, the advocacy from health commissioners, issues regarding the DSQ's update by family physicians, and Infoway's procurement of funds to support EMR implementation, Minister Bolduc decided to revise the MSSS's digitalisation strategy (Gouvernement du Québec, 2010). In the MSSS's 2010-2015 strategic plan, they proposed supporting EMR and CIS utilization, although the details regarding how this would be achieved had not yet been established (Ministère de la Santé et des Services sociaux, 2010). Subsequent to their strategic plan, Minister Bolduc raised the recommendations from the Auditor General and Infoway at the National Assembly (Journal des débats (Hansard) of the Committee on Health and Social Services, 2010). He argued that expanding their digitalisation strategy to include EMRs was necessary. Accordingly, he proposed enabling healthcare providers to access the DSQ using their EMRs, thereby capitalizing on the EMR systems and resources already in place. The initial conception involved access to regional DSQ repositories using a common visualizer. Instead, the MSSS would integrate EMRs and the DSQ so that DSQ data could be displayed through local EMR systems. Depending on the site, they would use either the visualizer or EMRs or a combination of the two.

While this strategy would prove to be an essential factor in the successful implementation of EMRs throughout Québec, it was heavily criticized by the media (Allard, 2015a). The DSQ had already been the object of criticism (Chouinard, 2009; Lessard, 2009a, 2009b; Radio Canada, 2010). The updated estimate for the cost of health network digitalisation was $1.4 billion (Allard, 2015a). Given the change in the nature of the project, additional delays were anticipated. This put a great deal of pressure on the Minister of Health and the DSQ project leads to keep costs contained and demonstrate results.

7.3. Formulation of Québec's Electronic Medical Record Implementation Strategy

In March 2011, following the redefinition of Québec's health network digitalisation strategy, the MSSS created an entity under the DGTI's leadership: the *Bureau de programme pour l'informatisation du reseau de la santé et des services.* Its mandate was to frame, coordinate and supervise the health network digitalisation, and the DSQ in particular (Vérificateur général du Québec, 2011b). The *Bureau de programme*'s strategy involved four essential actions: 1) an overhaul of DSQ project governance, 2) an amendment of legislation governing health information, 3) accreditation of EMR vendors, and 4) an incentive program for physicians' adoption of EMRs and the DSQ. The revision of DSQ governance facilitated their coordination of activities involving regional authorities, professional associations, and private sector entities. The legislative amendment (Bill 59, 2012) established the conditions regarding access to the DSQ data repositories by authorized primary care providers. The accreditation criteria conceived by the MSSS, DGTI and RAMQ would ensure that EMRs integrated particular functionalities for healthcare providers, in addition to interfacing with the DSQ. Finally, the formulation of the incentive program, the PQADME, involved negotiation with the FMOQ regarding adherence conditions and appropriate compensation. The *Bureau de programme*'s decisions and actions were integral to Québec's successful implementation of EMRs between 2011 and 2016. These are discussed in greater detail below.

7.3.1. Bureau de Programme d'Informatisation du Réseau de la Santé et des Services Sociaux

The Bureau de programme worked with three committees: a governance council (*conseil de gouvernance*), a clinical needs advisory committee (*comité consultatif des besoins cliniques*), and an interoperability board (*table d'interoperabilité*) (Ministère de la Santé et des Services sociaux, 2014). The governance council comprised partners including RAMQ, SOGIQUE, *Association québécoise des établissements de santé et de services sociaux* (AQESSS), the *Agences*, and hospital centres. Their role involved making decisions about strategic directions. The advisory committee comprised the MSSS, the FMOQ and FMSQ (*Fédération des médecins spécialistes du Québec*), *Association des Conseils des médecins, dentistes et pharmaciens du Québec (ACMDP), Association québécoise des pharmaciens propriétaires (AQPP), Collège des médecins du Québec* (CMQ). This committee worked to address user adherence and strike a balance between clinical needs and technological capabilities. Finally, the interoperability board, presided by RAMQ, comprised the MSSS, hospital centres and the *Agences*, and was responsible for defining the rules, norms and specifications regarding the integration of EMRs and the DSQ (Vérificateur général du Québec, 2011b).

Leadership of the DSQ project changed hands several times between 2010 and 2011 (Vérificateur général du Québec, 2011b). An expert manager was needed to overhaul the controversial DSQ project (Lessard, 2009a, 2010). After months of searching, Lise Verreault was recruited to lead the *Bureau de programme* as Associate Deputy Minister. Lise Verreault was an experienced project manager with the provincial government and had served as Associate Deputy Minister with *la Direction générale de la coordination, du financement, des immobilisations et du budget* of the MSSS. She acted as Associate Deputy Minister with the *Bureau de Programme* between 2011 and 2013 and then as Deputy Minister between 2013 and 2014. Richard Audet, who was Vice-president of information technology at the RAMQ, succeeded Lise Verreault as Associate Deputy Minister with the *Bureau de programme* between 2013 and 2016.

Lise Verreault recruited key people to form the core team: Dr. Michel Baron, Diane Bois, John Gauvreau and Claude Ouellet (Québec HIT policy expert 1, Interview). Dr. Baron had been Dean of the Faculty of Medicine at Université de Sherbrooke and CEO of the *ASSS de l'Estrie*. He had aided the development of the CIS implemented throughout the *Université de Sherbrooke Réseau Universitaires intégrés de santé* (RUIS). Dr. Baron was instrumental in developing the content of the PQADME. Diane Bois was the director of legislative projects concerning the DSQ and John Gauvreau was the director of investments with the *Direction générale de la coordination, du financement, des immobilisations et du budget*. With their legal backgrounds, they would play a vital role in developing an amendment bill that would, among other things, enable access to the DSQ repositories through EMRs. Finally, Claude Ouellet had served as director of policy and financial services at the MSSS and had the reputation of being "the person to call in a financial crisis" (Québec HIT policy expert 1, Interview).

One of the more significant actions Lise Verreault took to change the course of the controversial DSQ involved overhauling the project's governance (Québec HIT policy expert 2, Interview). One of the major challenges regarding the DSQ leadership had been the coordination with the various implicated entities. Lise Verreault examined the DSQ's management structure and identified a large number of private contractors who were no longer contributing substantially to the project. Part of the work of establishing the DSQ involved negotiating agreements with professionals, such as pharmaceutical associations and the Québec Federations of General Practitioners and Specialists (FMOQ and FMSQ). As [Québec HIT policy expert 1] explained, this needed to be conducted by government actors with the legitimacy and authority to do this, not HIT vendors. Thus, in her first year of operation, Lise Verreault ended over a hundred consultant contracts and retained a team of 39 key actors.

> *[Translated from French[17]] There were about 200 people. And I'll tell you, after a few months, we were down to about 30 people. We terminated all kinds of contracts, which...it wasn't delivering. We didn't need that. You have to be careful, when you work on dossiers like that, that the businesses don't feed themselves [...] The part that had been done was fine. But we didn't need to keep everyone. We kept the ones we needed, and for the others... we integrated oversight mechanisms within the Ministry (Québec HIT policy expert 1, Interview).*

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[17] [Original text] *Il y avait à peu près 200 personnes. Et je vous dirais qu'après quelques mois, on s'est ramassés à peu près une trentaine de personnes. On a mis fin à toutes sortes de contrats, qui… ça ne fournissait pas. On n'avait pas besoin de ça. Il faut faire attention, quand on travaille dans des dossiers comme ça, pour que les firmes ne se nourrissent pas elles-mêmes […] La partie qui avait été faite, c'était correct. Mais on n'avait pas besoin de garder tout le monde. On a gardé ceux dont on avait besoin; et pour les autres, on a intégré à l'intérieur du ministère certaines fonctions de contrôle*

Concentrating project authority within public administration facilitated the coordination of activities, concertation with the MSSS's objectives, accountability of actors, and control over costs.

The *Bureau de programme* used the 2009-2010 Auditor General report as a guide, as they had a responsibility to address concerns regarding the DSQ's mismanagement and inflated costs.

> *[Translated from French[18]] The other element that I think was important was the auditor's report. Each of the elements that were in that report, we made the adjustments and we went back to attest to them. We were authentic. Every time we would go to a budget review, we would come with "Here are the questions you asked us. Here are the requests you made. Here's what we did." We didn't hide anything. I think on that, people trusted us. You know, basically, we had a vested interest in being transparent in this, and not saying "everything is fine." [...] we said, "We're going to address every one of these points. That's our credibility!" (Québec HIT policy expert 1, Interview)*

The *Bureau de programme* sought out best practices and was committed to collaborating with experts and implicated actors to ensure its success. They looked at what was being done in other settings (Estonia, for instance, which had achieved the digitalisation of their health system) and drew on these examples for inspiration. Their interest in addressing concerns regarding the project and their transparency regarding their operations helped them gain the support of their colleagues. They earned a reputation for being open and collaborative, which was said to have been a key factor in successfully progressing the DSQ (HIT organization representative 3, Interview).

By 2012, pilot projects were underway in Capitale Nationale, Estrie, Lanaudiere and Montreal. The visualizer was functional, but data from numerous sources were still not available.

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[18] [Original text] *L'autre élément qui a été, je pense, important, c'est le rapport du vérificateur. Chacun des éléments qu'il y avait dans ce rapport-là, on a apporté les corrections et on est retournés en témoigner. Alors, on a été authentiques. À toutes les fois qu'on allait en étude de crédit, on arrivait avec « Voici les questions que vous nous avez posées. Voici les demandes que vous avez faites. Voici ce qu'on a fait. » On n'a rien caché. Je pense que sur ça, les gens nous ont crus. Tu sais, dans le fond, on avait intérêt à être transparent là-dedans, et non pas dire « tout va bien. » [...] on a dit « on va répondre à chacun de ces points. C'est notre crédibilité! »*

Although the development of the DSQ was not yet complete, Lise Verreault decided that they should start addressing its implementation as this would help generate momentum and insight into how to improve adoption. The project's previous directors waited for a more significant proportion of the pilot regions' laboratories, pharmacies and diagnostic imaging centres to be capable of transmitting their data. Change management had not yet been adequately addressed.

To develop the capability of transmitting digital data, often held by private entities, the *Bureau de programme* had to negotiate with each individually.

> *[Translated from French[19]] We had to negotiate. Agreements had to be reached, and everyone had to find a financial gain, in quotes, in these 'transactions'. Digitalisation is one thing. But to reach an agreement with autonomous professional bodies to share information is something else (Québec HIT policy expert 1, Interview).*

They had to make the case that there was a benefit to their joining the DSQ. Pharmacies tended to be the simplest since most pharmacy data had been digitised and was managed by the RAMQ and most pharmacies fell under the umbrella of a small number of larger entities. In addition, both physicians and pharmacies wanted an electronic prescriber, therefore this served as a sufficient incentive. In addition to individual pharmacies, they had to negotiate with the *Association des pharmaciens propriétaires* (AQPP) regarding linkage and financing for the pharmacies and the FMOQ regarding physicians' remuneration for prescriptions. Laboratory data was more challenging and time-consuming since the majority of the laboratories were independent (Québec HIT policy expert 1, Interview). They had to meet with each one individually to discuss their integration as well as standardization and coding. Finally, regarding diagnostic imaging, many institutions and *Agences* had developed the capacity to transmit results

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[19] [Original text] *Il a fallu négocier. Il a fallu avoir des ententes, et que chacun trouve un gain pécunier, entre guillemets, dans toutes ces transactions-là. D'informatiser, c'est une chose. Mais de convenir, avec des corps professionnels autonomes de partager l'information, c'est autre chose.*

within the regions. Integrating these different systems involved establishing common standards to be able to store them in a single repository. Under the *Bureau de programme*'s leadership, progressive deployment of the DSQ in the rest of Québec began in 2013.

7.3.2. Amendment to Legislation Governing the Sharing of Health Information

Given the change in the nature of the DSQ, an amendment to legislation governing health information was needed to re-establish the conditions for secure storage of information and their access by authorized professionals, particularly those in primary care. To this end, Minister Bolduc introduced the *Act respecting the sharing of certain health information* (Bill 59) in February 29, 2012. The Committee on Health and Social Services conducted specific consultations spanning four sessions (between May 3 and May 9, 2012). The Committee's report was provided on May 10, and adoption in principle took place on May 29. Detailed study of the bill and discussion of amendments then took place on June 14. It was adopted on June 15 and assent was given on June 18, 2012.

The bill's specific objectives were to define the rules for ensuring the protection of information as well as their communication, access, use and storage, and establish the rights of individuals whose information is collected (Verreault, 2012). The bill established six clinical domains of information: medication, laboratory medical imaging, immunization, allergy and intolerance, and hospital. It defined the rules regarding information access and conservation and the constitution and management of user, provider and institutional registries. It also defined the conditions of an electronic medication prescription system. Finally, it indirectly enabled the storage of information in a central repository, rather than in regional repositories (*Consultations particulières et auditions publiques sur le projet de loi n° 59*, 2012). At this time, concern regarding information security had diminished since the parliamentary review of the previous health information bill. Since the previous debate on this topic, there had been advances in information security. Moreover, information storage had become the responsibility of government entities. These contributed to the diminishment of the public's concern in this regard.

Bill 59 contained 177 articles. Despite its volume, it passed quickly. To ensure its acceptance, the *Bureau de programme* team met with government officials debating the bill and made sure to address their concerns.

> *[Translated from French[20]] We had to meet with the government opposition. When we introduced this bill, we agreed with Minister Bolduc that we would meet with the people in parliamentary committee who would be our counterparts. And we really understood, I would say, in a non-political way, the importance that this bill should be adopted (Québec HIT policy expert 1, Interview).*

They wanted to ensure that it would pass. It was the end of the session, and they did not want a lengthy process. Everyone at the National Assembly recognized the importance of the bill to progress the DSQ. There were only a few amendments and the bill passed unanimously. This demonstrates the value of collaboration in government to achieve more effective and productive policy processes.

7.3.3. Integrating the Dossier Santé Québec into Electronic Medical Records and Accreditation of Vendors

The harmonization of EMRs and the DSQ required a mechanism for ensuring that EMR products were capable of interfacing with the DSQ repository. There had been about a dozen EMR products available in 2010 (HIT Organization Representative 3, Interview). The market

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[20] [Original text] *Il a fallu rencontrer l'opposition au gouvernement. Quand on a déposé ce projet de loi-là, nous avons convenu avec le ministre Bolduc qu'on allait rencontrer les gens en commission parlementaire qui allaient être nos vis-à-vis. Et on a vraiment partagé, je vous dirais, d'une façon non-politique, l'importance que ce projet de loi-là soit adopté*

was relatively unregulated. Data standardization and interoperability were limited. The majority of the data in EMRs followed universal health information standards (e.g. HL7). However, a portion of the fields was unstructured or conceived to address local, specialized needs (Health administrator 2, Interview). Since EMRs were intended to address local needs and legislation restricted the transmission of EMR data beyond the clinic, interoperability standards were not enforced. In many cases, data was stored as an image rather than as granular data, inhibiting processing, analysis and transmission.

Québec utilized an open-market approach involving public tenders, whereby vendors offered their services directly to physicians, and physicians were autonomous in deciding what products suited their practice.

> *[Translated from French[21]] Everyone was being solicited by a handful of IT companies saying 'buy my software, not the other one'. There was competition! The physician was autonomous. The Ministry, even if it provided guidance, medical autonomy, especially in clinics... we had little leverage about this at the Ministry (Québec HIT policy expert 1, Interview).*

The *Agences* were involved in reviewing the offers, but played a minimal role in influencing the products healthcare providers selected, although a some of the *Agences* worked with healthcare providers to establish criteria that physicians could use to evaluate vendors' offers.

To integrate EMRs and the DSQ, the MSSS considered the possibility of evaluating all the products and recommending a single product that met everyone's standards. However, vendors expressed that this would be unfair, and government actors were cautious about being beholden to a single private entity (Professional Association Representative, Interview).

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[21] [Original text] *Tout le monde était sollicité par quelques firmes informatiques pour dire 'achète mon logiciel, et pas l'autre.' Là il y a eu de la compétition! 'lequel on prend, qui a le meilleur?' … le médecin était autonome. Le ministère, même s'il donne des orientations, l'autonomie médicale, surtout en clinique, on avait peu de leviers là-dessus au ministère. fois*

Additionally, the FMOQ had established that their membership had different demands. Users wanted a level of customization not provided by a single product.

> *[Translated from French[22]] There was a whole discussion about whether we should move towards a single system in Québec, or integrate several providers. That's a debate that still exists, by the way. There were two trends at the time in IT: the first was to give everyone the same thing, which prevented us from meeting specific needs. Or the second one, we ask that the system responds to very precise criteria, and that they are interoperable. That are capable of handling the entire system. In the end, we succeeded in getting the second approach through. Because it's easier to work with things that are already established, rather than having to redo everything and start over (Québec HIT policy expert 2, Interview).*

The MSSS opted, therefore, to maintain an open market of EMR solutions. To ensure that EMR vendors integrated with the DSQ, the MSSS developed an accreditation process in collaboration with the DGTI, RAMQ, the FMOQ, and *Bureau de programme*. Together, they established a list of around 450 testable criteria (Québec HIT policy expert 3, Interview). In addition to accreditation being used to ensure that EMRs interfaced with the DSQ, it also ensured that the MSSS's and physicians' priority services and functionalities were provided, such as a medication prescriber function. Base technological components were first imposed, including administrative and clinical functions, integrated multimedia telecommunications network (RITM) certification, and DSQ certification (Québec HIT policy expert 3, Interview). The requirements were then expanded gradually. This allowed the smaller vendors to maintain pace, given their more limited capacity for development. Non-accredited vendor products would not be

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[22] [Original text] *Il y avait eu toute une discussion sur est-ce qu'on va vers un seul système au Québec, ou on intègre plusieurs fournisseurs? Ça, c'est un débat qui existe encore, d'ailleurs. Il y avait deux tendances à ce moment-là en informatique, le premier c'est qu'on donne la même affaire à tout le monde, ce qui empêche de répondre à des besoins particuliers. Ou le deuxième, on demande que le système réponde à des critères très précis, et qui soient interopérables entre eux. Qui soient capables de faire l'ensemble. Nous, on a finalement réussi à faire passer la deuxième approche. Parce que c'est plus facile de travailler à partir de choses déjà établit, plutôt que tout soit à refaire, et à recommencer.*

eligible for the EMR adoption incentive program. By 2012, there were nine accredited EMR products in Québec.

7.3.4. Programme Québécois d'Adoption des Dossiers Médicaux Électroniques

One of the most critical factors behind family physicians' adoption of EMRs in Québec was the EMR adoption incentive program, PQADME. While numerous clinics and institutions had begun deploying or investing in EMRs, adoption rates remained relatively low. In 2010, the rate of EMR adoption among family physicians was estimated at 31.6% (The College of Family Physicians of Canada et al., 2010). When the *Bureau de programme* gathered information from FMGs concerning providers' needs, they found that a large number of clinics did not have the systems in place to use EMRs. They found that many physicians wanted an EMR. Physicians wanted to reduce paper and to have better tools that would help them manage their complex patients.

> *[Translated from French[23]] It's clear that we couldn't continue to operate on the front lines without having an electronic medical record. It's like that all over the world. And at that time, we were lagging far behind in this regard. We had very few electronic medical records (Professional association representative, Interview).*

Physicians were reluctant, however, as they were inadequately compensated. EMR adoption implied an investment of time without the expectation of immediate returns. Learning a new system and entering data would limit the number of patients they could see in a day. They expected concerns about the EMRs not functioning, causing a bottleneck in the clinic (HIT Organization Representative 1, Interview). For nearly a decade, the FMOQ had been lobbying the MSSS for appropriate compensation. While the FMG agreement of 2004 covered some costs,

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[23] [Original text] *C'est clair qu'on est à l'évidence qu'on ne pourra plus continuer à opérer en première ligne sans avoir de dossier médical électronique. C'est comme ça partout dans le monde. Et à ce moment-là, nous on accuse un énorme retard, par rapport à ça. On a très peu de dossiers médicaux électroniques*.

it did not sufficiently cover computer equipment, licenses and physicians' time. Negotiations between the MSSS and physician federations were challenging, particularly during periods of remuneration dispute (Health Administrator 1, Interview).

Family physicians' adoption of EMRs and the DSQ required an agreement with the FMOQ. The $60 million from Infoway gave the MSSS something to offer as an incentive. The *Bureau de programme*, particularly Dr. Baron, worked with Dr. Serge Dulude, director of planning and implementation at the FMOQ, and Louise Beauchesne, the Québec representative of Infoway, on the development of the PQADME. This program would provide reimbursements and financial compensation for their adoption and use of EMRs and the DSQ. Actors within the FMOQ estimated the cost of digitalising all the primary care practices in Québec, which included computer equipment, licenses, training, digitisation, and the archiving of paper charts. They met with provincial decision-makers in British Columbia and Ontario to review their budgets. They estimated that EMR implementation would cost approximately $14.5 million annually over a four-year cycle, which Infoway's funds would cover.

The MSSS and FMOQ reached an agreement concerning family physicians adherence to the PQADME, which took effect in August 2012: *entente particulière relative à la participation des Médecins omnipraticiens au dossier santé du Québec et au programme québecois d'adoption de dossiers médicaux électroniques* (Régie de l'assurance maladie du Québec, 2012). The PQADME established the conditions under which family physicians would receive reimbursement and compensation. These conditions included: rostering at least 300 patients, adopting an accredited EMR, adopting a single EMR per clinic, adhering to the PQADME by at least half of the physicians in a group practice, participating in training sessions regarding the use of the DSQ and EMRs, and complying with information privacy and security regulations

(Bureau de programme pour l'informatisation du réseau de la santé et des services sociaux, 2012). The items for which physicians were compensated included: equipment (computers, networking hubs, cables), internet lines, cable, implementation fees, change management costs, and software licenses. Physicians were also offered financial incentives for usings their EMR and the DSQ ($600 per month for six months). With the FMOQ's backing, this incentive program would help drive EMR adoption throughout Québec.

7.4. Implementation of Québec's Electronic Medical Record Strategy

The *Bureau de programme*'s strategy for addressing health network digitalisation comprised four domains: interoperability, integration, responsiveness to client needs and promotion. They sought to ensure that the various systems worked together as a unified whole, despite not being a single system. They worked closely with the FMOQ to ensure that users' needs were met, particularly with respect to compensation and the functionalities of accredited EMR systems. Once the PQADME was established, the *Bureau de programme* devised a strategy to promote the program and encourage family physicians to adopt EMRs and the DSQ and support implementation and change management at the practice level. The *Bureau de programme*'s collaboration with users and attention to their needs were considered critical factors in their success (Québec HIT policy expert 1, Interview).

7.4.1. Incentive Program Promotion

Between 2013 and 2014, a team of five from the *Bureau de programme* toured throughout Québec. The objectives of their promotional campaign were to explain the program and encourage EMR and DSQ adoption. To promote the PQADME, the *Bureau de programme* developed websites, newsletters and published articles in the *Médecins du Québec* journal. They also attended information technology and medical conferences and hosted a showcase involving hundreds of healthcare stakeholders (healthcare providers and administrators) to demonstrate the DSQ. Most significantly, on an individual basis, they met with regional health authorities and clinical teams to discuss their needs and concerns, and support their implementation initiatives. The partnership with the FMOQ and testimonials from their colleagues were significant in encouraging user adoption. The *Bureau de programme* brought physician ‘champions’ (early EMR and DSQ adopters) on their tours who spoke of their own experiences, the challenges they faced and the benefits they reaped following implementation. Their hands-on user-centred approach to promoting the program was considered a key factor in their successful recruitment of adopters.

7.4.2. Change Management

As highlighted by consultants and auditors throughout Québec’s health network digitalisation journey, change management is integral to users’ successful HIT adoption and adherence. Accordingly, the *Bureau de programme* provided, in the PQADME, a comprehensive change management strategy based on the Prosci ADKAR (awareness, desire, knowledge, ability, and reinforcement) model (Bureau de programme pour l'informatisation du réseau de la santé et des services sociaux, 2012). The strategy comprised the following 11 elements: 1) sensitization, 2) physician engagement, 3) training, 4) evaluation of preparedness, 5) choice of vendors, 6) revision and adaptation of workflow, 7) technological prerequisites (implementation of technology, digitisation of results, and manual data entry) 8) implementation and usage support, 9) appropriation (implementation of the chosen EMR and vendor support), 10) EMR usage, and 11) monitoring and adjustment. For each of these elements, the PQADME identified resources upon which users could draw for support regarding implementation and clinical process change (support for planning and transition to EMR in the clinic, and revision of workflow and personnel's roles) and technology issues (from the *Bureau de programme*, the *Agences*, and EMR vendors). They also devised policies, guides, evaluation grids, forms, templates, or frameworks for each of them, which were available for download on the internet (Bureau de programme pour l'informatisation du réseau de la santé et des services sociaux, 2012; Verreault, 2012).

While the MSSS, the *Agences* and vendors played a supporting role in physicians' adoption of EMRs and their integration into practice, the peer support program established by the FMOQ was considered essential (Professional association representative, Interview). The FMOQ had established a 'super users' program whereby early adopter physician 'champions' helped mobilize clinical teams to digitalise their practices. They also provided advice regarding EMR implementation and use, and relayed information between clinics and the *Agences*.

As practices enrolled in the PQADME, champions and regional authorities advocated for the collective adoption of the same EMR solution within a region or RUIS to improve interoperability and transferability of knowledge and training (Health administrator 1, Interview). In addition, select *Agences* developed documents to assist physicians in their selection of EMR solutions (Agence de la santé et des services sociaux de Montréal, 2014). They provided a breakdown of clinical specifications and functionalities that improved physicians' capacity to make informed decisions about their product choice, which helped concentrate the EMR market around vendors that offered solutions that appeared to meet physicians' needs. The *Agences* assisted physicians with their review of offers but respected their autonomy in selecting their product.

7.5. Outcomes

While the history of Québec's health network digitalisation involved challenges and delays, many policy makers consider it to have been a success (Québec HIT policy expert 1, Interview). The harmonization of EMRs and the DSQ and the actions undertaken by the *Bureau de programme* played a significant role in driving EMR adoption in Québec primary care. With the PQADME, there was a sharp increase in EMR adoption among primary care providers. By April 2014, 73% of FMGs (189 of 258) had implemented EMRs. Approximately 66% of the family physicians (5000 of 7600) in Québec had enrolled in the PQADME by April 2015 (Vérificateur général du Québec, 2015). The program was ended on August 31, 2016. After the end of the program, FMGs continued to receive funding from their regional health authorities for licenses, hardware, and remunerated training. The rate of EMR adoption among family physicians rose from 31.6% in 2010 (The College of Family Physicians of Canada et al., 2010) to 63.5% in 2014 (The College of Family Physicians of Canada et al., 2014) and above 80% by 2016 (Québec HIT policy expert 2, Interview). The current rate is estimated at 95% (Professional association representative, Interview).

Some of the reasons proposed by my interview subjects for why Québec's strategy was so successful included: the appropriation of health network digitalisation projects within public administration, experienced leadership, the development of the incentive program in collaboration with the FMOQ, and engagement in change management at the practice level. The creation of the DGTI and the *Bureau de programme* and the termination of contracts with redundant private sector consultants improved the MSSS's capacity for coordination, progress monitoring, and ensuring accountability of the various actors involved. In addition, the transfer of digitalisation projects to the RAMQ signified that the MSSS would be the proprietor of many of the HIT solutions and information assets and thus provided reassurance about privacy and security.

The strong leadership within the *Bureau de programme* was a significant factor in the development and implementation of the MSSS's new digitalisation strategy. They put aside politics and collaborated with other government actors to pass legislation and ensure the project's success. They also looked at what was being done across Canada and worldwide to learn from others' best practices. They worked with the FMOQ to develop an incentive program that would meet physicians' needs and offset most costs associated with EMR implementation. Significantly, the *Bureau de programme* developed a comprehensive change management strategy in collaboration with the FMOQ and Infoway and provided support at the local practice level.

> *[Translated from French[24]] I think the achievement of our time, which wasn't that long, was that we got closer to the the people on the ground, we got closer to the pharmacists, we got closer to those people who needed it and were going to work with it. And not simply 'we're going to develop IT tools.' I think that's what made the difference (Québec HIT policy expert 1, Interview).*

Their close collaboration with users would help ensure that implementation and adoption ran smoothly, that issues were addressed as they arose, and their strategy would be adjusted as needed.

Québec policy-makers were not displeased with having prioritized the DSQ. Despite issues regarding the coordination and execution of Québec's health network digitalisation strategy, Québec policy decision-makers I interviewed all praised the strategy itself. As [Québec

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[24] [Original text] *Je pense que le succès de notre période, qui n'a pas été si longue que ça, c'est qu'on s'est rapprochés du terrain, on s'est rapprochés des pharmaciens, on s'est rapprochés du monde qui en avaient besoin et qui vont travailler avec ça. Et non pas seulement 'on va développer des outils informatiques.' Je pense que c'est ça qui a fait la différence.*

HIT policy expert 2] admitted, “[Translated from French[25]] Bringing medical records to each of the clinics – maybe it could have been much more easily, but you wouldn't have test results from across the province!” If the MSSS had focused solely on implementing EMRs, only local data would have been available. They were all delighted with the outcome. Healthcare providers can access certain health information from points of care across Québec and a patient portal has since been developed which grants citizens access to their records as well.

7.5.1. Criticisms of Québec’s Harmonized Electronic Medical Record and Dossier Santé Québec Strategy

Despite its successes, there were some criticisms about the deployment of the MSSS’s harmonized strategy, particularly regarding the cost, implementation support, accreditation, and projection of advanced functionalities. The MSSS had initially projected a cost of $563 million. In 2011, when the MSSS’s strategy was changed to include integration with EMRs, the estimate was $1.4 billion. In 2014, the updated estimate was $1.6 billion. The media proclaimed that the project was a failure because the MSSS could not contain the costs (Allard, 2015a). The estimates, however, were not comparable. The initial estimate omitted several costs including equipment, implementation, and training (La Direction des communications du Ministère de la Santé et des Services sociaux du Québec, 2007). The subsequent estimates included the computerization of practices and institutions, implementation of EMRs and CISs, incentives and operational costs.

> *[Translated from French[26]] If you go and look at the Public Administration Commission, we had proposed $563 million for the cost of the project. And the plan required that we*

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[25] [Original text] *Amener des dossiers médicaux dans chacune des cliniques - peut-être que ça aurait été bien plus simple, mais tu n’aurais pas eu les résultats d’examens de ce qu’il se passe à travers la province!*

[26] [Original text] *Si vous allez regarder la commission de l’administration publique, on avait déposé 563 millions pour le coût du projet. Et le plan demandait d’avoir une idée de ce que ça serait, l’informatisation. Alors, on avait*

> *have an idea of what it would entail, digitalisation. So we came up with a figure of 1.6 billion. And from there, everyone said, "The project is too expensive. We heard about the $1.6 billion." But we never put into perspective the scope of the $563 million [...] The $563 million, in our speech when we looked at the budget, we were always within the $563 million... But obviously, it's less appealing to the media (Québec HIT policy expert 4, Interview).*

[Québec HIT policy expert 4] recommended that policy-makers be more transparent in this regard since more abstract estimates can provoke harsh criticism and a loss in the public's trust when a project's scope changes. In the end, the health network digitalisation budget was said to have been relatively well-respected (Québec HIT policy expert 2, Interview). Furthermore, the implementation of EMRs throughout Québec was considered to have been relatively inexpensive, at approximately $110 million.

> *[Translated from French[27]] Well, I think the EMRs were a great success. It didn't cost Québec that much! It cost about $50 million. And we received $60 million from the federal government. That's not a lot of money to digitalise all of primary care, as it were. And it was integrated. The DSQ cost considerably more (Québec HIT policy expert 2, Interview).*

While the *Bureau de programme*, *Agences*, physician federations, EMR vendors, and champions provided support, healthcare providers still found the implementation process challenging. The *Agences*, in particular, had been given a significant role to play in assisting the FMGs in their transition. However, their expertise and experience varied, and consequently so did their capacity to establish meaningful objectives and timelines and provide support during the transition. [EMR vendor] explained that the healthcare providers with whom they worked were rather confused by the process.

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sorti le chiffre de 1.6 milliard. Et à partir de ça, tout le monde a dit « Le projet défonce. On a entendu parler du 1.6 milliard. » Mais on n'a jamais mis en perspective la portée du 563 million […] Le 563 million, dans notre discours quand on regardait l'enveloppe, on était toujours à l'intérieur du 563 million… Mais évidemment, c'est moins cute pour les médias.

[27] [Original text] *Bien, je pense que les DME sont un grand succès. Ça n'a pas coûté cher au Québec, ça! Ça a coûté à peu près 50 millions. Et on a reçu 60 millions du fédéral. Ce n'est pas cher pour informatiser toute une première ligne, comme tel. Et ça a été intégré. Le DSQ a coûté beaucoup plus cher.*

> *My impression was that they didn't really have anyone good within the [specific] Agence to help people think about this process. To help people try to understand what their biggest needs would be in this initial transition from paper to electronic. It had been their job to make sure that money gets spent and used by a certain date for a certain project, and it wasn't happening. And I don't think they thought of it as a problem where like, 'Well, we're not doing a really good job reaching out, and systematically touching base with people, and giving them very simple steps to move through.' Like, 'This month, this is what you want to do. If this is your timeline for getting to tender, here are the things that you need to do with us, and here are the things that you'll need to do with your internal hospital.' And it's most likely because they didn't know, you know what I mean? Like, they didn't understand the complexity of all of it (EMR* Vendor, Interview).

Similarly, support from EMR vendors also varied as some provided more training and hands-on support than others. Although there was variable support from the *Agences* and EMR vendors, the FMOQ physician champion program that was considered to have played a significant role in assisting providers throughout the transition process.

Another criticism raised by the interview subjects concerned the use of accreditation to regulate EMR solutions. While it enabled the MSSS to interface EMRs and the DSQ and established the suite of features deemed relevant or necessary, there were consequences. For instance, the demands imposed on vendors required their investment of time and resources toward development (HIT researcher 2, Interview). Many vendors subsequently raised their license fees. In addition, EMR vendors' failure to meet the requirements was another issue. As the MSSS introduced new criteria, which they updated regularly, some vendors occasionally failred to achieved them in the time allotted. However, revoking an established vendor's status was undesireable (Physician and HIT champion, Interview). Demanding that clinics switch products was costly and time-consuming. Therefore, deadlines were not strictly imposed. Thus, despite the MSSS's use of accreditation to shape the landscape of EMR solutions, vendors still had a great deal of power.

A final criticism raised by my informants concerned the MSSS's interest in driving the development and use of advanced EMR features. Following the PQADME, the MSSS did not project a long-term vision regarding the mature use of EMR systems. While EMR accreditation could be used to drive the development of advanced features, the criteria primarily addressed integration and interoperability with other MSSS systems. Although physician champions have successfully advocated for integrating functionalities with certain vendors, their power is limited in this regard. Some vendors are more open to innovation than others. When more advanced functionalities are already integrated, [Professional association representative] suggested that using them is largely a question of training. Training a room of 800 people to use advanced features is not ideal. Training smaller groups would be more effective; however, reaching more than 7000 users would be highly intensive. Once the PQADME was ended, after achieving a satisfactory EMR adoption rate, the MSSS no longer addressed EMRs with the same kind of urgency.

7.6. Conclusion

In Québec, the MSSS's province-wide strategy for sharing health information across the network focused on establishing a provincial EHR, the DSQ. As established in the previous chapter, EMRs were not among the MSSS's initial priorities, and their province-wide implementation was thus delayed. Physicians sought to use EMRs, as was being done worldwide, but compensation for their investment of time and resources was inadequate. The FMOQ, Québec commissioners, the Auditor General and Infoway formally recommended that the MSSS devise a strategy to address EMR implementation. Infoway managed to secure funding from the federal government for EMR implementation in each of the provinces and territories, which the MSSS used to reimburse physicians and offer incentives. Given the need to address challenges regarding the DSQ, particularly regarding users' adoption and EMR implementation, Minister of Health Bolduc announced a change in the DSQ strategy involving the integration of EMRs and the DSQ. Rather than relying on a unique visualizer, as initially proposed, the DSQ would be made accessible through EMRs.

Since 2009, the MSSS had been appropriating aspects of health network digitalisation within public administration. The DGTI was created as a government entity to oversee the governance of information technology projects, and it absorbed other groups that involved primarily private sector consultants. Within the DGTI, the *Bureau de programme* was created to plan, coordinate and deploy the MSSS's harmonized strategy. Furthermore, the RAMQ was given increasing responsibility regarding the DSQ project. Consequently, contracts with many consultants and private entities were terminated, and the MSSS sought to obtain propriety of the information assets.

The *Bureau de programme* worked closely with the FMOQ and Infoway. They negotiated with pharmacies, laboratories and diagnostic imaging centres to get their commitment to standardize data and connect with the DSQ. They amended legislation governing health information to specify conditions for data storage and primary care providers' access. They also developed an accreditation process to regulate EMR products to ensure they would be compatible with the DSQ and that they would develop specific functionalities. Finally, in collaboration with the FMOQ and Infoway, the *Bureau de programme* negotiated and implemented a program, the PQADME, which would reimburse physicians' investment in computer equipment and EMRs, and provide financial incentives for adopting EMRs and the DSQ before 2016. To implement the PQADME, they conducted a massive promotional tour, devised a comprehensive change management strategy and worked closely on implementation with healthcare providers and managers at the local practice level.

The PQADME contributed to a sharp rise in EMR and DSQ adoption rates in Québec. The actors I interviewed considered the DSQ and EMR implementation to have been successful, despite delays. The *Bureau de programme* took on a controversial dossier. In four years, they established the framework for scaling up the DSQ across the remaining regions and achieved an acceptable EMR and DSQ adoption rate among family physicians. The *Bureau de programme*'s successful implementation was attributed to the appropriation of health network digitalisation projects within public administration, their experienced leadership, the engagement of the FMOQ in the development of the PQADME, and their involvement in change management at the practice level. While the MSSS's strategy and its deployment were ultimately successful, my interview subjects addressed critiques respecting cost, implementation support, consequences of EMR accreditation, and the lack of vision and political will regarding advanced functionalities.

CHAPTER 8. DISCUSSION

8.1. Summary of Findings

My presentation of results regarding the policy decisions and actions that shaped the implementation of electronic medical records (EMR) in Québec primary care proceeded as follows. I began with a description of the influential policies at the federal level between 1991 and 2001 that shaped Québec health policy decisions and actions surrounding the development of a provincial EHR. This provided context for Québec's health network digitalisation policy agenda. Following this, I described the Québec's Ministry of Health's (*Ministère de la santé et des services sociaux* – MSSS) policy decisions and actions surrounding the development of a provincial EHR, *Dossier Santé Québec* (DSQ), between 2001 and 2008. Since EMRs were lacking from the MSSS's provincial strategy, this provided context for EMR implementation in Québec and explained the delays in its prioritization. Finally, in view of this context, I described the MSSS's policy decisions and actions concerning primary care EMR implementation between 2008 and 2016. A brief summary of my findings follows.

Throughout the 1990s, Canadian healthcare stakeholders projected a vision of a pan-Candian health information highway. This vision was refined and developed by private and health sector committees and working groups and contributed to the development of a blueprint (F/P/T Advisory Committee on Health Infostructure, 2000) for constructing a standardized and interoperable electronic health record (EHR) systems within each of the provinces and territories. Canada Health Infoway Inc. (henceforth "Infoway") was created to oversee the disbursement of federal funds and support the jurisdictions' initiatives. Infoway's strategic funding of EHR components heavily influenced the MSSS's health network digitalisation strategy, which focused predominantly on strengthening the health service networks (*Réseau locaux de service* – RLS) by establishing the infrastructure for a provincial EHR, the DSQ, and deploying it throughout the province. One of the principle reasons for Québec's delayed implementation of EMRs was that it was not prioritized at the provincial level. The computerization of practices and implementation of primary care EMRs and hospital clinical information systems (CIS) were excluded from the MSSS's provincial strategy. They remained the responsibility of individual physicians and regional health authorities. As regional resources were restricted at the time and compensation was considered inadequate, only a small number of physician champions adopted EMRs. As the literature suggests, macro-level policy decision-makers' involvement in establishing the conditions and resources for implementation is often a critical factor in its success, particularly in publicly administered health systems (Desveaux et al., 2019; Keshavjee et al., 2006; Salzberg et al., 2012).

My interview subjects considered the costly delays regarding the development of the DSQ infrastructure to have been a major hindrance to EMR implementation. In addition to delaying preparations for users' adoption, these delays caused controversy and restricted the MSSS's capacity to expand their strategy (if they wanted to), as funds were limited and proposals would be rejected by the political opposition. Consistent with the literature (Fragidis & Chatzoglou, 2018), explanations for these delays included ineffective governance and project management. The coordination of different entities involved in the DSQ and the digitising and standardizing records from the myriad different sources proved to be more complex than anticipated. Another explanation given by my interview subjects for the DSQ's delays involved stakeholders' opposition to citizens' implicit consent to their information being shared across the health network. Ethical questions regarding confidentiality versus public good were heavily debated during the review of the first bill that would enable the sharing of health information between providers across the network. As the bill needed to pass quickly, the debate was cut short and an explicit consent model was adopted. Unanticipated logistics challenges were consequently introduced.

Planning for the DSQ's implementation phase was suboptimally addressed at the outset, and preparations for deployment were delayed until a sufficient portion of the technological infrastructure and data holdings were established. When the DSQ was finally available for primary care providers' use, uptake was slower than anticipated. Many regional health authorities were engaged in computerizing practices and implementing EMR solutions. The Ministry-mandated DSQ competed with more locally-relevant EMRs over limited resources. Both demanded a significant investment of time and physicians considered the available compensation for costs inadequate. As a large portion of family physicians' remuneration followed a fee-for-service model, time invested in other areas than their clinical practice represented a loss of revenue (Contandriopoulos et al., 2017). Since the MSSS was so heavily invested in the DSQ, it became imperative that measures be taken to radically improve its course. Following a change in provincial leadership, the MSSS consolidated health information technology (HIT) project authority within public administration, changed the DSQ strategy, and improved project leadership.

In response to family physicians' low uptake of the DSQ, the MSSS revised their strategy to integrate primary care EMRs and the DSQ, whereby the data stored in the DSQ would be accessible through local EMR solutions, in addition to the dedicated visualizer initially envisioned. To oversee the deployment of this harmonized strategy, the MSSS created the *Bureau de programme pour informatisation du réseau de la santé et des services sociaux* (henceforth *"Bureau de programme"*). The *Bureau de programme* overhauled DSQ project governance and negotiated with data holders (laboratories, pharmacies and diagnostic imaging centres). They presented a legislative amendment to enable the collection, storage and use of DSQ data within primary care (*Act respecting the sharing of certain health information*). Significantly, they negotiated with the Québec federation of family physicians (*Fédération des médecins omnipraticiens* du Québec – FMOQ) regarding family physicians' adoption of EMRs and the DSQ. Together, they devised a 4-year reimbursement and incentive program, the *Programme Québecois d'adoption des dossiers médicaux électroniques* (PQADME), and a comprehensive change management strategy. By the time the PQADME ended, a significant proportion of healthcare providers were using EMRs. Despite delays in the MSSS's prioritization of EMRs, my interview subjects generally considered Québec's implementation of EMRs to have ended in success. Within four years, on a reasonable budget ($110 million), a significant majority of primary care providers had adopted an EMR.

My research suggests that the *Bureau de programme*'s successful renovation of the DSQ and EMR implementation initiative validates the significance of effective project management and sustained collaboration with end-users throughout the planning and implementation phases (Carbone et al., 2020; Fragidis & Chatzoglou, 2018). It also demonstrates the importance of allocating adequate resources required for effective management, expertise, training at all levels, and compensation and incentives for end-users (Carbone et al., 2020; Lau et al., 2012; Rozenblum et al., 2011).

8.2. Considerations Regarding Health Information Technology Implementation Policy

My interview subjects contributed toward the interpretation of the history of policy decisions and actions regarding EMR implementation. From my examination of the Québec context, with input from my interview subjects, I identified several key considerations concerning policy decision-making and optimal HIT implementation, irrespective of the setting.

These corroborate the findings and recommendations from the scientific literature. Indeed, case study research that has put forward success factors at the policy decision-making level have suggested the importance of: 1) effective governance, leadership and project management (Keshavjee et al., 2006), 2) political will (Gagnon et al., 2010), and 3) change management (Carbone et al., 2020; Fragidis & Chatzoglou, 2018). In addition to these, my interview subjects highlighted the need to address private sector accountability. This factor is not among those commonly cited in the scientific literature on HIT implementation. The following provides a discussion of the significance of these four considerations for optimizing HIT implementation policy decision-making, as illustrated by the Québec context.

8.2.1. Politics and Leadership

The scientific literature highlights the importance of political will and leadership in policy decision-making (Milat et al., 2015; Salzberg et al., 2012). My research provides an illustrative case demonstrating their significance regarding EMR implementation policy. Proposing an agenda and passing legislation to expand the vision of health network digitalisation in Québec, when budgets were constrained and the project progressed more slowly than expected, required a Minister of Health and bill sponsor who sufficiently valued EMRs and could successfully advocate for them.

> *[Translated from French[28]] It takes a minister who believes in it. If the minister doesn't believe in it, the budgets, the credits won't go to the management that leads these projects. If we say to ourselves, "It's done, and let's stop here," it's likely to die one day. We have to keep evolving; we don't have a choice! We have to continue to evolve; it moves quickly! And it takes a minister who believes in this. And who believes in*

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[28] [Original text] *Ça prend le ministre qui y croit. Si le ministre n'y croit pas, les budgets, les crédits n'iront pas à la direction qui pilote ces dossiers-là. Si on se dit, « Ça a été fait, et on arrête là, » ça risque de mourir un jour. il faut continuer à évoluer; on n'a pas le choix! Il faut continuer à évoluer, ça va vite là-dedans! Et ça prend un ministre qui croit à ça. Et qui croit qu'on améliore la qualité des services qu'on dispense à la population*

> *improving the quality of the services we provide to the population (Québec HIT policy expert 1, Interview).*

My research suggests that one of the reasons that EMR implementation was not initially addressed was that it was not part of Minister Couillard's agenda. Healthcare was already facing budgetary constraints. I believe that restricting EHR implementation planning around Infoway's conditional funding was politically strategic. Taking on a cause that does not have a clear advantage or does not appear to be pressing tends to result in drawn-out policy processes and negatively affect public opinion (Health Administrator 1, Interview). As [Health Administrator 1] explained, these causes are often avoided, especially around election periods. Given the constrained budget, without a guarantee of immediate returns, additional investment would have been heavily scrutinized.

I observed that the negative attention towards the DSQ played a significant role in driving provincial EMR implementation. EMR implementation appears to have been largely addressed by the MSSS to help drive DSQ adoption. Many settings lacked the computer systems required to access the DSQ. Rather than addressing both development and deployment at the outset, planning for the latter remained rudimentary. After years of infrastructure development, with minimal returns on their investment, Québec was deeply invested. It was viewed as a problem that required urgent attention. It was imperative that these investments not be wasted. The political opposition was therefore more receptive to a broader vision and additional investment. The political will came from a perceived necessity. It did not come from the projected vision of healthcare in the computer age encompassing a range of interoperable system components. The MSSS's strategy was politically, ethically and fiscally conservative. Once the MSSS actors had addressed the DSQ, they did not turn their attention toward incentivizing the meaningful use of advanced features, as had been done in the United States and the United Kingdom, for instance

(Benson, 2002; Jha et al., 2008). The sense of urgency and perceived necessity had dissipated. The political will to continue addressing EMRs was gone.

My research exemplifies the value of vision and leadership to bridge the gap between emerging technology and policy. HIT is a rapidly evolving domain. Policy tends to lag. Capitalizing on the emerging technologies that promise to optimize and streamline health services demands that policy decision-makers present progressive plans and sponsor bills that establish the conditions for improvement, rather than address only critical issues and pick the lowest-hanging fruit with the most immediate returns on investment. Emerging technology is not necessarily compatible with existing regulatory frameworks, therefore foresight is required to keep pace. For instance, when electronic prescription was first introduced in EMRs, as per the accreditation criteria imposed by the MSSS, legislation concerning the use of digital signatures had not yet been introduced. Physicians were required to print and sign the prescription, then fax it to the pharmacy. As another example, Québec is in the process of piloting an asynchronous messaging platform called eConsult (Breton et al., 2020), which enables communication between family physicians and specialists. However, as family physicians in Québec are predominantly remunerated on a fee-for-serve basis (70% in 2015), with financial incentives attached to certain activities (Contandriopoulos et al., 2017), the mechanisms for remunerating physicians for their use of the platform needed to be established. It took several years before a billing code was assigned (Breton et al., 2019). Policy processes and negotiation with professional associations tend to take time. Vision and leadership can help to expedite these processes.

Federal-provincial politics also affected Québec’s collaboration with other provinces and with Infoway. I found that the fluctuation of Québec government actors’ partnership with federal and other provincial entities, most notably between 1994 and 2003 when the *Parti Québécois* was in power, had an impact on their receptiveness toward resources being offered and learning from other systems. That many government actors in Québec did not speak English further limited their capacity to engage with knowledgeable actors outside Québec.

My observations are consistent with assertions that political culture and the politicization of decision-making in healthcare can interfere with optimal policy processes (Castonguay, 2012). Large-scale HIT implementation tends to involve massive investment. Under conditions of restrictive budgets, these tend to be more heavily scrutinized. Buy-in among stakeholders and political opposition is therefore critical (Salzberg et al., 2012). My informants suggested that implementation initiatives are more successful when policy agendas reflect stakeholders' (i.e. citizens, health professionals, and researchers) needs and when decision-makers put aside political agendas and collaborate with stakeholders and political opponents. Delays can be costly and contribute to the initiative's eventual failure. They can slow momentum and incite resistance among users. Moreover, by the time the technology is ready to be deployed, it may already be outdated. Vision and leadership are therefore major assets for initiating policy processes to more rapidly realize the potential of these transformative technologies.

8.2.2. Government Expertise in Information Technology

HIT comprises a specialized, technical, and rapidly evolving body of knowledge. Up-to-date expertise in this domain was scarce in government. Although the MSSS contracted HIT consultants to assist in decision-making, knowledge is valuable for grasping and critically reviewing recommendations. One of the reasons why the *Bureau de programme* was considered to have been so successful was because of the experience and skill of the team and its leadership.

My research demonstrates that the limited expertise in HIT among government actors was a major contributor to the delays they faced when developing the DSQ. First, the limited expertise in HIT affected the comprehensiveness and robustness of Québec's strategic plans. The rudimentary planning, unfeasibility of timelines, underestimated costs and challenges, and the ineffective coordination of complementary projects was attributed to the MSSS's limited experience in this domain. These contributed to significant unanticipated costs which, as [Health Administrator 1, Interview] suggests, tend to be more heavily scrutinized than costs included in initial projections. Furthermore, the responsibility of overseeing the DSQ's implementation was decentralized and given to the *Agences*, where expertise and resources varied significantly. In their implementation of the DSQ, the *MSSS* did not provide the *Agences* with a detailed plan. Finally, drafting, presenting and defending policy demands a degree of expertise. To be a successful advocate and bill sponsor, knowledge about the area appears to provide a major advantage. For instance, Minister Couillard did not advocate for web-based platforms for the DSQ, although this emerging technology would have improved security by enabling system-wide updates alongside advances in encryption and information security. Instead, Minister Couillard selected USB dongles. Moreover, he did not debate the initial requirement for regional DSQ databases, due to public concerns about government surveillance. This consequently put the onus on the regional health authorities to develop something with which they had no experience.

My informants considered the lack of expertise in HIT to have been one of the most significant barriers to optimal policy development concerning EMRs. The lack of expertise influenced the MSSS's vision, as they did not initially consider the critical importance of addressing other complimentary areas of digitalisation, such as the computerization of practices and the implementation of primary care EMRs and hospital CISs. As a consequence, they did not provide healthcare providers and regional health authorities with adequate means of addressing these essential elements (Castonguay, 2012). Had EMRs been part of the MSSS's vision and planning, policies regulating the EMR market could have been introduced earlier, as with many of the other provinces (Chang & Gupta, 2015). Earlier regulation of EMRs could have enabled the MSSS to constrain the number of vendors, establish the capacity for integration and interoperability with other systems, and foster the provision of advanced features (e.g. analytic tools, shared decision-making tools, tools for interprofessional collaboration, etc.). When EMR implementation was finally addressed, a fragmented market of EMR solutions was well established. The number and variety of established EMR solutions made their regulation, standardization and integration with the DSQ more challenging. Although accreditation helped the MSSS ensured that EMR systems were compatible with the DSQ and that certain functionalities were provided, such as the electronic prescriber, revoking accreditation is not a desirable scenario. An earlier regulation of EMR vendors, before healthcare providers had adopted the systems, could have helped restrain vendors' power and ensure that their solutions better addressed users' needs.

My research demonstrates the critical importance of relevant expertise for developing effective HIT implementation policy. Given its significance, my interview subjects recommended that leadership and expertise in this domain should be cultivated. If this expertise cannot be found locally, it was recommended to look outside Québec if necessary (Health Administrator 1, Interview).

8.2.3. Private Sector Accountability

My thesis highlights the necessity of addressing the accountability of the private entities respecting their responsibilities in the health sector. My findings exemplify the challenges regarding a public system's reliance on private entities to provide services, while they are not subject to the same regulations nor motivated by the same interests as public entities (Appleford, 2020). The MSSS contracted numerous private sector consultants to assist with the planning and development of health network digitalisation. *Société de gestion informatique* (SOGIQUE), for instance, was a not-for-profit organization comprising primarily private sector actors. They were therefore not subject to regulations concerning contracting by public bodies, which allowed them to bypass the public tenders process (HIT Researcher 1, Interview). The SOGIQUE was heavily criticized by the media for their lack of transparency and accountability in their contracting private entities (Nadeau, 2015). Additionally, a large portion of DSQ development was also initially outsourced to private entities. This implied reliance on these entities to develop products and deliver services following established timelines. As private entities were not held accountable to the same degree as public sector organizations, they held a certain power over the MSSS (Castonguay, 2012; Church et al., 2018).

The MSSS discovered that coordinating various private entities involved in DSQ development was complex and challenging and that increased monitoring and accountability regarding health network digitalisation was needed. Consequently, they increasingly transferred responsibility to public entities and began developing HIT products in-house. Many DSQ sub-projects were transferred to the RAMQ. The MSSS also established the *Direction générale des technologies de l'information* (DGTI) to centralize authority within public administration. The DGTI assumed the responsibilities of numerous entities involved in health network digitalisation projects, including the SOGIQUE. The MSSS established the *Bureau de programme* as a branch of the DGTI to oversee the harmonization of EMRs and the DSQ. The *Bureau de programme* continued to consolidate HIT project governance within public administration by ending numerous unnecessary contracts with private sector consultants. Being a central government entity improved their effectiveness at overseeing coordination and ensuring the alignment of sub-projects with the MSSS's vision, as well as progress monitoring and evaluation, and their capacity to hold implicated actors accountable. The transfer of project authority to public entities was considered a significant factor in the MSSS's successful completion of the DSQ.

8.2.4. Change Management Strategies Tailored to the Needs of Adopters

Change management has been identified as a key factor in the success of HIT implementation initiatives (Desveaux et al., 2019; Keshavjee et al., 2006). As O'Donnell et al. (2018) expressed: "policymakers and system architects designing such initiatives need to recognize that EMR programmes are complex interventions, which must be implemented in dynamic social-technical systems, but that adoption is ultimately determined by the attitudes and preferences of the individual clinician (O'Donnell et al., 2018, p. 13)." Research suggests that the inclusion of user input during the development and implementation phases is essential to their successful uptake of EMRs and HIT (Carbone et al., 2020). As argued by Desveaux et al. (2019), standardized, hands-off, and top-down strategies often translate into suboptimal engagement. Effective change management demands an approach that tailors implementation strategies to adopters' varied needs. However, HIT implementation has commonly followed a paradigm of technological determinism, whereby innovation is primarily conceived as a technical challenge (Markus & Benjamin, 1997). Consequently, a large portion of HIT adoption interventions described in the research literature focused on encouraging and incentivizing adoption and underappreciate adopters' distinct needs and experiences, and their agency regarding their adoption of the technology (Desveaux et al., 2019; Lemire, 1999; Ramiller & Swanson, 2003).

My research illustrated the importance of healthcare providers' and the FMOQ's buy-in, identifying end-users' needs and engaging them in peer support, and continuing to work with users beyond the initial implementation phase to sustain change. In their management of the

DSQ project, the *Bureau du DSQ* focused exclusively on development and, as repeatedly reported by the Auditor General, considerably neglected the planning of its deployment. Consequently, identification of users' needs and preparation of the terrain were delayed. When the *Bureau du DSQ* turned its attention to implementation during the Capitale Nationale pilot project, they were faced with adopters' resistance, which was largely attributed to their prioritization of local EMRs and inadequate compensation for their time and equipment costs. Several interview subjects suggested that, in retrospect, both development and deployment should have been defined simultaneously at the outset. Physicians' buy-in was critical. The MSSS's EMR and DSQ implementation initiative was ameliorated after the *Bureau de programme* met with the FMOQ, negotiated an agreement regarding compensation and incentives, and collaboratively defined a user-focused change management strategy. The *Bureau de programme* ensured EMR implementation support and clinical process change were provided. They also included ongoing training and technical support to help sustain change (Bureau de programme pour l'informatisation du réseau de la santé et des services sociaux, 2012). Furthermore, the FMOQ provided peer support throughout the process. These various forms of support were considered essential to the relatively rapid and widespread implementation of primary care EMRs throughout Québec.

8.3. Limitations

Some of the limitations of my research must be acknowledged. First, my data collection was not exhaustive. I conducted a finite number of interviews and read a finite number of archival documents, following a systematic approach combining snowball sampling and theoretical sampling. I aimed to generate a sufficiently reasonable, coherent and plausible narrative, through the triangulation of data from different sources, that addressed my research objectives. As Weick (1995) suggested:

> *A good story holds disparate elements together long enough to energize and guide action, plausibly enough to allow people to make retrospective sense of whatever happens, and engagingly enough that others will contribute their own inputs in the interest of sensemaking […] sensemaking is about plausibility, coherence and reasonableness. Sensemaking is about accounts that are socially acceptable and credible" (Weick, 1995, p. 61).*

For my interviews, I focused on ideal informants who could speak to the key moments surrounding Québec policy-makers' decisions and actions regarding EMR implementation. The subjects that I selected provided an account of the key moments in the history of EMR implementation. I considered data saturation to have been achieved when I had a sufficiently robust and comprehensive explanation of the case, when I had exhausted the list of primary data sources identified from my review of the literature and my interview subjects, and when there was repetition in my interview subjects' accounts such that additional interviews would not have contributed substantially to the data. I also limited the scope of my research to focus on the Québec case. Although a comparison of contexts, following a multiple case study design, would have provided a basis for interpreting the relationship between policy decisions and outcomes and identifying more generalizable success factors, I aimed to conduct a more in-depth examination of the decisions and actions pertaining to the Québec context.

Second, my research was also limited according to the availability of data. I searched for primary data sources online and in the Québec national public library and archives (*Bibliothèque et archives nationale du Québec* - BANQ). Many reports that were no longer available in hard copy or on government websites were retrievable through the internet archive. A select few could not be retrieved, however. The data I obtained from my interviews depended on what my informants expressed. These data were determined by my informants' memory and candour, and the duration of our interviews (Schultz & Hernes, 2013). The policy-makers I interviewed appeared to be practiced storytellers. The literature suggests that it is not uncommon for them to revise the past to cast a better light on their work (Loat & Macmillan, 2014). My triangulation of data from different sources minimized the impact of potentially skewed accounts. In addition, my use of hermeneutic interviewing techniques supported their recall of events and my elicitation of honest accounts (Schultz & Hernes, 2013). Nevertheless, my report was also limited to what my informants were willing to divulge. Many of my interview subjects were still employed in public administration and were therefore cautious about what they said. They appeared well-practiced in not overtly criticizing others or discussing power dynamics and the influential personalities of certain actors. As I aimed to remain impartial, rather than elicit criticism, I did not press my subjects to discuss their impressions of others.

8.4. Insight Regarding Future Health Information Technology Applications in Québec

My research raised questions about the effectiveness of different strategies to achieve the standardization and interoperability of information systems. With the challenging development of information systems in Québec, policy-makers discovered that there were drawbacks to addressing standardization and interoperability after systems were in place. When the MSSS sought to utilize the established market of multiple EMRs to interface with the DSQ and ensure they worked in harmony with their vision, they imposed accreditation criteria to regulate them. Yet, given the MSSS’s preference for an open market and delays regarding the regulation of vendors through accreditation, many systems remain distinct and disconnected, hindering portability and interprofessional collaboration (Bouchard, 2019a; Lachance, 2021). To this day, Québec maintains a multiple vendor system comprising seven certified EMR vendors (Bureau de certification et d’homologation & Ministère de la Santé et des Services sociaux, 2021). In an open market of EMR solutions, it would have been preferable that the MSSS introduce development criteria, and monitoring and regulation mechanisms from the start. This would have improved their capacity to achieve standardization and interoperability. While Québec policy-makers have wondered in retrospect if it would have been simpler had there been a single EMR solution, this raised questions about whether a single solution would address all the users' specific needs. Indeed, there had been conversations within the FMOQ about endorsing a single product, but physicians' needs were varied and different vendors promised different features. This strategy was therefore dismissed.

Despite the challenges and delays, the DSQ was considered to have been a successful demonstration of the Québec government's capacity to develop and oversee its own IT solutions. Being responsible for managing IT solutions, the MSSS is better equipped to address standardization and interoperability and ensure that the solutions meet users' needs. Following the development of the DSQ, this logic was followed in an attempt to unify all of Québec's hospital systems. In 2015, Minister of Health Gaetan Barrette (Minister of Health 2014-2018) attempted to mandate that all hospitals migrate towards the same open-source clinical information system (Cristal-Net). It would have allowed Québec to end its contracts with the other telecommunications giants and take on the responsibility of expanding upon the open-source solution (Ministère de la Santé et des Services sociaux, 2015). The proposal was not well-received and was eventually abandoned. CISs had been well-established in most hospital centres for almost a decade. Users had worked with vendors to integrate custom, domain-specific features throughout this period. The loss of data and customization would have been catastrophic (Health Administrator 2, Interview). Minister Barrette's vision was that Québec should start over, this time with a single, unified and integrated system designed at the outset, which would include primary care and hospital records (Fidelman, 2014). However, since systems were already in place and the resources already invested would be wasted, Québec would need to work with the existing systems.

The vision of a single, unified system was not abandoned. In 2019, the MSSS announced that would begin exploring the development of their own shareable health record, *dossier santé numérique* (DSN) (Bouchard, 2019a; Gaudet, 2021). This system, made possible by recent technological developments (Lachance, 2021), would comprise the totality of patient information and grant healthcare providers and citizens access to certain information and tools, as well as data for researchers and decision-makers (Bouchard, 2019a, 2019b). This would involve building a system from scratch and migrating all users over in the span of eight years. The cost is estimated at $3 billion (Gaudet, 2021). Given Québec's past failures with government-developed IT solutions, the announcement about the DSN raised concerns from the media, particularly as it implies that nothing would remain from the decade of effort and the $2 billion invested. For instance, a recent La Presse article stated "[Translated from French[29]] The problem with government IT projects is that we don't seem to learn from our previous failures (Gaudet, 2021)." The Deputy Minister associated with the DGTI, Luc Bouchard, attributes the past failures primarily to having given unnecessary contracts to private firms and contends that the government's in-house development of a unified system would help ensure its success (Larin, 2021). However, my research suggests that further reflection is required.

My examination of EMR implementation in Québec, and its efforts concerning health network digitalisation preceding it, provides some guidance for Québec policy decision-makers involved in overseeing the DSN project. First, my research raises questions about the extent of

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[29] [Original text] *Le problème avec les projets informatiques gouvernementaux, c'est qu'on semble ne pas apprendre de nos échecs antérieurs.*

the government’s capacity to effectively oversee the development of IT solutions. Previous delays and failures regarding HIT implementation were attributed to the MSSS’s limited expertise in this area. Since the technology is no longer novel, the MSSS has access to expertise and training not previously available. My research suggests that drawing on expertise and best practices outside Québec is critical. The private sector has certain advantages over the public sector in terms of IT solutions development, including investment capital and experience. Off-the-shelf software benefits from having been tested, tweaked and regularly updated. In addition, while the Québec government tends to favour local products, a project of this scale likely exceeds Québec-based developers’ prior experience. It seems imperative to give careful consideration to the expertise and capabilities of the actors and entities implicated in the DSN’s development and governance.

Second, it is essential that the DSN address users’ (healthcare providers and patients) needs and that the users perceive the benefits to outweigh the costs. The new system will have a major impact on providers in particular as it implies a change in workflow, information entry and access, and a loss of data and domain-specific customization. Efficiencies that were gained with the introduction of EMRs and CISs may be lost (e.g. electronic intra-institutional communications), and additional human resources (i.e. administrative staff and nurses) may be required to address the emergent gaps in organizational processes. A comprehensive and responsive change management strategy must be in place with adequate measures to continuously monitor the implementation process and make adjustments according to emergent issues and user needs (Hudson et al., 2019; Wensing & Grol, 2019). If users’ buy-in is not adequately addressed, there is a great risk of resistance and implementation failure, which will have severe consequences for health service delivery in Québec.

8.5. Lessons for Policy Decision-Makers

This thesis provides a rich description of macro-level policy decisions and actions surrounding EMR implementation in Quebec primary care settings. It was intended to provide in-depth knowledge about this unique setting, where EMR adoption lagged, to help decision-makers optimize their HIT implementation strategies and policies. It was conceived in response to the high rates of EMR implementation failure as well as the documented need for richer, more relevant knowledge that may be adapted to optimize policy. This research compliments existing policy reseach in this field. Existing research tends to focus on producing success stories and generalizable (reductive) typologies of facilitating and inhibiting factors that provide little guidance about how these findings may be related to different settings. The inclusion of contextual detail surrounding Québec's policy decisions and actions supports the adaptation of relevant findings to other contexts.

The findings contained in this thesis provide policy decision-makers in diverse healthcare settings with a detailed case example of policy decisions and actions spanning three decades. They provide a deeper understanding of the components and complex processes surrounding EMR implementation and insight into the decisions that were made and why some strategies worked and others did not. This thesis provides a cautionary tale about potential pitfalls regarding HIT implementation. It illustrates the value of planning, expertise, leadership and management. It also reinforces well-established evidence about the critical importance of buy-in from end users and the necessity of a sufficiently robust change management strategy. This thesis also provides an appreciation of the contextual factors that contributed to planning and implementation. Québec policy decision-makers did not simply decide not to implement EMRs. Politics and economics heavily influenced the MSSS's decision to prioritize the EHR, which would help to establish the foundational infrastructure upon which other aspects of the system would be built. Successful HIT implementation is particularly difficult with a restricted budget and when facing pressure from political opponents. Public concerns regarding information security further complicate this challenge. Nevertheless, hasty planning and short-term, fiscally motivated corner-cutting can cost significantly more in the long run and sow distrust in government.

There are particularly valuable lessons to be learned from unsuccessful initiatives. These not only provide insight into less successful strategies, they also help policy decision-makers anticipate challenges and plan accordingly. In the Québec context, the MSSS underestimated the extent of the work required to standardize the data from the hundreds of independently managed laboratories across the province. Over time, they concluded that a government entity would be more successful than non-government organizations in addressing this challenge. A deeper understanding of these same challenges experienced in other settings could have better prepared the MSSS.

At the same time, this thesis shows that Québec's digitalisation project was not the failure the media portrayed it to be. Perception of failure depends on the observer. It can also change across time. Many of the informants considered the DSQ to have been a success, despite the unforeseen challenges and delays. They were not convinced that in retrospect Québec decision-makers should have employed a different strategy. In projects such as national EHR and EMR implementation, where abandonment is not an option, failures are eventually overcome. When the *Bureau de programme* inherited the project, they learned from their predecessors. They also drew on experiences from other contexts. Armed with this knowledge, they revitalized the DSQ and drove the adoption of EMRs among primary care providers within a four-year span. As this thesis illustrates, the knowledge derived from the study of failed initiatives can inform stonger and more comprehensive approaches to public health policy and improve the outcome of HIT implementation projects.

8.6. Conclusion

My thesis set out to address the need to better optimize health information technology implementation by generating contextually-embedded knowledge about policy decision-making. Specifically, my research aimed to understand Québec policy-makers' decisions and actions concerning primary care EMR implementation. My research provides insight into health policy decision-making in Québec and how HIT implementation might be more successfully achieved in this context. It provides considerations regarding the limitations of certain strategies as well as factors that contributed to Québec's successful EMR implementation. It also provides valuable insight regarding widespread HIT implementation for policy decision-makers worldwide. This research highlights the role of political will and leadership in agenda-setting, policy formulation, and driving HIT implementation. It reveals how political culture can interfere with optimal policy. It also suggests a need for expertise in government regarding HIT, as expertise determines the quality of planning, development and management of HIT projects. In addition, this research suggests the need to put in place measures to ensure the accountability of private sector entities contracted to develop solutions or provide services for the government. Finally, this research emphasizes the critical importance of collaborating with HIT users on a comprehensive change management strategy early in the planning phase, as well as ensuring support beyond the implementation phase to sustain change and that emergent issues and needs are addressed. While the knowledge this thesis generated generated is particularly relevant for Québec policy decision-makers regarding future HIT initiatives, my inclusion of rich contextual detail supports decision-makers' interpretation of its application to their contexts.

There is a scarcity of contextually-embedded qualitative research examining the role of policy decision-making in HIT implementation. Policy decision-makers rely on contextually-relevant evidence to make optimal decisions. Additional retrospective research is needed that investigates policy decision-making regarding EMR implementation and HIT implementation in other settings. This will deepen our understanding about how policy decision-making shapes implementation in healthcare and expand our knowledge about optimal and suboptimal decisions in different contexts. It will arm decision-makers with a deeper understanding the nature and complexity of HIT implementation and improve their capacity to anticipate the potential consequences of their actions. Most importantly, additional in-depth research of this kind will continue to reveal the inadequacy of technology-focused implementation strategies and provide additional justification of the need for user-defined change management in HIT implementation policy.

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APPENDICES

Appendix I. Tables and Figures

Table 1. Search Terms Used to Identify Relevant Passages within Government Documents

Concept	English Synonyms	French Synonyms
Digitisation/Digitalisation	Digiti*, digitali*, computer*, Health information highway, health infoway	Numéris*, informatis*, autoroute d'information, inforoute santé
Types of Health Records	Electronic medical record, EMR, Electronic health record, EHR, Patient health record, PHR, digital record, Clinical information system	Dossier médical informati*, DME, Dossier santé électronique, DSE, Dossier patient électronique, dossier patient partageable, Dossier clinique informatis*, DCI, dossier partageable
Québec-specific products		Dossier santé Québec, Dossier de santé du Québec, DSQ, Programme québécois d'adoption*, PQADME

Table 2. Federal-Level Policy Documents and Reports Reviewed

Organization	**Name/Type of Document**	**Date(s)**
Reports and Strategic Plans		
National Forum on Health	*Canada Health Action: Building on Legacy*	1997
CANARIE	*Towards a Canadian Health Iway*	1997
Advisory Council on Health Infostructure	*Canada Health Infoway: Paths to Better Health*	1999
Canadian Institute for Health Information	*Health Information Roadmap: Responding to Needs*	1999
Office of Health and the Information Highway	*Toward Electronic Health Records*	2001
F/P/T Advisory Committee on Health Infostructure	*Blueprint and Tactical Plan for a pan-Canadian Health Infostructure*	2000
F/P/T Advisory Committee on Health Infostructure	*Tactical Plan for a Pan-Canadian Health Infostructure: 2001 update*	2001
Accords		
Government of Canada	*First Ministers' Communiqué on Health*	2000
Government of Canada	*First Ministers' Accord on Health Care Renewal*	2003
Government of Canada	*First Ministers' A 10-Year Plan to Strengthen Health Care*	2004
Strategic plans - Canada Health Infoway		
Canada Health Infoway	*EHRS Blueprint*	2003
Canada Health Infoway	*EHRS Blueprint v.2*	2006
Commission Reports		
Royal Commission on the Future of Health Care in Canada	*Building on Values: the Future of Health Care in Canada*	2002
Auditor General Report		
Auditor General of Canada	*2010 Auditor General Report*	2010

Table 3. Provincial-Level Policy Documents and Reports Reviewed

Organization	**Name/Type of Document**	**Date(s)**	**# of Documents**
Reports and Strategic Plans			
Ministère de la santé et des services sociaux	*Plan stratégique du Ministère de la santé et des services sociaux*	2000-2020	4
Ministère de la santé et des services sociaux	*Rapport Annuel/Rapport Annuel de Gestion*	1996-2017	20
Ministère de la santé et des services sociaux	*Inforoute Québec : Plan d'action pour la mise en œuvre de l'autoroute de l'information (1995)*	1995	1
Ministère de la santé et des services sociaux	*La Politique québécoise de l'autoroute de l'information: agir autrement*	1998	1
Ministère de la santé et des services sociaux	*Les orientations technologiques du réseau sociosanitaire : pour un accès intégré et sécurisé à l'information*	2001	1
Ministère de la santé et des services sociaux	*Plan d'informatisation - présentation générale*	2003	1
Agence de la santé et des services sociaux de la Capitale-nationale	*Le plan régional d'informatisation du réseau de la santé et des services sociaux de la région de la Capitale nationale*	2005	1
Ministère de la santé et des services sociaux	*Plan d'informatisation du réseau de la santé et des services sociaux*	2006	1
Ministère de la santé et des services sociaux	*Programme Québécois d'adoption des dossiers médicaux électroniques (PQADME)*	2012	1
Commission Reports			
Commission of study on health and social services ('Clair commission')	*Emerging Solutions*	2001	1
Task Force on Health Funding ('Castonguay Commission')	*En avoir pour son argent*	2008	1
Auditor General Reports			
Québec Auditor General	*Rapport du Vérificateur général du Québec*	1990-2016	68
Legislation			
Québec Bill 161, 36th Legislature	*Act to establish a legal framework for information technology*	2001	1
Québec Bill 83, 37th Legislature	*An Act to amend the Act respecting health services and social services and other legislative provisions*	2005	1
Québec Bill 70, 38th Legislature	*An Act to amend the Act respecting health services and social services, the Health Insurance Act and the Act respecting the Régie de l'assurance maladie du Québec*	2008	1
Québec Bill 59, 39th Legislature	*An Act respecting the sharing of certain health information*	2012	1

Table 4. Characterization of Interview Subjects (n=15)

#	**Alias**	**Role(s)**	**Date Interviewed**	**Duration (min)**
1	*EMR vendor*	EMR vendor representative	2019-04-25	63
2	*HIT researcher 1*	Researcher with expertise in Québec health system digitalisation	2019-05-17	134
3	*HIT researcher 2*	Researcher with expertise in Québec health system digitalisation	2019-05-17	47
4	*Health administrator 1*	Quebec Health institution administrator	2019-06-20	85
5	*Physician and HIT champion*	Physician and EMR adoption champion	2019-07-11	90
6	*Health administrator 2*	Health institution administrator	2019-07-25	73
7	*Federal HIT policy expert*	Canadian health system digitalisation policy expert	2019-08-29	61
8	*HIT organization representative 1*	Representative of a Canadian health information technology organization	2019-09-12	110
9	*HIT organization representative 2*	Representative of a Canadian health information technology organization	2019-09-19	56
10	*HIT organization representative 3*	Representative of a Canadian health information technology organization	2019-10-02	109
11	*Quebec HIT policy expert 1*	Québec Ministry of Health digitalisation project manager/consultant	2019-10-30	81
12	*Professional association representative*	Quebec Professional Association Representative	2019-11-15	60
13	*Quebec HIT policy expert 2*	Québec Ministry of Health digitalisation project manager/consultant	2019-11-25	66
14	*Quebec HIT policy expert 3*	Québec Ministry of Health digitalisation project manager/consultant Quebec Professional Association Representative	2019-11-27	176
15	*Quebec HIT policy expert 4*	Québec Ministry of Health digitalisation project manager/consultant	2019-12-09	98

Table 5. Comparison of Themes Presented in Federal Reports on the Establishment of a Canadian Health Infostructure

Report	**Canada Health Action: Building on Legacy (1997)**	**Towards a Canadian Health Iway (1997)**	**Canada Health Infoway: Paths to Better Health (1999)**	**Toward Electronic Health Records (2001)**	**Blueprint and Tactical Plan for a pan-Canadian Health Infostructure (2000)**	**EHRS Blueprint (2003)**	**EHRS Blueprint v2 (2006)**
Organization	*National Forum on Health*	*CANARIE*	*ACHI*	*OHIH*	*F/P/T Advisory Committee on Health Infostructure*	*Canada Health Infoway*	*Canada Health Infoway*
Vision							
Electronic Health Records		x	x	x	x	x	x
Primary care electronic medical records						x	x
Components							
Common data standards	x	x	x	x	x	x	x
Harmonized privacy legislation	x	x	x	x	x		
Data storage requirements				x	x	x	x
Specific data holdings				x		x	x
Information exchange protocols				x	x	x	x
Electronic Health Record implementation					x	x	x

Table 6. Timeline of Federal Investment in Information Technology 1997-2004

Year	**Amount**	**For what?**
1997	$50 million	*Canada's health infostructure*
1999	$328 million	*Further develop Canada's health infostructure*
2000	$366 million	*Information and information technologies*
2000	$500 million	(Canada Health Infoway) *To accelerate the development and adoption of modern systems of information technology*
2003	$600 million	(Canada Health Infoway) *To accelerate the development of EHRs, common information technology standards across the country, and the further development of telehealth applications*
2004	$100 million	(Canada Health Infoway) *To foster the development and implementation of a pan-Canadian health surveillance system - integrating current disease-based surveillance systems - to support the management of infectious disease prevention and protection activities*

Table 7. Provincial and Territorial Privacy Laws Governing Health Information

Province	Laws governing the protection of personal information
British Columbia	Personal Information: Personal Information Protection Act (2003) Personal Health Information on electronic databanks: E-Health (Personal Health Information Access and Protection of Privacy) Act (2008)
Alberta	Personal Information: Personal Information Protection Act (2003) Personal Health Information: Health Information Act (2000)
Saskatchewan	Personal Information Protection and Electronic Documents Act (PIPEDA) (2000) Personal Health Information: Health Information Protection Act (1999)
Manitoba	Personal Health Information: Personal Health Information Act (PHIA) (1997)
Ontario	Personal Information: Personal Information Protection and Electronic Documents Act (PIPEDA) Personal Health Information: Personal Health Information Protection Act, (PHIPA) (2004)
Quebec	Personal and personal health information: Civil Code (1991) Personal information in the private sector: An act respecting the protection of personal information in the private sector (1993) Personal information in the public sector: An Act respecting Access to documents held by public bodies and the Protection of personal information (2003)
New Brunswick	Personal Information: Personal Information Protection and Electronic Documents Act (PIPEDA) (2000) Personal Health Information: Personal Health Information Privacy and Access Act (PHIPAA)
Nova Scotia	Personal Information: Personal Information Protection and Electronic Documents Act (PIPEDA) (2000) Personal Health Information: Personal Health Information Act (PHIA) (2013)
Prince Edward Island	Personal and Personal Health Information: Personal Information Protection and Electronic Documents Act (PIPEDA) (2000)
Newfoundland and Labrador	Personal Information: Personal Information Protection and Electronic Documents Act (PIPEDA) (2000) Personal Health Information: Personal Health Information Act (PHIA) (2008)
Yukon, Northwest and Nunavut Territories	Personal and Personal Health Information: Personal Information Protection and Electronic Documents Act (PIPEDA) (2000)

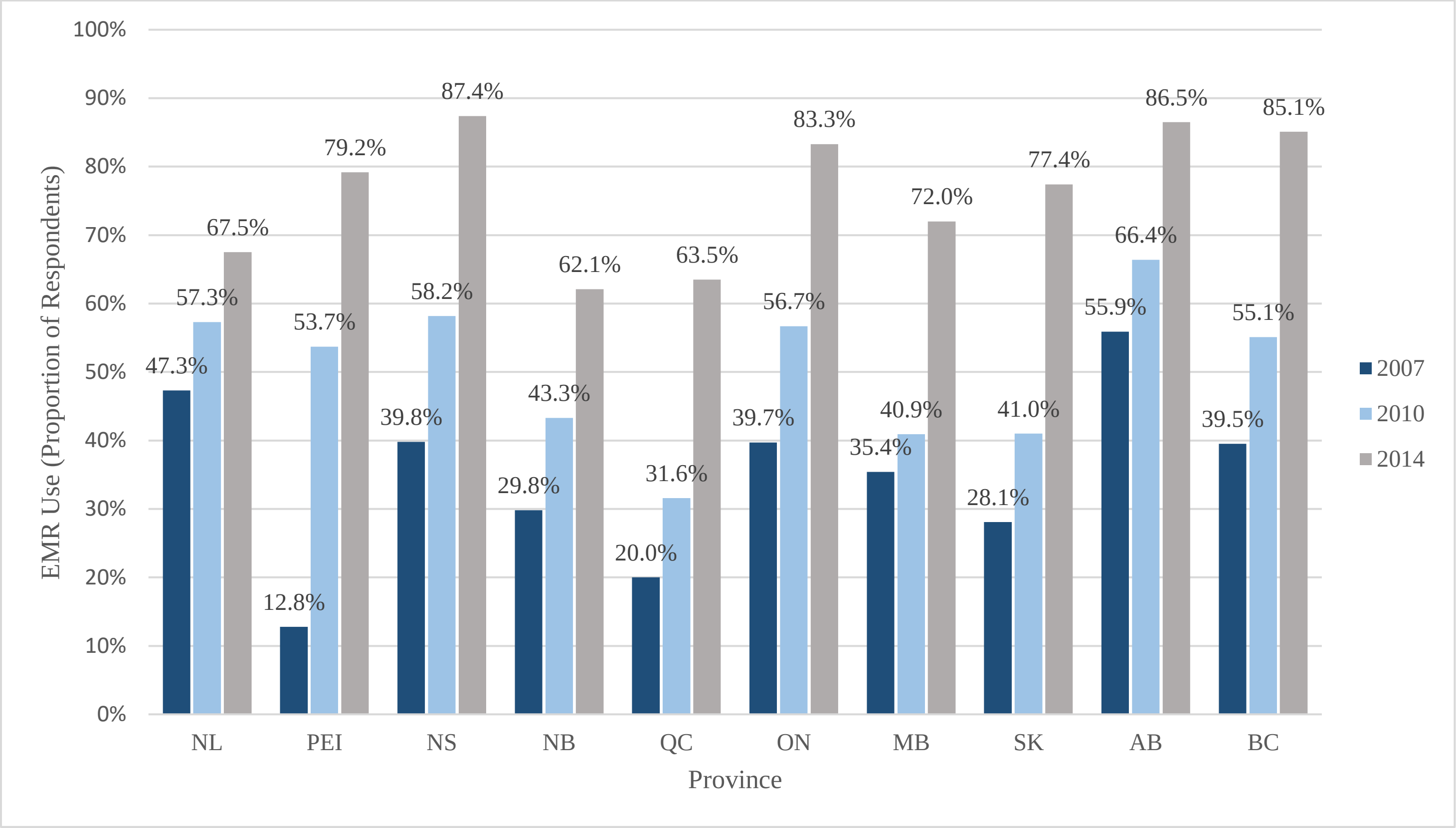

Figure 1. Comparison of Family Physicians' Use of EMRs in Canada by Province and Year[30]

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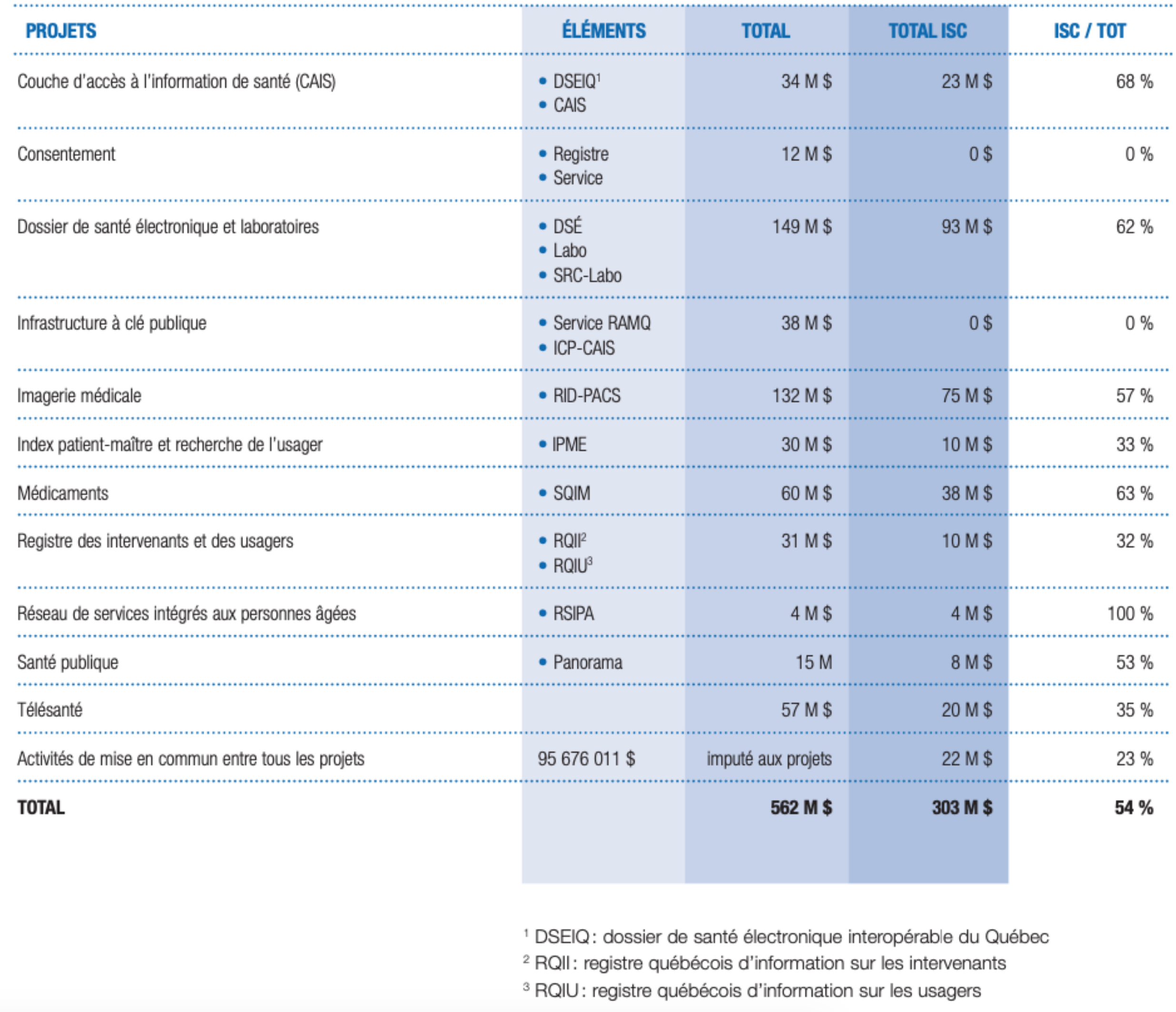
[30] Adapted from the College of Family Physicians of Canada et al.'s National Physician Survey (2007, 2010, 2014).



PROJETS	ÉLÉMENTS	TOTAL	TOTAL ISC	ISC / TOT
Couche d'accès à l'information de santé (CAIS)	• DSEIQ[1] • CAIS	34 M $	23 M $	68 %
Consentement	• Registre • Service	12 M $	0 $	0 %
Dossier de santé électronique et laboratoires	• DSÉ • Labo • SRC-Labo	149 M $	93 M $	62 %
Infrastructure à clé publique	• Service RAMQ • ICP-CAIS	38 M $	0 $	0 %
Imagerie médicale	• RID-PACS	132 M $	75 M $	57 %
Index patient-maître et recherche de l'usager	• IPME	30 M $	10 M $	33 %
Médicaments	• SQIM	60 M $	38 M $	63 %
Registre des intervenants et des usagers	• RQII[2] • RQIU[3]	31 M $	10 M $	32 %
Réseau de services intégrés aux personnes âgées	• RSIPA	4 M $	4 M $	100 %
Santé publique	• Panorama	15 M	8 M $	53 %
Télésanté		57 M $	20 M $	35 %
Activités de mise en commun entre tous les projets	95 676 011 $	imputé aux projets	22 M $	23 %
TOTAL		**562 M $**	**303 M $**	**54 %**

[1] DSEIQ : dossier de santé électronique interopérable du Québec
[2] RQII : registre québécois d'information sur les intervenants
[3] RQIU : registre québécois d'information sur les usagers

Figure 2. Estimated cost of different DSQ components and funding sources[31]

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[31] Reproduced from La Direction des communications du Ministère de la Santé et des Services sociaux du Québec. (2007). *Le Dossier de santé du Québec: Plan d'affaires 2007-2010*. Québec, Canada: Gouvernement du Québec .

Appendix II. Supplementary Material

Published Manuscript

Using Narrative Construction to Prepare the Ground for Hermeneutic Dialogue

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Justin Gagnon

Abstract

Hermeneutic research methodologists have recommended that, when conducting interviews, investigators should minimize the imposition of their pre-understandings on the conversation, as this would restrict the range of possible understandings that dialogue may produce. Instead, the phenomenon under investigation should determine the direction of conversation. This position paper argues that the iterative construction of a narrative enables increasingly focused, in-depth discussions with experts in the clearing where the interlocutors' horizons of understanding converge. Hermeneutic dialogue involves navigating one's own pre-understanding and exploring new branches of possible understandings that emerge from conversation. This navigation demands reflexivity and adaptability, as well as an openness toward the complexity of a living understanding informed by a diversity of perspectives. To illustrate how narrative construction informs an increasingly refined understanding, and how this understanding subsequently frames dialogue with interview subjects, this paper draws on a historical case study of electronic medical records implementation policy.

Introduction

Hermeneutics is a philosophical discipline concerned with interpretation and understanding. Making sense of others' understandings of the world involves integrating the unfamiliar with that which is familiar to us (Gadamer, 1960/2004). That is, we make sense of our interactions through our own frame of reference. Hans-Georg Gadamer, one of the pioneers of hermeneutic philosophy, characterized the interpretive process as a fusion of horizons (Gadamer, 1960/2004). Interpretation of another, upon reading a text or in conversation, involves the meeting of two (or more) worldviews, or horizons of understanding. Our horizons are informed by our traditions, which include our contexts and prior experiences and interactions. Upon fusion of another's horizon with our own, a shared spaced is negotiated and, through this fusion of horizons and integration of the unfamiliar, our understanding is transformed.

In recent years, researchers have made strides in developing what might be called "hermeneutic research methodology" (Curtis, 2010; Moules et al., 2015). While hermeneutics has its roots in the reading of (religious) texts, the principles of hermeneutics are particularly relevant to the conduct of interviews. Whether one is reading texts or dialoguing, interpretation involves a back and forth between what the other has expressed (a reflection of their own understanding, put to language and rooted in their own tradition) and one's own tradition. Dialogue, however, is bi-directional. In dialogue, a negotiation takes place whereby the interlocutors work out a common language and frame of reference pertaining to the object of their discussion. Understanding is co-created. The interlocutors each navigate their own understanding and what was said toward a contextually contingent shared understanding.

In hermeneutic dialogue, precedence is given to the object of discussion in determining the direction of conversation. Proponents of hermeneutic research recommend caution when conducting interviews, as one's pre-understanding (horizon) can restrict the range of possible understandings that can emerge from conversation (Moules et al., 2015; Geanellos, 1999). However, in research where data is iteratively synthesized into a narrative, one's pre-understanding is periodically refined and reconfigured, and inevitably influences the conversation. In what follows, I argue that this is still compatible with the principles of hermeneutics, and I provide recommendations for researchers adopting a narrative approach.

To provide an illustration of the application of hermeneutics to the conduct of research interviews informed by an increasingly refined narrative, I will draw on a historical case study of electronic medical records (EMR) implementation policy in Quebec.

Hermeneutic Interviewing

When conducting interviews in a manner consistent with the principles of hermeneutics, methodologists recommend that researchers be mindful of how their prejudices or pre-understanding might influence the conversation (Moules et al., 2015; Geanellos, 1999). In traditional qualitative semi-structured interviews, researchers tend to deliberately direct the conversation around established questions. However, when following the principles of hermeneutics, interviews should approximate a "genuine conversation" whereby the object of discussion plays a more prominent role in determining its direction.

> *We say 'conduct' a conversation, but the more genuine a conversation is, the less its con- duct lies within the will of either partner. Thus a genuine conversation is never the one we wanted to conduct. Rather it is more generally correct to say that we fall into conversation, or even that we become involved in it. The way one word follows another, with the conversation taking its own twists and reaching its own conclusion, may well be concluded in some way, but the partners conversing are far less than leaders of it than the led. No one knows in advance what will 'come out' of a conversation. (Gadamer, 1960/2004, p. 383)*

Certain authors, Geanellos (1999) for instance, proposed avoiding pre-determined questions entirely, as these could restrict dialogue around researchers' pre-understandings (Geanellos, 1999). However, research interviews are inevitably initially directed by things that you know and would like to know. Instead, Moules et al. (2015) suggested having pre-determined questions, but following a more unstructured approach in the conduct of the interview (Moules et al., 2015). Accordingly, the questions are simply a resource to guide the lines of inquiry that the researcher might want to explore, depending on how the conversation goes.

> *Research interviews [...] have a structure of sorts, and more importantly a purpose. That is not to imply that the interviewer enters with an immutable list of questions, but that the structure is defined by the topic and the interviewer attempts to keep the topic central to the conversation, while "turning around" with the participant. (Moules et al., 2015, p. 89)*

In addition to giving precedence to the object of discussion and following the natural flow of conversation, limiting the influence of your pre-understanding also involves keeping open the range of possible understandings that can emerge. The conversation should be conducted in a way that does not simply confirm the researchers' assumptions. Researchers should remain open to the transformative possibilities of the conversation.

> *It belongs to every true conversation that each person opens himself up to the other, truly accepts his point of view as valid and transposes himself into the other to such an extent that he understands not the particular individual but what he says. (Gadamer, 2004, p. 387)*

Research interviews are influenced by numerous factors, such as: the research objective, the nature of the phenomenon, the researcher's interviewing skills and their decision to pursue particular lines inquiry over others as the conversation unfolds. The interlocutors' knowledge and experience, or pre-understanding, regarding the object of discussion also play an important role. Rather than following a particular formula, I contend that research interviews should be conducted in a manner that best serves the research objective and that reflecting on and acknowledging factors that might influence the conduct of research interviews is integral to trustworthy qualitative research.

The aim of my historical case study of policy decisions surrounding EMR implementation is to map and understand policy decisions. More specifically, the aim is to provide an explanation of policy decisions in terms of actors, actions and social, historical and organizational contexts. To achieve this aim, I am constructing a narrative, through the triangulation of data from various historical documents and interviews with key experts and policy decision-makers (Creswell, 2012; Langley, 1999). The interviews will tend to involve discussions of policy processes, technological components, information infrastructure, and contextual factors. Knowledge about these aspects related to EMRs is essential to our establishing common ground and having a meaningful dialogue. I will frame my conversations around my prior knowledge about health technology in general and EMRs specifically, as well as institutional and policy processes. Furthermore, I will interpret the new knowledge generated from our discussion according to a pre-established map.

Were I conducting conversations about patients' experience of care, for instance, the discussions would be drastically different. One could posit that discussions around experience of care involve a broader range of possible directions. Every patient's story involves their own context and experience, and their own way of understanding and communicating it. A common frame of reference would, therefore, need to be re-established with every interview.

In all research, the process begins with an extensive review of the literature on the phenomenon under study. An effort is made to understand the available research on the topic. Researchers establish what is known and unknown and thereby refine their research objectives. In research involving interviews, a review of the literature also informs the interview guide and thus the direction of conversation. Both the researcher and interview subject bring their prior knowledge and experience to the conversation. As the subjects approached for interviews should be selected on the basis of their being knowledgeable about the object of study, both the researcher and interview subject are effectively experts on the topic, approaching it from different angles. Research prior to the conduct of interviews, therefore, enables more focused, in-depth discussions about the object of study. The scope of conversation is bounded by the shared horizon. In-depth discussion engendered by expertise is achieved at the cost of breadth, and breadth of understanding at the cost of detail.

Methodologists have acknowledged the influence of prior research on dialogue, in the context of interviews (Moules et al., 2015). I contend, however, that important consideration should also be given to how data is integrated throughout the research process, as this can have an important impact on the content and structure of one's pre-understanding. To my knowledge, this has not been discussed extensively in the literature.

Narrative Analysis

My narrative about the history of policy decisions affecting EMR adoption is iteratively constructed. Through the reading of historical documents, I constructed an initial narrative that serves to frame my understanding. Subsequently, each instance of data collection influences and is influenced by an evolving understanding.

All instances of data collection are inherently transformative. The review of every document and each interview transforms your understanding. They shape the scope and focus of the lines of inquiry pursued in conversation. In addition, each interview influences your pre-understanding for subsequent interviews.

When you process your data iteratively, as in my case study of EMR implementation, rather than after all your data are collected, your pre-understanding is increasingly structured. You have more formal moments in which you integrate your new understanding with the whole. Your understanding becomes increasingly refined throughout the research process, as more data are integrated.

When constructing a narrative, your pre-understanding, brought into each interview, is structured in a particular way. Accordingly, a narrative frames and directs the conversation in a particular way as well.

Narrative configuration consists of the construction of a story from the data. In narrative construction, the researcher chronologically configures and links events and actions within a story, to give meaning to the data, as contributors to a particular end (Polkinghorne, 1995; Sandelowski, 1999).

> *In [narrative configuration], the researcher's task is to configure the data elements into a story that unites and gives meaning to the data as contributors to a goal or purpose. The analytic task requires the researcher to develop or discover a plot that displays the linkage among the data elements as parts of an unfolding temporal development culminating in the denouement. (Polkinghorne, 1995, p.15)*

In my research, my narrative comprises events linked to particular actors and their actions. These events will be presented alongside social, cultural, and political contexts. These contexts change over time. I will then propose possible explanations and meanings, linking decisions and actions with changes in conditions surrounding EMR adoption, in an attempt to make sense of why Quebec has had such limited success in this regard.

We often make sense of happenings in the world narratively (Bruner, 1991). We tell stories. We even make sense of our own lives in a narrative fashion. Yet, narrative construction, in the context of research, has particular qualities that set it apart from narrative understanding. Our thoughts can be rather messy and are often quite abstract. Things are not always organized chronologically. When probed, we sometimes find a great number of inconsistencies in our thoughts. We have not worked everything out.

The act of thinking and communicating ideas to others transforms our thoughts. When called upon to tell a story, we put our thoughts to language and give it structure. Our understanding is transformed by our telling a story. In working out our stories, inconsistencies may be made apparent, and only then do we tend to try to resolve them. Over time, after multiple iterations of re-working our narratives, our stories take on a more logical structure. They become more coherent and refined.

The formal act of writing has an even greater structuring effect on our understanding. Writing is also transformative. Through writing, you produce something tangible that you can return to and reinterpret in light of having distanced yourself in time, thought, and experience.

> *Structure is necessary as a point in a cycle of interpretation and understanding in which meaning comes together as a unit of articulation an in doing so, the newly articulated meaning becomes available in itself for questioning, reappraisal, deconstruction, and interpretation. (Moules et al., 2015, p. 51)*

A written narrative permits the integration of vastly more information. It allows for greater complexity, with multiple layers and divergent paths. At the same time, having something tangible permits your identifying and resolving leaps in logic, contradictions and inconsistencies. Writing better permits your working out a logic linking the data to events and actions in your story, and interpreting their meaning in relation to the plot that you have devised.

When the act of writing is performed iteratively, the narrative may be increasingly refined. It enables greater coherence and complexity. In the conduct of interviews, this evolving formal narrative informs your pre-understanding.

For my historical case study, I constructed an initial narrative with a reading of news articles, scientific papers, strategic plans, auditor general reports, ministry of health reports and commission reports. I used the information contained in these documents to construct a timeline of factual events. These events consist primarily of policy actions and decisions, such as the creation of a governing body tasked with driving and coordinating EMR infrastructure projects, or the publication of policy that sets the context for EMR adoption.

At present, I have only begun conducting interviews. In my interviews, at this stage, I am primarily interested in establishing the key actors and organizations, and understanding their influence on EMR implementation. I am beginning to get a sense of the organizational cultures of the implicated institutions and the different political contexts, as they pertain to key policy decisions. I have also begun delineating phases in the history of EMR implementation, in terms of distinguishable groups of actors, organizations and contexts – in terms of major shifts in preoccupations and priorities.

As I conduct more interviews, I will make more and more links between context, actors and actions. I will develop and put forth explanations about how and why EMR adoption in Quebec has been so challenging. The more I learn, the more questions will inevitably arise as new gaps in understanding are revealed. I will cease data collection when I will have constructed a sufficiently coherent narrative without any apparent, seemingly relevant gaps.

I have begun the interview component of my research prioritizing experts familiar with the bigger picture, so to inform my initial narrative. Then, as I locate particularly meaningful events in the history of EMR implementation in Quebec, I will progressively narrow my focus around these key moments. I will therefore select subjects more specifically knowledgeable about these events. The data derived from each interview will fill in gaps in my understanding that emerge throughout the research process. They will thus provide greater depth to my narrative.

Before discussing strategies that favour hermeneutic dialogue in the conduct of research interviews, I will briefly summarize my argument so far. I have noted that data collection informs your understanding, and processing that data further refines your understanding. When narratively configured, your understanding takes a particular form. Furthermore, formally writing a narrative makes it something tangible that favours greater complexity and coherence. This then informs your pre-understanding in the conduct of interviews. Subsequently, each interview becomes increasingly focused around filling specific gaps in understanding, answering specific questions, and corroborating or refuting specific assumptions.

Following the principles of hermeneutics, is it a problem for one’s pre-understanding to expand and one’s line of questioning narrow throughout the research process? Is it a problem that I have a timeline of events and an increasingly coherent and complex historical narrative that delineates the space where my discussions take place? I argue that, given my research objective of con- structing a historical narrative, it is not.

We always already have a horizon.

> *We never approach a text, experience, or topic as a completely blank slate - we already have a fabric of meaning into which we accommodate, with more or less difficulty, the next new event. (Moules et al., 2015, p. 43)*

Your horizon directs the conversation. Following the principles of hermeneutics, however, means ensuring that you avoid, as much as possible, restricting the range of possible understandings that can emerge. You want to ensure that you are not simply confirming your beliefs. You want to remain open to what the other has to say and not ignore information that does not fit with what you already think you know. You want to remain open to transformation of your under- standing.

I argue that to achieve this, the following should be considered. First, the conduct of interviews requires skill as well as reflexivity and creativity. Approaching a genuine conversation in the prepared ground established by your narrative pre-understanding involves allowing the object of discussion to lead and following the flow.

> *To obtain good data […] requires a discernment and instinct around choices of which direction to take the conversation, which leads to follow and which to divert, which statements to probe further, when to engage the participants in interpreting, and ultimately keeping the topic as the focus while respecting the participants' needs to tell their narratives of experience. (Moules et al., 2015, p. 89)*

It demands an awareness of the potential impact of your words on both the direction of conversation and the boundaries of understanding. It is important to recognize when you may be imposing your understanding in a way that restricts the range of possible understandings that can emerge. Reflection upon your prejudices is recommended, and researchers should be open and transparent about them in their writing. Recognition of the potential impact of one's words is generally cultivated with experience. With each interview, through trial and error, and the practice of reflexivity, you cultivate a better sense of how your pre-understanding might influence the direction of conversation. As every situated understanding action both reveals and conceals (you cannot know what you do not know), the ideal of self-awareness is an unattainable state. Aware- ness is a continuous process that demands practice and adaptability.

In addition to creativity, reflexivity and skill, I contend that researchers should embrace the complexity and ambiguity of an understanding informed by a diversity of interpretations. As more data are collected, the range of interpretation grows rather than shrinks (Curtis, 2010). The number of possible interpretive paths and interlinkages increases. The story becomes increasingly complex. The advantage of the narrative structure is that is embraces complexity and ambiguity by permitting the inclusion of multiple, potentially contradictory accounts. If two people have different interpretations about the factors that contributed to a certain outcome, both may be included. Then, one can reflect on the meaning of each interpretation in the context of the whole. A “true” story is not the aim. The aim is to tell a good story. As Weick (1995) suggested, a good story should be reasonable, coherent, and plausible (Weick, 1995). Understanding is finite. Research follows a certain path, limited in time, setting and scope. One cannot include every- thing of potential relevance nor reconcile differing accounts. In my case study of EMR implementation in Quebec, I will not be reconciling, aggregating, averaging, or reducing people’s accounts when I consider them to meaningfully contribute to the plot. I will include contradictions in people’s interpretation as bifurcating branches of my narrative understanding. My research presents a living understanding rather than a timeless verity.

Triangulation of data sources is valuable in this regard. Inclusion of complementary viewpoints can simultaneously strengthen particular propositions when different accounts are concordant and broaden the range of possible interpretations when accounts are irreconcilable. Each interpretation has value. Every interview should therefore be approached with curiosity and humility.

I will now provide a concrete example from my research to illustrate how I navigated the flow of conversation, while utilizing a graphic timeline of events to prepare the ground for our discussion. In one of my first interviews, I spoke with a physician/researcher who had been involved in a number of health information technology initiatives over the last 30 years. I had done my research on him and had an idea about the specific moments about which he might be particularly knowledgeable. I adapted my interview guide to include more directed questions about his relevant experience.

In my interview, after explaining my project, I began by asking my subject to speak broadly about the basis of his expertise, such as: what initiatives was he involved in? This already began generating lines of inquiry that I had not anticipated. For instance, he mentioned that he was involved in a chip card program prior to decision-makers' formal discussions about strategic plans to digitalize the health system. I had known a bit about the chip card program, but I had not discovered in my research that he was involved. I decided to put on pause his description of his experience and focused the discussion around how the program went. Later in the interview, after we had discussed other similar initiatives, I asked my interview subject to reflect on how the projects differed in terms of how they were managed. I asked him about the different organizational cultures of the actors involved, and what this impact this might have had on the outcome. None of these questions had been specifically planned; they emerged from the conversation.

Throughout my interview, as a prompt for our discussion, I used a graphic timeline depicting the major events that I considered relevant to the narrative. I felt that this was extremely valuable in quickly establishing common ground. I could point to two distinct events and ask if he felt there was any connection between them. For instance, in 2006, Quebec proposed a formal plan for digitalizing the health system. I asked: "what contributed to the development of this plan?" He looked at the timeline and located "Canada Health Infoway" - a federal organization charged with driving health information technology interoperability across the country. He said: "Quebec's plan was devised in such a way as to meet Canada Health Infoway's conditions for receiving funding. They didn't devise a comprehensive digitalization plan until much later." Thus, we uncovered an important influence explaining the state of EMRs in Quebec. Most of the remain- der of the conversation involved a deeper probe into this.

Had I taken a more traditional approach to the conduct of my interviews, I suspect that I would not have pursued the new direction that emerged from our conversation. Additionally, had I not prompted the subject with my visual timeline, and established common ground and my expertise on the topic, we may not have had such a rich, focused discussion.

Conclusion

In sum, the iterative construction of a narrative involves the development of an increasingly coherent and complex, formally written, understanding. I began with an initial timeline, informed by the reading of historical documents. Then, in the conduct of interviews, my pre-understanding became increasingly refined and formally structured into a narrative. The conversations I had with my interview subjects were situated in the clearing where our horizons met. I presented to the interview subject what I knew, and as two experts on a topic, we had a focused discussion. As I conduct more interviews, they will become increasingly focused and directed around filling in gaps, addressing remaining questions, and reinforcing or refuting events and interpretations. I have argued that this does not inhibit my following the principles of hermeneutics.

With each interview, there is a back and forth between the discussion (the part) and the grand narrative (the whole); between following the flow of conversation and making sense of what was said in relation to your pre-understanding. I concur with fellow methodologists in positing that navigating this back and forth requires reflexivity and adaptation. In addition to this, I contend that embracing the divergent accounts and interpretations that emerge in conversation is vital to conducting trustworthy hermeneutic research.

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