

# A Comparison of National Health Data Interoperability Approaches in Taiwan, Denmark and Canada

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## Abstract

**This paper compares the interoperability approaches of three countries: Taiwan, Denmark and Canada. The work maps out how various countries have addressed the interoperability problems as well as what factors affect decisions and the result, and in what manner. The key findings are as follows: (1) the federal government's ability to mandate standards affects choice of interoperability strategy, (2) e-Health status influences choice of interoperability strategy, and (3) differences in geography, population and demographics affect the selection of national strategies toward interoperability.**

## Introduction

### Study Background

There are many benefits associated with the use of electronic health records (EHRs). One of the expected benefits of EHRs is data interoperability, which would allow health data to be transferred electronically from one EHR system to another. It has been shown that interoperability can improve the efficiency of healthcare delivery while reducing the costs and time associated with accessing and analyzing health information (Gartee 2006; Maki and Petterson 2008). Many countries in the world are developing interoperable EHR systems (iEHRs). For example, Canada Health Infoway is investing billions of dollars and is working in partnership with federal, provincial and territorial

governments to create and implement a pan-Canadian iEHR. The new iEHR will enable healthcare providers to access and update any Canadian's health record electronically and securely at any time and any location (Giokas 2008). However, several problems arise because there are many differing types of EHR users, including clinicians, health information management (HIM) professionals, billing and reimbursement staff, medical researchers, data modellers and others. All types of users rely on the same EHR data to do their work. Therefore, there is a great deal of variation in the hardware, software, coding methods and terminologies/nomenclatures used and in their definitions between systems. Furthermore, each type of user may interpret the same data (e.g., words or terms) in different ways. These problems are barriers to achieving health data interoperability (Abdelhak et al. 2007; Garde et al. 2007).

Worldwide, different countries have developed national strategies to promote interoperability among EHRs (Abd Ghani et al. 2008; Giokas 2008; HIMSS 2008). These strategies have unique features that have been influenced by different aspects of each country's government and technological development and culture. In this paper, the authors compare and contrast the strategies undertaken by three countries – Taiwan, Denmark and Canada – as they move toward developing interoperability between EHRs. Data regarding the following aspects of each national strategy were collected: (1) the federal government's

governance power over healthcare organizations, (2) the current state of each country's e-Health status, (3) the standards used, (4) the data interoperability mechanisms used, and (5) the benefits and drawbacks of each country's national approach. Recommendations for development of an iEHR at a country level will be discussed.

**Health Data Interoperability Issues**

Previous research focused on three types of issues in the area of health data interoperability (Coyle et al. 2003; Lopez and Blobel 2009; Schweiger et al. 2005).

**1. The Functional Interoperability Issue**

Functional interoperability is the ability of two or more systems to exchange information despite differences in functionality and defined message structures. The problem arises when data has to be exchanged between different data structure systems (Eckman et al. 2007). For example, a set of health data stored in an Oracle database in system A is going to be transferred to an SQL server database in system B. The Oracle database and SQL server database use different data structures to store their data. Also, system A might use the "CHAR" datatype to recode patients' symptom information, while system B might use "NUMBER" datatype (see Figure 1). Both examples will cause functional interoperability problems.

**2. The Data Instance Interoperability Issue**

There is a great deal of variation in the health terminologies, measurement units and code sets used among health information systems (HISs). For example, the acronym "OD" could represent *right eye*, *optic disc* or *once daily*. System A might use "1" to represent a patient's gender as male; however, system B might use "M." One hospital might use pound as the measurement unit for patients' weight; another might use kilogram. September the 5th of year 1986 in the Canadian date system is recorded as 09-05-1986. However, the same data will be interpreted as May the 9th of year 1986 in the United Kingdom. In addition, different systems using

different coding schemes could cause code mapping problems. For example, the ICD-10 code of "Bacterial meningitis" could map into 6 different SNOMED CT codes (UVic-HTG 2011).

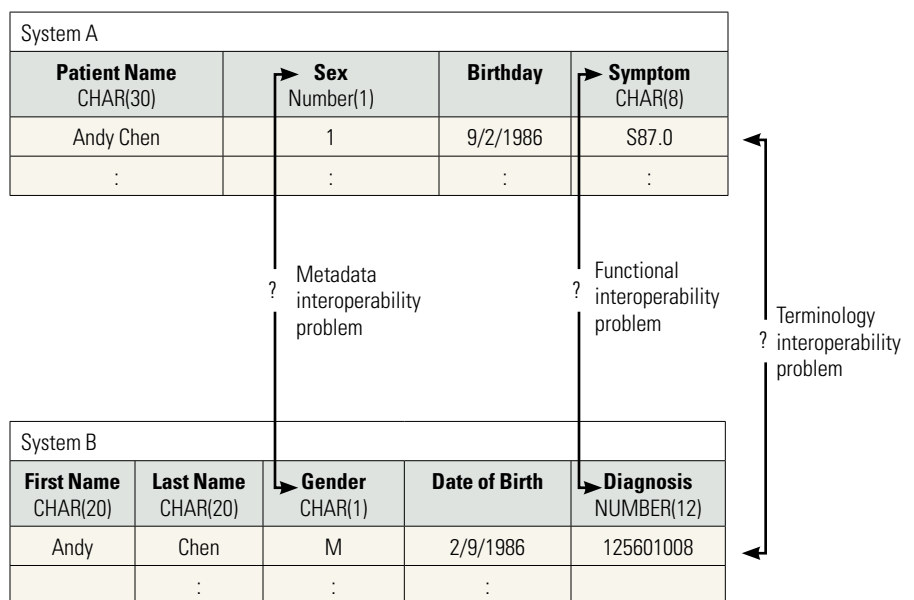
**3. Metadata Interoperability Issue**

"Metadata" is data about other data. It is structured data that describe the characteristics of a resource. In the relational database model, the attributes/columns are used as metadata to describe the characteristics of data. There are two major problems in metadata interoperability. First, different HISs may use different metadata to describe patients' health information. For example, one system might use "sex" to record whether a patient was male or female, while another system might use "gender." A computer does not recognize that "sex" and "gender" are semantically similar. Second, there are problems in mapping simple metadata to composite metadata. For example, a computer cannot map a metadata "Name" in one system into composite metadata "FirstName" + "LastName" in another (Jeong et al. 2005).

**Interoperability Models**

Many previous studies had proposed different methods in the attempt to solve the interoperability problems (Bicer et al. 2006; Jian et al. 2007; Kuo et al. 2009; Lopez and Blobel 2009; Ryan 2006). In this study, we categorize interoperability methods into three models:

**FIGURE 1.**  
**Health data interoperability issues**



**1. The Point-to-Point-Oriented Model**

Using the point-to-point-oriented model, data exchange parties have mutually agreed-on coding terminologies, messaging protocols and business processes. Therefore, health data can only be exchanged between organizations with a contract (see Figure 2). For example, the United States Department of Veterans Affairs (VA) and the Department of Defence (DoD) have built a Clinical Data Repository/Health Data Repository (CHDR) patient data exchange gateway for patient health information exchange (Bouhaddou et al. 2008). This gateway enables real-time bi-directional computable data exchange and achieves semantic interoperability.

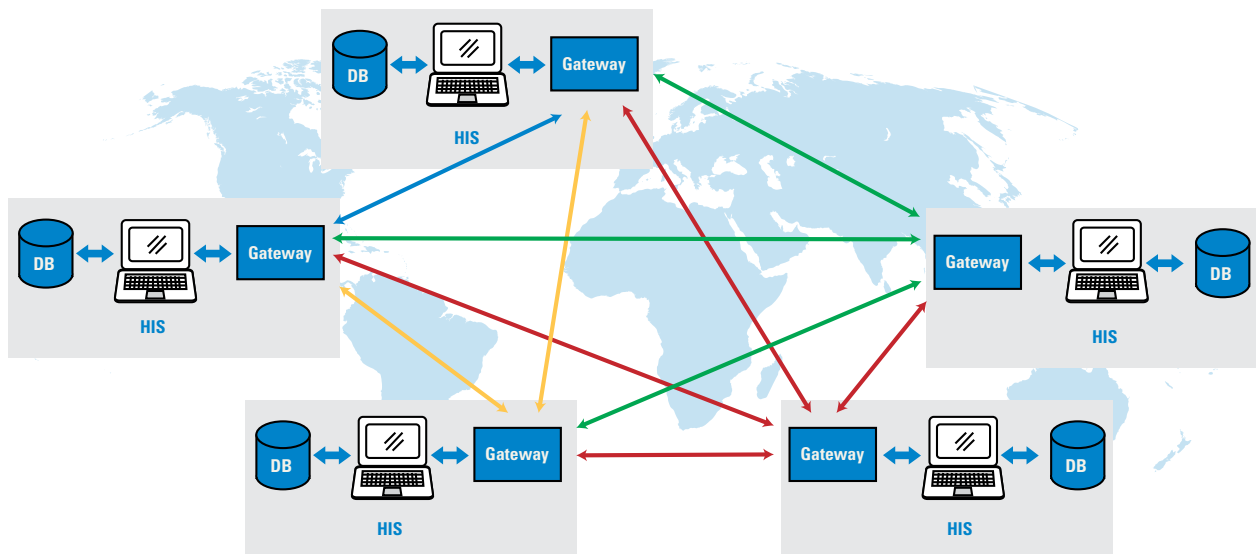
The main benefit of this model is that the data exchange process is very flexible and straightforward. Health organizations can develop their own health information systems locally. When they have mutually agreed-on coding terminologies, messaging protocol and business process, they can start to exchange health information. Therefore, it has a minimal impact on the existing healthcare systems. The drawback of this model is it will cause huge variation among data exchange parties. If data needs to be exchanged between only two systems, then a common standard or interface can be developed quite easily and can be made to accommodate the needs of both organizations. However, if many different types of systems need to exchange data, then many interfaces and data formats need to be developed, which will cause huge variation in HIS development (e.g., it needs  $N(N-1)/2$  exchange interfaces for N different HISs).

**2. The Standard-Oriented Model**

When health organizations use the standard-oriented model, they must follow a unique standard (terminology and message standard) for health information exchange (see Figure 3). A typical example of this model is the Department of Health Taiwan (DOH-Taiwan) which, in 2007, determined to allocate about US\$1 million to promote the Taiwan Electronic Medical Record Template (TMT) format in ten medical centres that collectively provide more than ten million outpatient visits a year). The design of the TMT format provides the basis for developing a document-based information standard and information interoperability infrastructure for the healthcare system in Taiwan. With the help of the TMT, the document-based electronic medical record (EMR) can also be used for digital signatures and encryption of files that can be delivered to individual patients for personal health management purposes. In addition, through Extensible Stylesheet Language Transformations (XSLT) technology, TMT XML files can be transformed into the HL7 CDA format, which can facilitate international interoperability in the future (Jian et al. 2007).

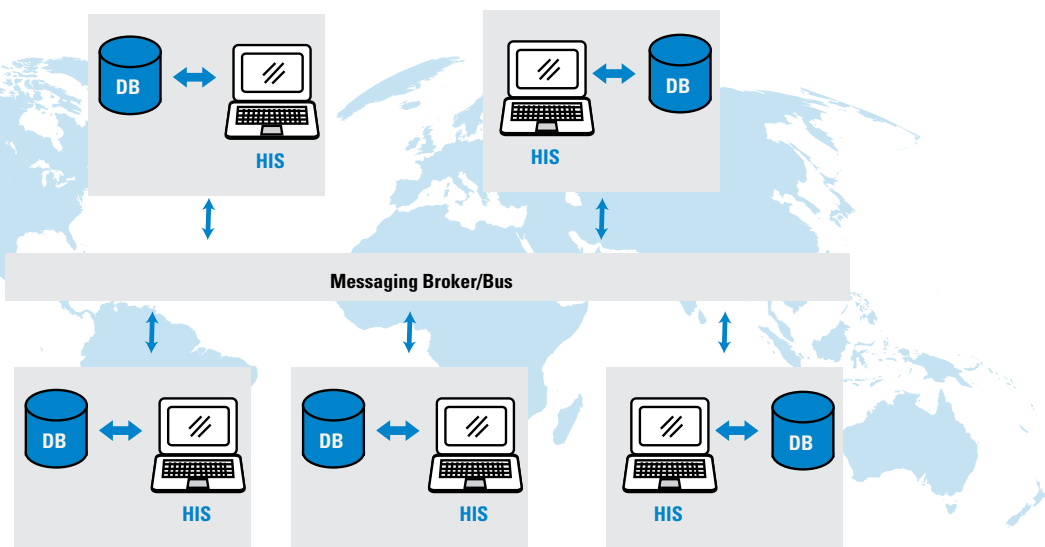
The benefit of this model is that it has less variation in HIS implementation. However, in practical application it is difficult for organizations to agree on the types of standards that should be used (Lopez et al. 2008). In addition, Lenza and colleagues argued that “standards should not try to comprehensively model an application domain, because systems must be capable to rapidly adapt to an evolving application domain” (Lenza et al. 2007: 204).

**FIGURE 2.**  
**Point-to-point-oriented data interoperability model**





**FIGURE 4.**  
**Common-gateway data interoperability model**



healthcare expenditure that is 6.3% of GDP. Taiwan adopted a national health insurance (NHI) model in 1995 after a close analysis of other countries' health system models. Similarly to Denmark and Germany, Taiwan's system was designed so one government-run insurer would cover all citizens. The average family premium is \$650 per year for a family of four. Working people split their premiums with employers; others pay flat rates with government help; and some groups, like the poor and veterans, are fully subsidized (Frontline 2008). Of Taiwan's 515 hospitals, over 89% are computerized and over 70% are constructing an EMR (Chang et al. 2009). Of Taiwan's 17,000 primary care clinics, over 60% are computerized and have computerized physician order entry (CPOE) (Li 2005).

The Taiwanese can see any specialist without a referral upon presentation of their personal smart card. The card is presented to their doctor during each visit and is inserted into a secure reader that then displays the patient's medical history. The bill for services rendered is formulated automatically, sent directly to the government insurance office and paid automatically (Reinhardt 2008). The system also helps public health officials monitor standards and effect policy changes nationwide. Health information is exchanged over the nationwide health information network. Built in the 1990s, the health information network connects the department of health, regional information centres and the bureau of national health insurance.

Taiwan's national health information interoperability strategy is the Taiwan electronic medical record template (TMT) project.

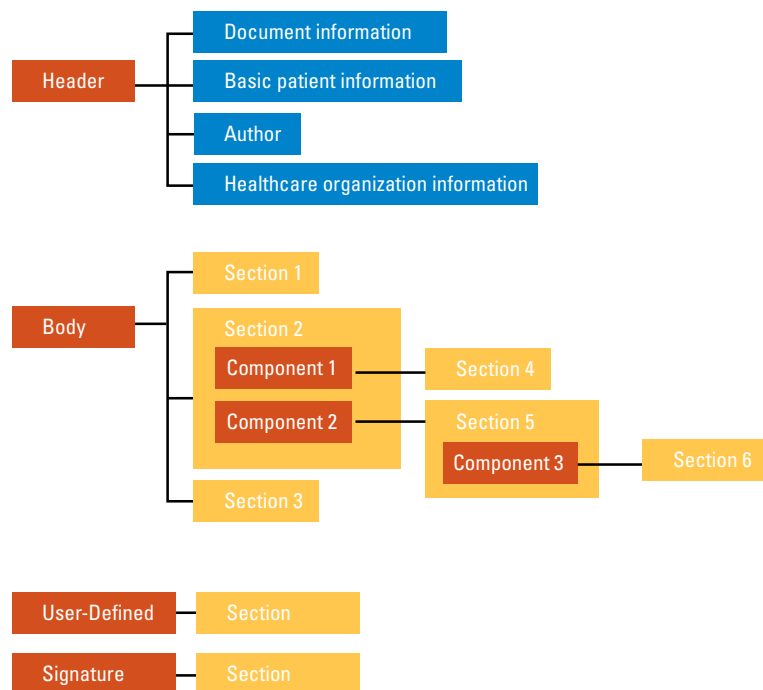
In 2007, the Department of Health (DoH), Executive Yuan, Taiwan, determined to allocate about US\$1 million to promote the TMT format in ten medical centres that collectively provide more than ten million outpatient visits a year (Jian et al. 2007). The TMT project aims to achieve a basis for building a portable, interoperable information infrastructure for EMR exchange in the country. The requirements for developing the TMT include (1) minimal impact on the existing healthcare system, (2) easy implementation and deployment, (3) compliance with Taiwan's current laws and regulations, and (4) transformable to international standards. With this basic format template, it becomes feasible for people to check their own EMR within Taiwan (Chu et al. 2006; Hu et al. 2005).

The TMT architecture is basically composed of forms, components, sections and elements (see Figure 5). Data stored in the elements can be referenced by the code set, data type and narrative block. The architecture also includes many XML schemas that express shared vocabularies and allow machines to carry out rules made by people (Jian et al. 2007; Rau et al. 2010). So far, 70 TMT forms have been completed representing commonly used paper-based forms found in traditional medical records (around 13,000 forms collected from 246 hospitals).

**Denmark's Health Data Interoperability Strategy**

Denmark has a population of 5.5 million people living across an area of 43,000 square kilometres. Denmark spends 10.8% of its GDP on healthcare expenses and 19% of the total health

**FIGURE 5.**  
**The TMT form (schema) structure (Jian et al. 2007)**



expenditures toward physician co-payments. The Danish healthcare system used to be mainly financed through regional and municipal taxation that consisted of funding and provision of healthcare at the regional level, but this changed in 2007. Private general practitioners, whose locations are managed by the counties, are paid on both a capitation and fee-for-service basis. Hospitals are publicly controlled, whereas general practitioners work privately on a contract basis with the health region they are currently in. The Danish population cannot opt out of the required healthcare system. Each resident in Denmark has a unique personal identification number that was first introduced in 1996 and is used for health in addition to other administrations (Protti et al. 2009).

There are 19,287 practising physicians in Denmark. Almost all of them (over 95%) record clinical notes and exchange clinical messages electronically. In addition, the vast majority of the healthcare sector uses Denmark’s national health network, comprising more than 10,000 users in over 4,000 organizations. Of clinical communications that occur between the primary and secondary care sectors, over 90% are communicated across this network (Protti et al. 2007).

Health information in Denmark is coordinated by MedCom, a private/public partnership established in 1994. MedCom is responsible for setting all of Denmark’s standards related to

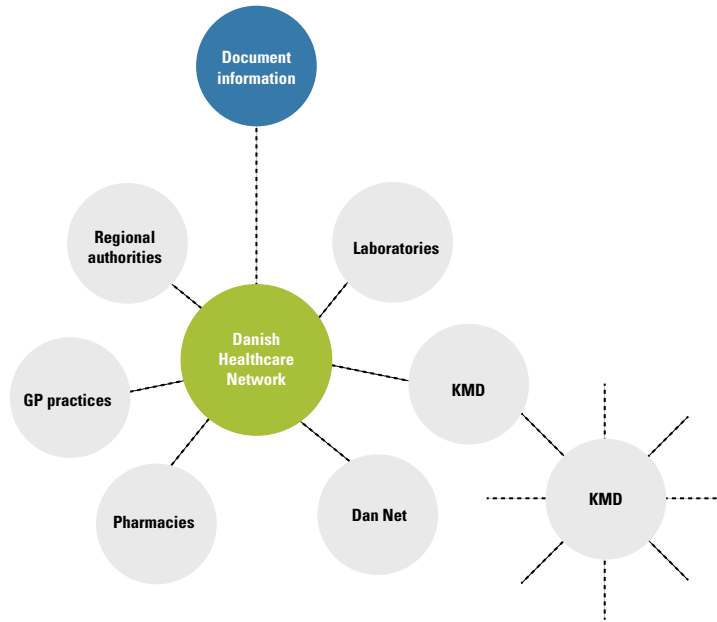
health information. It is mandatory for each health region in Denmark to use the standards established by MedCom, and regions are regularly scrutinized to ensure that these standards are being followed (Protti 2008). Messages are transmitted across the Danish Healthcare Data Network (DHDN), a secure network connecting more than 5,000 organizations and 100 IT systems (see Figure 6). The network is used by 97% of general practitioners, 74% of full-time specialists, 100% of hospitals and pharmacies, and 44% of local authorities. MedCom uses EDIFACT as the messaging standard for communicating between the primary and secondary sectors (Bernstein et al. 2005; Bruun-Rasmussen 2009). The actual exchange uses a point-to-point structure, wherein providers request information from other providers who each maintain their own databases. Because of interoperability assured by certified software, sender and receiver can respectively upload and download the messages into their own electronic record systems.

**Canada’s Health Data Interoperability Strategy**

Canada is the world’s second largest country, with total area of 9,093,507 square kilometres and an estimated population of 33.6 million. Canada spends 10.0% of its GDP on healthcare expenses. According to WHO 2010 statistics, there are 62,307 physicians (WHO 2010). Healthcare in Canada is supported both privately and publicly. The private system is combined with a publicly financed health insurance system called Medicare, which is paid for by the provincial and federal governments. Every province and territory in Canada is responsible for delivery of healthcare in their respective region. The federal government provides funding in a lump sum based on the province’s population. Canada’s EHR adoption rate is low, with only 28% of Canadian physicians using a form of an EHR (Powers 2009; Protti 2008).

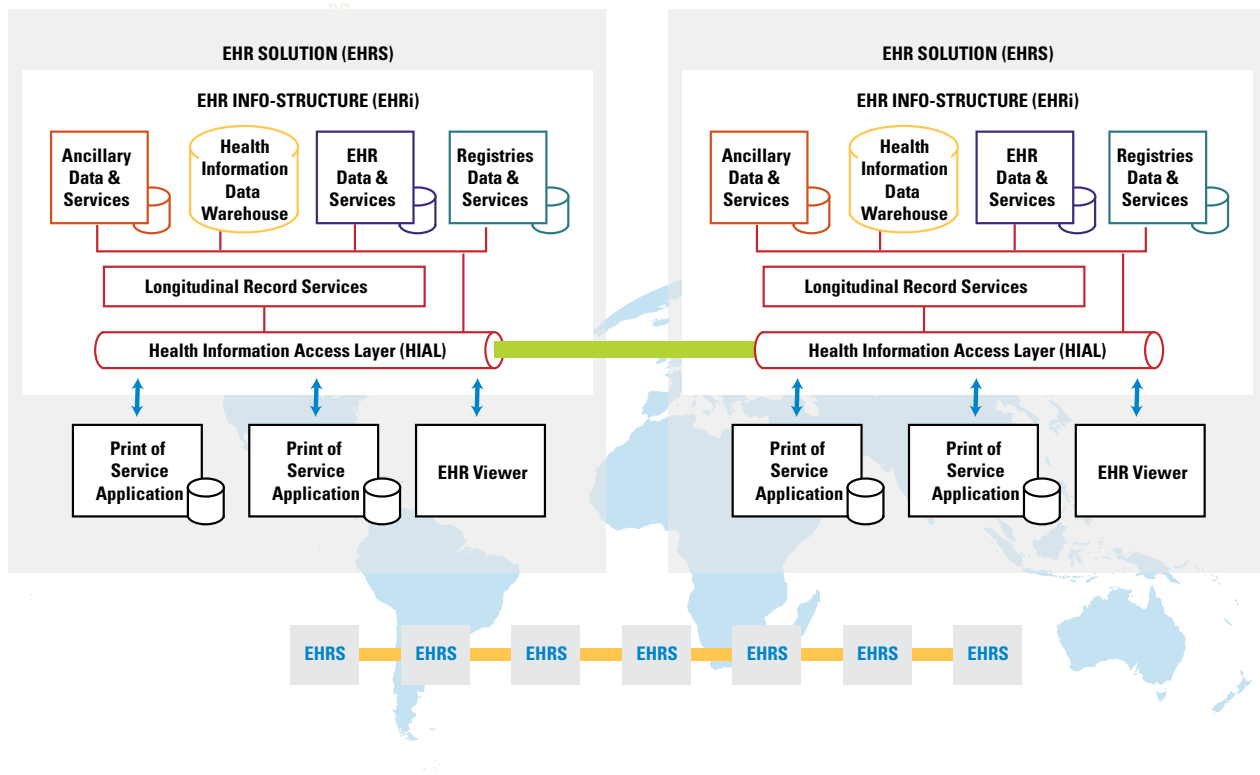
Canada’s main strategy and method for investing in the development, adoption and interoperability of electronic health is via Canada Health Infoway. Infoway is a not-for-profit organization established in 2001 that collaborates with the provinces and territories, healthcare providers and technology solution providers to accelerate the use of EHRs in Canada. In July 2003, Infoway published the first version of an EHR interoperable framework, the Electronic Health Record Solution Blueprint (Giokas 2008). It is a comprehensive and interactive

**FIGURE 6.**  
**The Danish healthcare data network and health portal architecture**



document that describes the business and technical architecture of EHR solutions to be implemented across Canada. In the blueprint, Infoway promoted the use of common architecture and standards to ensure that systems can interoperate so that data can not only be shared over distance, but also read and understood. The common architecture is called EHR info-structure/EHR conceptual architecture (see Figure 7). In the architecture, a jurisdiction's point-of-care operational information systems manage and store patients' clinical information. A central EHR repository and domain-specific repositories combine their information at a jurisdictional level to provide full clinical patient information to any point of care. The Health Information Data Warehouse (HIDW) provides patients' longitudinal record services, including

**FIGURE 7.**  
**Canada interoperable electronic health record (iEHR) architecture (Giokas 2008)**



an ability to extract, transform and load (ETL) EHR information into the warehouse. The registry services support the accurate and unambiguous identification of patients, providers and the location of service delivery. An EHR viewer facilitates the ability for health providers to access shared EHR information for those who do not have an EHR-enabled application at the point of service. Public health surveillance can also use the info-structure to provide services and repositories.

EHRs are tied together by the Health Information Access Layer (HIAL), a set of Infoway-mandated specifications for integration, interoperability, privacy, security and other services. In general, each jurisdiction will have its own HIAL; HIALs will follow a similar design and architecture and will use the same standards, although the vendors may be different. Therefore, patient health information is made available across different locations and jurisdictions by way of interconnecting EHR info-structure via the HIAL.

To facilitate interoperability, Infoway has invested \$365 million on iEHR systems (Canada Health Infoway 2010-a) and established the Infoway Standards Collaborative (SC), which was created to develop, support and sustain health information standards (Canada Health Infoway 2010-b). In addition, Infoway plans that in the 2010–2011 year, the interoperability of EHRs will be expanded through providing expertise and solutions in support of a successfully implemented and secure iEHR (Canada Health Infoway 2010-a). For example, Newfoundland and Labrador have implemented Canada's first fully functional iEHR, integrating the foundational components of client and provider registries and a DI/PACS system and a drug information system (Powers 2010).

## **A Comparison of the Three Countries' Strategies**

In this section, we compare the interoperability strategies of the three countries, based on three criteria: healthcare systems, e-Health status and information standards. A summary of the comparison is provided in Table 1.

### **Healthcare Systems**

As can be seen in Table 1, all three countries adopted a universal healthcare insurance policy and are financed through public revenues. Although MedCom is a private/public partnership, the majority of its funding is from the public coffers. This means that each government has significant influence over policy. Denmark and Taiwan have the ability to implement policy nationally, and within those countries MedCom and DOH-Taiwan have government authority to mandate interoperability standards. On the other hand, healthcare in Canada is for the most part under provincial jurisdiction. For Canada, this creates a situation where the federal government's primary influence in healthcare is through financial incentive, and its

ability to implement a nationwide policy is through consensus building with and among the provinces and territories. Canada Health Infoway is forced to promote interoperability mechanisms through incentives, such as financial aid. In addition, the interoperability strategies that Canada promotes must meet the needs of each province, since they are the ultimate decision-making authorities. Currently, Canadian provinces and territories deliver care through regions in hospitals, community health agencies, primary care clinics, and so forth. They deliver locally, and therefore there may be a strong tendency to think locally. In addition, jurisdictions have made advances and have been successful to varying extents in health info-structure development, achieving valued and visible e-Health results, advancing their use of technology, and achieving better information for better health. As a result, local successes and autonomy in implementing e-Health strategies within provinces and regions may end up in conflict with the desire to have a common EHR system or to connect national initiatives (Infoway) with the local hospitals and regional developments.

**As Canada has** a lower rate of EMR adoption, it is likely that health information system structures and data format will change in the future.

### **e-Health Status**

Denmark and Taiwan have high EMR adoption rates and national-level health info-structure in place. Therefore, it is less likely that data format/requirements and system structures will change dramatically over time (Schrader et al. 2009). For example, Taiwan's health smart cards are a significant investment, requiring the distribution of cards to every Taiwan resident, the purchasing of numerous card readers for every healthcare organization, and the provision of training for citizens and healthcare workers. This type of investment would not be possible if major changes were expected to occur to health information systems (Pinciroli et al. 2010). Because of this, interoperability standards can be more rigid. Whereas Canada has a lower rate of EMR adoption than either Denmark or Taiwan, it is likely that health information system structures and data format/requirements will eventually evolve to facilitate greater EMR use.

### **Information Standards**

Both MedCom and DOH-Taiwan have the ability to enforce exchange structures for their countries' healthcare organizations and force healthcare organizations to adapt their clinical information systems to meet federal interoperability standards. In addition, because EMR adoption is high in both countries and because system structure will likely not change dramatically,

**TABLE 1.**  
**Comparison of health data interoperability strategies of three countries**

Criteria	Taiwan	Denmark	Canada
<b>A. Background (2009)</b>			
Land area (sq. km)	35,980	43,098	9,093,507
Population	22,974,347	5,511,451	34,018,957
GDP per capita <sup>a</sup>	\$17,040	\$62,626	\$45,428
<b>B. Healthcare Systems</b>			
Healthcare jurisdiction	One (18 counties)	One (13 counties)	Multiple (10 provinces + 3 territories)
Funding	Public (Universal Healthcare)	Public (Universal Healthcare)	Public (Universal Healthcare)
Healthcare expenditure (GDP) <sup>b</sup>	6.1%	10.8%	10.0%
Hospitals/Beds (per 10,000) <sup>b,c</sup>	515/66	70/38	719/34
No. of physicians <sup>b</sup>	53,291	19,287	62,307
<b>C. e-Health Status</b>			
EHR/EMR adopting rate	~75%	95%	28%
Health Info-structure	Taiwan Health Information Network, Health Smart Card	Danish Healthcare Data Network, e-Health Portal	EHR conceptual architecture
Governance	DOH-Taiwan	MedCom	Canada Health Infoway
<b>D. Information Standards</b>			
Terminology standards	ICD-9-CM, LONIC	SNOMED CT/ Allied Standards	ICD-10CA, LONIC, SNOMED CT
Messaging standards	TMT (XML, HL7-v2)	EDIFACT (XML)	HL7 v2/v3
Government intervention	Mandated	Mandated	By incentive

<sup>a</sup>Globalpropertyguide. <<http://www.globalpropertyguide.com/Europe/Denmark/gdp-per-capita>>.

<sup>b</sup>World Health Statistics 2010. <<http://www.who.int/whosis/whostat/2010/en/index.html>>.

<sup>c</sup>Department of Health, Taiwan. <[http://www.doh.gov.tw/CHT2006/DM/DM2\\_2.aspx?now\\_fod\\_list\\_no=10711&class\\_no=440&level\\_no=3](http://www.doh.gov.tw/CHT2006/DM/DM2_2.aspx?now_fod_list_no=10711&class_no=440&level_no=3)>.

they can implement exchange standards that are more rigid. For example, Taiwan proposed the TMT standard for messaging standards, and Denmark has developed the MedCom standard (EDIFACT and XML) for message handling between systems. Canada has focused on common standards and architectures for interoperability, while the development of individual IT systems is done at the local/regional level (Giokas 2008; Socialstyrelsen 2009).

Canada’s open source (e.g., the Reference Implementation Suite) and pre-certification mechanisms are less rigid and allow each province to meet its unique needs while still attempting to maintain interoperability. An open source strategy allows provinces to share their data structures. Pre-certification allows provinces’ healthcare organizations to select from an assortment of vendors, all of which share common predefined interoperability mechanisms. It appears as though these flexible

strategies were chosen because the Canadian federal government does not have the same authority to mandate national standards as Taiwan and Denmark do. This means Canada Health Infoway can only encourage the use of standards, and they must consider meeting every province's needs. Furthermore, low levels of EMR adoption likely mean that system structures will change over time (Schrader et al. 2009).

### **Adoption of Interoperability Approaches**

From our study of interoperability in three countries, the following emerge as key findings regarding adoption of different approaches:

- **The federal government's ability to mandate standards affected the choice of interoperability strategy**

Denmark and Taiwan's federal governments have the ability to mandate information technologies and standards for healthcare organizations. Therefore, it was feasible for both countries to have implemented local standards such as TMT and EDIFACT in order to minimize impact on existing healthcare systems and meet their actual requirements. On the other hand, the Canadian federal government does not have as direct authority over healthcare organizations.

- **e-Health status influenced the choice of interoperability strategy**

Denmark and Taiwan have already achieved high EMR adoption rates, have made significant advances in health info-structure development and have achieved valued and visible e-Health results. Therefore, it is less likely that data format and system structures will change dramatically over time. As a result, both countries have adopted more rigid terminology and message standards for data interoperability. As Canada has a lower rate of EMR adoption, it is likely that health information system structures and data format will change in the future. Consequently, flexible standards such as SNOMED CT and HL7 are chosen to allow for the varying needs of each province and the changes to health information systems.

- **Differences in geography, population and demographics affected the selection of national strategies toward interoperability**

Canada's population is unevenly distributed through ten provinces and three territories (3.7 people/km<sup>2</sup>), each with its own jurisdictional government. Taiwan and Denmark are much smaller countries with a much larger population density (638.5 people/km<sup>2</sup> and 127.8 people/km<sup>2</sup> respectively) than Canada's. In addition, both countries have a single health governance authority (Taiwan Ministry of Health and Danish Ministry of Health). These are probably also reasons why Canada has adopted an interoperability approach that differs significantly from those of Denmark and Taiwan.

Based on the differing approaches we have uncovered toward interoperability in the three countries examined, several primary factors appear to affect what type of approach may be most suitable under differing country conditions (Schrader et al. 2009):

- **The power of the federal government over healthcare organizations**

If the federal government's governance power over healthcare organizations is wide reaching, then a standard-oriented or common-gateway interoperability model may be recommended. In some situations, the point-to-point-oriented or common-gateway model may be more appropriate.

- **The number of data-exchanging systems**

If health information exchange is limited to only a few systems, then a common standard or interface can be developed quite easily and made to address the needs of healthcare organizations. In such cases, a point-to-point-oriented interoperability model can then be applied. However, if many different types of systems are used in a country, a need arises for mechanisms to exchange data. In such cases, the standard-oriented or common-gateway interoperability model can be used. To meet the needs of many systems, standards cannot enforce rigid data structures.

- **The likelihood that systems will change over time**

Adapting systems around a standard can be an expensive investment. If systems are not likely to change over time, then a standard-oriented interoperability model is recommended, and the standard can be rather strict. However, if a system is likely to change, then the point-to-point-oriented or common-gateway model is more suitable. As well, the standard needs to be flexible to allow for system evolution.

**... if flexible** solutions are truly a goal in Canada, then the Health Information Access Layer (a common-gateway similar model) will benefit future data interoperability.

### **Conclusion**

Canada Health Infoway's proposed EHR conceptual architecture clearly indicates that there will not be just a "one system" EHR nor a central national database. Indeed, each province/territory could be seen as having its "own EHR journey" (Canada Health Infoway 2006). The reasons for the approach are that currently Canada's provinces and territories deliver care through regions in hospitals, community health agencies, primary care clinics, and so forth. In addition, jurisdictions have made some significant advances in health info-structure development, have achieved varied degrees of valued and visible e-Health results, have advanced their use of technology and

have achieved improved information for better health. Because Canada cannot mandate standards and because health information systems will likely grow over time, data exchange mechanisms will benefit from the use of flexible standards such as HL7 because they allow messages to be exchanged between systems using different data structures and coding standards. Finally, if flexible solutions are truly a goal in Canada, then the Health Information Access Layer (a common-gateway similar model) will benefit future data interoperability.

In conclusion, there are many issues associated with the development of interoperable EHRs, such as functional interoperability issues, data instance interoperability issues and metadata interoperability issues. Many previous studies have proposed different methods in the attempt to address these problems. Interoperability methods can be categorized into three models: the point-to-point-oriented model, the standard-oriented model and the common-gateway model. Each has its benefits and limitations. On the national level, considering EHR interoperability strategies, this paper has begun to compare and contrast approaches to interoperability taken in three different countries – Taiwan, Denmark and Canada. **EH**

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