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To Whom It May Concern:

My name is Duane Bender and I am the Research Director at the MEDIC Digital Health Applied Research Centre at Mohawk College in Hamilton. I have been conducting applied research in the area of digital health since 2007, and have worked in over 10 countries on their digital health infrastructure and applications. I have also worked extensively with the Ministry of Health and Long Term Care Ontario, eHealth Ontario and Canada Health Infoway.

This letter was created in response to a request to comment on the question:
"What is the value of the assets of eHealth Ontario?"

Kindest Regards

Duane Bender
Professor, Software Engineering Technology
Research Director, Digital Health
Mohawk College
Hamilton, Ontario

Part 1: Context & Background

Mohawk MEDIC Centre & Innovation Lab

Mohawk College in Hamilton is home to MEDIC (**m**Health and **e**Health **D**evelopment and **I**nnovation **C**entre), an internationally renowned applied research centre in digital health. MEDIC is also home to Canada's only Federally-sponsored Technology Access Centre in Digital Health. MEDIC supports innovation, adoption and commercialization of digital technology into the healthcare sector, with an emphasis on public-private innovation and the involvement of small and medium enterprises (SMEs).

MEDIC's resources include a state-of-the-art laboratory and data centre which houses working test versions of key components of Ontario's Digital Health Ecosystem. This infrastructure is accessible to the digital health community via innovation-lab.ca. By providing the test system, the goal of the Innovation Lab is to enable better public-public and public-private partnerships that would lower the risk, timeline and costs of building digital health systems for Ontario.

The MEDIC lab also contains consumer and commercial grade medical devices, mobile computing devices, simulators suitable for large scale testing, internet accessible private cloud computing facilities, and access to an online, sandboxed version of various global Digital Health ecosystems. All of these assets support rapid prototyping, experimentation and digital health innovation to occur.

Part 2: What are the assets of eHealth Ontario?

Human Capital

Digital Health is a relatively new global industry and one that Canada may seek to provide a leadership role as an innovator and as a champion. Jurisdictional digital health systems are a relatively new concept globally, developing only in the last decade. eHealth Ontario has served as an important capacity building organization for Ontario and Canada in order to support their entry into the future world of ubiquitous electronic medical record systems.

eHealth Ontario has forged through first hand experiences – both successes and failures – people with world-leading skills in the development and adoption of digital health systems. This asset will continue to be important as more and more health systems are digitized if Canada is to avoid being a net importer of knowledge, skills and experience in this area. eHealth Ontario staff have also localized their expertise for the unique needs of Ontario and Canada. Specialist capacity of this type is difficult to manufacture. We have learned through consultation that many jurisdictions, especially outside North America find themselves in a

situation where they are required to import this skill. This asset would be very expensive to dismantle and recreating it or importing it would require an extraordinary amount of time and money. Expert knowledge is an especially critical component when developing public-private partnerships and negotiating with solutions vendors.

Besides the direct knowledge and experience assets inside eHealth Ontario, making continued investments in digital health in Ontario creates a market ecosystem of public and private organizations. These organizations have an opportunity to improve the lives of Ontarians, and also to export their knowledge globally. Lack of investment in Ontario-based digital health organizations will set back an opportunity for Canada to export high value knowledge assets and intellectual property, and will cause Ontario to simply be a consumer of goods from other regions.

Legal Agreements

A large component of what eHealth Ontario does is act as the agency to hold and operate various transfer payment and data sharing agreements with various regional programs and services. One should be extremely careful when considering organizational changes to avoid disrupting important regional programs and services that rely on these agreements. A deeper look into these programs is required to ultimately determine if they should continue and/or where the agreements should live. Local stakeholder consultation is likely required.

Centralized Records & Information Exchange Systems

(HIAL, cGTA, cSWO, etc.)

Over 80% of doctors in Ontario have adopted electronic systems in their offices. This leads to better efficiency at a local level however it does not necessarily allow for better system wide efficiency, and more importantly this data is not flowing to the right party at the right time to be used in the course of care throughout the patient journey. The eHealth Ontario health information access layer (HIAL) system was envisioned as the back-office system that would connect all of the individual systems together – the "interac™ network" for health information exchange in Ontario. eHealth Ontario has also built large-scale clinical repositories to store individual health records, the largest being Connecting GTA or cGTA.

Much of the detailed health record information is likely to only be useful at a local or regional level and may not be suitable to be shared in a central repository for the Province, either for clinical care or for health system improvement purposes. It is therefore not clear to this author whether a centralized massive health records repository for clinical use is warranted. However it is clearer that a central agency should manage centralized lists of patients, providers and other key pieces of information required to make policy and care delivery choices and to implement privacy and security controls. More specifically authentication, authorization, identity management, privacy and audit are more effective if they are centrally

managed. Limited important clinical data could also be shared at the provincial level for safe care delivery and to support data-driven policy decisions. If standards are effectively used, local, regional and provincial systems would be able to exchange information on demand as required.

Health Information Exchange Standards

Health information exchange and vocabulary standards (collectively referred to as "standards" here) are extremely important in the digital health environment. Standards contribute to patient safety by the consistent interpretation of data and standards lower integration costs, timelines and project risks by re-using known interfacing approaches, and much more. eHealth Ontario manages the provincial standards for health information exchange and this could be a very valuable asset for Ontario. The current standards in use used by eHealth Ontario are at end of life and need to be re-considered moving forward.

eHealth Ontario to a large degree has followed the direction of Canada Health Infoway and the Electronic Health Record System (EHRS) Blueprint which specified architecture and standards to be used in the development of digital health systems in Canada. Infoway acts as a strategic funder to projects in Provinces that follow Infoway's model. Arguably one misstep along the way was the selection of the pan-Canadian standards to be used for the exchange of health information. Infoway choose to adopt the messaging standards[1],[2] of the Health Level 7 (HL7) organization, a global not-for-profit agency that develops health information data exchange structures and vocabulary to achieve interoperability between disparate health care systems. Specifically Infoway specified the use of HL7 Version 3, a relatively new, untested standard. The choice to use HL7 Version 3 (circa 2006) was made with the best information available at that time but ultimately negatively impacted development projects at eHealth Ontario and across the country. This standard turned out to be extremely complex and was claimed by some to be "un-implementable" in practical terms. eHealth Ontario inherited this pan-Canadian decision as project funding in many cases was tied to the use of those specific "standards". This issue alone caused substantial delays and cost overruns in many eHealth projects in Ontario and across Canada, and continues to be a burden of adoption today. The HL7 organization itself has acknowledged the deficiencies of Version 3 and has for the most part abandoned its' development. In recent years HL7 has developed and released a newer more practical set of standards called FHIR (pronounced "fire") that are being used for new developments.

The market for health IT systems that service government and large agencies is actually quite small in terms of the number of organizations or buyers in a particular jurisdiction. The only

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[1] https://infocentral.infoway-inforoute.ca/2_Standards/1_pan-Canadian_Standards
[2] https://www.infoway-inforoute.ca/en/component/edocman/390-ehrs-blueprint-v2-summary/view-document?Itemid=101

way to achieve economies of scale is to sell to a global market. In turn, the only way to lower procurement costs is to develop solutions with many customers in a global market. Therefore the use of globally accepted standards is preferred if possible.

The digital health industry in Canada is highly supportive of the use of standards. *ITAC Health* is an association of Canadian firms who provide products and services in the healthcare sector. In the spring of 2016, ITAC Health surveyed its members on the topic of healthcare interoperability standards. The survey report is currently in draft form, but early analysis shows that ITAC members felt that Canada would benefit from the following policy recommendations. The first recommendation being that Standards should be the same across Canada. Members also felt that Canadian jurisdictions should choose standards that are commercially established internationally, particularly those established in the U.S. ITAC members also felt that Canadian jurisdictions should phase out the use of HL7v3, and promote the adoption of IHE/XDS and FHIR (the FHIR standard is currently under development; as such the FHIR profiles promoted within Canada should be prioritized according to the stability and commercial adoption of those profiles). And finally, Canadian public healthcare RFPs should mandate compliance with interoperability standards on procured software systems. Specifically, ITAC Health would support mandating demonstrable interoperability such as can be confirmed through successful testing at jurisdictional, regional, national or international "Connectathons", or certified by an accredited, independent testing/certification body.

The lack of effective management of standards will dramatically increase the lifecycle cost of provincial health IT systems. However, if managed effectively, provincial standards for health information exchange will continue to be an important asset for the Province.

Intellectual Property

It is unlikely that protectable and/or commercializable software or technology IP exists inside eHealth Ontario. If it does, it is unlikely that it was properly registered and protected and even less likely that it is commercializable (sellable) to another agency due to extensive customization for the Ontario environment and dependencies on vendor products.

It is possible, that a potentially valuable asset of interest for research and development in both the public and private sectors could be the data inside the patient records themselves. In the long term, Ontario should have a well-defined policy for the research use of this data, either in raw, aggregated, de-identified or anonymized forms. Large patient datasets in other jurisdictions have been considered to be valuable assets when working in public-private partnerships, however this information must be treated with extreme sensitivity.

Consumer Brand and Goodwill

The consumer brand of eHealth Ontario is likely a liability.

Part 3: What is the value of the assets of eHealth Ontario?

In general, this is a very difficult question to answer. eHealth Ontario is effectively an Information Technology cost centre for the Province, an organization responsible for building and operating secure electronic patient records systems. The vast majority of eHealth's budget in 2015 was either for operating costs (mainly salaries) or capital investment in computer hardware and software, which by their nature are depreciating assets.

eHealth Ontario is also a catalyst in the coordination, funding and development of several regional systems, acting as a transfer payment agency, so in many cases funding flows directly "through" eHealth Ontario budgets towards regional programs and eHealth staff assist in defining these programs.

In this author's opinion, one should focus on cost reduction and cost avoidance arguments when discussing the value of eHealth Ontario. For example for a given service, one must decide if the service being provided is worth continuing. If not, then a cost reduction can be realized. If one determines that the service must be continued then the cost cannot be avoided. The cost could possibly still be reduced by utilizing a different provider or techniques however it must be provided by one agency or another.

Value of Human Capital

Much of the investment in eHealth Ontario has been in the salaries of staff. eHealth Ontario has been an investment in capacity building and expertise in the field of digital health. Being fairly specialized and a relatively new industry, there is not a large supply of qualified personnel available in this field. Special attention should be paid to maintaining valuable human capital, especially those that can act in the best interests of government when working with the private sector. The costs of rebuilding this capacity are very high.

Value of Legal Agreements

The value in the many (hundreds or possibly thousands) of legal agreements that have been established between various agencies is in the avoidance of costs of re-performing this work. Preserving this asset would potentially avoid a large cost of re-working data sharing and transfer payment agreements, which are often with other public sector agencies thereby creating a doubling of public costs of re-work. For example if the agreement is with a hospital there would be an equivalent cost on the hospital side renegotiate an agreement with a different organization.

Value of Centralized Records and Information Exchange Systems

Studies commissioned by Infoway have indicated that, once they are in place, EHRs will save an estimated $16 billion[3] each year across Canada. Will the cost savings and efficiencies be realized for Ontario? This is an important question. Assets that are now in place could potentially avoid future costs and this must be looked at carefully. The author is not aware of any recent study conducted for Ontario that could help to answer these questions, however there are obvious direct and immediate benefits to using systems such as digital imaging and electronic lab results that are in place today.

Value of Intellectual Property

It is unlikely that there are software or technical intellectual property assets of value inside eHealth Ontario.

Value of Consumer Brand and Goodwill

In the opinion of this author the public consumer brand of eHealth Ontario is a liability. Public opinion remains very negative after accusations of waste during previous administrations and the media continues to refer to eHealth Ontario as the "beleaguered" agency even several years later[4].

Lack of public goodwill has a direct impact on personnel as well. Morale suffers and it is more difficult and costly to attract higher caliber staff because of the reputation of the agency.

Part 4: Moving forward

The healthcare system in Ontario is an extremely important public institution. Further digitization of the healthcare system needs to happen. There is no option to return to paper-based systems. We need find better ways to do this.

Aspects of doing better include having a well-defined strategic focus; balancing governance vs. making progress; using best practice methodologies for systems development such as agile approaches; involving end-user stakeholders such as clinicians more directly in the process; making more strategic use of key partners and the private sector; embracing innovation; benefiting through the strategic adoption of technological change; adopting market changes such as consumer access to health data; and continuously seeking the best value for money available.

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[3] https://www.infoway-inforoute.ca/en/component/edocman/3098-annual-report-2015-2016/download
[4] http://business.financialpost.com/legal-post/ontario-ehealth-class-action-certified

Strategic Focus

The role of Government in the adoption of digital health overall should be clearly defined, regardless of agency or division. An overarching strategy should be issued, defining the roles of the future. Roles could include funders, regulators, governors, policy enforcers, data owners and other key players.

With respect to existing agencies, each should be asked what role they are uniquely positioned to perform. Currently, eHealth Ontario performs important roles such as architecture, standards and procurement but more attention could be spent on industrial research & development (innovation as opposed to investigator-led research), testing and conformance and certification/accreditation in the future.

Governance vs. Progress

Digital health development in Ontario has traditionally been a very opaque closed process. A very high degree of governance was also put in place at eHealth Ontario which slows down the operation considerably. This is not beneficial in a technology environment. Ideally the agency can find a better balance between governance and delivery as there is a need for innovation and agility.

Methodology

Digital health systems should be designed and built using modern best practice methodologies of incremental and iterative development. Older "waterfall" style methods which are commonplace in Ontario today require intensive upfront design without validation and create unclear procurement requirements. A more agile approach is recommended for new development projects and procurements in the future.

Clinician Engagement

Future system requirements should be done with more direct involvement of end-users, especially clinicians. End-users should have more direct influence over prioritization of systems being built.

Collaboration & Private Sector Involvement

A strategic use of private sector innovation and efficiency should be utilized. This must be done in a very precise way and ensure that value for money and public sector principles that serve the citizens are achieved, such as ensuring that data ownership and access is properly enforced by government. Agency staff must also be sure to protect public resources and manage operating costs, for example by ensuring that contract lengths are of a reasonable duration and that IT vendor lock-in is avoided.

Additionally, operational roles should always be evaluated on a value for money basis – i.e. if it is not a strategic role can it be done in the private sector at a lower cost?

Innovation

Where does one go with a good idea? There is currently little or no ability to innovate within the current system, especially for organizations outside the Provincial government. To this author's knowledge there was also no significant industrial research and development being conducted at eHealth Ontario. The agency was primarily a technology procurement organization. A future recommendation would be to introduce a better balanced approach between research, prototyping, procurement and partnership. We feel that partnerships such as innovation-lab.ca are a strong movement in the right direction for digital health innovation in Ontario.

Technological Change

The technology world continues to evolve at a rapid pace. Right now, for example, there is a dramatic shift happening towards cloud computing and mobile technology. Has eHealth Ontario positioned itself to benefit from these changes? Is there a mechanism in place to assess new technology and the related business impacts?

Consumer Access

A paradigm shift is occurring whereas while previously systems were developed for clinicians they are now, more and more, being developed for consumers. There is tremendous pent up demand for consumer access to health data – how will the government establish a model for this exchange of information?

New health information systems that allow patients direct access to and control over their personal health information are becoming more common. For the systems to exchange information properly, the vendors of these new systems will need to offer solutions that are compatible with the systems that have already been funded. Infoway has launched a certification service to ensure that consumer health solutions available for sale meet the requirements for privacy, security, and compatibility. Will further steps be needed in Ontario to ensure that consumer health solutions or personal health records are compatible with EHR systems already in place?

Value For Money

Many IT services are operational in nature and are not highly specialized for healthcare. There should be a clear distinction between strategic and operational services and what activities can be conducted for best value for money.

[END]