

Ministry of Health and Long-Term Care

Hospital Information System Renewal Panel Report

August 5, 2016

PREPARED BY: HIS RENEWAL ADVISORY PANEL SECRETARIAT



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Table of Contents

Acknowledgements.....	4
Executive Summary.....	7
Strategic Context.....	7
Key Concepts.....	9
Envisioned Future State	10
Recommendations	12
Introduction.....	15
Ontario's HIS Landscape	17
Challenges and Opportunities.....	20
Our Advice on HIS Partnering	24
Strategic Context.....	24
C1 Recommendation – HIS Partnering	25
C2 Recommendation – Approach to HIS Partnering.....	27
C3 Recommendation – Leveraging Existing HIS Instances.....	28
C4 Recommendation – HIS Partnering Exemption Requests.....	30
C5 Recommendation – HIS Partnering Maturity Path	31
Implementation Considerations	32
Our Advice on HIS Clinical Adoption & Outcomes.....	34
Strategic Context.....	34
A1 Recommendation – HIS Community of Practice	35
A2 Recommendation – Knowledge Sharing Strategy	36
Implementation Considerations	38
Our Advice on HIS Procurement	41
Strategic Context.....	41
P1 Recommendation – Seeking Policy Approval Enabling HIS Partnering.....	42
P2 Recommendation – Provincial HIS Renewal Procurement Guidelines.....	43
P3 Recommendation – Accelerating Innovation	44
Implementation Considerations	45
Our Advice on HIS Financing	47
Strategic Context.....	47
F1 Recommendation – HIS Costing Standard	50
F2 Recommendation – HIS and Health System Funding Reform Predictor Tool.....	51
F3 Recommendation – HIS Total Cost of Ownership Standardized Tool.....	51
F4 Recommendation – HIS Investment and Hospital Funding	52
Implementation Considerations	52
Moving Forward.....	54
The Future of HIS Renewal.....	54
G1 Recommendation – Enabling integrated Health Care Services.....	55
G2/G3 Recommendations – Extending the Panel's Mandate	56

Appendix A – Panel Terms of Reference.....	57
Appendix B – HIMSS Analytics EMR Adoption ModelSM (EMRAM).....	60
Appendix C – HIS Renewal Secretariat	62
References.....	63
Glossary.....	64

List of Figures

Figure 1 - HIS partnership maturity path.....	9
Figure 2 – Shared HIS Instances in Ontario	18
Figure 3 – HIS Vendor Analysis in Ontario (based on number of hospital beds)	19
Figure 4 – HFSR Overview.....	48

Acknowledgements

The Hospital Information System (HIS) Renewal Advisory Panel (the “panel”) benefited greatly from the expertise and on-the-ground experience of its membership, whose insight helped to shape and inform the panel’s work. Members performed a deep analysis of the current state of HIS renewal in Ontario, identified and investigated strategic options on a go-forward basis, both for the short-term and the long-term, and provided strategic direction and specific recommendations to the eHealth Investment and Sustainment Board in order to achieve outcomes that are aligned with Patients First objectives and improve the delivery and integration of care in Ontario.

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Finally, we wish to acknowledge the support of the PricewaterhouseCoopers for their advisory services.

Members of the HIS Renew Secretariat are listed in Appendix C.

Executive Summary

Strategic Context

HIS renewal is an opportunity to transform Ontario's fragmented HIS landscape into a platform for a high-performing, patient-centred health care system.

Patients First: Action Plan for Health Care is the next phase of Ontario's plan for changing and improving Ontario's health system, building on the progress that's been made since 2012 under the original Action Plan for Health Care. It exemplifies the commitment to put people and patients at the centre of the system by focusing on putting patients' needs first.

In support of the *Patients First* plan and acknowledging the significant changes in the health sector and the opportunities created by advances in technology since the original 2008/09 eHealth strategy, the ministry has initiated the eHealth 2.0 strategy as an initiative to enhance how ehealth effectively supports and enables the Ministry's business priorities and the next phase of health system transformation. It will also establish and provide a clear understanding of the government's key ehealth directions and priorities.

As a leading element of the eHealth 2.0 strategy initiative, HIS renewal represents an opportunity to advance Ontario's *Patients First* objectives by helping transform Ontario's fragmented HISs into a platform for a high-performing, better connected, more integrated, and patient-centred health care system.

This is especially important given the fact that HISs represent approximately 75% of the health care system's capacity relating to information systems and associated resources^[1].

HIS investments to-date have provided hospital-specific improvements in service quality and efficiency, but from a system perspective, it has also generated duplication of effort and resources across hospitals, and a lack of standardization.

The first generation of HIS investments were made independently by hospital organizations to create hospital-specific value focusing on efficiencies and quality improvements through automation:

- This resulted in a high degree of variability among hospitals with respect to levels of investment, capacity, maturity of implementation, and utilization and benefits realized with respect to internal efficiencies and patient outcomes.
- As a result, duplication of effort and resources across hospitals, and internally a lack of standardization with

respect to data and clinical models, emerged. This is reflected in change management costs which contribute a sizeable part of the HIS Total Cost of Ownership (TCO).

HIS investments are moving towards partnership models that build on existing relationships to move onto shared HIS instances and services, and increasingly driven by evidence of quality of care and health system integration benefits.

The next generation of HIS investments (forecasted under current conditions to be in the \$2B range^[2]) now underway is seeing movement towards partnership and collaboration to increase value spurred by an environment of fiscal constraint:

- The focus on partnership will initially build on existing relationships to move onto common, shared HIS instances and services with a goal of realizing efficiencies and economies of scale, as well as accelerated hospital adoption of electronic health information and clinical functionality for hospital-specific enhanced patient outcomes.
- Increasingly driven by evidence that appropriate clustering of hospitals (patient referral based, geographic based on shared patient population, or thematic- based on clinical specialty) for common HIS services can lead to additional benefits associated with improved quality of care and health system integration.
- While HIS installations are converging to a limited number of HIS vendor products, there still are more than 80 separate HIS instances^[3], thus suggesting that more partnering opportunities must exist.

The hospital sector and LHINS are looking at HIS partnering models as a mean to generate increased benefits while minimizing overall HIS costs.

It is generally acknowledged that, if left to evolve organically under current conditions, this generation of HIS renewal will likely fall far short of realizing the potential value and benefits from current and future investments.

There is a strong demand from the sector and LHINS for direction and an enabling framework for HIS Services delivery, particularly with respect to clustering and related models for increased value of HIS investments.

. Funding and procurement are related key themes that must also be explicitly addressed within this framework.

Key Concepts

Defining clustering

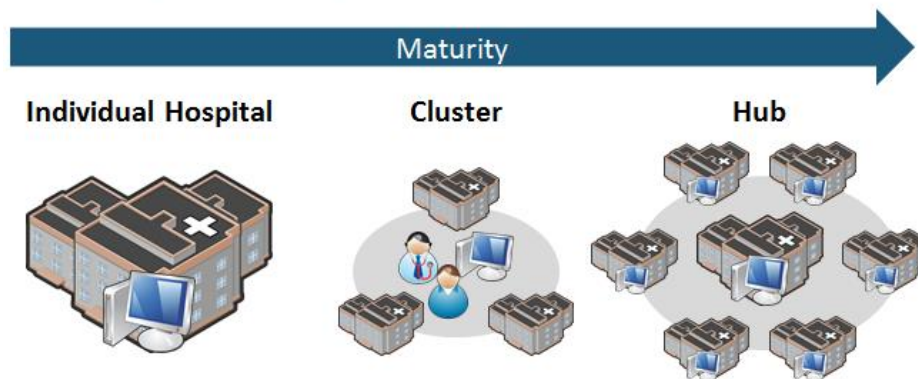


Figure 1 - HIS partnership maturity path

HIS Cluster

A group of hospitals that have partnered to support patients through use of a shared HIS (typically of a lead hospital).

The panel has defined a “HIS Cluster” as a group of hospitals that have partnered in some capacity to support patients through the use of a shared HIS instance, typically under the lead hospital.

Hospitals within a cluster typically share an affinity that is conducive to sharing an HIS instance. Such affinities include:

- shared patient population and referral patterns,
- part of an integrated regional health network, and
- common areas of clinical specialization.

Sharing a common HIS would result in increased benefits associated with patient outcomes and health system integration. Additional benefits of HIS clustering are realized from adopting common cluster solutions beyond core HIS services, for example: DI/PACS, eReferral, ePrescribing, medication management, care planning, decision support and advanced analytics, as well as extending these solutions across the continuum of care, all of which become more tractable where there is a common HIS.

HIS Delivery Hub

A more formal HIS cluster arrangement that would focus on advanced use of shared HIS services along with distinct governance and well-defined accountabilities of all parties.

The panel defined a “HIS Delivery Hub” as a more formal HIS cluster arrangement that focuses on the advanced use of shared HIS services along with a clear delineation of the hub governance distinct from participating hospitals, and with well-defined accountabilities of all parties, in order to avoid potential conflict of interests.

An HIS delivery hub would typically be hosted by a larger lead

hospital, leveraging the advances and critical mass that larger hospitals have been able to achieve with respect to HIS implementations. The hub's mandate for its HIS service-provider role would be grounded in its core clinical and program mandates and associated relationships with other cluster hospitals.

HIS delivery hubs would represent a scale and concentration of specialized resources that would offer a balance of efficiencies and economies of scale while still reflecting regional variability inherent in Ontario's health care system. They would represent a critical mass and advanced state of maturity capable of driving ehealth innovation and adoption on an ongoing basis.

Envisioned Future State

Most Ontario hospitals will be part of HIS clusters. Some HIS clusters are expected to morph into or spawn more advanced HIS delivery hubs. All the while, the number of distinct HIS vendor solutions will be reduced from their current levels.

We envision a future state where Ontario hospitals participate in HIS clusters and delivery hubs:

- The large majority of hospitals will be part of a HIS cluster on the basis of common patient population or clinical affinity, for the purposes of adopting/utilizing a common HIS service. However, some of the largest hospitals are likely to retain single HIS instances.
- The majority of HIS clusters will have completed their transition to a common HIS instance or be well on the way. As a result, most hospitals will be out of the business of operating core HISs.
- Some HIS clusters will have morphed into or spawn more advanced HIS delivery hubs, for example around specific HIS vendor solutions.
- HIS delivery hubs will be an integral part of a mature provincial ehealth program and have an increasing role in addressing the ehealth and health informatics requirements of patients and health service providers.
- The number of distinct HIS vendor solutions is expected to be reduced from current levels.

HIS investment benefits include:

- Enhanced patient outcomes,
- Better health system integration,

Hospitals will fully benefit from HIS investments:

- The value from HIS investments will have increased

- *Greater economies of scale*
- *Advanced HIMSS Analytics EMRAM maturity level reached*
- *HIS ecosystem open to consumer and clinician applications.*

significantly as a result of enhanced patient outcomes, greater health system integration, increased efficiencies and better economies of scale.

- All hospitals will be utilizing appropriate HIS services at a higher maturity level on the HIMSS Analytics Electronic Medical Record Adoption Model (EMRAM) scale (see Appendix B) with respect to their utilization of standardized/best practices associated with electronic health information and clinical applications.
- Hospitals, affiliated health service providers (HSP) and their patients/clients will be able to easily access and utilize the emerging ecosystem of consumer and clinician applications in conjunction with their core HIS services via a wide range of channels, devices and solution providers, thereby ensuring flexibility, responsiveness and innovation at all scales.

Standardized HIS services:

- *Standardized with respect to evidence-based best practices*
- *Standardized infrastructure with predictable costs and performance*
- *Integration with provincial ehealth assets*
- *Active Community of Practice to facilitate adoption*
- *Comprehensive measurement models for benefits and outcomes*

Hospitals will fully leverage standardized HIS services:

- HIS services will be standardized with respect to evidence-based best practices (business and clinical), helping to ensure province-wide, equal access to quality health care services.
- HIS services will have evolved into standardized infrastructure-type services with predictable and measurable costs and performance.
- Province-wide sharing of health information will be achieved through integration of HIS clusters and delivery hubs with provincial ehealth assets, which becomes tractable (technically and financially) as a result of fewer points of integration; this also contemplates integration opportunities with other sectors (*see comments from last board meeting).
- There will be an active Community of Practice that will facilitate the ongoing adoption of evidence-based best practices with respect to the application of IT and health informatics.
- Hospital clusters will be well down the path of working with LHINs and other HSPs towards integrated health care networks more generally,

contributing to the patient-centred health care system envisioned in the ministry's Patients First and LHIN Renewal initiatives.

- Comprehensive models for the measurement of benefits and outcomes associated with investments in and application of HIS and other eHealth services will have been developed and implemented.
- Performance measurement and related funding of HSPs with respect to the effective application of IT and health informatics is fully integrated with performance measurement and funding related to patient and health system outcomes more broadly.

Recommendations

In order to achieve the future state described above, the panel tables the following recommendations as advice to the eHealth Investment and Sustainment Board to advance the objectives of Patients First and eHealth 2.0.

HIS Partnering (Cluster/Hub) Recommendations

- C1** When undertaking HIS renewal, hospitals must form HIS clusters to maximize the value of current and future investments.
- The panel will develop a framework to define the value proposition, with a focus on measurable patient benefits to be achieved as a result of HIS investments.
- C2** Hospitals must work with Local Health Integration Networks (LHINs) and other partners to assess geographic clustering options and non-geographic alternatives as supported by patient referral patterns and a comprehensive, value-based analysis.
- C3** Prior to initiating a return to market, clusters must leverage existing HIS installations where informed by the results of a comprehensive value-based analysis.
- C4** The ministry should set an expectation that very few exemption requests will be considered for recommendations C1-C3 and that hospitals pursuing a related exemption will need to meet a high approval threshold from the eHealth Investment and Sustainment Board.
- C5** The panel will develop a provincial strategy to define a maturity path that fosters the capacity for high-performing hubs to ensure a sustainable, long-term approach to managing HIS investments.

HIS Clinical Adoption & Outcomes Recommendations

- A1** The ministry will work with hospitals to draw on existing resources and networks of health care professions to formalize an HIS Community of Practice that supports the acquisition, implementation, and optimization of HIS systems.

This HIS Community of Practice, once established, will share high-value clinical and business assets that support the evidence-based standardization of clinical practices within hospitals.

- A2** The panel will propose strategies to better deploy and share the knowledge and expertise of clinical, IT, and decision-support professionals through on-the-ground support and training.

HIS Procurement Recommendations

- P1** The ministry should make it a top priority to seek appropriate policy approval to enable hospitals to join existing peer HIS installations, where there is a strong clinical and financial business case for doing so.
- P2** The ministry should promote general HIS procurement best practices by releasing a provincial HIS Renewal Guideline that supports the sector in structuring multi-tenancy procurements, while clarifying best practices on data and interoperability standards as promoted by the Canadian Institute for Health Information and eHealth Ontario.
- P3** The ministry should create opportunities for meaningful dialogue between hospitals and the vendor community to accelerate innovation.

HIS Financing Recommendations

- F1** The Panel will develop cost standards for hospital accounting and coding to allow for more accurate projections of HIS-related expenses, and in turn support the effectiveness of ministry funding models.
- F2** The OHA, with the support of the ministry, should modify the current Health System Funding Reform Predictor Tool so that hospitals can better understand local impacts that may result from HIS investments, while also validating these impacts at a provincial level.
- F3** The Panel will support the development, approval, and use of a standardized tool to calculate the Total Cost of Ownership of HIS renewal activities.
- F4** The panel will continue to explore how the Health Based Allocation Model (HBAM) and other funding models can support the adoption of evidence-informed practices related to HIS investments.

HIS General Recommendations

- G1** The ministry should, with the continued support of health system partners, provide clear direction to the sector that coordinated Hospital Information System (HIS) investments are integral to effective patient-centred health care services, cross-sector integration and provincial connectivity.
- G2** The ministry should, with the continuing support of health system partners, extend the mandate of the HIS Renewal Advisory Panel to create an implementation plan for these short-term recommendations, and to develop additional medium-term recommendations for consideration by the eHealth Investment and Sustainment Board.
- G3** The ministry should, with the continuing support of health system partners, work with the Ontario Hospital Association (OHA) to engage its members on the implementation plan for HIS renewal, as endorsed by the eHealth Investment and Sustainment Board.

Introduction

Ensuring that technology systems facilitate the delivery of integrated, patient-centered care is critical to Ontario's Patients First Action Plan and the health care system transformation agenda.

Patients First, our government's action plan for the next phase of health care system transformation, is designed to deliver on one clear promise: to put people and patients first by improving their health care experience and their health outcomes. Ontarians will have better and faster access to quality health services. They will have better information so they can make decisions that will help them live healthy and stay healthy. Ensuring that technology systems are available to facilitate the delivery of this integrated, patient-centered care is a critical component of the plan.

The ministry is leading a refreshed eHealth 2.0 strategy in consultation with stakeholders from across the health care sector.

Ontario is currently refreshing its provincial ehealth strategy in order to advance the objectives of Patients First. The new ehealth strategy, once approved by Cabinet, will provide faster access to care through innovative ehealth delivery channels; connect clinicians to integrated, comprehensive patient health information; empower patients and caregivers with access to tools and information; and provide new ways to manage ehealth investments to ensure a fiscally sustainable public health system. The Ministry of Health and Long-Term Care ("the ministry") is taking a lead role in developing this refreshed strategy, in consultation with stakeholders across the health care sector.

The eHealth Investment and Sustainment Board was established to advise the ministry on eHealth Strategy 2.0 and to monitor its implementation.

The ministry has established the eHealth Investment and Sustainment Board ("the board"), chaired by the Deputy Minister on behalf of the Minister, to be the focal point for engaging the health system in the renewal of the provincial ehealth strategy. The board's mandate, set by Minister Hoskins, is to provide advice to the ministry on eHealth Strategy 2.0, and once approved, to monitor its implementation.

The time-limited HIS Renewal Advisory Panel is to advise the board on HIS investments in Ontario.

Taking into account evidence from the field and requests for provincial engagement, the board motioned to establish the Hospital Information System Renewal Advisory Panel, as part of eHealth Governance 2.0, during the board's inaugural meeting in March 2015. This time-limited panel was established with a mandate to provide recommendations to the board that maximize the patient benefits and value for money derived from current and future HIS investments in Ontario. The panel's Terms of Reference are provided in Appendix A.

The panel focused on the most urgent issues with a commitment to delivering short-term recommendations for maximizing HIS investment value.

The panel set out to achieve this mandate within a six-month term, thus necessitating a focused analysis of the most urgent issues. There was also acknowledgment that the panel's mandate might need to be extended past its term based on the progress achieved.

The purpose of this report is to detail the panel's recommendations for maximizing the value of Ontario's HIS investments within a 6 month horizon. The report also recommends follow-up work in order to fully realize the potential of HIS investments in Ontario.

The panel acknowledged the importance of balancing multiple priorities when undertaking HIS renewal, for example, the clinical and business needs of individual hospitals contrasted with the legislative mandate of LHINs and their efforts to maximize the benefits of regional integration.

Early on, the panel recognized the importance of providing recommendations that:

- acknowledge the need to allow individual service providers to make timely decisions that meet their clinical and business needs,
- direct resources to most effectively and efficiently advance health system transformation,
- comply with the Broader Public Sector Accountability Act and its Procurement Directive,
- recognize the legislative mandate of LHINs and their efforts to maximize the benefits of regional integration, and
- leverage the integration infrastructure services being implemented by eHealth Ontario.

The panel's ultimate aim is to support hospitals as partners in health system transformation, by maximizing the contribution of HISs to the delivery of quality, cost-effective, patient-centered care.

It is our hope that these recommendations will further the objectives of Patients First by improving access to information for clinicians so they can provide patients with timely access to the right care; enhance connectivity and integrated care; allow for improved information flow to both provider and patients; and, ensure that we are getting the most value out of every dollar we spend on HIS investments.

Ontario's HIS Landscape

HISs and their ancillary applications integrate the management of clinical, administrative, and financial aspects of hospitals.

A hospital information system ('sometimes referred to as 'clinical information system' or 'electronic medical record') is a comprehensive, integrated information system designed to assist with the management of the clinical, administrative, and financial aspects of a hospital^[4].

Typically, hospitals purchase enterprise solutions that provide information management requirements for multiple business areas. These solutions are often augmented with specialized ancillary applications.

Ontario hospitals average approximately 3 on the HIMSS Analytics Electronic Medical Record Adoption Model (EMRAM) 0 to 7 scale, comparatively low in realizing the full potential benefits of their HIS solutions.

The HIMSS Analytics Electronic Medical Record Adoption Model (EMRAM) stage 0 to stage 7 scale (see Appendix B) is a widely used benchmark against which hospitals measure their progress towards achieving a paperless patient record environment^[5].

On average, Ontario hospitals function at an EMRAM score of approximately 3, meaning that they have lab, radiology and pharmacy ancillary systems, as well as nursing/clinical documentation, all integrated with a Clinical Data Repository (CDR). Hospitals at this level also have a computerized or electronic Medication Administration Record and an integrated Picture Archive and Communication System (PACS). However, hospitals at this stage may not have implemented Computerized Practitioner Order Entry (CPOE), closed loop medication administration, structured physician documentation or data analytics functionalities^[6]. While HISs offer a wide array of functional capabilities, many hospitals don't make full use of this functionality as these system capabilities have to be implemented in tandem with hospital clinical and administrative process improvement initiatives.

The maturity of HIS solutions depends on both the digitization of traditionally paper-based hospital records and processes, and the ability of the hospital to leverage the data analysis and data sharing capabilities of its system to improve the quality and efficiency of patient care, beyond what would be possible with a paper-based system. Benchmarking Ontario hospitals against the EMRAM scale provides a reasonable estimation that most hospitals are at a relatively low level of maturity and are not yet realizing the potential benefits of their HIS solutions.

Approximately 59% of Ontario hospitals

Many hospitals in Ontario (~59% at time of writing) are sharing

currently share their HIS instance with their peers in some capacity.

an HIS instance with their peers^[7]. These shared HIS instances are usually geography based. Some of these collaborations can be considered to be HIS clusters, that is, as groups of hospitals that have partnered in some capacity to support patient care through the use of a shared HIS.

Some of the more advanced HIS partnerships may morph into HIS delivery hubs, that is, as clusters that focus on the advanced use of shared HIS services, along with distinct governance, and clear delineation of the governance roles and accountabilities of member hospitals.

Still other hospitals operate stand-alone HIS solutions managed independently from their peers. These hospitals are usually too large to benefit from economies of scale (e.g., University Health Network) or do not have a consistent referral pattern in the region (e.g., Mount Sinai). Often hospitals operating standalone HIS instances have already invested in their HIS systems to gain the desired level of functionality.

46% of Ontario hospital beds (and 59% of Ontario hospitals) participate in a shared instance

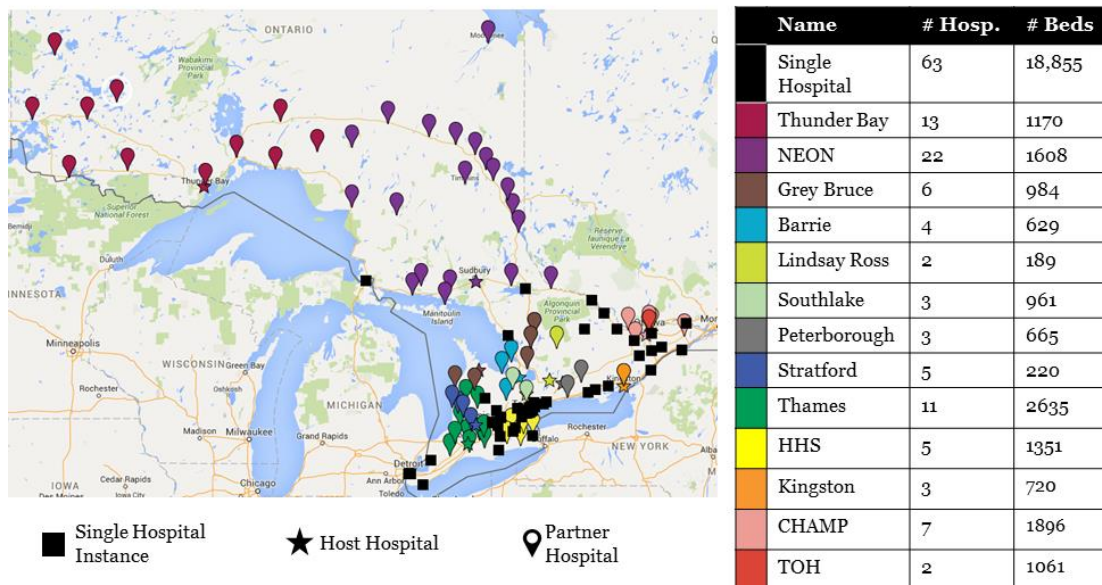


Figure 2 – Shared HIS Instances in Ontario

As per diagram below, four vendors dominate the Ontario HIS market: Meditech, Cerner, McKesson (to be discontinued in 2018) and Quadramed.

More than 80% of Ontario hospital beds are currently leveraging 1 of 4 vendors – Meditech, Cerner, McKesson, and Quadramed (see diagram below)^[8]. Note that McKesson has announced the termination of support for their Horizon Platform on March 31st, 2018^[9].

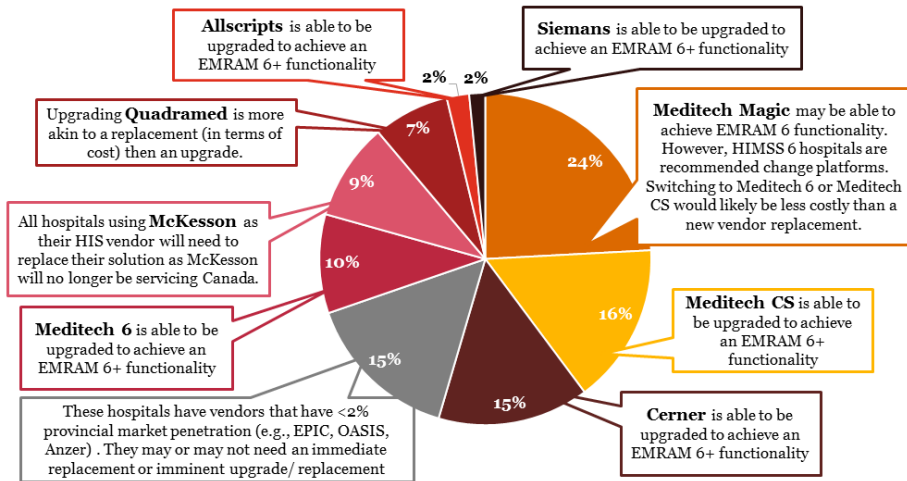


Figure 3 – HIS Vendor Analysis in Ontario (based on number of hospital beds)

OHA 2015 survey indicates a critical mass of hospitals are planning major HIS renewal activities due to end of life technology, and are actively considering partnering with their peers on procurement, implementation and service delivery.

A February 2015 survey conducted by the Ontario Hospital Association indicated that^[10]:

- 35% of Ontario hospitals are currently implementing or have recently completed an upgrade or replacement,
- 37% of Ontario hospitals plan to replace their HIS solution within the next two years (n=97),
- 70% of the hospitals that are completing or already have completed an upgrade or replacement chose to do so in partnership with their peers,
- 89% of the hospitals planning to replace their existing solution within the next 2 years are very likely or certain to partner with peers when making these HIS investments (n=34).

Survey respondents indicated that collaborations are equally as likely to include collaboration in procurement, implementation and service delivery^[11].

The ministry requested a time-limited HIS procurement pause to allow the panel to deliver its recommendations before the vast majority of these hospitals return to market.

Recognizing that hospitals and their partners are at various stages of HIS procurements, the ministry requested that hospitals pause their HIS procurements (including partnering with other hospitals to leverage existing contracts) to allow the panel to provide advice on how to best address hospital HIS renewal activities moving forward.

The panel was also asked to support the ministry in assessment of any requests from hospitals with an urgent need to proceed with HIS procurement activities during the pause period. Hospitals making such requests were asked to make a submission to the panel demonstrating necessary due diligence, including a strong partnership model, procurement

and financing plans.

With such a large proportion of Ontario's hospitals seeking new systems to enhance their delivery of quality patient care, the time is right to identify strategies for provincial alignment to enable health system transformation as part of Patients First. It is within this context that the HIS Renewal Advisory Panel set out to understand the issues and opportunities associated with HIS renewal.

Challenges and Opportunities

Ontario's average HIS EMRAM score is lagging other jurisdictions.

Key challenges:

- *Finding ways to increase HIS maturity at a cost commensurate with benefits*
- *The lack of tools to determine the suitability of developing strategic HIS partnerships*
- *Defining HIS requirements for multiple hospitals as part of joint procurements*
- *Identifying appropriate governance and cost-sharing structures*
- *The additional resources needed for host hospitals*
- *Blending HIS collaboration with broader regional planning requirements*

Key opportunities:

- *Partnerships are viewed as a way to improve HIS maturity while providing value for money*
- *Sharing patient information is easier when hospitals deploy the same solution*
- *Partnerships can enable the pooling of scarce HIS IT resources*
- *Panel will investigate in Phase II potential financial incentives to increase EMRAM maturity levels in conjunction with HIS clustering*

As noted previously, the maturity of HIS implementations varies greatly between hospitals in Ontario. Leading maturity models such as the HIMSS Analytics EMRAM scale indicate that Ontario's average HIS EMRAM score is behind that of other jurisdictions such as the United States.

Increasing EMRAM maturity levels while managing costs

While it is generally recognized that clinical performance and outcomes improve with HIS EMRAM maturity levels, it is also a reality that HIS costs increase as hospitals implement and maintain the associated higher levels of HIS functionality. Finding ways to increase HIS maturity at a cost commensurate with benefits represents a challenge for many hospitals, particularly in light of fiscal constraints and efficiency expectations associated with new hospital funding models. Increasingly, collaborations or partnerships between peers are being viewed as a productive approach to improving HIS maturity while providing value for money.

The panel understands the tension around EMRAM acceleration by individual hospitals vs. HIS clustering, and will investigate in Phase II potential financial incentives such as investing a portion of the savings arising from clustering into increasing the EMRAM maturity levels of the hospitals within the HIS cluster.

Enhancing health system integration

Beyond the potential for increased maturity at a reduced cost, peer collaboration also enhances integration potential – sharing patient information is better enabled when hospitals deploy the same solution. Greater hospital-to-hospital integration could also facilitate integration with broader health system initiatives such as eHealth Ontario's ConnectingOntario projects.

Enabling pooling of HIS IT resources

Furthermore, many hospitals do not have the IT resources or access to resources to support large-scale technology implementations and partnerships that can enable the pooling of skills and resources. Other potential benefits include the ability to realize economies of scale through joint procurement activities, collective management of risks, and stimulation of sector innovation through combining hospitals' purchasing power.

HIS partnerships associated challenges

- *Partnership business case* – Hospitals seeking to collaborate find it challenging to develop robust business cases for partnership, particularly since IT costs are challenging to translate into traditional cost/benefit analyses.
- *Partnership model selection* – Referral patterns and shared specialties provide a logical basis for partnering, however there are no guidelines and tools in place to guide hospitals in determining the suitability of and developing these types of strategic partnerships while addressing competing priorities – for example, the need to meet IT services needs while aligning partnership with patient referral patterns on the basis of broader health service delivery .
- *Joint HIS procurements* – HIS procurements in a partnership model present challenges related to defining vendor requirements to meet the needs of two or more hospitals. This could arise for instance from major differences in HIS maturity or financial status between hospitals.
- *Partnership governance model* – Hospitals must define long in advance the governance and cost-sharing structures to ensure the decision making power and accountability associated with the system's implementation and long-term operation are appropriately distributed.
- *Capacity of HIS cluster lead hospitals* – Existing HIS shared instances have reported challenges related to the capacity of host hospitals to lead HIS clusters in absence of additional provincial funding, and a desire, in some cases (e.g. for smaller hospitals), to consider outsourcing HIS hosting and/or management of shared instances.

All of the above challenges affect not only the establishment of collaborative models but also their effectiveness at adding value. HIS partnerships are in a state of flux in Ontario, where the path forward requires clarity with the opportunity for a

large degree of benefit.

Financial challenges prevent hospitals from achieving value for money

- Many hospitals have working capital challenges and will need to pursue debt financing
- Hospitals are collectively challenged in accurately and consistently evaluating the TCO for HISs,
- It is difficult for hospitals to accurately model and plan for the impact of HIS investments within the current funding model.

Hospitals are entering this phase of HIS renewal with varying degrees of readiness in terms of both financial resources and sophistication. Many hospitals have working capital challenges and will need to pursue debt financing in order to make necessary upgrades or procurements. In a fiscally constrained environment, greater provincial support and creative options are required to address these financing challenges.

Without the ability to monitor HIS-related costs through standardized cost-coding methods, hospitals are challenged in accurately and consistently evaluating a system's Total Cost of Ownership ("TCO"). Enhancing this capability would enable hospitals to better plan for downstream investments, reducing the risk of future operating pressures and capital planning challenges.

While many hospitals are now receiving funding allocations based on Health System Funding Reform models, these hospitals vary greatly in their ability to accurately model and plan for the impact these large-scale technology investments will have on their Hospital Based Allocation Model (HBAM) and Quality Based Procedures (QBP) allocations.

Hospitals require provincial support to enable strategic procurement opportunities

- Existing provincial procurement policies may limit the ability of hospitals to leverage the mature systems hosted by their peers

Vendor pitches may create a perception that new HIS solutions are 'silver bullets' for existing challenges, but these systems are costly and implementation is time consuming. While partnership models present many potential benefits for Ontario hospitals, existing provincial procurement policies may limit the ability of hospitals to leverage the mature systems hosted by their peers. There is also an opportunity to build greater system capacity and coordination for hospitals to explore emerging HIS technology options.

HIS renewal affords many additional opportunities that have yet to be explored in detail due to the complexity of the current environment – for example, Shared Service Organizations (SSO). Building on Ontario's experience with SSO is definitely an opportunity worth further analysis.

The panel also identified several key opportunities and challenges of less immediate urgency, where future analysis and stakeholder engagement may be required. An important one that would need further analysis is HIS Shared Services Organizations (SSO).

The private sector has a long history of providing IT-related hosting and shared services. However, this is relatively new in healthcare, especially in Ontario. While there are examples of Shared Services Organizations for Enterprise Resource Planning (ERP), IT service desk and diagnostic imaging sharing

type services (e.g. Mohawk Shared Services, 3SO, Plexxus), the implementation and ongoing operations of HIS related shared services is relatively new.

While carrying the promise of tangible benefits, SSOs have been challenging for hospitals to implement across the globe. In Ontario the nature of the hospital landscape makes aligning goals, processes, technology and procurement especially challenging. It is also important not to underestimate the degree of governance, change management, resourcing, funding, communication and, potentially, legislative changes that may be required.

Building on Ontario's experience with SSO implementations, careful planning, and extensive consultation and collaboration, the implementation of HIS Shared Services Organizations in Ontario is definitely an opportunity worth further analysis.

Based on extensive and collaborative consultations, the panel focused its recommendations on the four most critical HIS Renewal pillars: partnering, clinical adoption and outcomes, procurement and financing.

Given the above noted challenges and opportunities present in the hospital sector, and based on extensive and collaborative consultations with health system stakeholders, the panel chose to focus its HIS Renewal recommendations on the following four pillars:

- partnering,
- clinical adoption and outcomes,
- procurement, and
- financing.

These four pillars carry a sense of urgency and need to be expediently addressed in order to meet the needs of the health care community and lay the groundwork for future success. Recommendations in these four areas are discussed in the upcoming sections of this report.

Our Advice on HIS Partnering

Strategic Context

There is a need to reconcile HIS investment pressures with the goals of Patients First. HIS systems supporting higher HIS maturity level promise better health outcomes but at a substantial cost.

In attempting to remain focused on viewing HIS renewal through the lens of the Patients First Action Plan, there is a need to reconcile HIS investment pressures with the goals of Patients First to determine how to best move forward to drive a high-performing and better connected health system.

Hospitals are keenly aware that a certain level of HIS maturity will result in better outcomes; new systems promise advanced clinical functionality, but at a substantial cost. When paired with the very real fiscal pressures that most hospitals face in planning for large HIS investments, opportunities emerge to build on the experiences of others through leveraging both technology and resources.

HIS investments previously made by hospital organizations resulted in high variability with respect to levels of investment, capacity, maturity of implementation and benefits realized.

The first generation of HIS investments were made independently by hospital organizations to create hospital-specific value that focused on efficiency and quality improvements through automation. This resulted in a high degree of variability among hospitals with respect to levels of investment, capacity, maturity of implementation and benefits realized.

Significant duplication of effort and resources occurred, a lack of standardization with respect to data and clinical workflow models also emerged, and change management costs often contributed a sizeable fraction of the total cost of ownership.

Recent and upcoming HIS investments show increased movement towards partnership and collaboration to increase value in the current environment of fiscal constraint.

Recognizing this, the next generation of HIS investments has begun to see increased movement towards partnership and collaboration to increase value amidst the current environment of fiscal constraint. The question faced by the panel was how to best support this growing environment of partnership in a manner that still allowed individual hospitals to make timely decisions that met their clinical and business needs.

The following HIS partnering recommendations will:

- Provide pragmatic direction to hospitals in the short-term that creates the right conditions for success while acknowledging this direction in the context of a

- broader maturity journey, and
- Acknowledge and accommodate the heterogeneity of hospital IT systems across the province today.

C1 Recommendation – HIS Partnering

While the hospital sector shows strong interest in partnering models due to their tangible clinical benefits, the variability in their use of HIS clinical functionality is presenting challenges to implementing these partnerships.

There remains a strong demand from the sector and LHINs for direction on HIS renewal provided through an enabling framework, particularly with respect to clustering and related models for HIS services delivery.

As previously described, HIS partnering, as an organizational construct, can lead to tangible benefits associated with improved quality of care and health system integration, and these benefits improve with the use of advanced clinical functionality residing in HIS systems. However their implementation in a capital constrained environment has fuelled the variability in HIS use across hospitals today, and this variability makes the implementation of HIS partnering models more difficult to achieve.

HIS partnering, as a framework, helps identify hospitals that have an affinity – shared patient population, referral patterns, clinical specialization – thus providing the rationale for a shared HIS.

Establishing effective partnerships within the health care system that can support large IT investments and complex operations is a difficult undertaking.

Within the hospital sector, the concept of HIS partnering has emerged to help identify hospitals that have an affinity, often based on shared patient population and referral patterns or common clinical specialization. In these cases, sharing a common HIS in some form would result in increased benefits associated with patient outcomes and health system integration. However, there is also broad acknowledgement that these specific benefits require clearer definition.

Partnerships shared governance, access to expertise and resources, reduction in duplicate efforts, etc., will reduce HIS implementation and operating costs.

Partnering offers unique opportunities around areas such as:

- shared governance,
- access to expertise and resources that may not reside locally,
- opportunities for more quality access to information,
- reduction in duplicate efforts, and
- data centre consolidation, reduced licensing fees, etc.

which collectively can generate a sizeable decrease in HIS implementation and operating costs, and enable hospitals to have its scarce internal resources focus more on adoption than

design.

There is an established base of hospitals IT partnership experience in Ontario that can be leveraged. More advanced jurisdictions such as the US also provide valuable lessons learned.

While variability exists in the delivery models and associated governance, significant work has been invested in establishing some degree of IT partnership across Ontario regions. Notable examples include North East LHIN, North West LHIN, Champlain, and Thames Valley among others.

Looking to other jurisdictions such as the US, there have also been important learnings from ‘clustered’ multi-organizational models noting the importance of doing this in an organic way, while avoiding the use of a single system as the core organizing principle^[12]. This has helped create an early roadmap of benefits when considering demonstrated accomplishments around coordination of care, quality reporting and advanced information exchange functions.

Measurable outcomes resulting from HIS partnerships have been difficult to quantify due to the long benefits cycle. Opportunity exists to identify a standard set of indicators that will help measure these benefits.

However, many of these hospitals continue to maintain an average EMRAM score of approximately 3 on a 0 to 7 scale, indicating that there is more work to be done both in terms of achieving local benefit, but also in defining with greater precision, the outcomes that such partnerships should be striving for.

Measurable, short-term outcomes resulting from HIS investments have been difficult to quantify in this space, in part due to the long cycle to realize the benefits, typically in the neighborhood of five to ten years. There is however an opportunity for hospital partnerships to identify a standard set of qualitative and quantitative indicators that will help track and measure these benefits.

Partnering can help in incremental standardization while ensuring more accurate benefits benchmarking.

In considering the broader environment of hospitals, partnering based on size, hospital-type or geography can also help in incremental standardization while ensuring more accurate benchmarking (assuming the resources are reallocated to benefits realization rather than being released).

However, geography or patient flow should not be assumed to be firm constraints, recognizing the need to balance a variety of factors spanning regional care delivery, patient flow, provincial objectives, health continuum objectives, cross-sector objectives, technology maturity, and costs, to name but a few.

HIS Partnering (Cluster/Hub) – C1 Recommendation

C1 When undertaking HIS renewal, hospitals must form HIS clusters to maximize the value of current and future investments.

The panel will develop a framework to define the value proposition, with a focus on measurable patient benefits to be achieved as a result of HIS investments.

C2 Recommendation – Approach to HIS Partnering

Hospitals will continue to have a need to engage deeply with LHINs and other sectors in their service area in order to align with health system transformation and regional integration priorities.

On December 17, 2015, the ministry released ***Patients First: A proposal to strengthen patient-centred health care in Ontario***. While the discussion paper focuses on four new areas where the LHINs will play a bigger role, ensuring more effective integration of services and greater equity is tightly aligned with the objectives of HIS renewal.

Accordingly, hospitals will continue to have a need to engage deeply with LHINs and other sectors in their service area, recognizing HIS renewal as one dimension of health system transformation and regional integration priorities. In this way, HIS renewal can also act as an enabler.

Hospitals with consistent referral patterns should aim to partner with hospitals sharing the same population base.

Clustering, while focused on the immediate needs of acquiring a common HIS service and supporting the implementation and adoption of expanded HIS and other ehealth services, will need to be done within the context of supporting broader health system integration priorities.

Geographic based clustering requires active consideration as hospitals look to undertake renewal activities. Hospitals located in regions with consistent referral patterns should aim to partner with hospitals sharing the same population base.

Specialty hospitals require highly customized solutions that are costly for an individual hospital to build. However they can be leveraged in a clustered model such that they are beneficial to all hospitals sharing the specialty.

On the basis of maintaining flexibility, both specialty hospitals and single instances do require special consideration.

Specialty hospitals deliver similar services, and a single HIS solution enables standardization of care and specialty resource sharing across the respective organizations while maintaining customized solutions focused on the needs of a unique patient

population.

While these highly customized solutions are costly for an individual hospital to build, they could be leveraged in a clustered model to be beneficial to all hospitals sharing the specialty.

Standalone HIS instances may be justified when size, complexity and lack of direct economies of scale make clustering a disadvantageous option.

In considering certain hospitals with a standalone HIS instance in major academic centres, referral pattern and organizations requirements may in some cases dictate disadvantages, both in joining a peer instance or making the current instance available to others.

This is most relevant for some of Ontario's largest hospitals that deal with case complexity that prohibits direct benefit from typical economies of scale realized through clustering.

A value-based analysis of the standalone HIS instance option vs the HIS partnering options would nevertheless be required to provide the justification for the standalone option in the business case.

HIS Partnering (Cluster/Hub) – C2 Recommendation

- C2** Hospitals must work with Local Health Integration Networks (LHINs) and other partners to assess geographic clustering options and non-geographic alternatives as supported by patient referral patterns and a comprehensive, value-based analysis.

C3 Recommendation – Leveraging Existing HIS Instances

In many cases, requirements for HIS systems are very similar, thus creating a rationale to minimize the number of unique installations.

In examining existing processes in Ontario around the acquisition of new HIS technology, many hospitals continue to draw on similar procurement documentation. This demonstrates that the requirements for HIS systems are, for the most part, very similar, especially for hospitals of the same type and size. This provides a rationale for minimizing the number of unique installations when there is a shared patient population, potential for greater centralization to support the associated IT functions, and better share the risk that comes

with these large investments.

Leveraging existing HIS instances is the preferred clustering option, even if it requires an HIS upgrade.

Leveraging an existing HIS instance, whenever possible and justifiable, is therefore the preferred path to HIS clustering. It is understood that this existing HIS instance might require to be upgraded in order to meet the capability and capacity requirements of the HIS cluster.

Innovative partnership models such as the Vendor Managed Solution (VMS) model for HIS are likely to emerge over time as viable options from a value-based analysis standpoint.

The HIS vendor community has proposed innovative partnership models with hospitals such as the Vendor Managed Solution model where the vendor hosts and/or manages an HIS shared service tailored to the needs of the partnering Ontario hospital clients.

From a governance perspective, the vendor owns and operates the HIS solution using its infrastructure and platform. The vendor, with its hospital partners, develops and maintains the solution's standards and features. Finally, there is a service agreement set in place between the vendor and the client hospitals with respect to the delivery, funding, and degree of clinical control selected.

From a financial perspective, the VMS scenario requires the design of a funding model involving all the partnering hospitals for the provision of VMS services. The VMS model is likely to emerge over time as a viable option from a value-based analysis standpoint.

There is a "grey" zone where HIS partnering with other hospitals to leverage an existing HIS installation in the region is not an immediate option. The panel will address it in Phase II.

A hospital may fall into a "grey" zone where partnering with other hospitals in the region to leverage an existing HIS installation is not an immediate option, and the direction that they should take is therefore not clearly delineated.

While there was extensive discussions by the panel on ways to address the "grey" zone, no decision was reached. The panel intends to revisit the "grey" zone as part of its upcoming Phase II activities, and provide specific recommendations for addressing it.

HIS Partnering (Cluster/Hub) – C3 Recommendation

- C3** Prior to initiating a return to market, clusters must leverage existing HIS installations where informed by the results of a comprehensive value-based analysis.

C4 Recommendation – HIS Partnering Exemption Requests

Ontario's acute sector will see the emergence of 9-10 regional shared HIS instances in the short-term, along with 2 or more specialty shared instances, and a number of single instances, mostly in the largest urban centers.

Over the coming two years, based on OHA projections, the sector will see the emergence of 9 to 10 regional HIS clusters within Ontario sharing HIS instances, including:

- NEON,
- Thunder Bay,
- LHSC,
- HHS,
- Waterloo Wellington,
- CHAMP,
- Kingston,
- TOH, and
- 1 or 2 others in central Ontario.

There will also be some specialty-based HIS clusters in Ontario sharing HIS instances, including:

- pediatric (Sick Kids and CHEO) and
- mental health (Ontario Shores and Waypoint).

Single HIS instances are likely to continue in the largest urban centers, since regional benefits of partnering (e.g. shared referral patterns) may not be relevant. However, there might be opportunities for them to partner along the HIS delivery hub partnering model, for instance when hospitals use the same HIS vendor solution.

Very few exemptions will be supported. Those pursuing them will need a strong business case.

With this clear path in mind, there may nevertheless be scenarios where a value-based analysis may not support hospitals participating in an HIS clustering initiative due to reasons such as:

- costs and risks being unacceptably high,
- major service level requirements mismatched amongst hospitals, and
- timelines are too lengthy and may compromise patient

care.

Hospitals pursuing an exemption from clustering will need a strong business case as it will need to meet a high approval threshold from the eHealth Investment and Sustainment Board.

HIS Partnering (Cluster/Hub) – C4 Recommendation

- C4** The ministry should set an expectation that very few exemption requests will be considered for recommendations C1-C3 and that hospitals pursuing a related exemption will need to meet a high approval threshold from the eHealth Investment and Sustainment Board.

C5 Recommendation – HIS Partnering Maturity Path

HIS shared instances are expected to evolve from simple HIS clusters based on geography or specialty, to modern, scalable HIS delivery hubs. A clear maturity path from clusters to hubs is needed.

Overall, HIS clustering remains a near-term strategy as there is much variation amongst shared instances in Ontario in terms of size, governance models, maturity levels and business drivers – and firm expectations have not yet been defined.

Over time, HIS shared instances are expected to evolve their partnering model from simple HIS clustering based on geography or specialty, to modern, scalable hubs that move past HIS functionality and focus on standardizing clinical processes, benchmarking clinical outcomes, and consolidating back office functions. This evolutionary process could be enabled, for instance, by new technical delivery modes such as “cloud”-based solutions, that could be examined in concert with the HIS partnership (cluster/hub) models.

Experience from other jurisdictions can provide some early guidance in consideration of what the maturity path from clusters to hubs will have to encompass. There are also risks that have to be identified and mitigated, for instance when hospitals act as hubs.

An HIS delivery hub strategy providing a clear maturity path from simple clustering to high-performing hubs will need to be developed in parallel with the near-term implementation of HIS clusters.

HIS Delivery Hub

A more formal and sophisticated HIS cluster arrangement that would focus on advanced use of shared HIS services alongside distinct governance and well-defined accountabilities of all parties.

An “HIS Delivery Hub” would be a more formal and sophisticated HIS cluster arrangement that focuses on advanced use of shared HIS services along with a clear delineation of the hub governance distinct from participating hospitals, and with well-defined accountabilities of all parties.

An HIS delivery hub would typically be hosted by a larger lead hospital, leveraging the advances and critical mass that larger hospitals have been able to achieve with respect to HIS implementations. The hub’s mandate for its HIS service-provider role would be grounded in its core clinical and program mandates and associated relationships with other cluster hospitals.

HIS delivery hubs would represent a scale and concentration of specialized resources that would offer a balance of efficiencies and economies of scale while still reflecting regional variability inherent in Ontario’s health care system. They would represent a critical mass and advanced state of maturity capable of driving ehealth innovation and adoption on an ongoing basis.

These would be elements of the HIS delivery hub framework which would include a business model that articulates the accountabilities, roles and responsibilities of the “host” and participating hospitals, as well as the key business processes, performance measures, etc., associated with the formation and operation of high-performing HIS delivery hubs.

HIS Partnering (Cluster/Hub) – C5 Recommendation

- C5** The panel will develop a provincial strategy to define a maturity path that fosters the capacity for high-performing hubs to ensure a sustainable, long-term approach to managing HIS investments.

Implementation Considerations

As partnering represents the most strategic component of the panel’s recommendations, its implementation will need to include a high touch approach and continued consultation.

To ensure achievement of the panel’s HIS partnering recommendations, an implementation plan will be developed in consultation with the LHINs and the hospital community that will consider key factors for successful implementation including:

- Development of a comprehensive communication

strategy to ensure hospitals have clear direction to support them on their partnering journey.

- Setting clear criteria for clustering and exemptions that hospitals can use as goal posts in making their renewal decisions.
- Expedient development of a HIS delivery hub strategy to maintain continuity of strategic direction and ensure adequate support for hospitals to mature their clusters.
- Focus on increased capacity-building in specific regions such as Central Ontario, where the path forward includes more crucial challenges that will need to be addressed.

Our Advice on HIS Clinical Adoption & Outcomes

Strategic Context

Successful HIS renewal will require active engagement and sharing of knowledge and expertise.

In order to ensure that HIS renewal advances the objectives of Patients First, there is a need to focus on:

- establishing the right foundation for connectivity and integrated care,
- improving information flow between providers and patients, and
- ensuring the attainment of value-for-money from HIS investments.

These objectives can be achieved through the ongoing creation, maintenance, refinement and sharing of knowledge amongst and between health care system stakeholders. Active engagement and sharing of knowledge and expertise can potentially lower barriers to innovation, prevent repetition of previous errors and provide a “go-to” body of knowledge that can be consulted by stakeholders when needed.

There is an opportunity to create a mechanism to leverage and share HIS expertise for the benefit of the whole sector.

Currently, there is an opportunity to create a mechanism by which expert sources of HIS knowledge could be leveraged and shared, for the benefit of the whole sector. This approach provides tangible resource benefits as not every hospital would need to hire, train and retain staffing resources or services to essentially do the same thing.

This would also create the opportunity for social learning activities to occur, such as knowledge creation, information distribution, sharing learnings from previous engagements (e.g., tips and pitfalls) and keeping this knowledge current.

Creating, sharing, utilizing and storing knowledge and best practices would also aid in the standardization of tools and guidelines that can be used by different hospitals across the province. These tools and guidelines can also, in turn, allow for increased standardization of specific components of a hospital’s information system.

An HIS expertise sharing mechanism would help hospitals achieve greater standardization, and thus help increase hospitals EMRAM scores.

For instance, EMRAM scores across the sector significantly vary between hospitals^[13]. Given the current state of highly heterogeneous HIS instances, there is great potential to use knowledge translation to enable organizations to invest more

appropriately and cost effectively in an effort to achieve greater standardization. As more hospitals continue to engage with this HIS expertise sharing mechanism, when fully defined, organizations will achieve more consistent EMRAM scores across the province.

A1 Recommendation – HIS Community of Practice

The panel recognizes that an HIS expertise sharing mechanism is necessary to facilitate knowledge translation and exchange as part of local and regional HIS implementation work.

Hospitals have reported some challenges identifying proven HIS adoption strategies and tools for guiding HIS investments. Furthermore, stakeholders have noted that locating these strategies and tools can be time consuming, costly, and repetitive.

The capacity to plan and manage major upgrades to HIS varies widely across the hospital sector. To ease the burden of planning and managing future HIS investments, there is a need to identify knowledge gaps, rationalize content, and make content more accessible.

A large amount of information currently exists in the HIS landscape owned collectively by the hospitals and other stakeholders. This information needs context and be shared through interaction between stakeholders who provide their knowledge, skills and experiences to the field.

Knowledge translation and exchange can be facilitated through the creation of a Community of Practice (CoP), which is defined as:

“A group of people who share a common concern, a set of problems, or interest in a topic and who come together to fulfil both individual and group goals.”^[14]

CoPs focus on sharing best practices and developing new knowledge to further a particular domain of practice. They rely on ongoing interaction and typically have a defined purpose and objectives that help to drive associated activities and supporting tools.^[14]

It is evident that there is a large amount of information that currently exists in the HIS landscape owned collectively by the various hospitals and other stakeholders across the health care system. For this information to be most useful, it must have context and be obtained through interaction between stakeholders who provide their knowledge, skills and experiences to the field (Garcia and Dorohovich, 2005). Information must be transferrable and easily usable across various contexts and dimensions of the health care system.

An HIS Community of Practice will need to be created as an expert source of knowledge for HIS related activities.

Thus, a community of practice (CoP) will need to be created as an expert source of knowledge for HIS related activities. This HIS CoP will aggregate and generate quantitative and qualitative knowledge for sharing (e.g., HIS assets). Generally, the CoP will provide the foundation for CoP members, and hospital organizations in the sector to create value (i.e., knowledge sharing) for the entire sector when pursuing HIS related activities.

HIS Clinical Adoption & Outcomes – A1 Recommendation

A1 The ministry will work with hospitals to draw on existing resources and networks of health care professions to formalize an HIS Community of Practice that supports the acquisition, implementation, and optimization of HIS systems. This HIS Community of Practice, once established, will share high-value clinical and business assets that support the evidence-based standardization of clinical practices within hospitals.

A2 Recommendation – Knowledge Sharing Strategy

Hospitals are interested in sharing HIS best practices but generalizing their learnings is laborious. This is compounded by the difficulty of in-person collaboration within and across hospitals, and the fact that no centralized repository of best practices currently exists.

Hospitals have expressed an interest in sharing HIS best practices across the sector. However, repackaging organization specific learnings for generic use has been described as a laborious and time-consuming process.

Stakeholders have acknowledged that best practices are most effectively shared when prepared specifically for consumption, contextualization, and include appropriate use statements.

Furthermore, in-person collaboration has become increasingly difficult within and across organizations, and it is therefore essential to leverage new ways to share learnings and best practices across the sector (Garcia and Dorohovich, 2005).

Stakeholders have also articulated that a centralized location to store and acquire HIS best practices does not currently exist.

Some hospitals have begun sharing their HIS best practices such as NYGH and Ontario Shores with Waypoint Centre.

Currently, some organizations in the sector have begun sharing their HIS best practices.

For example:

- North York General Hospital has begun sharing their order

sets as part of a CPOE best practice toolkit.^[15]

- On October 15, 2015 Dr. Jeremy Theal was awarded the 2015 Minister's Medal Honouring Excellence in Health Quality and Safety (individual) for conceiving and leading the development of the Canadian CPOE Toolkit.
 - The Canadian CPOE Toolkit^[16] was inspired by NYGH's eCare project, a multi-year project to improve patient safety and quality of care through the use of leading-edge technologies that reduce medication errors and provide evidence-based information automatically as doctors and nurses make care decisions with patients.
 - The Canadian CPOE Toolkit shares evidence-based order sets and best-practice implementation tools across Canada, at no cost to hospitals. Today, there are more than 1,280 evidence-based order sets available in the Canadian CPOE Toolkit, with 49 healthcare organizations from six provinces as members.
 -
 - Another 50 organizations are in the process of signing up. As well, five Ontario healthcare organizations are now contributing order sets to the Toolkit.
- Ontario Shores is working towards partnering with the Waypoint Centre for Mental Health Care, which will see the sharing of HIS best practices between organizations.^[17]
 - Waypoint recently formalized a strategic partnership with Ontario Shores Centre for Mental Health Sciences to optimize opportunities to improve patient care through collaboration on a shared EHR. The integration will create opportunities to develop, implement, evaluate and advance best practices, evidence based care and common clinical standards within mental health care. Further, opportunities to collaborate on and support mental health research aimed at improving patient care and advancing evidence-based practice will be enhanced. The pursuit of a shared EHR solution grounded in best practice and evidence based care will result in improved:
 - Quality and safety of patient care;
 - Quality of the work experience for staff involved;
 - Effective and efficient use of resources;
 - Opportunities to advance mental health

research to advance evidence-based practices.

By making knowledge sharing practices available to the sector, organizations will be better equipped as they pursue HIS related activities.

HIS Clinical Adoption & Outcomes – A2 Recommendation

A2 The panel will propose strategies to better deploy and share the knowledge and expertise of clinical, IT, and decision-support professionals through on-the-ground support and training.

Implementation Considerations

An effective yet lean governance model will be required to provide oversight and guidance to the Community of Practice and sector leaders who will support the CoP. Appropriate support resources will need to be allocated to the CoP.

The panel has considered multiple factors that will potentially impact the implementation of the clinical adoption & outcomes recommendations. These factors include:

- effective governance,
- continuous knowledge sharing,
- focusing on outcomes,
- ensuring responsible funding, and
- leveraging existing technology where possible.

Effective governance will be required to provide oversight and guidance to the CoP and sector leaders supporting the CoP.

The governance provided will help to establish subcommittees that will:

- develop complex reference models for the sector (e.g., benefits models), and
- ensure alignment with clinical standardization priorities.

There will also be a need for staff to help administer the CoP on a working basis, and have it supported with executive decision-making.

A Best Practice Toolkit would provide the opportunity to identify high value tools to harness knowledge for sharing, invest in our people, and generate knowledge to deliver the best patient outcomes.

The panel has indicated that recommendations must provide practical guidance and tactical support.

A Best Practice Toolkit would provide the opportunity to identify high value tools that could be anonymized, wrapped

with appropriate use statements, and carry the appropriate disclaimers and encouragement for continued diligence.

The development of the toolkit would take into consideration resource availability, investments made to-date in developing intellectual property, and the costs associated with sharing information.

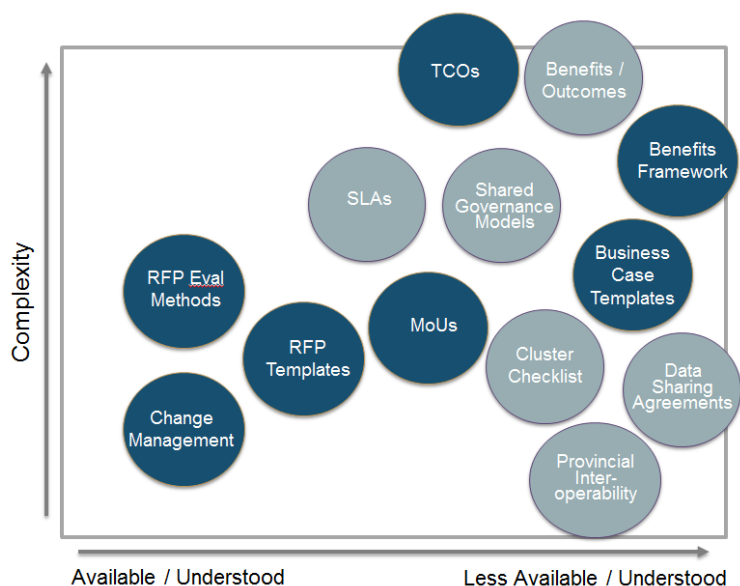
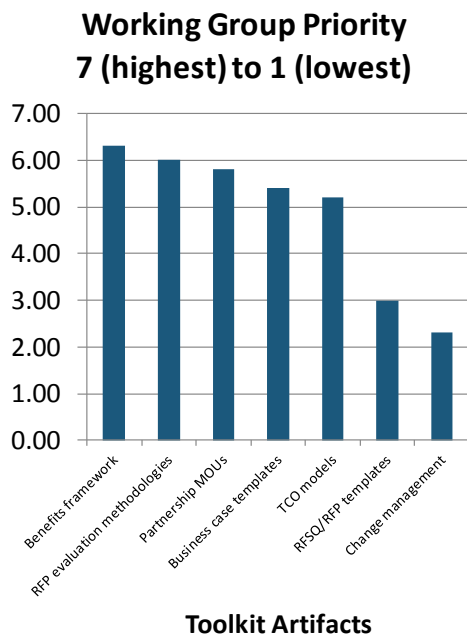
Under the framework of a Community of Practice there is an opportunity to harness knowledge for sharing, invest in our people, and generate knowledge to deliver the best patient outcomes.

Best practice toolkit opportunities were investigated by the Working Group, and the key ones identified were the following in the following order of priority (see graph on the left):

1. Benefits framework,
2. RFP evaluation methodologies,
3. Partnership Memoranda of Understanding (MOU),
4. Business case templates,
5. Total Cost of Ownership (TCO) models,
6. RFSQ/RFP templates, and
7. Change management.

Other potential toolkits identified include:

- Service level agreement templates,
- Outcomes and benefits alignment with TCO,
- Interoperability requirements,
- Cluster requirements checklist,
- Shared governance models, and
- Data sharing agreements.



A Community of Practice will help partnering hospitals ensure that:

- *Future HIS investments are outcome focused,*
- *Existing assets are leveraged,*
- *Resource needs are identified,*
- *Requirements are aligned with existing programs.*
- *Standardization improves, ultimately resulting in better outcomes*

Future HIS investments should be outcome focused. Identifying specific time-bound outcomes will inform how to best apply incentives for future HIS investments. The outcomes should be identified at the hospital and broader health system level.

When possible, the sector should leverage existing assets (e.g., technology and toolkit artifacts). By leveraging these assets, the sector can more responsibly invest in HISs and their associated activities.

Also, resource needs across the sector will need to be identified. By identifying resource needs, there may be an opportunity to align requirements with existing programs (e.g., QBPs).

Finally, as we move towards standardization, which a CoP can help enable, we increase our chances of achieving targeted outcomes.

Our Advice on HIS Procurement

Strategic Context

Approximately 40 of 97 responding Ontario hospitals have plans to replace their HIS in the next 5 years (75% initiating within 2 years) at estimated cost in the order of \$1.5B. If these hospitals could upgrade their HIS or were to join other hospitals, this would result in significant cost savings.

There are numerous Ontario hospitals ready to procure a new HIS solution. While HISs typically have a lifespan of 15+ years, there are a number of hospitals currently planning to procure new solutions within the next 2 years.^[18]

Last year, the Ontario Hospital Association (OHA) surveyed its members and approximately 40 of 97 responding hospitals have plans to replace their HIS in the next 5 years (75% initiating within 2 years).

Based on Canada Health Infoway's estimated cost of \$106K / bed in one-time costs, using a traditional procurement methodology, this represents a \$1.5B spend in the province.^[19]

If, instead, these same organizations were able to upgrade their existing solutions (where appropriate), or were to join / expand a pre-existing solution in the province, significant cost savings for Ontario's health care system would occur.

The Broader Public Service Directive Mandatory Requirement # 3 states that open procurement must be used for goods and services of \$100K or more, thus applying to all HIS procurements as they are typically in the order of \$10M or higher.

The Broader Public Sector (BPS) Procurement Directive ("the Directive") governs the procurement activities of all designated broader public sector organizations, including hospitals, as provided for under section 12 of the Broader Public Sector Accountability Act, 2010. The purpose of the directive is to ensure that publicly funded goods and services, including information technology, are acquired by BPS organizations through a process that is open, fair and transparent. The Directive is based on five key principles: accountability, transparency, value for money, quality service delivery and process standardization.

The Directive includes 25 mandatory requirements for hospitals and other BPS entities. Mandatory Requirement #3 states that organizations must conduct an open procurement process when the estimated value of the procurement of goods or services is \$100,000 or more. This is the case for most HIS procurements, as the value of enterprise-wide system procurements are typically over \$10M.^[20]

HIS procurement is the second largest

Acquiring an HIS is major undertaking, second only to building

project a hospital can engage in next to building a new facility. Joining pre-existing, mature HIS solutions, or upgrading an existing HIS solution would reduce hospital costs and prioritize limited resources on adoption and achieving measurable patient outcomes.

and moving into a new hospital facility. The procurement process is long, complex and expensive, and when completed, it is followed by 4+ years of implementation.^[21]

One of the key opportunities for hospitals who need a new HIS, is to non-competitively join a pre-existing, mature HIS solution of another hospital with which it shares some affinity (e.g. same patient population, common clinical specialization). Another key opportunity is to non-competitively upgrade an existing solution. Both are notably less expensive than the traditional method and enable the hospital to focus its limited resources on HIS adoption and achieving measurable patient outcomes.^[22]

By explicitly addressing procurement enablers in its recommendations, the panel supports sound business decisions by the hospitals regarding HIS procurement while encouraging partnering through cluster development.

By including procurement enablers as a core component of the recommendations, the panel can both support hospitals in the short-term and enable the broader vision of the panel under eHealth 2.0.

The procurement recommendations will:

- support more expedient alternatives to “rip and replace” activities,
- maintain greater continuity in quality, safety, and connectedness within hospitals,
- provide guidance in navigating HIS procurements,
- support sound business decisions that account for cost pressures and the need for more conservative investments, and
- encourage the development of clusters in pursuit of scalable technology alternatives and integrated care.

P1 Recommendation – Seeking Policy Approval Enabling HIS Partnering

Currently, the BPS Procurement Directive limits the ability of HIS partnering between hospitals, thus preventing hospitals from maximizing the clinical and financial benefits from HIS investments.

Joining existing HIS installations and/or making major HIS upgrades provide a compelling value for money case, but will involve non-competitive procurement in the vast majority of cases.

- BPS Mandatory Requirement #3 requires open procurement process when the estimated value of the procurement is \$100,000 or more.
- This is the case for all HIS procurements, as the value of enterprise-wide system procurements typically exceeds \$10M.

Evidently, specific hospitals have identified meaningful cost savings and patient benefits that could be achieved by joining peer HIS solutions and/or upgrading their existing solution.

Some hospitals have sought legal counsel and were advised that they cannot join legacy solutions or conduct major upgrades as per the current BPS Procurement Directive.

Overall, competitive procurement may not yield the best value for money in the context of such wide transformational change as HIS renewal.

It is the opinion of the panel that policy approval to enable hospitals to join existing peer HIS installations (P1 recommendation below) is absolutely critical to the success of the HIS partnership strategy presented in this report.

HIS Procurement – P1 Recommendation

- P1** The ministry should make it a top priority to seek appropriate policy approval to enable hospitals to join existing peer HIS installations, where there is a strong clinical and financial business case for doing so.

P2 Recommendation – Provincial HIS Renewal Procurement Guidelines

Procurement guidelines for large HIS renewal activities (e.g. HIS business case development guidelines, HIS RFQ/RFP development and evaluation process, HIS joint procurement guidelines), currently do not exist thus causing avoidable difficulties. Opportunity exists to achieve clarity and consensus on HIS procurement best practices.

Currently, standard and accessible guidelines do not exist for hospitals who wish to undergo large HIS renewal activities (e.g. HIS business case development guidelines, HIS RFQ/RFP development and evaluation process, HIS joint procurement guidelines).

Hospitals have reported receiving disparate and sometimes inaccurate advice concerning appropriate procurement processes and required RFP language. This is often compounded by selective interpretation of the Directive through hospital retained legal counsel, etc.

RFPs reviewed by Supply Chain Ontario to date have varied in terms of the language enabling joint HIS procurements or future contract extensions.

The opportunity exists to achieve clarity and consensus on specifications relating to HIS procurement best practices (e.g., issuing RFSQs and interoperability guidelines).

HIS Procurement – P2 Recommendation

- P2** The ministry should promote general HIS procurement best practices by releasing a provincial HIS Renewal Guideline that supports the sector in structuring multi-tenancy procurements, while clarifying best practices on data and interoperability standards as promoted by the Canadian Institute for Health Information and eHealth Ontario.

P3 Recommendation – Accelerating Innovation

Opportunity exists for hospitals to collaboratively engage vendors regarding new, innovative HIS technology solutions, thus increasing the range of options in HIS procurement.

Further effort is needed, at a health system level, to explore and evaluate emerging HIS technology options.

Many hospitals do not consider emerging technology solutions in their RFPs, limiting vendors from proposing new innovative solutions.

Conversely, hospitals that are interested in emerging technologies do not have an open forum to collaboratively consult vendors.

Given that many hospitals have similar requirements, an opportunity exists for these hospitals to collaboratively engage vendors regarding current and emerging technologies.

HIS VMS is a market disruptor as it provides the option of outsourcing HIS hosting and operations to the vendor.

Vendor Managed Solution is a market disruptor to traditional implementation of HIS in hospital data centres. In the VMS scenario, the vendor builds and provides an off-the-shelf HIS solution that is web-enabled, hosted and managed on the vendor's infrastructure, and is contracted using a subscription payment model.

From a technical perspective, the HIS solution is hosted and managed by the vendor, and is therefore a "rip and replace" of existing legacy systems. The hospital has access to a single HIS instance with parameterization, but no customization.

From a business perspective, the hospital outsources the HIS system operations to the vendor. Payment is set on a subscription basis and funded by hospital operating budgets. Business and clinical processes would be standardized for, as opposed to customized by, the hospital.

The VMS model targets small/medium hospitals as they have limited resources and capabilities. It has the advantage of reducing capital and operating expenditures, but has to be adopted “as is”.

The VMS model target customer is typically the small and medium-sized hospitals with limited financial resources, internal capabilities and capacity to operate their own HIS installation.

From a hospital standpoint, the VMS model has the advantage of reducing capital expenditures and potentially operating expenditures in the order of 30%, and enables the adoption of an established solution.^[23] However, there is no ability to customize the solution, and therefore to adopt it “as is”, including the embedded business and clinical processes.

The VMS model hasn’t been implemented yet in Ontario, but is an opportunity worth investigating as it minimizes financial risk to hospitals by providing cost certainty. It also reduces the need to invest funds upfront.

As part of Phase II, the panel will examine as to whether a host hospital could act as a VMS, and if so, how the governance could be set up to ensure that there is transparency, fairness and no conflict of interest.

HIS Procurement – P3 Recommendation

P3 The ministry should create opportunities for meaningful dialogue between hospitals and the vendor community to accelerate innovation.

Implementation Considerations

Three major factors will potentially impact the recommendations implementation:

The panel has considered multiple factors that will potentially impact the implementation of the procurement recommendations, including non-competitive procurement exemption, procurement guidance, and hospital-vendor engagement.

i) Approval for non-competitive procurements for HIS renewal when hospitals have a strong business case for doing so

The ministry will need to seek approval from the Treasury Board / Management Board of Cabinet (TB/MBC) to enable select non-competitive procurements when hospitals have a strong clinical and financial business case for doing so, in line with the province's direction on HIS renewal.

Should select non-competitive procurements be approved, hospitals will be required to follow a submission process, until a broader review of the BPS Procurement Directive occurs (i.e., the Directive as it applies outside of an HIS context).

ii) Enhanced procurement guidance through a provincial procurement guideline for HIS renewal developed within 6 months by a focused working group

Specific procurement guidance would benefit the sector, as standard and accessible guidelines do not exist for hospitals who wish to undergo large HIS renewal activities.

A focused working group, convened under the panel's governance, would help develop and disseminate a procurement guideline within the next 6 months. The membership for the group would include the ministry, Supply Chain Ontario, and hospital sector representation.

Membership would need to establish consensus on the guidelines topics, such as:

- structuring multi-tenancy agreements,
- defining upgrade versus new procurement, and
- interoperability standards.

The working group would have the opportunity to collaborate with peers through similar initiatives (e.g., Health care Sector Supply Chain Strategy).

iii) Hospital-vendor engagement to explore and evaluate emerging HIS technology options

Collectively, hospitals should explore and evaluate emerging HIS technology options through focused hospital-vendor engagements. These can take the form of special forums and symposiums.

The following groups should be considered when hosting innovation discussions:

- ITAC,
- other ministries (e.g., Ministry of Research and Innovation), and
- Office of the Chief Health Innovation Strategist (OCHIS).

Our Advice on HIS Financing

Strategic Context

Funding streams must be examined in the context of HIS renewal given the multi-billion dollar investment involved.

In Ontario's fiscally restrained environment, we must examine existing funding streams and how they can be optimized. This is particularly important in the context of HIS renewal given that preliminary estimates suggest that the needed spend for HIS renewal will be a multi-billion dollar undertaking.

Financing and funding for HIS renewal was therefore a major area of the investigation and consideration for the panel. There is a need to understand what/how hospitals are spending.

Sector requested direction to better predict HIS expenditures, maximize value of HIS investments, validate impact of these investments, and consider alternate funding approaches

The sector requested direction and support to ensure HIS investments are cost-effective, provide value for money, and increase clinical benefits.

The panel developed HIS financing recommendations that are intended to:

- Build the capacity of the sector to predict and HIS capital and operating expenditures,
- Maximize and improve existing systems and tools,
- Validate impacts of investments on current funding mechanisms, and
- Support consideration of alternative funding approaches.

Understanding the impact of HIS investments on HSFR funding is essential for the panel to make financing recommendations.

Health System Funding Reform (HSFR) was a key component of the analysis performed, examining the existing pool of funding provided to hospitals to understand how HIS investments impact HBAM / QBP allocations. See diagram and descriptions below.

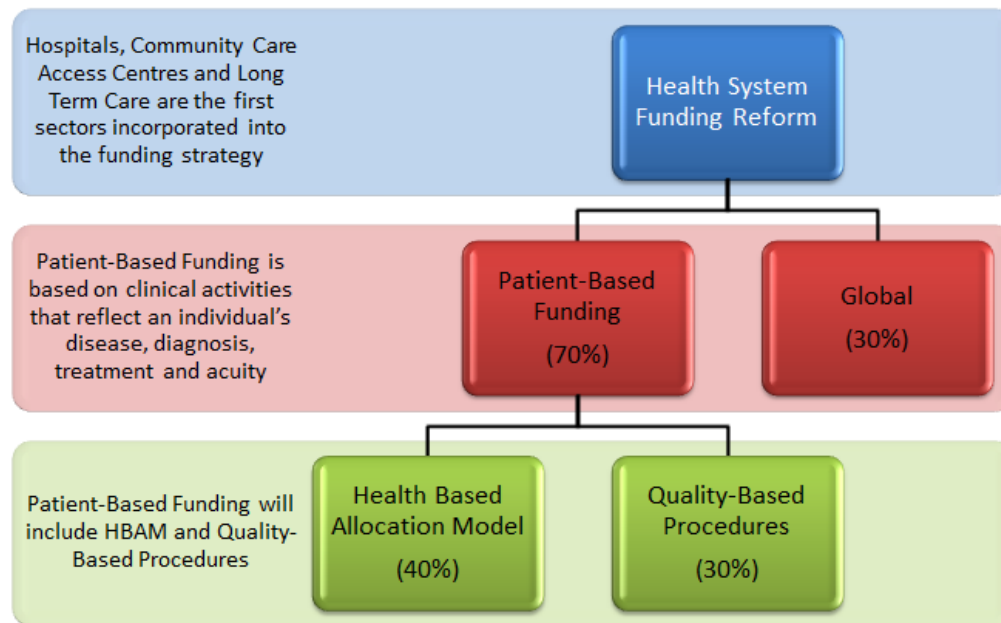


Figure 4 – HFSR Overview

Health Based Allocation Model (HBAM) is a made in Ontario funding model. HBAM distributes an amount of health care funding to organizations in accordance with population projections and their ability to provide cost-effective care.

Quality Based Procedures (QBPs) are clusters of patients with clinically related diagnoses or treatments that have been identified by an evidence-based framework as providing opportunity for process improvements, clinical re-design, improved patient outcomes, enhanced patient experience and potential cost savings.

Source: CCO Ontario Health System Funding Reform Overview (CAPCA Roundtable Sep. 11, 2013)

Hospital HBAM funding is based largely on expected costs, not actual costs

HBAM being largely based on expected costs, HIS IT costs realized by more sophisticated hospitals will not be reflected in expected costs if overall provincial IT costs stay the same. Actual costs will go up, but expected costs will stay largely the same (keeping everything else the same).

The actual cash expenditure for HIS is not realised in HBAM for a number of years

From a cash flow perspective:

- Increases in actual costs across the province (e.g., for HIS renewal) are not reflected in expected costs for two years, resulting in a delay in the realization of actual cost increases. Capitalized IT expenses are included as depreciation, which does not line up with the actual upfront expenditure of cash.
- Neither of these issues makes an impact until the average provincial cost increases due to many hospitals investing in HIS renewal.

Hospitals investing heavily in IT will see

In order to incentivize efficiency, hospital HBAM expenses are

their Base Funded Expense (BFE) decrease, at least in the short term. As to QBP funding, it is provided at average cost but carved out at actual costs.

reduced by the percentage of their costs that are not funded by ministry funding (Base Funded Expense - BFE). Investing in HIS will reduce a hospital's BFE and impact their slice of the overall HBAM funding available.

Major IT investments can lead to a difference between one-time and ongoing carve out and QBP funding. While the hospital's actual costs are carved out, the average cost (with some modifications) is provided back in the form of QBP funding (for ministry managed QBPs).

'First movers' on HIS renewal are disadvantaged from a funding model perspective. Those who wait may benefit most.

'First movers' or early adopters on HIS renewal will not be funded at least in the short term, for making large and incremental IT investments. . Should many large hospitals make large IT investments, hospitals underinvesting in IT modernization will see an increase in funding as expected expenses rise due to the investments of others. This is the 'second mover' advantage.

Pricing for ministry managed QBPs will only reflect higher IT costs realized by more sophisticated hospitals, if the provincial average IT cost increases. This will vary from hospital to hospital.

IT investments reduce the Base Funded Expense (BFE) modification in HBAM which reduces a hospitals share of the provincial expenses. As many hospitals invest, this effect will be reduced.

Volumes for non-emergent care are impacted during HIS implementation.

Typically, volumes for non-emergent care are reduced during major clinical transformations. Hospitals must manage volume impacts of HIS renewal carefully and be able to understand the potential future impacts on HBAM volumes.

Hospital sophistication in projecting HBAM and QBP funding varies widely.

The sophistication of hospitals in managing and projecting HBAM and QBP revenues varies widely. Small community hospitals, in particular, are at a disadvantage as they have relatively small finance and decision support teams to support analysis.

Coding of IT and HIS related costs varies widely.

Hospital processes for coding HIS related projects vary widely and do not just reside in IT. OCDM (Ontario Cost Distribution Methodology) does not currently provide the level of granularity to accurately compare hospital IT costs.

Removing IT costs from HBAM and QBP funding cannot be easily done and would require each hospital to abide by a standardized methodology.

HBAM is not structured to enable clinical best practices. Furthermore, degree of benefits realized will vary based on EMRAM maturity level

The HBAM funding model is not currently structured to enable clinical best practices. QBPs are designed to enable the adoption of leading practice pathways. However, specific HIS or IT related measures are not part of the funding model.

Furthermore, each hospital entering an HIS renewal will be starting from different points on the EMRAM maturity model scale. Depending on the level of maturity, the degree of benefits that is realized will change significantly.^[24]

F1 Recommendation – HIS Costing Standard

No consistent HIS costing standard is in place to accurately track hospital HIS costs.

Hospitals do not have a common approach for coding HIS related costs and sometimes may employ different accounting treatments, despite the existence of standard guidelines.

Approaches to accounting for HR, operational impact, and transition costs sometimes varied. As well, the OCDM (Ontario Cost Distribution Methodology) does not currently provide the level of granularity to accurately track hospital IT costs.

Having consistent HIS costing standards including standard cost categories, depreciation rates, etc., will enable standardized HIS TCO models to be developed and shared, cost expenditures to be tracked, managed, compared and optimized, funding models to be optimized, etc.

There is a need to build consistency in cost categories, depreciation rates and clarity as to what constitutes a one-time vs. ongoing expenditure.

These HIS costing standards will enable standardized TCO models to be developed and shared, HIS cost expenditures to be tracked at the hospital/cluster/hub/LHIN/province levels, and the funding models could then be optimized accordingly.

HIS Financing – F1 Recommendation

F1 The panel will develop cost standards for hospital accounting and coding to allow for more accurate projections of HIS-related expenses, and in turn support the effectiveness of ministry funding models.

F2 Recommendation – HIS and Health System Funding Reform Predictor Tool

Hospitals need to reliably predict the impact of HIS investments. Existing HFSR Predictor Tool needs to be modified to handle HIS investments.

Hospitals have limited ability to accurately model potential HBAM and QBP impacts of making significant investments in HIS and other large capital investments.

The OHA has worked with the ministry to develop a tool but use of the model requires capacity building. As well, the tool could be adapted to be more specific and sensitive to the type of investments required for HIS.

HIS Financing – F2 Recommendation

- F2** The OHA, with the support of the ministry, should modify the current Health System Funding Reform Predictor Tool so that hospitals can better understand local impacts that may result from HIS investments, while also validating these impacts at a provincial level.

F3 Recommendation – HIS Total Cost of Ownership Standardized Tool

There is no common approach to HIS total cost of ownership (TCO) which is critical to understanding HIS investment affordability and managing long-term costs.

Hospitals do not have a common approach for accurately projecting total cost of ownership (TCO) which makes predicting true capital and operating expenses challenging. It is indeed often too late into the investment when cost pressures emerge. Hospitals typically don't know the extent of these costs before making a purchasing decision.

Accurate TCO is integral to the effective long-term management of costs extending from HIS investments and key to understanding affordability before contracting with a particular vendor.

Much of this challenge stems from a broader ecosystem of inconsistency in costing practices. For example, what is included in the analysis or how many years out the model should go varies from site to site. As well, hospitals have varying degrees of capacity (resource and skill) to develop accurate and comprehensive TCO modelling.

HIS Financing – F3 Recommendation

F3 The panel will support the development, approval, and use of a standardized tool to calculate the Total Cost of Ownership of HIS renewal activities.

F4 Recommendation – HIS Investment and Hospital Funding

HIS business case for hospitals is challenging as most benefits accrue outside the hospital.

HIS investments represent major capital investments, and should therefore directly benefit patients and improve system outcomes. However the business case at the hospital level is challenging as many benefits accrue outside the hospital.

HIS investment effects HBAM/QBP model, resulting in real but potentially manageable reduction in funding.

Any large capital expenditure, such as an investment in HIS, has an effect on the way the Health Based Allocation Model (HBAM) / QBP (Quality Based Procedures) funding is applied, resulting in a real, but potentially manageable, reduction in funding.

For example, those making investments early may appear to have higher costs than others and, at least in the short term, will receive only what the average hospital receives, resulting in a shortfall.

Any alteration of funding models could have harmful unintended consequences.

However, altering the HBAM funding model, even to mitigate one aspect of expense, can have unintended consequences that need to be understood.

HIS Financing – F4 Recommendation

F4 The panel will continue to explore how the Health Based Allocation Model (HBAM) and other funding models can support the adoption of evidence-informed practices related to HIS investments.

Implementation Considerations

HIS costing standardization will require the setup of a task force with representation from all hospital types and

Building on the early work of the financing subgroup, a task force will be assembled under their leadership to initiate the necessary analysis, building on early findings to date.

a willingness for transparency.

It will be important to have appropriate representation from all hospital types, and willingness for some transparency in financial practices with an aim to accurately contribute to broader provincial standardization.

TCO tool development needs to take into consideration:

- *Variability between hospitals*
- *Need for different TCO worksheets based on thresholds*
- *Dissemination and education*
- *Use with HIS business case*
- *Resourcing effort to develop tool*

The TCO tool will need to account for variability in expenditures and other differences between hospitals.

Different 'thresholds' in budget or beds could produce different TCO worksheets while also guiding hospitals as to the degree of proportionate investment in key areas.

Bodies such as the OHA can play an important role in dissemination and education when this TCO tool is completed.

Eventually, this tool can also be the standard by which hospitals are assessed through any business case requests for HIS procurements in consideration of financial viability.

Smaller hospitals may have challenges devoting resources to undertaking this work as such, support could be provided by the Community of Practice.

HSFR modeling tool modification will need to work through the existing HSFR governance, involve the HIS Community of Practice and other stakeholders to disseminate, support and adapt the tool, and have the commitment of the sector to support this work.

In order to modify the current Health System Funding Reform (HSFR) Predictor Tool, the ministry will need to work through the existing HSFR governance to best mobilize required supports, specifically, the identification and assessment of any existing relevant artifacts for this purpose.

Use and implementation of the HSFR tool should be promoted by the ministry, the HSFR governance, the HIS community of practice and other stakeholders to disseminate, support and adapt the HSFR tool as needed.

Parallel commitment to support usability of any HSFR artifacts should also be considered (e.g. through holding webinars).

There is a need for commitment from the sector to support this work so it is informed by the experiences of hospitals .

The financing subgroup should be expanded so that there is additional support from key hospital staff, and there needs to be clear expectations about resource implications.

Moving Forward

The Future of HIS Renewal

The panel report was built on three core principles: clear long-term thinking, pragmatic short-term action, and strong commitment to ensure success.

The panel feedback has highlighted three core principles that have formed the basis of this report and associated recommendations. In summary, to ensure success, we need:

1. Clear long-term thinking

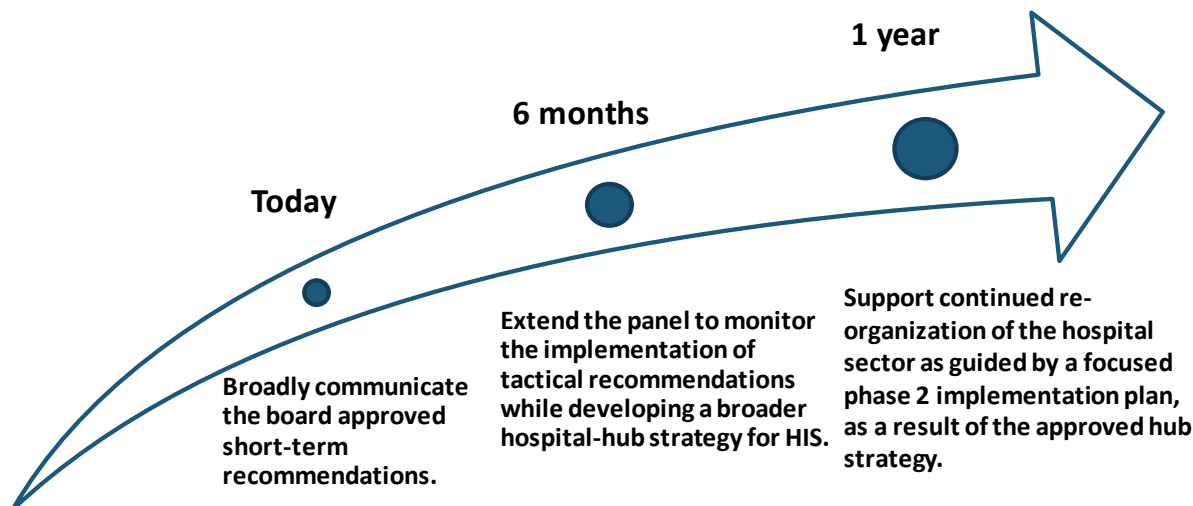
- A well-defined long-term vision is critical to the success of the HIS renewal initiative
- Set the stage for resolving proximate issues (e.g. Diagnostic Imaging Common Services)
- HISs are needed for the successful completion of the “connected backbones”

2. Pragmatic short-term action

- Implement short-term recommendations within the next six months
- Clearly identify and mitigate risks
- Clustered HIS model can help hospitals with limited access to capital continue to progress in their HIS maturity journey

3. Strong commitment

- Governance and accountability to ensure that local, regional and provincial actors know how to collaborate effectively in implementing and operating HIS partnerships



The next generation of HIS investments will need to be value-based and rely more

Considering the environment of fiscal constraint, the next generation of HIS investments will need to rely more heavily

heavily on partnership and collaboration

on partnership and collaboration in order that HISs help to drive an integrated, equitable and efficient health system that delivers high quality, patient-centered care.

The recommendations of the panel set us on a path towards a systems strategy of value-based investments that create the foundation necessary to advance health care system transformation, in line with Patients First: A proposal to strengthen patient-centered health care in Ontario, and to realize key health system objectives, such as:

- Optimized connectivity (across acute, primary and community sectors),
- Clinical standardization and effective service integration,
- Common requirements and interoperability standards, and
- Improved patient outcomes.

G1 Recommendation – Enabling integrated Health Care Services

The panel's recommendations are aligned with Patients First and recognize the role of LHINs and health system partners to ensure a more effective integration of health care services.

The panel recommendations have taken clear direction from the objectives of the government's Patients First initiative, and the roles of health system partners, including the emerging changes in the role of LHINs, to ensure that HIS investments are integral to the effective integration of health care services.

Indeed, on December 17, 2015, the ministry released a government initiative, *Patients First: A proposal to strengthen patient-centered health care in Ontario*, which proposes four new areas in which LHINs will play a bigger role:

- Ensure more effective integration of services and greater equity,
- Improve timely access to primary care, and seamless links between primary care and other services,
- Ensure consistent and accessible home and community care, and
- Establish stronger links between population and public health and other health services.

The first item on LHINs playing a bigger role on ensuring more effective integration of services is directly pertinent to the HIS renewal initiative.

HIS General – G1 Recommendation

- G1** The ministry should, with the continued support of health system partners, provide clear direction to the sector that coordinated Hospital Information System (HIS) investments are integral to effective patient-centred health care services, cross-sector integration and provincial connectivity.

G2/G3 Recommendations – Extending the Panel’s Mandate

Extending the panel’s mandate will allow it to address the mid and long-term HIS renewal objectives.

The panel’s original Terms of Reference laid the groundwork for a role beyond its initial short-term commitment. There is a need to address the mid and long-term objectives of the HIS renewal initiative that were identified in the course of the panel discussions, but could not be elaborated sufficiently due to the need to focus on near-term objectives.

It will also provide continuity which is essential for a successful implementation of the panel recommendations.

The panel’s work has created a strong foundation for HIS investments in the Province, generating an opportunity to build further on this success into the implementation phase. This includes:

- Supporting the development of a rigorous implementation plan for the board approved recommendations,
- Overseeing the implementation of the short-term recommendations over a six month timeline, and
- Supporting continued development of medium to long-term opportunities as part of eHealth 2.0

HIS General – G2/G3 Recommendations

- G2** The ministry should, with the continuing support of health system partners, extend the mandate of the HIS Renewal Advisory Panel to create an implementation plan for these short-term recommendations, and to develop additional medium-term recommendations for consideration by the eHealth Investment and Sustainment Board.
- G3** The ministry should, with the continuing support of health system partners, work with the Ontario Hospital Association (OHA) to engage its members on the implementation plan for HIS renewal, as endorsed by the eHealth Investment and Sustainment Board.

Appendix A – Panel Terms of Reference

Purpose

A significant number of Ontario’s hospitals are replacing or upgrading their Hospital Information Systems (“HISs”), or will be doing so in the near future. At this crucial juncture, there is an opportunity for hospitals, Local Health Integration Networks (“LHINs”), the Ministry of Health and Long-Term Care (“the ministry”), and other key partners to examine ways to maximize the value and impact of public investment in these systems. This work is one important component of eHealth 2.0, which will see the renewal of the existing ehealth strategy.

The eHealth Investment and Sustainment Board (“the Board”) is establishing the HIS Renewal Advisory Panel (“the panel”) as a subcommittee of the Board, to undertake activities as outlined in this Terms of Reference. The panel will have a time-limited mandate set through the direction of the Board and its Chair. The time-limited nature of this panel will coincide with the “pause” on HIS renewal (as articulated in ministry-approved key messages to the field), spanning procurement and multi-tenancy activities.

The objective of the panel is to provide recommendations to the Board that maximize the value of current and future hospital information system investments in Ontario, while also taking into account the need for hospitals to have cost-effective systems supporting the provision of quality care, and the requirements of health system transformation, including the enhanced integration of services supported by the electronic sharing of health information. The panel will also support the ministry in assessment of any requests to proceed with HIS procurements during the pause period, with a focus on improving patient outcomes and value for money through collaboration and innovation.

Governing Principles

The panel’s work and recommendations will reflect the need for:

- Individual health service providers to make timely decisions that meet their clinical and business requirements.
- LHINs to fulfill their legislative mandate to maximize the benefits of health services integration.
- Advice to the Board to be based on strong analysis and evidence – and to support the overall objectives of eHealth 2.0 (e.g. increasing the capacity for investment management).
- Health service providers to account for the interests of other hospitals in planned HIS renewal activities to maximize opportunities for collaboration, procurement, and shared services.
- Innovative ways to support HIS renewal, including new technologies, financing models, and change management.

Roles and Responsibilities

Support of eHealth Strategy 2.0

1. Provide advice that will make a significant contribution to the ministry’s development of an investment management model for ehealth.
2. Lay the groundwork for guiding ongoing HIS renewal decisions in order to support an effective transition to implementation and sustainment phases.

Support Health System Objectives

3. Recognize the opportunity for procurements and information technology “multi-tenancy” to support the provision of cost-effect, quality health services, when guided by meaningful use.

4. Demonstrate fiscal prudence for tax dollars when mobilizing HIS investments.
5. Balance the pressure of hospital information system acquisition with the ministry's interest in achieving its transformational priorities.
6. Provide due consideration for optimizing integration infrastructure and services being implemented by eHealth Ontario, including the provincial health information access layer and three regional connecting projects.

HIS Renewal Scope Definition

7. Define the case for change, identifying the scope of issues requiring coordinated provincial support.
8. Ensure a shared understanding amongst the panel of HIS renewal activities in Ontario, from both an historical perspective (e.g. what has been done; what were the costs and benefits) and a forward-looking perspective (e.g. what is needed; how is technology changing).

Communication & Engagement

9. Support, where requested, ministry review of exceptions during the pause period for HIS renewal.
10. Support the development of key messages for HIS renewal in the province of Ontario.
11. Identify and engage relevant subject matter experts who can contribute to the scope of the panel's work.

Options Analysis

12. Examine, in an evidence-based manner, the contribution of governance, multi-tenancy, collaboration, technology, procurement and funding to HIS renewal in Ontario.
13. Assimilate information on procurement opportunities and risks, costing and financing.
14. Assess the approaches taken by other jurisdictions and the relative contribution of these activities to defining best practices.
15. Define the potential roles and activities that could be undertaken by hospitals, shared service organizations, LHINs, the ministry, and others.
16. Develop and assess, based on aforementioned analysis and residual risk, the strength and weakness of a select number of integrated approaches that can be applied to HIS renewal.

Develop a Recommended Model for HIS Renewal in Ontario

17. Using these options, develop a preferred provincial 'model' to support HIS renewal in Ontario.
18. Contemplate the most appropriate implementation intervention(s) across the spectrum of options from guidelines to enhanced opportunities for specific performance expectations, based on Board direction.
19. Consider a potentially staged implementation of recommendations under a broader model based on immediate, near and long-term pressures from hospitals.

Create Capacity for Meaningful Use

20. Ensure that any recommendations create clear expectations about the way in which hospital information technology should be used to achieve high quality patient outcomes.
21. Explore how other maturity models (e.g. the Healthcare Information Management and Systems Society model) could be supported in an Ontario context.
22. Describe an optimal future state that illustrates the vision of HIS functionality and meaningful use.

Membership

See membership table in Acknowledgements section of this report.

Reporting Relationships

The panel will, through its Co-Chairs:

- Hold formal accountability to the Chair of the Board
- Receive and incorporate direction from the Board, as provided
- Actively identify matters for timely tabling and resolution with the Board
- Through a standing reporting relationship, table routine updates with the Board

Frequency of Meetings

The panel shall aim to meet monthly during the term of the panel.

Members of the panel may not delegate attendance or responsibilities without the permission of the Co-Chairs.

Quorum

Quorum shall be a majority representation of the panel members.

Term of Participation

All members will hold their position for the nine month term of the panel, unless otherwise determined by the Co-Chairs. At the end of this term, the Co-Chairs, in partnership with the Board Chair, will determine the need to continue with any subsequent phases of work.

Secretariat

The ministry will provide secretariat functions for the panel, including analytical and administrative support.

The panel will also be supported by an HIS Working Group that will meet twice monthly and assist in supporting the informational needs of the panel, to aid in the development of recommendations.

Communications

All formal communications on the activities of the panel will be managed by the Co-Chairs. Public facing communications will require endorsement by the Chair of the Board.

The draft agenda for each panel meeting will be distributed five business days prior to the scheduled date, and materials will be circulated two business days in advance. The meeting minutes will be distributed within five business days of the meeting taking place, to be approved by members at the following meeting.

Amendment

At any time, members may propose changes to the terms of reference, which will require subsequent approval by the Co-Chairs and the Chair of the Board.

Board Approval Date	June 15, 2015
Last Amendment Date	August 5, 2015

Appendix B – HIMSS Analytics EMR Adoption ModelSM (EMRAM)

Reference: <http://www.himssanalytics.org/research/emram-stage-criteria>

The HIMSS Analytics EMRAM incorporates methodology and algorithms to automatically score hospitals around the world relative to their EMR capabilities.

Global HIMSS Analytics EMR Adoption ModelSM

STAGE	CUMULATIVE CAPABILITIES
Stage 7	Complete EMR, Data Analytics to Improve Care
Stage 6	Physician documentation (templates), full CDSS, Closed loop medication administration
Stage 5	Full R-PACS
Stage 4	CPOE, Clinical Decision Support (clinical protocols)
Stage 3	Clinical documentation, CDSS (error checking)
Stage 2	CDR, Controlled Medical Vocabulary, CDS, HIE capable
Stage 1	Ancillaries - Lab, Rad, Pharmacy - All Installed
Stage 0	All Three Ancillaries Not Installed

Data from HIMSS Analytics® Database ©2015 HIMSS Analytics

Stage 0	<ul style="list-style-type: none"> The organization has not installed all of the three key ancillary department systems (laboratory, pharmacy, and radiology).
Stage 1	<ul style="list-style-type: none"> All three major ancillary clinical systems are installed (i.e., pharmacy, laboratory, and radiology).
Stage 2	<ul style="list-style-type: none"> Major ancillary clinical systems feed data to a clinical data repository (CDR) that provides physician access for reviewing all orders and results. The CDR contains a controlled medical vocabulary, and the clinical decision support/rules engine (CDS) for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage. The hospital may be health information exchange (HIE) capable at this stage and can share whatever information it has in the CDR with other patient care stakeholders.

Stage 3	<ul style="list-style-type: none"> • Nursing/clinical documentation (e.g. vital signs, flow sheets, nursing notes, eMAR) is required and is implemented and integrated with the CDR for at least one inpatient service in the hospital; care plan charting is scored with extra points. • The Electronic Medication Administration Record application (eMAR) is implemented. • The first level of clinical decision support is implemented to conduct error checking with order entry (i.e., drug/drug, drug/ food, drug/lab conflict checking normally found in the pharmacy information system). • Medical image access from picture archive and communication systems (PACS) is available for access by physicians outside the Radiology department via the organization's intranet.
Stage 4	<ul style="list-style-type: none"> • Computerized Practitioner Order Entry (CPOE) for use by any clinician licensed to create orders is added to the nursing and CDR environment along with the second level of clinical decision support capabilities related to evidence based medicine protocols. • If one inpatient service area has implemented CPOE with physicians entering orders and completed the previous stages, then this stage has been achieved.
Stage 5	<ul style="list-style-type: none"> • A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images. • Cardiology PACS and document imaging are scored with extra points.
Stage 6	<ul style="list-style-type: none"> • Full physician documentation with structured templates and discrete data is implemented for at least one inpatient care service area for progress notes, consult notes, discharge summaries or problem list & diagnosis list maintenance. • Level three of clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. • The closed loop medication administration with bar coded unit dose medications environment is fully implemented. • The eMAR and bar coding or other auto identification technology, such as radio frequency identification (RFID), are implemented and integrated with CPOE and pharmacy to maximize point of care patient safety processes for medication administration. • The "five rights" of medication administration are verified at the bedside with scanning of the bar code on the unit dose medication and the patient ID.
Stage 7	<ul style="list-style-type: none"> • The hospital no longer uses paper charts to deliver and manage patient care and has a mixture of discrete data, document images, and medical images within its EMR environment. • Data warehousing is being used to analyze patterns of clinical data to improve quality of care, patient safety, and care delivery efficiency. • Clinical information can be readily shared via standardized electronic transactions (i.e., CCD) with all entities that are authorized to treat the patient, or a health information exchange (i.e., other non-associated hospitals, ambulatory clinics, sub-acute environments, employers, payers and patients in a data sharing environment). • The hospital demonstrates summary data continuity for all hospital services (e.g., inpatient, outpatient, ED, and with any owned or managed ambulatory clinics). • Blood products and human milk are included in the closed-loop medication administration process.

Appendix C – HIS Renewal Secretariat

Organization	Name	Title
HIS Renewal Panel Secretariat		
London Health Sciences Centre	Glenn Holder	Executive Lead, cSWO Program
MOHLTC eHealth Strategy and Investment Branch	Greg Hein	Director
	Lauren Bell	Senior Program Consultant
	Kathryn Chadwick	Research Analyst
	Sarah Knox	Senior Program Consultant
	Roula Al-Sammak	Policy Intern
	Serge Theberge	Senior Program Consultant

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Glossary

3SO	Shared Support Services Southeastern Ontario
BFE	Base Funded Expense
BPS	Broader Public Service
CHAMP	Champlain Association of Meditech Partners
CHEO	Children's Hospital of Eastern Ontario
CHI	Canada Health Infoway
CoP	Community of Practice
CDR	Clinical Data Repository
DICS	Diagnostic Imaging Common Services
EMRAM	HIMSS Analytics Electronic Medical Record Adoption Model
ERP	Enterprise Resource Planning
GTA	Greater Toronto Area
HBAM	Health Based Allocation Model
HFSR	Health System Funding Reform
HHS	Hamilton Health Sciences
HIS	Health Information System
ITAC	Information Technology Association of Canada
LHIN	Local Health Integration Network
LHSC	London Health Sciences Centre
MOHLTC	Ministry of Health and Long-Term Care
MoU	Memorandum of Understanding
NEO	North & Eastern Ontario
NEON	North Eastern Ontario Network
OCDM	Ontario Cost Distribution Methodology
OCHIS	Office of the Chief Health Innovation Strategist
OHA	Ontario Hospital Association
OHIC	Ontario Health Innovation Council
QBP	Quality Based Procedures
RFP	Request for Proposal
SCO	Supply Chain Ontario
SSO	Shared Services Organization
SWO	South Western Ontario
TB/MBC	Treasury Board / Management Board of Cabinet
TCO	Total Cost of Ownership
TOH	The Ottawa Hospital
UHN	University Health Network
VMS	Vendor Managed Solution