BRITISH COLUMBIA

OCT 17 2013

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Mr. Craig James
Clerk of the Legislative Assembly
Room 221
Parliament Building
501 Belleville Street
Victoria BC V8V 1X4

Dear Mr. James:

In accordance with Section 14 of the *Budget Transparency and Accountability Act,* please find enclosed a major capital project plan for the Clinical and Systems Transformation Project.

Yours truly,

Terry Lake
Minister

Attachment

Ministry of Health

Office of the Minister

Mailing Address:
PO Box 9050 Stn Prov Govt
Victoria BC V8W 9E2

Location:
Parliament Buildings
Victoria

CAPITAL PROJECT PLAN
CLINICAL AND SYSTEMS TRANSFORMATION PROJECT
AUGUST 14, 2013

1. Project Background

The primary purpose of the Clinical and Systems Transformation (CST) Project is to establish a common standardized, integrated, end-to-end clinical information system and environment ("Integrated Clinical Information System (CIS) Environment") for Provincial Health Services Authority (PHSA), Vancouver Coastal Health Authority (VCHA) and Providence Health Care (PHC) (collectively "the Health Organizations"). The three Health Organizations enable approximately 1.2 million patient visits each year and provide health services that serve each citizen in British Columbia. In addition, the facilities within the Health Organization's are central for teaching and research in British Columbia.

The vision of this integrated system is "One Person. One Record. Better Health". A single health record for each patient will promote high quality care and improve health outcomes throughout the region by ensuring clinicians have a greater level of accurate and consistent patient information. A single electronic health record per patient across the continuum of care (acute, ambulatory, and residential integrated with lab, medical imaging, health information, and pharmacy) will streamline the care process, improve the safety and efficiency of patient care, and provide clinicians with a longitudinal view of a patient's medical history for better care decisions.

The CST Project is more than a change in technology platform—it will transform the way practitioners care for patients. The Health Organizations are standardizing clinical processes and systems in acute, ambulatory, and residential sites throughout the Lower Mainland and some of the outlying regions serviced by PHSA. This initiative will enhance the Health Organizations' ability to ensure accuracy, safety, and the integrity of patient identification.

The CST Project will deliver real-time health information to clinicians and researchers in a way the current heterogeneous systems do not. It will enable the standardization of administration functions, such as referrals, scheduling, and registration. It will also enable the Health Organizations to better manage and measure wait times as well as provide comparable and timely data for efficient resource management. This will in turn allow British Columbia to better manage future health care costs while improving the quality of patient care.

The core components of the CST Project include the design, build, integration and implementation of the Integrated CIS Environment, based on the Cerner system (Cerner). This solution will not be built from "scratch" but rather leverage the existing PHSA instance of Cerner to save time and reduce costs. By creating a standardized clinical platform, the foundation for a provincial clinical and technology asset is established and available to other Health Authorities in British Columbia and if desired, nationally.

2. Project Objectives

The key objectives for the CST Project are to:

- Transform care delivery through standardized protocols, order sets and clinical documentation with the focus to improve patient safety and quality;
- Standardize key clinical and business processes including admitting/registration, discharge, transfer, referral, medical imaging, laboratory services and pharmacy;
- Standardize acute, residential and ambulatory care information systems on a non-customized Cerner application;
- Standardize and enhance technology infrastructure including access and medical devices (IV pumps, medical equipment for closed-loop, monitors, computers), servers, storage and networks; and
- Achieve a HIMSS[1] Analytics score across the Health Organizations of Level 5+ [2] in 5 years.

3. Project Status

Preparations for the project have included:

1. The CST Project has been approved by the Board of Directors of each Health Organization;
2. A service agreement has been signed with IBM Canada Limited;
3. The Project Director and Chief Transformation Officer has been appointed;
4. Communication on project approvals and signing of the service agreement have been circulated within the Health Organizations;
5. A Memorandum of Understanding between the Health Organizations is being finalized;
6. A Project Board has been established to govern the project.

4. Project Costs and Benefits

Project Costs:

The ten-year total cost of ownership (TCO) for the project is projected to be $842 million, comprising of a capital and an operating cost component. This TCO includes expenditures on the

[1] The Health Organizations use the Electronic Medical Record Adoption Model (EMRAM) to benchmark, set targets and track progress toward a complete electronic health record. The model, developed by the Healthcare Information and Management Systems Society (HIMSS – see www.himss.org) is internationally recognized.

[2] Level 5 involves the integration of Labs, Radiology and Pharmacy, clinical documentation, clinical protocols and closed loop medication administration. Level 6 is the addition of Physician documentation (structured template), and full R-PACS (PACS – Picture Archiving and Communications System). Level 7 is the final stage, and achieves a complete Electronic Medical Record.

installation and implementation of the new system and related maintenance and support costs for the ten-year period.

The industry average annual expenditure on IM/IT operating costs is approximately three percent of the total annual Health Organizations operating budget. This average is based on information from Canada Health Infoway.

During the ten-year period of this project, the total operating budget expenditure for the Health Organizations will be approximately 60 billion. Prior to the initiation of the project, the Health Organizations spend approximately 1.2 percent of their operating budget on IM/IT costs, which is 1.8 percent less when compared with the industry average.

This project will help to close this investment gap, although the ratio anticipated will stay below industry average.

The capital cost component of the CST Project is estimated at $480 million over the next ten years. The operating cost component of $362 million is projected over the ten years for supporting the new Integrated CIS Environment and the current legacy systems, until such systems are replaced by the Integrated CIS Environment. The Health Organizations are committed to have a rigorous governance process in place to oversee and manage the project and adequately fund the CST Project during its implementation and ongoing support as required.

Project Benefits:

The most significant benefit to patients and the care delivery process is in relation to the reduction of adverse events associated with a hospital stay. The anticipated benefits of the CST Project are listed below under several high-level benefit categories. Many of the listed technical and system benefits work together in the interest of the patient and delivery of care.

Quality, Patient Safety and Clinical Excellence:

- Enhanced patient experience and higher levels of satisfaction related to information flow and retrieval during hospital stay or outpatient visit
- Reduced number of forms to complete for clinicians
- Decreased need to repeat information by both clinicians and patients
- Decreased need to carry written copy of history
- Decreased need to remember medications taken while in hospital
- Care providers have comprehensive information at the point of care
- Decreased need for repeating tests
- Increased ability for preventative care, such as reminders for immunizations and screening
- Automatic alerts for results out of range
- Records easily shared with other providers which facilitates decision making as not dependent on having chart with them
- Decreased adverse events (drugs, blood transfusion errors, infections)
- Increased clinical documentation compliance (inpatient admission, discharge, education, wounds, shift assessment)
- Improved care maps/pathway compliance

- Increased computerized physician order entry adoption rates
- Medications are reconciled more quickly and accurately with less effort

Process Redesign and Workflow:

- Reduced medical record deficiencies
- Reduced duplicate ancillary testing and decreased cycles times (Lab, Radiology)
- Increased standardization of workflow within and across the Health Organizations
- Improved data quality for research and health system planning
- Decreased need for standalone research databases
- Decreased cycle time for first medication dose administered
- Decreased time from medication order to medications available at point of care
- Improved access to information at patient care transfer points
- Decreased call backs to physicians for order clarification
- Improved reporting and health planning decision making

Efficiency and Cost Avoidance:

- Increased productivity as repetitive tasks related to paper charts are removed
- Cost avoidance for drugs, laboratory and radiology
- Decreased transcription costs
- Reduced length of stay
- Fewer reports missing on charts that require repeating to determine plan of care
- Improved wait times
- Decreased operating cost per exam/test
- Increased report turnaround time
- Improved medication management (improvement in inventory, packaging and distribution processes)
- Efficient clinical documentation (decreased clinician overtime)
- Reduced readmission rates
- Cost avoidance associated with legacy systems
- Increased system security, audit capability and accountability

5. Project Risks & Mitigation Strategies

As a large project spanning multiple years and Health Organizations, challenges could arise and have adverse impact on the project unless properly mitigated. Some of the common issues with other major projects would include: achieving agreement around standard practices, having the appropriate internal resources to meet project timelines, and consistent engagement with stakeholders for timely decision making.

Major Risks:

- Project timelines or scope are not achievable or keep changing to meet shifting expectations
- Clinical stakeholders are not engaged and accountable

- Clinical standardization is not accepted by all Health Organizations and decisions are not based on best practices or evidence-based clinical practices
- Strong organizational identities clash with shared project vision impacting on collaboration and rapid decision making
- End users and other stakeholders are not aware of required changes, not adequately prepared for changes, or not sufficiently supported after implementation
- Decision-making governance structures not clear, efficient or timely, or decisions once agreed are not followed
- Leadership is not visible or effective at influencing change across the Health Organizations
- Appropriate resourcing, including clinicians, are not available for project duration or supported with dedicated time to participate in planning, workflow redesign and ongoing education
- Technical complexity from integration with other downstream clinical and business systems, data conversions from multiple legacy systems and module implementation challenges
- Vendor is unable to execute on requirements and ineffective dispute resolution

Mitigation Strategies Identified:

- Manage competing expectations through governance processes and a dedicated project phase for strategy and planning
- Robust governance and project management structure to review and prioritize changes to scope, and ensure clear decision-making structures
- Establish clear and visible executive and clinical leadership by having visible executive support throughout the implementation, setting expectations and establishing physician and clinical advisory groups to provide leadership and make appropriate decisions
- Early engagement of end-users and stakeholders
- Develop and model a culture of collaboration at the Health Organizations leadership level, and ensure consistent messaging through a communication plan
- Acquire executive support and allocate funding to secure commitment for key resources
- Develop and monitor accurate long-term funding forecast to meet realistic project costs
- Ensure adequate on-site support for system implementation and sustainment, and establish long-term support model including training, education and support resources
- Leverage vendor and Health Organization's tools and resources to standardize workflow processes before and during the design and build of the enterprise solution, maintaining a focus on best practices
- Include best practice protections including performance incentives and penalties in the service agreement

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JUL 2 3 2014

Ms. Judy Darcy
MLA, New Westminster
737 Sixth St.
New Westminster BC V3L 3C6

Dear Ms. Darcy: Judy

Thank you for your request for information during the 2014/15 Ministry of Health Estimates Debates in regards to Clinical and Systems Transformation (CST) Risk Management.

Risk management is an important aspect of the CST project. Risk management is a function performed by the Joint Project Management Office (JPMO), which monitors and controls the project to ensure key outcomes are achieved on time and within budget. The JPMO is responsible for actively monitoring, managing, communicating and escalating project risks.

While the risks identified in the CST Risk Register report are still relevant, much progress has been made since then to actively manage and mitigate the risks associated with this large and complex transformational project. Please see the attached table for specific actions that have been undertaken to mitigate each risk.

Executive oversight of the program-level risks is actively managed through a robust project governance structure. This structure includes a Project Board, which is chaired by the Associate Deputy Minister, and includes the Chief Executive Officers from each partnered Health Organization. An Executive Steering Committee also exists that includes senior clinical and executive leaders, and is chaired by the Chief Transformation Officer for the project.

In addition to the risk management processes managed by the JPMO, and the existing governance structure, the vendor (Team IBM) also conducts regular Project Management Reviews on the project. The Project Management Reviews are regularly scheduled, and are focused on assessing risk and monitoring progress throughout the lifecycle of the project. The first review was undertaken in August 2013 and the second was completed in May 2014. The reviews provide the CST team with a joint plan of action for addressing the risks identified.

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The Project Board has also recently initiated an independent project risk review, currently being conducted by a third party with completion targeted for August 2014. This is an example of the project's strong risk management culture. This review involves an objective third party conducting a series of interviews with executives and senior project leaders to identify findings/key themes, and put forward recommendations to mitigate key risks. Early and periodic external assessments of projects of this magnitude improve the probability of success.

Through robust governance, the existing risk management processes, and regularly scheduled risk reviews/audits, the government and partnered health organizations are actively monitoring and controlling the risks associated with the CST project.

Sincerely,

Terry Lake
Minister

Attachment

Attachment:

Risks	Mitigation Completed	Previous Rating	Current Rating
Finances	• A Memorandum of Understanding (MOU) was formed between the Health Organizations to clearly identify cost sharing principles, and financial oversight. • Robust, comprehensive financial planning (forecasting, tracking and reporting) is in place. The Project Board, with Ministry of Health and the CEOs of the Health Organizations, governs the financial control for the project.	High	Moderate
Governance	• Established governance bodies made up of multi-disciplinary leaders from across the Health Organizations and Team IBM. • All key decisions required to facilitate the design of the system have been made on time; governance is functioning very well.	High	Moderate
Culture	• The JPMO conducted a Shared Vision and Goal Alignment (SVGA) organizational assessment in the planning stage of the project to understand cultural differences and organizational readiness for change. • Established Change Management, Communications and Transformational Learning teams to address cultural resistance to change and to foster adoption.	High	Moderate
Technical complexity	• Through the implementation of CST we are reducing technical complexity across the Health Organizations, moving from several old, legacy information systems to Cerner, a modern, robust, integrated clinical information system.	High	Moderate
Shared Vision	• Clinical visioning session held with representatives from each organization and Team IBM. Developed a mission statement, shared vision, tagline and guiding principles to ensure alignment towards a common goal.	High	Moderate
Resourcing	• Robust resource planning conducted with the service provider (Team IBM). • The design process mobilized and engaged hundreds of practicing clinicians to participate in the design and development of future state clinical workflows.	High	Moderate
Clinical standardization	• Through 13 design teams, brought hundreds of multi-disciplinary practicing clinicians together, from across the Health Organizations and Team IBM, to standardize clinical processes, protocols, care pathways and order sets. This is the largest clinical standardization initiative ever undertaken in BC. The clinical standardization design work will complete by Spring 2015.	High	Moderate

Achievable expectations and timelines	• Robust project management office processes to monitor scope, schedule, budget. • Regular communications to thousands of stakeholders, to explain the goals of the CST project, progress and to answer questions.	High	High
Clinical engagement and accountability	• Alignment of Change Management and Communications plans and priorities including: a physician engagement strategy, lunch and learn series, a website, regular all-staff meetings and bulletins, and more. • Many forums established for engagement, including a Clinical Decision Group and multiple clinical advisory task groups. A new Provider Advisory Group is being developed.	High	High
Leadership	• Chief Executive Officers and the Associate Deputy Minister formed a Project Board; actively meeting to control the project and provide executive leadership. • Vice President Executive Sponsors have been established in each Health Organization and meet weekly to guide and control the project and provide leadership. • Chief Medical Information Officers have been appointed in each organization to provide medical leadership. • A Chief Transformation Officer has been appointed to oversee the project. • Executive Awareness Sessions were held with each of the three Health Organizations. • The Joint Executive Committee manages the Health Organizations' relationship with Team IBM and reviews overall service provider performance, project status and progress against the contract.	High	Moderate
End-user adoption	• Alignment of Change Management and Communications plans and priorities including a physician engagement strategy lunch and learn series and more. • A dashboard of metrics will be developed to track and monitor usage and uptake of the new clinical processes and information system.	High	High
Vendor relationship	• Joint governance of the project in place through the Joint Project Management Office. • Management of vendor relationship through a Joint Executive Committee.	High	High
Political	• The government is committed and supportive of the project, with the Associate Deputy Minister chairing Project Board, which is responsible for providing overall executive direction and key decision making for the project regarding scope, budget, schedule, communications and dispute resolution.	Moderate	Moderate

Memorandum

BRITISH COLUMBIA

Ministry of Health
Office of the Minister

To: Clinical and Systems Transformation (CST) Project Board

Date: December 19, 2014

Earlier this week, accompanied by my Deputy Minister and Associate Deputy Minister (as the Chair of the CST Project Board), I met with the responsible Health Authority Board Chairs (VCH, PHC, PHSA) and their respective CEOs to discuss the status of the CST Project. The Project Director of the CST Project and the former Chair of the CST Project Board joined us as invited guests.

The CST Project is one of the largest healthcare projects embarked upon in the history of British Columbia and will be transformational in its impact on clinical practice and systems when it is completed. The complexity and size of this undertaking naturally means the CST Project does not come without risks and challenges - some of which have been raised over the last month. While I am confident the right teams are in place to find solutions within the existing framework, given the recent issues, the following direction is provided:

1) The Project Board is to review the concerns raised in VCH's November 3 email and determine what additional mitigation strategies may be required to manage risk. These could include reviewing the training requirements, pace of implementation, and physician engagement strategies.

2) The Project Management Office, CST Project is to arrange for a senior member of the North York General Hospital (NYGH) consulting team that undertook a week long review of the CST Project to provide a verbal briefing on NYGH consulting team findings to the Project Board.

3) Notwithstanding current discussions with the vendor, the PMO with the full support of the Project Board is to concentrate their efforts and energy on delivering the project in scope and on budget. The PMO and Project Board are to engage as frequently as required.

4) Update on progress to be provided in mid-February.

Thank you and I look forward to hearing of your progress in the New Year.

Sincerely,

Lake

Honourable Terry Lake, Minister of Health

Brown, Stephen R HLTH:EX

From: Ackenhusen, Mary [CORP] <Mary.Ackenhusen@vch.ca>
Sent: Wednesday, February 4, 2015 7:47 AM
To: Brown, Stephen R HLTH:EX; Feulgen, Sabine HLTH:EX
Subject: followup from yesterday
Attachments: Review_ large Health IT_CST_FINAL Nov 7 2014.pdf

Hi Stephen and Sabine,

I am reflecting on the learnings from the meeting with John, and how we can meet his expectations.

The largest area of concern for VCH, because of the high risk it entails, is the big bang strategy for the VCH and PHC sites. s.13

s.13

We are all in a learning mode on this complex project, and I hope you will welcome some additional information to give you more background on this debate. With your permission, I am sending you a review of learnings from other large IT projects (pulled from a literature review) as they apply to our CST project. The paper, written in November 2014 by the 3 VCH executive leads including Dr Bruce Long, presents the history of the project to date (as background) and then reviews a number of published articles on specific large complex IT EHR projects so that we can understand the challenges that other projects have faced and learn from these. It is worth reviewing so that we don't unknowingly make the same mistakes.

I thought this could be useful as we move forward to discuss next steps.

Thanks
Mary

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vancouver coastal Health
Promoting wellness. Ensuring care.

Review of Large Health IT Projects in the CST Context

Authors:

Susan Wannamaker
Vice President, Professional Practice
Chief Clinical Information Officer
Vancouver Coastal Health

Dr. Bruce Long
Chief Medical Information Officer,
CST Project
Vancouver Coastal Health/Providence Health

Paul Brownrigg
Vice President, CST & Special Projects
Vancouver Coastal Health

Date: November 3rd 2014

Version: FINAL 1.0

Background and Introduction

This paper is intended to bring experience and learnings from a sample of projects and academic papers to the Clinical and Systems and Transformations Project (CST) with a clear intent to influence decision-making related to the project structure, approach and overall strategy. At the time of writing (November 2014) the CST project is at a pivotal point. s.13,s.17

s.13,s.17

s.13,s.17 The CST project is highly ambitious and has, at its core, the replacement of vulnerable legacy information systems with a single instance of the Cerner clinical information system together with a battery of high-impact clinical transformation modules (appendix 1). These modules include CPOE, clinical documentation, closed loop medication as well as replacement and enhancement of legacy systems including, surgical modules (SurgiNet), radiology Information systems (RadNet), pharmacy information system (PharmNet) and many more ancillary and necessary supporting technologies. There is absolutely no doubt about the gargantuan degree of change to clinical and administrative workflow.

The literature is rich with experience of health IT project failures but few of this size and complexity. s.13,s.17

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Scope

The CST project scope is, by necessity, extremely large. In the past, clinical information systems were implemented in a piece-meal fashion with little thought given to sustainability and interoperability of systems as a whole. There is, however, little value in dwelling on history when the future potential of system transformation is ahead of us. The opportunity to improve the health system and the care we deliver to patients is very high and exciting.

Once the core information systems are refreshed and stable the opportunity to grow and innovate will be safer and will drive quality care improvements. In addition to core systems replacement, the CST project has included an ambitious list of transformational change projects. One in particular, CPOE, stands out as offering great benefits; The Agency for Healthcare Research and Quality[2] reported in 2008 that CPOE has the potential to be of high value in reducing prescribing errors, which are as high as 7.6% in an outpatient setting and 5% in an inpatient setting. The report goes on to emphasize quality of care improvement opportunities through compliance with guidelines.

The three Health Organisations and the Ministry of Health are courageous to embrace such a large scope over such a large and complex mix of hospital sites and organizations. s.13,s.17

s.13,s.17

[2] Hook J, Cusack C. Ambulatory Computerized Provider Order Entry (CPOE): Findings from the AHRQ Health IT Portfolio. (Prepared by the AHRQ National Resource Center for Health IT under Contract No. 290-04-0016). AHRQ
Publication No. 08-0063-EF. Rockville MD: Agency for Healthcare Research and Quality. May 2008.

External reviews

There have been two formal external reviews to date plus a TIBM self-review. The two external reviews by McKinsey and by North York General Hospital (NY) are remarkably consistent in their findings. NY found fundamental deficiencies in details of the approach and methodology as well as cautioning against the "full-scope Big Bang" implementation. They did, however, support the need to replace existing IT systems simultaneously to avoid a loss of functionality (also referred to as a form of Big Bang by NY). The NY recommendations included a strong signal to improve self-sufficiency and rely less on TIBM consultants citing the risk associated with dependency on a consulting firm and lack of internal capacity building.

McKinsey had a very limited scope to their review but nonetheless made a recommendation to slow down and phase the implementation instead of the Big Bang approach. McKinsey have advised the health organisations that a Big Bang approach is not a wise choice and have cautioned leaders that project failure in the form of non-adoption or physician rebellion could occur at the first site. In the event that was to occur it is possible that patient care could be negatively affected and such a high-profile failure would attract a lot of media attention. The opportunity to regain physician and clinician confidence in both the system as well as CST leadership would be significantly compromised.

UK NHS Experience

One of the early Patient Administration System (PAS) projects in the late 1990's was in Lancashire, England. In that project and many others in the NHS, there was an early realisation that scope and pace were combining to increase project risks. At that time vendors were developing new systems and the market was far less mature than today. The PAS project in Lancashire Health Authority was successfully implemented after slowing the pace and improving clinical involvement and ownership. CPOE and other modules were removed from scope due to the change management and adoption risk involved. Despite the passage of time, the same principles hold true that scope and pace can overwhelm an organisations capacity to adapt an adopt to the degree of change required.

Again in the NHS the National Program for IT (NPfIT), a $11Billion project[3], failed due to a combination of three factors[4]

Haste. *In their rush to reap the rewards of the programme, politicians and programme managers rushed headlong into policy-making, procurement and implementation processes that allowed little time for consultation with key stakeholders and failed to deal with confidentiality concerns;*

Design*. In an effort to reduce costs and ensure swift uptake at the local levels, the government pursued an overambitious and unwieldy centralised model, without giving consideration to how this would impact user satisfaction and confidentiality issues; and*

[3] Six billion GB pounds

[4] Oliver Campion-Awwad, Alexander Hayton, Leila Smith and Mark Vuaran. MPhil Public Policy 2014, University of Cambridge.The National Programme for IT in the NHS. A Case History. February 2014

Culture and skills. *NPfIT lacked clear direction, project management and an exit strategy, meaning that the inevitable setbacks of pursuing such an ambitious programme quickly turned into system-wide failures. Furthermore, the culture within the Department of Health and government in general was not conducive to swift identification and rectification of strategic or technical errors.*

Implementation Lessons Learned

The University Health Network (UHN) reported their experience and learnings from their project to implement Medication Order Entry (MOE); a component of CPOE[5] in 2006. The project was rolled out incrementally and included a pilot in 2003 confined to a single ward and single speciality. The pilot had to terminate early due to technical and workflow issues. Resolution of the "pilot failure" took 1-year before further incremental implementation was re-started. Eventually, the project achieved successful deployment of MOE/MAR but did not achieve implementation in the ICU, Transplant or in chemotherapy units.

The UHN experience and method describes a story of a project that was planned in manageable "pieces" with sufficient time have intimate participation from clinical staff and to perform a pilot implementation.

Rossos[6] also reported on the UHN MOE/MAR project regarding physician participation,

"...MOE/MAR implementation would only be successful if there were widespread acceptance of front line clinical staff. Otherwise this bold initiative would end in abject failure."

In his report, Peter Rossos described an extensive program of physician participation (not just engagement or consultation) at the ward level. He sounds the bell of caution against the mistake of relying on one or two physician champions and a relatively small proportion of the physician population being actively engaged.

The Agency for Healthcare Research and Quality in the US[7] evaluated 5 Health IT project that received grants of $166mm for projects outside the acute hospital setting. The conclusion of the study is consistent with several health IT projects, particularly those involving changes to clinician workflow.

AHRQ's Conclusion

"With time it has become clear that the task of implementing health IT is not easy and presents multiple challenges. This may be particularly true of CPOE with clinical decision support. The AHRQ grantees interviewed for this project have encountered the

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[5] Stephanie Saull-McCaig, et al. Implementing MOE/MAR: Balancing Project Management with Change Management. Health Care Quarterly. Vol 10. 2006

[6] Peter G. Rossos et al. Active Physician Participation Key to SmoothMOW/MAR Rollout. Health Care Quarterly. Vol 10. 2006

[7] Hook J, Cusack C. Ambulatory Computerized Provider Order Entry (CPOE): Findings from the AHRQ Health IT Portfolio. (Prepared by the AHRQ National Resource Center for Health IT under Contract No. 290-04-0016). AHRQ Publication No. 08-0063-EF. Rockville MD: Agency for Healthcare Research and Quality. May 2008.

same issues as others who have tackled implementing health IT. Their experiences and lessons learned re-emphasize the need for strong leadership, a solid implementation approach, good relationships with developers, strong training programs, and an approach to adoption that encompasses all that we have learned to date."

In the AHRQ experience (above) reference is made to strong relationships with the software vendor. s.17 s.17 Furthermore, the italicised text below provides key lessons that the CST project would be wise to attend to. Of particular note is reference to the Big Bang approach.

Roll Out Incrementally

"Once pilot testing with select users has been completed, the grantees with multiple practices recommended that the tool be rolled out slowly, one clinic at a time, rather than a "Big Bang" approach with a rollout across all clinics at once. This allows the implementers to observe the use in a real-world environment with all types of users. By implementing clinic by clinic, further refinements may be made to the tool, without subjecting large numbers of users to the frustrations of a tool not working as initially intended."

AHRQ emphasize the value of a strong relationship with the software vendor s.17 s.17

s.13

Workflow analysis and design is highly labour intensive and fundamental to successful change management and adoption. s.13

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s.13,s.17

Highlight the Added Value

"It has been noted that when clinicians recognize the added value of a health IT tool, they are far more likely to adopt that technology than when there is no apparent added value. One grantee noted huge success with their e-prescribing tool, while they had very low success with their laboratory and imaging order tool. The clinicians perceived real added value to the e-prescribing tool since it sped up the process of writing prescriptions, compared with paper-based prescribing. The clinicians also recognized the added value of the resulting medication history documentation."

The CST project includes such a vast array of potential for changes with unintended or unknown consequences that it is hard to imagine what they might be. In a fast-paced implementation more unintended consequences will inevitably occur. Learning from other projects is time-consuming but a worthwhile investment. An example is the lessons from both NY and AHRQ below:

Alert Fatigue

"Those projects implementing decision support systems have long struggled with the issue of alert fatigue. These grantees were no different. High-volume, low acuity, and

disruptive alerts led to clinicians clicking through and ignoring them. As such, the risk of implementation failure increases if alerts are not carefully constructed to bring important information to the clinician at the point of care. One of the grantees noted that they had learned from prior projects the importance of minimizing the number of alerts to reduce the risk of alert fatigue."

Similar to the time and space required to learn and improve the quality of the implementation to avoid unintended consequences CST needs to study the characteristics and individual characteristics of its user community. Fear and anxiety of multiple changes thrust upon users in a Big Bang implementation is to be expected. The behaviour fallout of those situations is usually rebellion and non-adoption.....or project failure.

Adoption Patterns

"... "just because you build it, doesn't mean they will come." He observed that while clinicians newer to the health care system tend to adopt faster than veteran clinicians, there is no clear adoption pattern with these veteran clinicians. Older clinicians may adopt more quickly than their middle-aged counter-parts. Interestingly, this grantee also observed that those clinicians with a larger clinic load adopted faster than those with a part-time commitment to seeing patients. Training strategies that target different groups of clinicians may be needed."

High-Touch Workflow Change

Computerized Physician Order Entry (CPOE) is an example of 'high-touch workflow change" but by no means the only one. CPOE is intended to be implemented as part of the Big Bang approach at each site during the CST project as are other high-touch technologies. The literature contains strong evidence that CPOE is a high risk and high value undertaking. To be successful and to reap the benefits care and attention to the lessons of those who have blazed the trail before CST must be learned and applied.

Ash et al[8] reported more specifically on CPOE, "CPOE by reputation, is hard to implement, expensive, and difficult to coax clinicians (and especially physicians) to use."

The Ash report also describes valuable considerations that require a significant amount of time and care to successfully implement.

"*The manner in which a CPOE application alters and integrates into existing environments and workflows is critical to its success. Users resent disruption of their patient care activities; thus, implementers must consider the following issues:*

- *Whether the impact of CPOE on the work processes of physicians, nurses, pharmacists, ward clerks, laboratory personnel, registration personnel, and other*

8 Joan S Ash, PhD, MLS, P Zoë Stavri, PhD, MLS, Gilad J Kuperman, MD, PhD. A Consensus Statement on Considerations for Successful CPOE Implementation. J Am Med Inform Assoc 2003;10:229-234 doi:10.1197/jamia.M1204

hospital staff was carefully considered and will be closely followed during implementation and afterward

- *Whether an organization-wide change management strategy exists and has been tested under similar stresses previously*
- *How new, potentially life-saving orders will be communicated reliably to nurses or others who need to be aware of them*
- *Whether the impact of CPOE on human communication among key employees such as physicians, pharmacists, nurses, and lab technicians has been worked out for both regular use and during CPOE downtime.*

Ash and her colleagues presented a list of consideration regarding the project management and staging of the implementation. From the list it is clear that CPOE, for example, requires time and carefully planned engagement, planning, training and a very effective change management plan that is championed by local physicians with the time and skills to be successful. Of equal importance is a stable pharmacy platform where pharmacists are a key part of the go live support. The following is a sample of the most pertinent considerations related to the CST project.

"Project Management and Staging of Implementation:
Project management dictates that implementation be completed in carefully planned stages. Key considerations include the following:"

- *During all stages, "people issues" must have highest priority—keep employees (clinicians) informed, engaged, and content, through planning and communication.*
- *Early in the project, the scope must be defined, with clear, reasonable, measurable goals.*
- *Early milestones must be selected to produce "wins" that help maintain momentum toward more difficult long-term objectives.*
- *Plans should be detailed enough but not overly so*
- *Multiple mechanisms for collecting feedback from users and staff must be in place, and analyzed in real time for appropriate action.*
- *The golden rule should be applied by all involved (do unto others as you would have them do unto you), and leaders should work to develop consensus when disagreements arise (keeping in mind that various ways of doing things may all lead to success).*
- *Use of consultants should be carefully planned with specific objectives before they are employed (if at all).*
- *A critical mass of users must be ready for the implementation.*
- *A plan for involving clinicians must be developed, followed, and evolved.*

- *During the implementation phase, the organization should hire staff, deploy staff where and when most needed, keep up staff morale, and use communication, publicity, and personnel management skills effectively to maintain project momentum.*
- *After implementation, the organization should establish maintenance routines, create an environment for ongoing system improvement, and provide management systems for the long term.*

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In a paper by Missouri University, "The Big Bang implementation: not the faint of heart"[9] they write,

"Replacing a hospital's obsolete mainframe computer system with a modern integrated clinical and administrative information system presents multiple challenges. When the new system is activated in one weekend, in "big bang" fashion, the challenges are magnified. "

The point being made by the authors is that a Big Bang implementation increases the risk in an already high risk project. The study later describes the benefits of a phased implementation.

Conclusion and Recommendations

The CST project had a rocky start during the S&V stage and the s.13,s.17

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s.13,s.17 Given these circumstances, the evidence in the literature and from external CST reviews s.13

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[9] Integrated Technology Services, University of Missouri Health Care, DCO17.00, Columbia, MO 65212, USA. andersonlk@health.missouri.edu

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Appendix 1: CST IT Systems Scope Summary

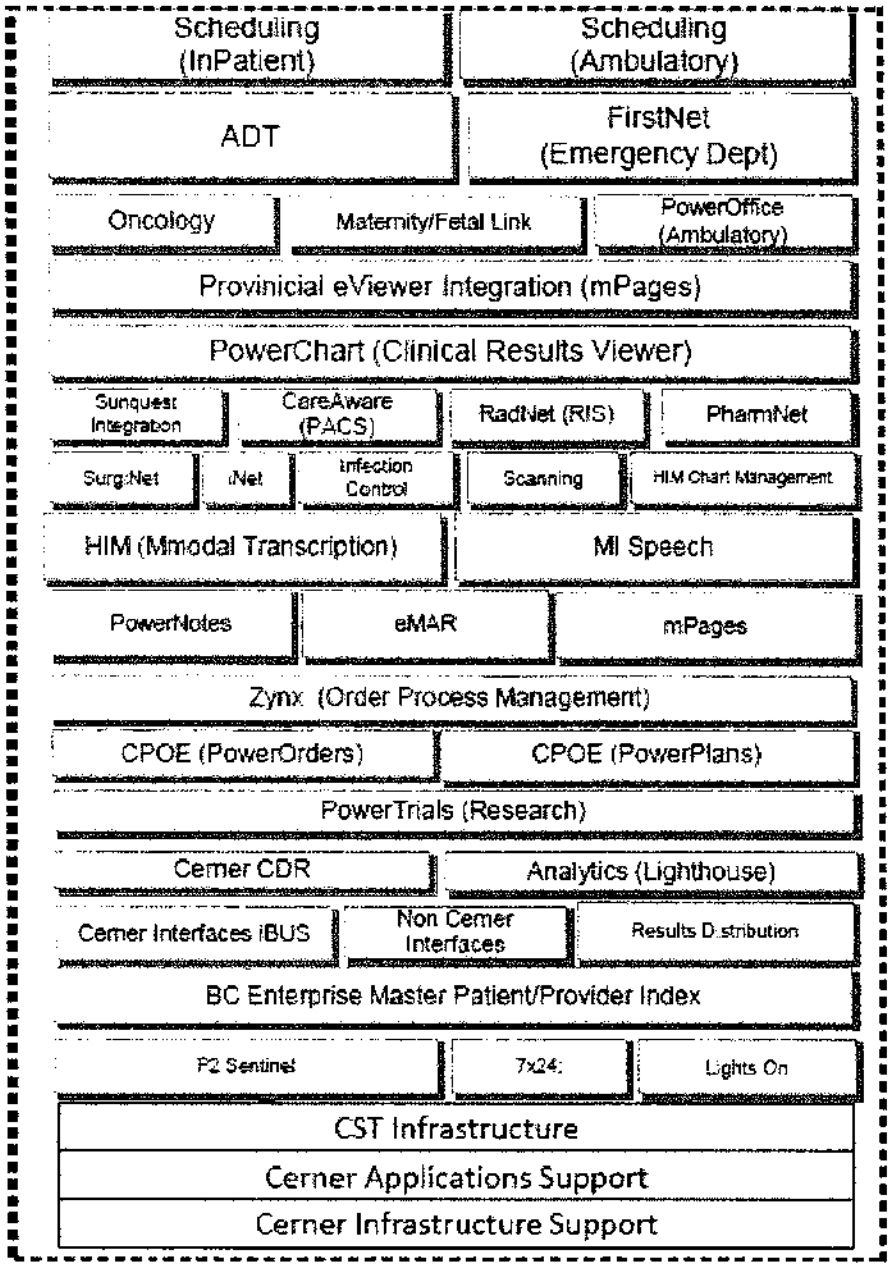

Figure 1: Summary of CST IT Systems Scope

Brown, Stephen R HLTH:EX

From: Feulgen, Sabine HLTH:EX
Sent: Monday, January 12, 2015 7:16 PM
To: Lake, Terry HLTH:EX
Cc: Brown, Stephen R HLTH:EX; Kislock, Lindsay M HLTH:EX; Stevenson, Lynn HLTH:EX
Subject: CST Update

Hi Minister

Last Friday, the CST Project Director (Rebecca Hahn) provided a status update to the CEOs of the affected Health Authorities and myself.

Vendor Relationship

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s.14 The CST Project Board (PB) will be updated this Wednesday on the PMO's recommended position.

It is expected that when it is clear which route the parties agree to take is resolved this week, work will continue on a co-ordinated remediation plan with Team IBM (TIBM).

Risk Mitigation

The CST Executive Steering Committee (ESC) has begun its review of risks from the risk register, NYG report and McKinsey report, and are expected to report out on an agreement of risks, prioritization of risks (including a sense of collective risks), and mitigation strategies to the PB in early February. A meeting with the NYG assessment team is still in the process of being set up.

The ESC will also review the integrated project plan to ensure clarity on stream by stream work plans. The plan will also be updated to include prerequisite safety/quality gates that must be achieved before another activity begins ie sequencing is appropriate.

The Project Management Office (PMO) will continue to work with TIBM on improving status reporting to ensure the right information is being reported to the ESC and PB.

Communications

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PMO Communications will co-ordinate with MOH to prepare briefing materials for legislature and estimate sessions.

Commitment

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FYI. Stephen, Lynn and I met with Island Health early last week to discuss their experiences with clinical transformation via Cerner. It was a helpful discussion and I will be asking the Island Health implementation team to present "lessons learned" to the ESC and then PB shortly thereafter.

Sabine

phone: 250.952-1764
email: Sabine.Feulgen@gov.bc.ca

-----Original Message-----
From: Lake, Terry HLTH:EX
Sent: January 12, 2015 2:38 PM
To: Feulgen, Sabine HLTH:EX
Cc: Kislock, Lindsay M HLTH:EX; Brown, Stephen R HLTH:EX
Subject: Re: CST

That's fine. Thanks.

Terry Lake DVM
Minister of Health

> On Jan 12, 2015, at 1:58 PM, "Feulgen, Sabine HLTH:EX" <Sabine.Feulgen@gov.bc.ca> wrote:
>
> Minister Lake,
>
> Would a written update later today work with verbal to be scheduled thereafter if you wish?
>
> Sabine
>
> phone: 250.952-1764
> email: Sabine.Feulgen@gov.bc.ca
>
>
>
> -----Original Message-----
> From: Brown, Stephen R HLTH:EX
> Sent: January 12, 2015 1:16 PM
> To: Lake, Terry HLTH:EX; Feulgen, Sabine HLTH:EX
> Cc: Kislock, Lindsay M HLTH:EX
> Subject: Re: CST
>
>
> Hi Sabine
> can you give the Minister an update. Thks
>
>
> Sent from my iPhone
>
>> On Jan 12, 2015, at 1:13 PM, Lake, Terry HLTH:EX <Terry.Lake@gov.bc.ca> wrote:
>>

>> Well, we are getting close to when we need to see some positive movement on the CST file. Can you provide me with any update?
>>
>> Thanks, T
>>
>> Terry Lake DVM
>> Minister of Health

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Brown, Stephen R HLTH:EX

From: Roy, Carl <CRoy@phsa.ca>
Sent: Monday, December 15, 2014 12:47 PM
To: Brown, Stephen R HLTH:EX
Subject: CST Approval Milestones and Timeline

As requested

CST Approval Milestones and Timeline

The chronology below summarizes the key milestones. The engagement process was extensive involving clinicians throughout the procurement process, CEOs, administrative and technical staff throughout the contract negotiation process and CEOs, senior executive and Board providing governance support through every step of the process.

Further detail including representatives from each HA plus external experts is contained in the Project Board record of documents.

The CST Procurement process had the following key milestones:

August 8th, 2011 – HSSBC, on behalf of the health organizations, releases of a Request for Proposal Qualification
October 14th, 2011 – HSSBC provides a summary of the recommendation of the evaluation committee to the CST CEO Council. Short list three consortiums to receive a directed Request for Proposal (IBM and Deloitte, Cerner and TELUS and CGI and Dell Professional Services).
February, 2012 – PWC is hired as a fairness advisor for the RFP.
February 15th, 2012 – HSSBC releases the Request for Proposal
May 30th, 2012 - PWC issues a fairness review of the procurement process
June 5th, 2012 – Evaluation committee provides recommendation to the CST CEO Council
July 16th, 2012 – Negotiations charter is approved by the CST CEO Council and detailed negotiations begin with Team IBM.
November 30th, 2012 – HSSBC, on behalf of the health organization, issues a letter to IBM descoping the transfer of the health organizations IMIT staff along with the UPMC assets and Data Warehouse, as proposed.
December 7th, 2012 – CST CEO Council approves updated negotiations guiding principles
Feb 7th, 2013 – CST Board subcommittee meets to review business case
Feb 26th, 2013 – CST Audit committees meet along with DM Whitmarsh and Minstry (Elaine Mc Knight) to review business case and approve going forward.
March, 2013 – Boards of HO's approve Team IBM Agreement and Plan
March 28, 2013 – CEO's of HOs sign TIBM Agreement.

Carl Roy
President and Chief Executive Officer
Provincial Health Services Authority

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Brown, Stephen R HLTH:EX

From: Ackenhusen, Mary [CORP] <Mary.Ackenhusen@vch.ca>
Sent: Friday, December 12, 2014 7:05 AM
To: Brown, Stephen R HLTH:EX
Cc: Feulgen, Sabine HLTH:EX
Subject: CST Decision Tree
Attachments: CST Planning Scenarios Dec 11th 2014.pdf

Hi Stephen

You asked for a decision tree to help you better understand the options with the CST project. Not an easy task but the attached decision tree does a pretty good job of highlighting the two key decision points and how they are not independent decisions:

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This was developed just within VCH due to the time constraints so it is of course only one view.

Let me know if you'd like me to take you through it. This may also be useful to frame the discussion on Tuesday.

Thanks
Mary

Mary Ackenhusen
President and CEO
Vancouver Coastal Health
11th Floor, 601 West Broadway
Vancouver, BC V5Z 4C2
Tel: 604.875.4721
e-mail: mary.ackenhusen@vch.ca
VCH's executive blog for staff: *Up For Discussion:* http://blog.vcha.ca

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Brown, Stephen R HLTH:EX

From: Ackenhusen, Mary [CORP] <Mary.Ackenhusen@vch.ca>
Sent: Tuesday, December 9, 2014 1:14 PM
To: Brown, Stephen R HLTH:EX
Cc: Feulgen, Sabine HLTH:EX; Geoff Plant; XT:Woodward, Kip HLTH:IN; XT:HLTH Doyle, Dianne
Subject: Update on CST - VCH/PHC Board direction

Hi Stephen

The subcommittee of our respective boards met this afternoon to discuss the perceived risk in the current plan and what direction should be taken to mitigate risks. These Board members are well informed with experience in complex project management and IMIS projects. Their unanimous direction coming out of the meeting is as follows:

1. We cannot continue the current course with the current project work plan as it is has too much risk for our patients, clinicians and the taxpayer

2. VCH/PHC/PHSA leadership should begin an analysis of options to mitigate risk. Options could include changes to methodology, moving to a phased approach, introduction of new timelines, and enhanced provider engagement .

3. Create an alternative resourcing plan that would be the basis of moving forward in the case that we s.13,s.14,s.17

Any alternative plan would ideally be developed with the full support of the project board and participation of PHSA and would be attentive to PHSA's objectives for its sites. If this is not possible, the Board has directed VCH/PHC leadership to still undertake this work as we are overly vulnerable to risk if we have no "Plan B".

4. Continue to work to achieve an agreement with TIBM within the contract terms for the s.13,s.17

It is our hope that we can begin discussions to form the project team to develop the analysis of alternative options this week, with the support of MOH and PHSA.

Thank you,

Mary Ackenhusen
President and CEO VCH

Dianne Doyle
President and CEO PHC

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Brown, Stephen R HLTH:EX

From: Feulgen, Sabine HLTH:EX
Sent: Monday, December 8, 2014 9:00 AM
To: Brown, Stephen R HLTH:EX; Stevenson, Lynn HLTH:EX; McKnight, Elaine L PSA:EX
Subject: s.13,s.17
Attachments:

Tony's negotiating team is meeting this morning and will provide update by noon.

Tony did note in a later email last night the following:

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s.21

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s.21

Foran, Grace E HLTH:EX

From: Ackenhusen, Mary [CORP] <Mary.Ackenhusen@vch.ca>
Sent: Monday, November 3, 2014 10:06 AM
To: McKnight, Elaine L PSA:EX; Brown, Stephen R HLTH:EX; XT:Roy, Carl EHS:IN; XT:HLTH Doyle, Dianne
Subject: Recommendations - CST
Attachments: Confidential CST Recommendations Nov3-14 Final2[1].pdf; NYGHCSTExecSummary_FINAL.pdf; McKinsey CST review.pdf

Hi all,

As you know, we are at a pivotal point on the CST project. I hope that a discussion of our next steps will be the focus of the Project Board meeting on Wednesday. Please find attached a memo outlining VCH's position on the project and recommendations for moving forward in a manner that will mitigate many of the current risks.

Elaine, please feel free to send this to Rebecca (who is aware of these recommendations) or more broadly to the full Project Board membership if you feel that is appropriate.

I have also attached two key external reports undertaken recently to assess the project health that are referenced in the memo.

Please let me know if you have any questions or would like to discuss.

Mary

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President & Chief Executive Officer
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Vancouver BC V5Z 4C2
Tel: 604-875-4721
Fax: 604-875-4750

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To: Stephen Brown
Elaine McKnight
Dianne Doyle
Carl Roy

Cc: Kip Woodward

From: Mary Ackenhusen

Date: November 3, 2014

Subject: Recommendations to Mitigate Risk of CST Project

The Clinical Systems and Transformation Project (CST) is at a pivotal point. The recent validation of the design and build of the early work streams has revealed a number of serious shortfalls. Additionally, two independent project reviews by McKinsey and Co. and North York Hospital have raised additional areas of significant concern. These, in combination with the professional judgment of the VCH CST leadership team, lead VCH to conclude that the project requires immediate action to reduce the risk of failure. The need to adjust the project is based on the extensive learnings to date, and it is not a negative reflection on the original project plan – rather, it is a normal milestone that often occurs in well-managed complex IT projects.

VCH, due to its size and complexity, carries the large majority of risk of the project and as such, calls for immediate remedial action on the project. We have a collective duty of care to our patients and the public to maintain the focus on a safe and high quality implementation while doing all that we can to reduce unnecessary risk.

VCH recommends the following:

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CST Project – NYGH Consultation – Executive Summary

Overview

This executive summary highlights key findings from the week-long consulting visit conducted by NYGH at the CST project offices from October 6 to 10, 2014. A comprehensive review process was undertaken, in which the NYGH team met with executives, directors, managers and other project personnel to gain a broad perspective of current project state.

In the opinion of the consultants, some aspects of the project have been proceeding well; however, important risks to project success were also identified. These risks are organized into four main themes:

1) Project scope and roll-out strategy;
2) Project governance structure and workforce;
3) Clinical content design and clinician engagement;
4) Data governance

The themes define the sections of this report, in which both the identified risks and suggested mitigation strategies are outlined.

Positives of CST Project Current State

- Robust governance structure
- Extensive clinician engagement in design
- Economy of scale – creating design and build for multiple facilities in one project

1. Project Scope and Roll-Out Strategy

Due to the magnitude of organizations, and various system replacements included in scope, Big Bang makes sense as it supports a clean end of one system and start of a new. Attempting a phased approach would be challenging and could not be replicated across organizations, as systems being replaced may differ.

Risk #1:

During our meetings, we had noticed that project scope was not always clearly defined. When considering what to include in scope, determine workflows that could potentially be fragmented or result in lost efficiency if not included. For example, never break apart closed loop medication administration process, CPOE and eMAR must go together.

Suggested Mitigation Strategies:

- Perform an inventory of current processes (automated and manual) and future processes and solutions to be used. This will inform **change management strategies** and aid in the **definition of scope**. Our experience is that it requires more change management effort when moving clinicians from an existing system than moving from paper to electronic.

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- Consider excluding physician documentation from scope. CPOE introduces enough change, which should be the primary focus. Often current physician documentation processes are based on dictation, and therefore already accessible to all on line. Our experience shows significant time and resource commitments are required in iterative physician documentation design to maximize workflow efficiencies, capture meaningful and standardized discrete data, and ensure clinician adoption.

- Consider including Bedside Medical Device Interface (BMDI) as it offers significant efficiencies in clinical documentation which in turn supports positive clinician adoption. The effort in setting up this technology is well work the benefits gained.

- Cardiology requires thought out strategy prior to integrating components within this implementation. Some components can be integrated into project scope, but if the plan is to procure a complete Cardiology Information system, then decisions made today may result in rework later.

Risk #2:
With a project of this magnitude and with the complexities of multiple organizations and existing systems, projecting a realistic rollout strategy is a "shot in the dark". For the purposes of project and resource planning, estimated timelines can be developed, however when communicating go live dates to end users, it should be a firm date in order to avoid loss of confidence.

Suggested Mitigation Strategies:

- Your first implementation will set the tone of all future implementation. Make sure it is not rushed. Wait to define your go live date until after clinicians have had an opportunity to "kick the tires" in design validation. This will provide an accurate pulse of effort still remaining and considerations that may have been overlooked.

- There will be many lessons from the first go live that you will need to correct prior to rolling out to subsequent organizations. Allow time in the plan to apply these lessons. We recommend at least 4-6 months (2 months support, 2-4 months to make necessary adjustments). Once you have replicated seamlessly to a new site, only then can you expedite rollout.

- Senior leadership needs to support an "All hands on deck" model minimizing all other competing initiatives.

Risk #3:
Big-Bang go-live requires a well-defined support structure. With all new systems going live at once throughout the organization, all staff will be facing changes and will require support.

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Suggested Mitigation Strategies:

- We recommend 4-6 weeks, 24x7 on-site supports. Support should include peer to peer support wherever possible specifically physician "at the elbow" support.

- Need to segregate Clinical Informatics "builders" from front line support so they can manage issue resolution and process urgent change requests. It will be tempting to have them work with front line support since they are often most familiar on how application works, but this will result in delayed issue resolution and potential resource burnout as they are pulled in every direction.

- See detailed report for recommendations regarding setting up Go-Live command centre.

Project Governance Structure and Workforce

Risk #1:
The NYGH team observed that CST project structure has resulted in design and decision-making processes that are siloed. The working groups have overlapping accountability, there is no Cerner system build expertise at the table to guide design decisions. It also appears there is lack of clarity in project deliverables for each group. This approach can lead to three risks: 1) design/build/future state workflow that does not meet all clinical needs (for example, medication build might work well for the pharmacy team that designed it, but is unintuitive for nurses and physicians to use); 2) time is wasted because clinical groups are requesting or suggesting build that is not technically possible within Cerner or not best practice (clinicians would have to wait until their decisions are turned down by builders, then have to meet again to discuss options); and 3) without a central team to co-ordinate design/build decisions coming from different areas, there is a risk of inconsistency of build, duplicate build or missing items that will result in an unintuitive, inefficient and possibly unsafe system design.

Suggested Mitigation Strategies:

- Consider developing a "Core" group that has representatives from all working groups and all disciplines that discuss all design decisions that cross working groups. Have a document management solution that is open and transparent that all working groups can view to see design decisions made and how they could impact their work.
- Develop standards and guidelines for build components. Examples include;
    - set definitions for when order tasks should and should not be used
    - if new orders/nomenclature need to be built, request rationale for deviation from original data set
    - determine standards for order formats so display in orders tab is consistent
    - centralized ESH role to ensure clinical events are not duplicated, nomenclature standards are followed and similar content is grouped appropriately for clinical consumption.

- Recommend CST Provider and Orders Team have more cross-over moving forward.Those with orders build/content knowledge need to help inform the order set design/build group what is and is not possible. When new orders are requested by the Provider team for build into order sets,

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they will need to be reviewed by the orders build group before they can be added to the order catalogue. If everyone is at the same table, this dialog will happen appropriately without being "lost in translation" later.

- When reviewing clinical workflows, representation must be at the table from all groups/scopes of practice that the workflow affects. During process redesign, identify suboptimal workflow in current state and correct it in future state (eg med admin FMEA). Consider what is important to patients and staff (e.g. safety, quality, efficiency, patient experience). Consider how this will "mesh" with use of the new system. Each site may have workflow variations, so don't assume that a workflow that has been reviewed at one facility will be exactly the same at another facility.

Risk #2:
The CST project has been successful in communicating that the project is not an IT project, but rather a clinical transformation project as clearly stated in the project name. There are clinical leaders engaged throughout the project committees but what was not clear to us was whether they had clinical operational responsibilities or whether they were clinical leaders put into a specific project role. In order to ensure engagement at the practice level, operational leaders need to be engaged in the system design and implementation.

Suggested Mitigation Strategies:

- Ensure clinical leaders with current accountabilities to direct healthcare delivery are on project leadership committees.
- Clinical Team/Unit Managers have a special role in communicating system benefits to front line staff. Without their buy-in and support, expect a lack of adoption and resistance to change.

Risk #3
The CST project is heavy with consultants driving design and build. The risk is that once project is live, the knowledge of design considerations and build techniques are lost. Those left to support the system are lacking fundamental understanding of design decisions,rationale, and knowledge of system build for maintenance purposes. There is also a risk that decisions will be made for short term success but are not realistic to manage long-term.

Suggested Mitigation Strategies:

- It is very important to build your own internal team of individuals with clinical and technical build knowledge (similar to Clinical Informatics at NYGH). Select individuals from amongst your staff who have a clinical background and an aptitude for informatics. Send them for training from Cerner so that you can create a team that has in-house technical build knowledge. Once trained, these people should be directly involved in meetings with clinicians to make design decisions and validate build. Since these people know what truly is possible and not possible within the constraints of the vendor software, they can help to focus clinician design/validation discussions only on the truly implementable options. If these individuals are not involved in clinician

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meetings, the concern is that clinical requirements will be "lost in translation" and the build team will not be able to create a solution that truly meets clinician needs – either because they don't understand what is needed, or because what the clinicians requested simply isn't possible within the vendor software design constraints.

- Rely less on consultants (they don't have a vested interest in decisions, your team won't be able to support after they leave)

Clinical Content Design and Clinician Engagement

Risk #1:
The CST project has been structured so that many different aspects are underway simultaneously: clinical engagement and workflow review, design, build, device selection, development of training materials, and so on. This approach is not recommended, even though it may appear to be more efficient. Significant dependencies exist between these elements which require some of them to be completed sequentially. If instead they are completed simultaneously, there is a risk to effective design, proper clinical validation, optimal build, training and adoption. Examples of simultaneous work noted by the NYGH team included: building order sets while the custom order catalogue is still being built and clinically reviewed; starting testing while clinical validation of system design and content is still underway or not complete; selecting devices for clinical use without system design/build being finalized; and planning work for training without project scope and final design being completed.

Suggested Mitigation Strategies:

- Ensure project components with dependencies are sequenced in time so that they are after the components they are dependent upon. For example, do not build order sets until each facility's custom order catalog has been built and clinically validated; do not start unit testing until after system build is complete and has been fully clinically validated; complete future state workflows before selecting devices for clinical use, and so on.

- Clinicians need to review and validate build before moving forward to testing. Do not rush design, as sub-optimal product will not result in adoption.

Risk #2:
The original development methodology outlined in the consultant contracts signed by PHSA was that system design and build would be completed in stages, with frequent opportunities to see build prototypes and for clinicians to provide feedback along the way. Instead, due to difficulties with consultants completing the build, no prototypes have been made available and clinicians have not been able to see how their design decisions will look in the system. This is a major risk to project success. It is almost 100% certain that clinicians will not be happy with the first version of the build that they see in the system. Consultants on the CST project are pushing for "sign off" on build and starting testing.

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Suggested Mitigation Strategies:

- System development must be approached using an agile and iterative process of: initial design (by core project Clinical Champions working with builders) → build prototype → demo to front-line clinicians → refine build based on feedback → repeat demo → further refinement based on feedback, and so on until clinicians are comfortable with the build and the accompanying future state clinical workflows. This process is essential to success because in our experience, clinicians will not be able to adequately visualize future state and give appropriate feedback until they can see and use actual system build in a demo environment.

- While compiling design decisions and working on system build, the project team will become aware of certain items on which it will be difficult for clinicians to reach consensus because Cerner does not support an ideal workflow (for example, the process of issuing "suggested orders"). In this case, before engaging front-line clinicians it is best for the project team "do their homework" in advance – research different options for a solution, then for each potential solution summarize pros/cons, and build prototypes for clinicians to view in a demo environment. Then, when meeting with the clinicians, it will be easier and more efficient to reach consensus on the best option. The conversation will be focussed on options that are realistically possible within the constraints of the Cerner software, and clinicians will be able to understand the options because they will see a demonstration of each.

- The project team should never make crucial design decisions without first demonstrating the implications to clinicians in a demo environment, because clinicians are unlikely to arrive at an optimal decision if they cannot visualize the system they will be using in future state.

- No matter how much pressure there is from consultants to meet a certain timeline, do not sign off on any build or start any testing until build has been demonstrated to clinicians, there has been opportunity for multiple rounds of clinical feedback and build adjustment, and the project team is comfortable that final build has been fully validated by clinicians.

Risk #3:
System design specification documents (such as "Design Decision Matrix" or similarly-named spreadsheets) were/are being completed by front-line clinicians at PHSA. This is not recommended because: 1) Front-line clinicians usually do not have the system build knowledge to completely understand the meaning or implications of design decisions they are being asked to make, resulting in suboptimal decision-making; and 2) Clinicians can become disengaged from the project when being asked to complete documents with a lot of technical jargon that does not seem clinically relevant to them.

Suggested Mitigation Strategies:

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- Instead of involving front-line clinicians, the recommended approach for completion of system design decision documents is a co-operative effort between core project Clinical Champions and builders who have technical system knowledge. Core project clinician champions have better familiarity with Cerner terminology and functionality than front-line clinicians. Working together with builders, they will have the time and the patience required to develop a deep understanding of the implications for each design decision. Sometimes, there may be more than one viable design option. In these cases, the Clinician Champion can distill the main design questions down into simple clinical scenarios, which can be demonstrated in a meaningful and efficient way to front-line clinicians, optimizing decision-making.

- Be careful not to rely solely on Cerner content such as START and MethodM documents. START content usually does not come even close to meeting real clinical needs; often starting from scratch is required. MethodM documents (including Design Decision Matrices) often leave out important workflow and design decisions – these will need to be identified, compiled and addressed by your project team.

Risk #4:
The NYGH team observed that the order set build process has been rushed ahead using a generic order catalogue, because the custom PHSA order catalogue is not yet complete or clinically validated. Also, there are deficiencies in the custom order catalogue build/validation process. This is a major risk to project success because:
1) An order catalogue that has not been properly designed and clinically validated will lead to adoption and safety risks. Clinicians will be frustrated because orders will be unintuitive to find and use. They may inadvertently select incorrect orders because they cannot find what they need.
2) Front-line clinicians are reviewing order set content that will not match the final version they will use in Cerner (since all generic orderables will need to be changed to match the custom order catalogue when it is complete). This presents a safety risk since the clinical meaning of orders may change in the final version of order sets based on the new catalogue, and represents an adoption risk because clinicians are not reviewing on a "what you see is what you will get" process.

Suggested Mitigation Strategies:

- Stop the order set build process until the first version of the custom order catalogue is completed and has been clinically validated.

- It is well worth the additional time to develop a robust order catalogue build and validation process, which should include:
    - An interdisciplinary team of builders familiar with Cerner, Clinical Champions as well as front-line clinicians for periodic validation. When orders affect multiple departments, ensure individuals from each of the involved departments are included in order design and review.
    - Create a style guide for order development, which should include acceptable abbreviations, standard terminology and code sets for OEF fields, decisions on use of

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range dose/range frequency, and so forth. All orders, regardless of department or facility, should adhere to this style guide. Form a small core of central project staff that are responsible for review of all orders build against the style guide.

- Careful examination of every orderable to ensure:
  1) the root name of the order is intuitive for clinicians to find based on common clinical language;
  2) there are synonyms for each order so that each is easily findable based on multiple different search terms;
  3) the order entry formats have been reviewed to minimize un-necessary fields (e.g. orders should not be used as documentation), minimize un-necessary mandatory items, ensure that choices within fields are standardized using code sets where possible; and that no fields are missing
- Mock-up of orders in a Cerner demo domain, with validation by clinicians. Be sure to involve physicians with specialty knowledge of the orders being reviewed (e.g. Cardiology orders reviewed by Cardiologists, Orthopedics orders reviewed by Orthopedic Surgeons, etc).

- Once most orders have been completed and validated in Cerner, version 1 of the custom order catalogue should be exported from Cerner and uploaded to Zynx. Order set build can then resume. Zynx should be used as the main tool to build and review order sets.

- Any remaining unfinished orders awaiting final review/validation in Cerner can be exported incrementally to Zynx when completed. Order catalogue development will be an iterative process, with several successive catalogue uploads required over time. This is because need for new orders and changes to orders will be identified as order sets are being built and reviewed. For this reason, do not expect the order catalogue to be "final" the first time – this would delay starting order set build in Zynx. Instead, placeholder terms can be built as required in Zynx for orders pending final build, to assist clinicians in seeing orders as they should eventually appear in Cerner.

Risk #5:
In the CST project there has been a good level of engagement with clinicians to discuss order set content. However, there is an insufficiently robust methodology to determine order set scope, include and maintain evidence in order sets, as well as obtain adequate clinician review and validation of order sets once built. Zynx evidence links have not been included in CST order set build, which results in lost opportunity for clinicians to discuss evidence in the order set review process (risking poor consensus), lost opportunity for clinicians to use evidence in the course of clinical care (potentially reducing quality and safety), and increased difficulty in maintaining order sets with new/updated evidence over time.

Suggested Mitigation Strategies:

- For each facility, determine order set build scope by doing a "Gap Analysis". This requires obtaining a year's worth of retrospective discharge data, rank ordering the diagnoses in

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descending sequence by volume of cases per year, then taking the top 80% of the diagnoses from the list. The number of order sets in this 80% by volume list, after subtracting the number of matching electronic order sets already created (e.g. from other facilities) will be the "gap" – the number of order sets required to build at that facility before go-live.

- There should be a core order set team at each facility that is comprised (at a minimum) of Clinical Champions, pharmacists, and Clinical Informaticists who specialize in order catalogue build and order set build. It is important that builders are "at the table" in order set meetings, so that clinicians understand what can and cannot be built.

- Develop and adhere to a standardized style guide for all order sets. This should include conventions for abbreviations, sorting of order categories, orders and order sentences within an order set, standards for linked evidence and evidence documents (e.g. use of static links such as PubMed), conventions for order defaults, and so on.

- Avoid using Multi-Phase PowerPlans at initial go-live. They are complicated and time-consuming to build, and are confusing for inexperienced clinicians to use.

- Do not allow the option for PowerPlan Favourites (i.e. allowing physicians to customize order sets by adding or deleting options or changing defaults, and then saving to their Favourites folder). This will completely undermine efforts to standardize care and will compromise the ability to improve quality and safety, since updates to facility-wide order sets will not be reflected in physician-customized "Favourite" plans.

- Consider asking Zynx to come to PHSA and assist in creating the first 12 to 24 order sets. They provide this service for free, and it will help to train your order set staff to work independently using effective methodology.

- We recommend employing a standard 5-step method for all order set development:
    1. PROTOTYPING: Start with order set content from Zynx if available, and include the associated Zynx evidence links. Also consider order sets from the Canadian CPOE Toolkit library, which are available in Zynx for free. Paper order sets from PHSA are an important resource, but should never simply be converted into electronic form since: 1) this will leave out Zynx evidence links; 2) some content on the paper version may be out of date; 3) paper orders are fundamentally different from electronic ones. Always build order sets using your custom PHSA order catalogue, extracted from Cerner into Zynx.
    2. REVIEW BY NON-PHYSICIAN CLINICIANS AND DIAGNOSTIC SPECIALTIES: Use Zynx Viewspace.
    3. REVIEW BY PHYSICIANS: Use Zynx Viewspace. Ensure physicians with subject matter expertise for each particular order set are involved (e.g. Orthopedics for hip fracture, Cardiology for Congestive Heart Failure).
    4. CONSOLDIATION OF REVIEW COMMENTS: Make changes in the order sets based on reviewer ViewSpace suggestions, unless there is disagreement among reviewers, in which case meeting(s) with a small group of individuals may be required to reach consensus.

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5. APPROVAL OF ORDER SETS: Requires clearly written policy outlining the accepted order set approval and update process. Consider involvement of MAC or an arm's length committee of MAC.

Data Governance

Risk #1:
With archived data from old systems and new content being developed in new systems, now is the time to define a data governance model. This can be closely tied to risk in project governance where deliverables need to be more discretely defined. At the point of defining specific content deliverables to each working group, data stewards can also be identified.

Suggested Mitigation Strategies:

- Develop a data governance model. This model will define owners of data and hold people and/or groups accountable for monitoring of data quality, integrity, adherence to standards and reporting requirements.

- Consider developing data auditing tools to be used for go live performance metrics and ensure staff are using the system appropriately. It is better to correct bad practices early.

- Identify and engage data stewards early in system design. These resources will be critical in understanding data analytic capabilities and can offer input into key indicators that need to be integrated into system design.

Assessment of project risks

Synthesis of Value Assurance interviews on the Clinical Transformation Project (CST)

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BRITISH COLUMBIA
Ministry of Health

Discussion document
July 15, 2014

McKinsey&Company

Executive summary

- Vancouver Coastal Health Authority (VCHA), and Providence Health Care (PHC), and the Provincial Health Services Authority (PHSA) -- known as the "health organizations" (HOs) – along with British Columbia's Ministry of Health are embarking on a multi-entity, multi-year effort called the Clinical and Systems Transformation (CST) Project to establish a "common standardized, integrated, end-to-end clinical information systems and environment" for 1.2m patient visits in British Columbia

- Given the complexity, and criticality for success, of CST, you had asked us to provide an independent perspective on potential risks in the project, highlighting the ones that could be "hidden" or especially detrimental to large "mega" projects

s.13,s.17,s.21

- Against these, we launched a series of structured interviews of CST's key stakeholders and believe that:
  - You have made great strides in launching CST, stabilizing the project where team members can work effectively, and having a better relationship with your key delivery partner, Team IBM
  - However, there are potential key risks that must be meaningfully addressed. In particular, a) lack of transparency/ buy-in on scope; b) inadequate level of granularity on objectives, unclear measures for success that are specific, time-based, and grounded on granular objectives; c) inadequate effort to include clinicians not just in design but change management; and d) insufficient understanding across the stakeholders that sufficient effort is made to ensure project delivers objective value (balanced by on time and on budget delivery)

- As next step, we suggest a deeper, more targeted set of interviews to confirm our initial hypotheses on the 5 risks the CST Project must address immediately

s.13,s.17,s.21

SOURCE: www.health.gov.bc.ca; McKinsey interviews; McKinsey research

Content

1. Playback of success factors and what we heard from you in the interviews
2. Preliminary hypotheses on project risks (against the Value Assurance categories)
3. Suggested next steps

1 McKinsey's Value Assurance: s.13, s.17, s.21 key success factors for "mega" projects

SOURCE: McKinsey

1 What we heard… (1 of 2)

FOR DISCUSSION

Value Assurance categories	Key points of agreement	Key points of difference
s.13,s.17,s.21	▪ General agreement on CST objectives: standardize clinical practice and modernize IT infrastructure ▪ Scope could have been better defined before contract was signed with Team IBM ▪ Suboptimal start to working with IBM, but trajectory is improving ▪ Strong executive support for the project ▪ CEOs are working well together ▪ Aligned on who stakeholders are – and aligned on stakeholder group at most risk to be disappointed (physicians)	▪ "True north" objective: Is it to be on time and on budget? Or should we index on achieving quality outcomes? ▪ Lack of scope clarity post Strategy and Verification phase ▪ s.13,s.17 ▪ Sufficient status transparency : Consensus that things have gotten better, disagreement still lingers whether reports are effective
	▪ Software technology and service partners are considered best in the business s.13,s.17 s.13,s.17 ▪ General agreement on the importance of involving clinicians in design ▪ Clinicians are involved in design; "Everyone is participating and giving input during the design phase"	▪ Difference in opinion whether physicians are engaged sufficiently ▪ Opinions differ on whether we are positioned for success. "We just have to make it work" (vs. we're doing all we can to make it work)

SOURCE: Interviews with CST stakeholders

1 What we heard… (2 of 2)

FOR DISCUSSION

Value Assurance categories	Key points of agreement	Key points of difference
s.13,s.17,s.21	▪ Team IBM, serving as project manager had a rough start – though getting better ▪ General opinion that shared IT service could be a risk area ▪ Teams are extremely motivated	▪ Right mix of talent: everyone agrees at some level that we need more talent, however, there is difference on how critical stakeholders perceive this risk to be ▪ s.13,s.17
	▪ There were general issues with estimates, plans, and transparency at the beginning – but things are better ▪ Methodologies exist ▪ Change management must get getter	▪ Opinion on whether sufficient transparency exists vs. "we don't really know what we're getting in the end" ▪ Methodologies used are effective – "project plan has 3,000 lines! Not an effective way for us to communicate the really important things that must happen"

SOURCE: Interviews with CST stakeholders

2 Synthesis of preliminary hypotheses of key/hidden risks in CST project

- Several "simple practices" have been neglected. No single one is particularly troublesome, but taken together, the negative impact could be substantial
  - *Lack of transparency on scope* – No good understanding of what functionality are exactly expected by when. Difficult to know "must have" vs. "nice to have" elements. Difficult to measure true risk if there is a lack of specific objectives
  - *Lack of alignment on granular business case, and KPIs reflecting clinical improvement objectives* -- Overall objective is clear, but not sufficiently broken down to objectives that can be tracked and managed. Interviews and document review did not suggest that there is clarity on granular enough time-based KPIs to measure adoption/uptake (e.g., % Rx via CPOE, % adherence to order sets, % physician to physician chart sharing via CST) that stakeholders can assess
  - *Insufficient physician involvement* -- The user group with the highest relevance for participating is involved in decision making, but have not been adequately included in strategy (e.g., scoping) and change management activities (e.g., user adoption). Fixing this requires massive communication effort and focus
  - *Uninformed decision making by Steering committee* – Decisions were made under time pressure, without: a) being fully informed about the underlying facts; and b) understanding the full implications of the decision. "We're making design decisions without anticipation of effects on workflow and impact, such as [changes to operations and] requirement in additional downstream personnel"

s.13,s.17

- Imbalance between leading for project value versus leading for specification. There is clear agreement that we have a goal to deliver project on time and on budget. However, can we get comfortable that after project is completed, we will have the needed capabilities enabled[1]?(e.g. s.13,s.17,s.21

- Realizing full value of investment presupposes maximum user adoption, especially with clinicians. Are we investing sufficiently in this area? Do we have sufficient focus on change management?

s.13,s.17,s.21

SOURCE: Interviews with CST stakeholders; McKinsey experience and analysis

2 Hypotheses on critical and/or hidden risks you face (1 of 2)

s.13,s.17,s.21

Potential key / hidden risks you face

Most critical risk which need to be resolved to ensure project success

- Lack of clarity and granularity of objectives: Objectives are not granular enough. Consistent acknowledgment that ultimate goal is to improve clinical care, but there is no granular enough articulation (e.g., % CPOE, % images shared via HIE); consequently value capture is hard to track and measure. Further, "cost and timeline are the only things measured"
- Downstream, non-IT activities are not sufficiently planned nor budgeted: To be successful, CST requires transformation and change in operations beyond IT. However, there seems to be insufficient budget for clinical transformation or user adoption activities
- Balance between clinical and IT modernization benefits: Not everyone is aligned on the balance between (a) infrastructure-led benefits (IT modernization) vs. (b) clinical benefits (workflow standardization) – is this acceptable, since (a) is a (necessary?) enabler while (b) delivers the value to the health system
- Ambiguity in the project scope creates confusion, hampers communication, and results in disappointment for stakeholders who do not get what they expect from the system. "Some people communicate their aspiration"
- No model for on-going collaboration after implementation across the HOs
- Lack of alignment on scope among stakeholders, especially clinical staff. They have not understood the implications of what is going to be created. "Only those who participated in the 'design phase' really understand it, but they have not effectively communicated this– and the implications – back to clinical staff yet"

1 Physicians are involved; did not get information on whether nurses are involved as well

SOURCE: Interviews with CST stakeholders; McKinsey experience and analysis

2 Hypotheses on critical and/or hidden risks you face (2 of 2)

s.13,s.17,s.21

Potential key / hidden risks you face

Most critical risk which need to be resolved to ensure project success

- Lack of support from physicians, a key stakeholder : While clinicians[1] are involved in design, there is strong doubt among key stakeholders whether they are ready to adopt the solution
- s.13,s.17
- s.13,s.17 , clinical leadership, communications expertise, clinical informatics, others
- s.13,s.17
- Speed of communication and the preparation for decision making is improving, but still insufficient. Executive stakeholders are not always fully aware of status and key activities, nor do they know communication outside the project team
- "We are not aware of the ramifications of the decisions we are taking on how the system is going to work and how the workflow is going to look like. This is our most significant risk"
- Root cause and risk assessment lacking – executive stakeholders are not comfortable about true project status, scope, plan, and downstream clinical transformation needs

1 Physicians are involved; did not get information on whether nurses are involved as well

SOURCE: Interviews with CST stakeholders; McKinsey experience and analysis

3 Suggested next steps

FOR DISCUSSION

- Review our current perspective and hypotheses with the 4 key stakeholders (*today*)
- Hold a more targeted set of interviews to confirm hypotheses; list of interviewees[1] to be jointly determined with you
- Outline potential activities to mitigate key risks after hypotheses are either refuted or confirmed

1 Potentially includes clinicians (physicians, nursing), IM/IT, CST Project Manager, CFO, Team IBM

Getting started: Initial interviews

Name	Function	Status
▪ Mary Ackenhusen	▪ CEO Vancouver Coastal Health	▪ Completed
▪ Carl Roy	▪ President and CEO, Provincial Health Services	▪ Completed
▪ Dianne Doyle	▪ President and CEO, Providence Health	▪ Completed
▪ Elaine McKnight	▪ Associate Deputy Minister, BC Ministry of Health	▪ Completed

- We estimate each interview to take 1 hour
- If needed, interviewees can bring one additional person who may can provide additional details during the interview

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Vancouver Coastal Health

Providence Health Care
How you want to be treated

Provincial Health Services Authority

Cl. 88 # 1012178

June 6, 2014

Ms. Linda McKenzie
Deputy Director
Canadian Institutes of Health Research
160 Elgin Street, 9th Floor
Address Locator 4809A
Ottawa, Ontario
K1A 0W9

Dear Ms. McKenzie,

This letter confirms that Clinical and Systems Transformation (CST) Project Board comprised of Vancouver Coastal Health (VCH), Providence Health Care (PHC), Provincial Health Services Authority (PHSA) and the Ministry of Health (MOH) support the alignment of this project to the data platform and services elements in British Columbia's (BC) SUPPORT Unit through a matched funding partnership.

BC has five regional health authorities and one provincial health authority to provide high quality, appropriate and timely health services to British Columbians. Additionally, the First Nations Health Authority represents a new relationship between BC First Nations, the Province of BC and the Government of Canada.

VCH (VCH and PHC) and PHSA are two of the BC health authorities. VCH serves a geographic region that includes 12 municipalities and four regional districts in the coastal mountain communities, Vancouver, North Vancouver, West Vancouver, Richmond and 14 Aboriginal communities. VCH also delivers health services to many people from across the province, and is the main centre for academic health care (clinical service, teaching, research) in BC.

PHSA's primary role is to ensure that BC residents have access to a coordinated network of high-quality specialized health care services. PHSA operates provincial agencies including BC Children's Hospital and BC Transplant, but PHSA is also responsible for specialized provincial health services like trauma and chest surgery, which are delivered in a number of locations across the province. Through BC Emergency Health Services (BCEHS), PHSA oversees the BC Ambulance Service, Patient Transfer Network, and Trauma Services BC.

VCH, PHC and PHSA each have a member on the interim SPOR Governance Council and each organization through this has participated and overseen the development of the business plan.

.../2

Vancouver Coastal Health

Providence Health Care

Provincial Health Services Authority

The three health organizations serve a sizable portion of the provincial patient population, collect rich patient data and are sites for the majority of patient-oriented research in the province. The CST project will provide:

1. A rich set of quantitative and structured clinical data from clinical systems (Cerner and Paris) and potentially, subject to appropriate approvals, selected linked Provincial Registries that are distinct from the holdings available to the Ministry.
2. Data that is timely (typically within 24 hours). Among other things, that would provide an opportunity for both researchers and clinical and operational personnel to conduct investigations on sufficiently current data to understand evolving changes in patient care and conditions.
3. A data environment that is more readily augmented with linkable supplementary data meaningful to researchers and clinicians (such as PROMS and PREMS).
4. Initial steps to make data marts accessible to qualified super-users and researchers, rather than just limited datasets or extracts.

The individual and shared data warehouses of VCH, PHC and PHSA are valuable contributions to the research community. The project board has identified $7.5 million toward a matched funding partnership over the next five years that will explicitly assist and accelerate extending what is being developed for CST to the research community with a secure data analytics/reporting environment with data that is accessible for research - from clinician scientists' informal inquiry to informal/unfunded research, to formal/ funded research. This data environment in turn would become the organizations' major data feed to the provincial data warehouse that is available to researchers. The potential new insights that researchers will be able to unlock is exciting.
On behalf of the project board, we offer our unqualified support for the alignment of this project to the data platform and services elements in BC's SUPPORT Unit through a matched funding partnership.

Sincerely,

Mary Ackenhusen
President and Chief Executive Officer, Vancouver Coastal Health Authority

Dianne Doyle
President and Chief Executive Officer, Providence Health Care

Carl Roy
President and Chief Executive Officer, Provincial Health Services Authority

pc: Elaine McKnight, Associate Deputy Minister, Corporate Services, Ministry of Health and Clinical and Systems Transformation Project Board Chair

Brown, Stephen R HLTH:EX

From: Murray, Wendy HLTH:EX
Sent: Wednesday, February 5, 2014 10:26 AM
To: XT:Roy, Carl EHS:IN; McKnight, Elaine L HLTH:EX; Brown, Stephen R HLTH:EX; Milburn, Peter R FIN:EX
Cc: XT:HLTH Dailly, Janet; Weiss, Cheryl HLTH:EX; Moir, Lindsay HLTH:EX; O'Callaghan, Jacqueline HLTH:EX; Freeman, Lisa FIN:EX
Subject: Material for CST Briefing with John Dyble - Feb 6th at 2pm
Attachments: CST updatedrft3.1.doc; DybleCST v5.pptx

Importance: High

Good Morning:

The attached material is for the Clinical and Systems Transformation briefing tomorrow afternoon in John Dyble's office.

Thanks so much...enjoy your day....W

Wendy Murray
Manager, Associate Deputy Minister Office, Corporate Services, Ministry of Health 5th Floor, Victoria, BC, V8W 3C8~250-952-1685~Cel s.17 mailto:wendy.murray@gov.bc.ca

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OPERATIONS BRIEFING NOTE

PREPARED FOR: John Dyble, Deputy Minister to the Premier, Cabinet Secretary and Head of the Public Service

TITLE: PHSA, VCH, and PHC contract with Team IBM to implement clinical and systems transformation

Summary:

There are five major clinical information systems operating within PHSA, VCH, and PHC: Cerner, CAIS (Cancer Agency Information System), McKesson, CareCast, and Allscripts. With the exception of Cerner, all other systems are at varying stages of obsolescence. Considerable customization over time created complex systems that aren't easily upgradable to newer versions; CAIS is a custom built system that can't be upgraded.

The current mix of heterogeneous systems across the three health organizations results in workflow gaps and inefficiencies across the continuum of care. Lack of connectivity between systems means limited opportunity for seamless sharing of patient data.

In 2007, the Ministry of Health Services (MoHS) directed the six Health Authorities in British Columbia to rationalize and standardize their clinical information systems to one of two core clinical platforms: Cerner or Meditech.

To fulfill both the MoHS' direction and their own strategic plans and vision, VCH, PHC, and PHSA decided to implement the Cerner Millennium platform in all acute, ambulatory, and residential care sites across the three health organizations and collectively work towards establishing standard processes, protocols, order sets, and clinical documentation. This clinical and systems transformation (CST) is guided by a shared strategic vision of a single health record per patient, enabled by technology.

In early 2012, three prequalified vendors were invited to participate in a directed Request for Proposal to provide clinical vision, technology vision, design/build and integrate/implement services, and transition support for a clinical and systems transformation program. An evaluation committee consisting of 27 individuals from all three HOs (including 15 clinicians) selected Team IBM (IBM Canada, University of Pittsburgh Medical Center, Deloitte, and maxIT Healthcare) as the preferred proponent. This was announced on June 8, 2012.

The CEOs of the Health Organizations de-scoped Managed Operations Services from the proposed service agreement on December 7, 2012. Contract negotiations with Team IBM formally restarted on December 10th, 2012. A contract with IBM was signed on March 28, 2013.

s.17 The total cost of the CST program will be $842 million over 10 years, equating to an investment of $50 million per year.

Background:

PHSA, VCH, and PHC are embarking on a strategic transformation of their clinical practices and systems. The goal: to create a common, integrated, end-to-end clinical information system that will achieve their collective strategic vision of *One Patient. One Record. Better Health.* A single health record for each patient will promote high quality care and improve health outcomes throughout the region by ensuring clinicians have a greater level of accurate and consistent patient information at the touch of a finger.

A single electronic health record per patient across the continuum of care (acute, ambulatory, and residential integrated with lab, medical imaging, health information, and pharmacy) will streamline the care process, improve the safety and efficiency of patient care, and provide clinicians with a longitudinal view of a patient's medical history at the touch of a finger for better care decisions. It will also bend the future cost curve of health spending in BC by improving quality of patient care.

This clinical and systems transformation program is more than a technology platform—it will transform the way practitioners care for patients. VCH, PHC, and PHSA are standardizing clinical processes and systems in all acute, ambulatory, and residential sites throughout the region. This initiative will enhance our ability to ensure accuracy, safety, and the integrity of patient identification.

Hospitals that have undergone a similar transformation, such as North York General Hospital in Ontario, have seen remarkable improvements in quality of care.

CST will deliver real-time health information to clinicians and researchers in a way our current heterogeneous systems do not now. It will enable the standardization of administration functions, such as referrals, scheduling, and registration. It will also enable clinicians and management to better manage and measure wait times as well as provide comparable and timely data for efficient resource management.

The Cerner Millennium clinical information system is already in use by PHSA and VCH—over 4,000 of the 22,000 clinicians in the three health organizations use it every day. In 2007, PHSA embarked on the implementation of the Cerner system at BC Children's, BC Women's, and Sunny Hill Hospitals and has spent approximately $35 million on design, development, and implementation of processes, software, and infrastructure. VCH has just recently added specific elements of the platform at St. Mary's Hospital in Sechelt. The full project will leverage the existing environment and scale it to support all acute, ambulatory, and residential sites across PHC, VCH, and PHSA.

The health organizations are using HIMSS Analytics Electronic Medical Records Adoption Model (EMRAM) as a framework to guide our investment in the CST program. The current project scope is to ensure all sites are at HIMSS level 5+: closed loop medication administration and physician documentation. This level integrates computerized order entry and clinical documentation and includes electronic medication administration records (eMARs), bar-coding or other auto-identification technology, and automated "5-rights" checking (right patient, drug, dose, time, route). It has also been demonstrated that HIMSS 5+ leads to significant cost avoidance through standardization of practice and prevention of patient errors and complications.

Current Project Status:

The project is governed by a Project Board, which consists of senior Ministry of Health executives, Health Organization CEOs and CST Executive Sponsors. Reporting to the Project Board are the Joint Executive Committee (Health Organization executives and partner representatives from IBM and Deloitte) and the Executive Steering Committee (Health Organization Executive Sponsors, Transformation Leads, Chief Medical Information Officers, the Chief Transformation Officer and the Chief Information Officer). The Joint Project Management Office, led by the Chief Transformation Officer, as well as a number of other steering and advisory committees, report up to the ESC.

There are three distinct phases to the CST project:

- Strategy and Verification (S&V)
- Design, Build, Integrate (DBI)
- Implementation

Strategy and Verification was completed between April and December 2013. Essentially a comprehensive planning process, it refined the scope of the work, informed the roadmap for CST implementation, and determined the resources needed to achieve the CST vision over the next five to ten years. S&V deliverables included the establishment of the CST Project Management Office, governance framework, and benefits framework as well as a Memorandum of Understanding between the three Health Organizations on how they'll work together to deliver the project. Other strategic work was completed around system integration, technology, data management, testing, and communications. The transformation roadmap was also confirmed, which is the blueprint of the order and timing for rolling out the new system to sites across the health organizations.

Design, Build and Integrate (DBI) began in January 2014 and is expected to last until the fall of 2015. This phase includes future state design, workflow mapping, standardized content build, testing/validation of the new system, and the development of transformational learning plans to ensure staff and clinicians are ready to use the new system when it's implemented on site. Currently, work is underway to identify subject matter experts to join a number of clinical workgroups that will help redefine the new joint clinical standards in areas such as Orders, Documentation, Emergency, Radiology, Pharmacy, Scheduling, Registration, and Surgery. The project is also actively recruiting clinical and technology resources that will be needed for this phase.

Work is also underway on developing core communications deliverables including a CST visual identity, a public website, short videos on the project, and other tangible resources to support the official project kick off in the first quarter of 2014.

Implementation Phase will occur in three waves, beginning in the summer of 2015. A Transformational Roadmap that was agreed upon in the Strategy & Verification phase determines which clinical sites are included in each wave. Implementation waves are expected to take 11 months, which includes the technical deployment of the new system as well as significant change management and training processes.

This project will ultimately allow standardization of practice throughout the province of BC with enormous benefits for the public.

Approved/Not Approved

Date Signed

Responsible Executives:

Carl Roy
President and Chief Executive Officer

Dr. David Ostrow
President and Chief Executive Officer

Date: January 30, 2014

February 2014

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DRAFT – FOR DISCUSSION ONLY

Organizations We Serve

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- Provincial Mandate
- Specialty Services
- 20,000 employees

Vancouver Coastal Health
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- Vancouver/Richmond and the Coast
- 13 Acute & Rehabilitation Programs
- 'Hub of Regional Care' for BC
- 22,000 Employees

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- Faith Based Health Care Organization
- Vancouver Focused
- 7,000 employees

Our customers serve every citizen and clinician in British Columbia and are the core academic centres in the province.

- **Quality of Care**
  - Standardization of clinical practice through digital protocols and evidence-based best practice care
    - Reduction of duplicate medical orders
    - Reduction of Adverse Drug Events (ADEs)
    - Reduction in length of stay, preventable readmissions

- **Capacity**
  - Improved patient flow (increased time of clinicians with patients)
  - Reduction of materials requirements (paper/drugs/test duplication)

- **Employee Satisfaction**
  - Increase in employee staff satisfaction reduces turnover costs

- **Systems Maintenance Reduction**
  - Retirement of legacy systems

[redacted]

s.13,s.17

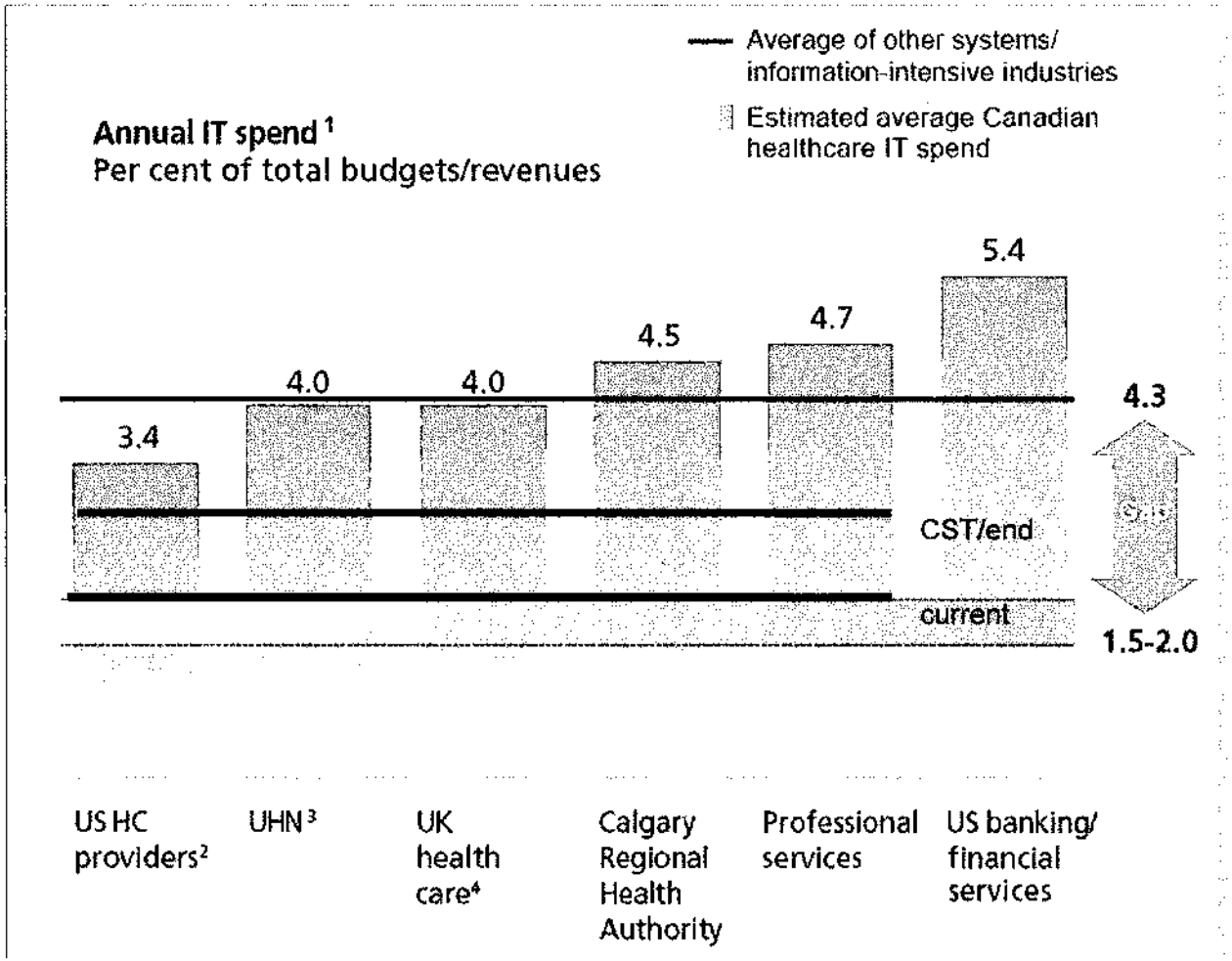
1. *Oldest active component only, e.g Eclipsys AM/ES was implemented in 2009 but SCM was implemented in 1999*
2. *Oldest active component only, e.g McKesson STS is current, but McKesson STAR LGH is 6 versions behind*
3. *Note that support for certain modules of McKesson cease on December 31, 2013.*

DRAFT – FOR DISCUSSION ONLY

Provincial Health Services Authority
Province-wide solutions. Better health.

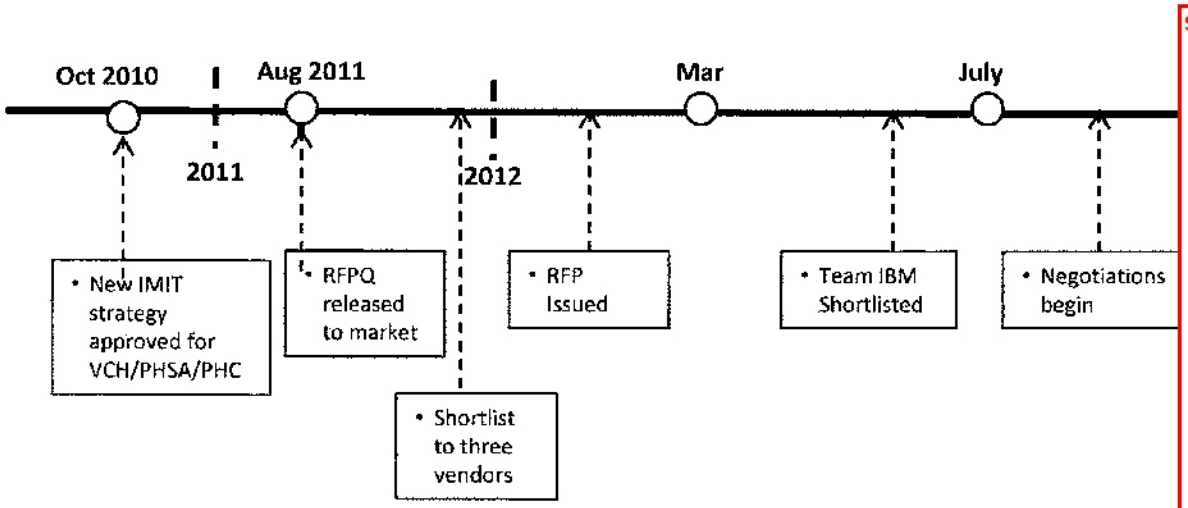
Vancouver Coastal Health
Providing wellness. Ensuring care.

Providence Health Care
How you want to be treated.



- We currently spend 1.7% of our operating.
- With CST averaged over 10 years, it will be an additional 1.2% bringing us to 3.0% of total spend.
- Even after this major investment, we're still barely there in terms of IT investment.

[redacted]



s.13,s.17

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Providence Health Care
How you want to be treated.

- Clinical Practice and Operations (In-Patient, Ambulatory and Residential).
- Business Process (Including Medical Imaging, Laboratory Services, Health Information Management and Pharmacy)
- Information Management and Information Technology Services (user experience, applications, infrastructure)

- 3,500 **Beds**
- 7,000 **Physicians**
- 22,000+ **Users**
- 26 **Facilities**
- 1.1m **Visits per year**
- $842m **Program**
- 10 **Years**

Clinical Transformation:

Design, Build, Implement & Integrate:

- Design, Build and Implementation of People, Process and Technology (Cerner)
- Transformation Roadmap
  - Accelerators: Methodologies, Tools and Content
- Health organization resources

Applications and Infrastructure:

(Legacy and New)

- Management of Legacy Systems
- Management of Cerner Platform
- Maintenance Costs
- Application Costs
- Infrastructure Services
  - Storage/Servers/Networks
  - Hardware Refresh

[redacted]

10 Year Cost and Net New Spend ($M)

	A	B	C	D	E=A+B+C+D	F	G=E-F	H	G+H
	Program Costs	T&L	Inflation	Net Sales Taxes	Total Costs before Contingency	Less Base Spend	Net New Spend before Contingency	Add Contingency	Net New Spend including Contingency
IBM (TCV)	s.17								
HO									
Total									

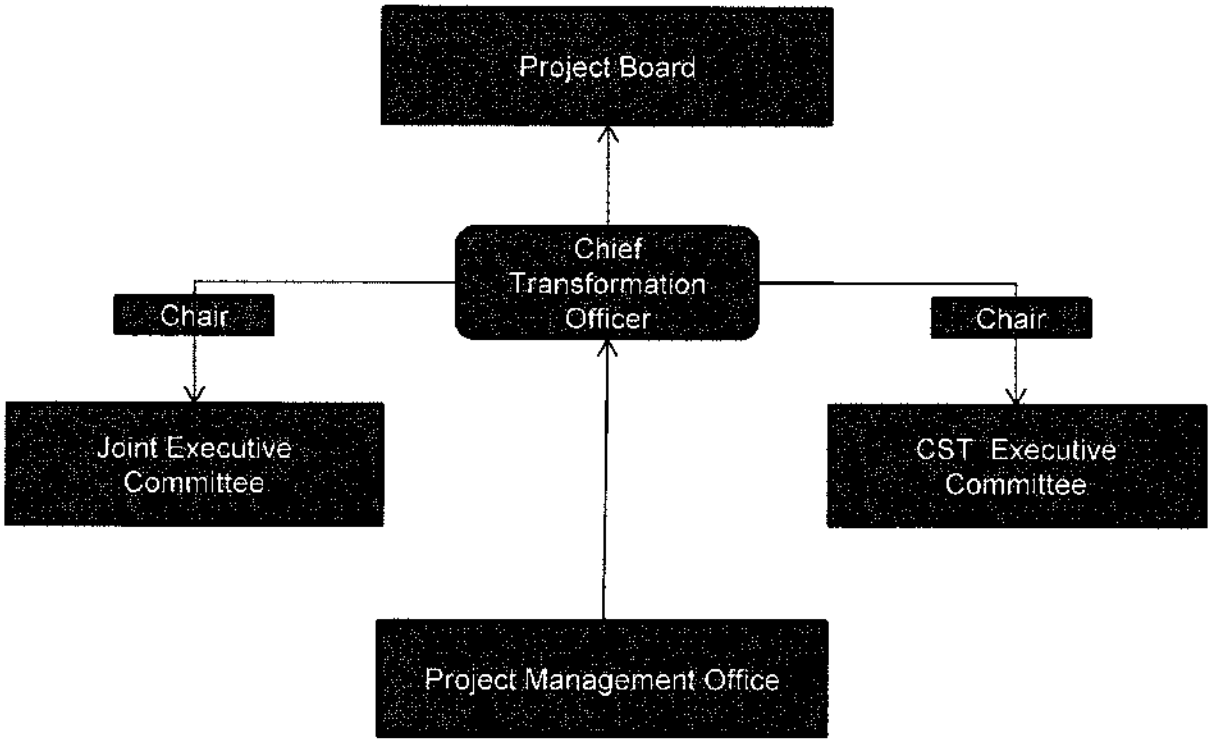
Notes:

IBM inflation starts in Year 3 as per MSA

Net Sales Taxes are per PHSA rebate structure

Base spend includes inflation and net sales taxes

Figure may not add due to rounding



- Project board chaired by MoH and fully accountable for time, cost, quality
- Chief Transformation Officer reports to Project Board, not HAs
- ESC internal to Health
- JEC includes IBM and codified in contract
- Risks and scope are managed by project board on advise from CTO and ESC

[redacted]

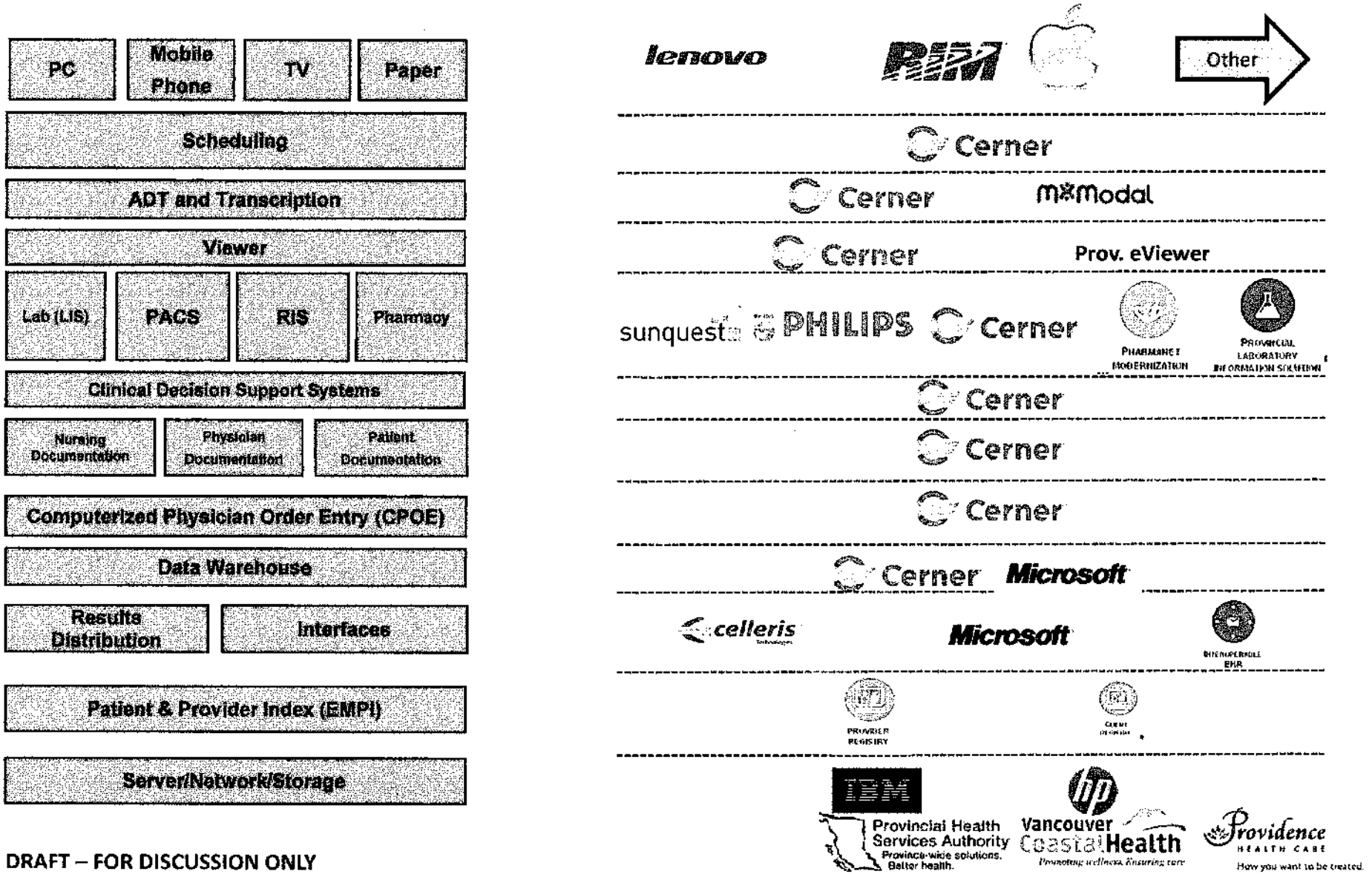
Project Status

s.13

Key Risks:

- Vendor Performance
- Vendor and health organization penalties due to:
  - Ability to make timely decisions
  - Resource availability from health organizations
- Scope Management
- Discipline of health organizations to prioritize and limit non-CST initiatives.

[redacted]



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Thank you.

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Providence
HEALTH CARE
How you want to be treated.

Mail: 1081 Burrard Street
Vancouver, BC Canada V6Z 1Y6

Office: 11th Floor, 1190 Hornby Street
Vancouver, BC Canada V6Z 2K4

Tel 604 806 8020
Fax 604-806-8811
officeoftheceo@providencehealth.bc.ca
www.providencehealthcare.org

April 4, 2013

Hon. Margaret MacDiarmid MD, Minister
Ministry of Health Services
1515 Blanshard Street
Victoria, B.C. V8W 3C8

Dear Minister MacDiarmid:

I am pleased to inform you that the Providence Health Care Board of Directors has approved the Clinical Systems Transformation project (Cerner). This project will support better health outcomes through standardization of clinical processes and implementation of "best practice" care protocols, enabled by a common IT platform.

The support of your ministry has been a key factor in our decision. s.13,s.17

s.13,s.17

We are confident that partnering with Vancouver Coastal Health and the Provincial Health Services Authority on this project will transform care delivery through improved efficiencies and standardization of the patient journey.

Sincerely,

Geoff Plant
Board Chair
Providence Health Care

cc: Dianne Doyle, President & CEO, Providence Health Care

Vancouver Coastal Health
Promoting wellness. Ensuring care.

C.C. (Kip) Woodward, Board Chair
11th Floor–601 West Broadway
Vancouver, BC V5Z 4C2

Tel: 604-875-4719
Fax: 604-875-4750
Email: board.chair@vch.ca

March 28 2013

Hon. Margaret MacDiarmid MD, Minister
Ministry of Health Services
1515 Blanshard Street
Victoria, B.C. V8W 3C8
(email: Hlth.health@gov.bc.ca)

Dear Minister MacDiarmid,

I am pleased to inform you that the board of Vancouver Coastal Health Authority has approved the Clinical Systems Transformation project (Cerner). This project will improve healthcare for our citizens by creating standardized, evidence based platforms across our sites. We are expecting that care will be more effective, efficient and appropriate s.13,s.17

Key to our decision making has been support by your ministry s.13,s.17

We are convinced that our partnership with Provincial Health Services Authority and Providence Health Care on this project will, by eliminating duplication and non-standardization, improve the services we provide British Columbians.

Yours sincerely,

Kip Woodward
Board Chair

Cc: Graham Whitmarsh, Deputy Minister of Health
Wynne Powell, Chair, PHSA
Geoff Plant, Chair, PHC
David Ostrow, CEO, VCH

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