

**2012 Laboratory Reform Committee**  
**Laboratory Services Plan**

Date: February 1, 2013

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## Acknowledgements

The Laboratory Reform Committee would like to recognise the contribution of the many individuals who volunteered their time and expertise on the working groups and on the production of materials. Their work was instrumental to the creation of this Report. To each of you, the Laboratory Reform Committee extends its appreciation for your valuable contribution to this process.



February 1, 2013

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Dear Minister MacDiarmid, Dr. Ross, Mr. Seckel and Mr. Whitmarsh:

As per the Terms of Reference of the Laboratory Reform Committee (LRC), a bipartite government and British Columbia Medical Association (BCMA) endeavor, we are pleased to provide to you the *Laboratory Services Plan* for your consideration.

The mandate of the LRC was to develop a plan to be submitted to the government and the BCMA, by no later than February 1, 2013, to achieve additional laboratory savings from outpatient laboratory services, and achieve a more efficient integration of inpatient laboratory services. As part of this process, the LRC worked to find an additional \$25 million in outpatient savings and \$18 million in inpatient savings to support the Lower Mainland consolidation. The total potential savings identified by the LRC was \$ 30.3 million outpatient and \$35.1 million inpatient. The *Laboratory Services Plan* is a culmination of six months of collaborative endeavor between the Ministry of Health, the health authorities, and a number of laboratory medicine physicians to achieve the LRC mandate and the ensuing savings.

The majority of the recommendations in the report were achieved based on consensus; however, the parties agreed to submit separate recommendations on governance. The findings and recommendations of the LRC are summarized in the attached report.

Thank you for your consideration of the *Laboratory Services Plan*.

Sincerely,

Ms. Nichola Manning,  
Co-Chair, Laboratory Reform Committee  
Assistant Deputy Minister  
Medical Services and  
Health Human Resource Division  
Ministry of Health

Dr. Chris Bellamy  
Co-Chair, Laboratory Reform Committee  
Past President  
BC Association of Laboratory  
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## SCOPE OF DOCUMENT

This document is the key deliverable stemming from the Terms of Reference for the 2012 Laboratory Reform Committee (LRC), established through negotiations of the 2012 Physician Master Agreement. It serves as the consolidated summary of the activities accomplished during the LRC's six month mandate, outlines the opportunities identified by the LRC, and includes a priority Plan as mandated by the LRC's Terms of Reference.

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## 1 EXECUTIVE SUMMARY

The Laboratory Reform Committee (LRC) was established in response to the outcomes of negotiations for the 2012 Physician Master Agreement. The mandate of the LRC was to develop a plan to be submitted to the Government and the British Columbia Medical Association (BCMA) by no later than February 1, 2013 to:

- a) achieve additional laboratory savings<sup>1</sup> from outpatient laboratory services; and
- b) achieve a more efficient integration of inpatient laboratory services that may include the following:
  - a single operating entity and governance structure to manage operations in the Vancouver and Fraser regions including single medical leadership;
  - a provincial laboratory technology and test assessment process;
  - ability to transition services and associated funding from the MSC payment schedule to an alternative payment arrangement and vice versa;
  - a provincial plan for physician human resources;
  - a single quality framework;
  - the integration of actual services and facilities; and
  - a timeline for achievement of the previously identified \$18 million in annual savings.

The inaugural meeting of the LRC was held on August 2, 2012. Over the next six months it engaged more than 35 stakeholders and experts and hosted 21 working meetings through which it collected and assessed articles, reports and select data to assist in the achievement of its mandate and development of the *Laboratory Services Plan*.

The *Laboratory Services Plan* (the “Plan”) lays the foundation for enhancing the quality and delivery of laboratory services in British Columbia and provides the framework for more detailed planning, assessment and implementation of the LRC’s recommendations.

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<sup>1</sup> The Government has a target of \$25 million in savings. The BCMA does not have a specific savings target however there is support to gain efficiencies and savings.

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## Summary of Recommendations

The Laboratory Reform Committee identified eight strategic areas for recommendations: governance; service delivery and integration; utilization, costing and funding; outpatient; quality; clinical guidance; human resources; and, information sharing. Within these strategic areas, there are a total of 40 consensus recommendations and 3 non consensus recommendations. Recommendations are as follows:

### Non Consensus Recommendations

#### **Government Governance:**

**Recommendation 1:** Establish a provincial laboratory agency that provides provincial direction and leadership for all aspects of the delivery and quality of all clinical laboratory services in British Columbia. This responsibility will include setting the strategic direction, developing operating, funding, capital and human resource plans, identifying service delivery models and the required infrastructure, implementing utilization management programs, establishing quality and technology assessment frameworks as well as designing practice guidelines.

**Recommendation 2:** Establish a provincial medical advisory panel that will provide medical and scientific expert advice and recommendations to the agency on how to achieve stated goals and objectives, and the best practices in relation to improving patient outcomes, technology and test utilization.

#### **BCMA /BCALP Governance:**

**Recommendation 1:** The BCMA and the BCALP recommend that collaborative discussions with the Ministry continue over the next number of months to address matters related to the governance of laboratory medicine services, including:

1. the structure, reporting and decision making processes and accountability of a provincial laboratory agency functioning within a co-management model;
2. the representation of critical stakeholders in a provincial laboratory agency;
3. the role of laboratory medicine physicians within a provincial governance structure;
4. a budgetary and funding framework for laboratory services and the related responsibilities of a provincial agency.

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## **Consensus Recommendations**

### **Service Delivery and Integration:**

**Recommendation 1:** Consolidation of the microbiology services in Fraser Health to a single site be considered.

**Recommendation 2:** Consolidation of virology to a single site be considered.

**Recommendation 3:** Re-evaluate the role of the public health laboratories in British Columbia by defining services that should be provided.

**Recommendation 4:** Consolidation of microbiology to a single test site in Vancouver be considered.

**Recommendation 5:** Implement Matrix-Assisted Laser Desorption/Ionization-Time Of Flight (MALDI-TOF) in microbiology for rapid microbial identification.

**Recommendation 6:** Consolidation of tumour markers to a single site be considered.

**Recommendation 7:** Consolidation of trace elements to a single site be considered.

**Recommendation 8:** Consolidation of drug screen confirmation testing be considered.

**Recommendation 9:** Close the Radioimmunoassay (RIA) Service at St Paul's Hospital.

**Recommendation 10:** Consolidation of hormone assays be considered.

**Recommendation 11:** Consolidation of stone analysis be considered.

**Recommendation 12:** Consolidation of serum free light chain analysis be considered.

**Recommendation 13:** Investigate the possibility of consolidating testing for complex hematology tests.

**Recommendation 14:** Move to the province wide adoption of testing protocols in the area of HIT testing, hereditary thrombophilia screening and autoimmune testing.

**Recommendation 15:** Introduce standardised work processes and utilization management in flow cytometry in the province.

**Recommendation 16:** Review cytogenetics and molecular diagnostic testing with a view to improving efficiency and centralising evolving expensive technology.



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**Recommendation 17:** Consolidation of the histopathology processing laboratories in the Lower Mainland to fewer sites be considered.

**Utilization, Costing and Funding:**

**Recommendation 18:** Establish a Provincial Utilization Management working group or committee for both acute and community care laboratory services. This function could be structured under a provincial agency.

**Recommendation 19:** Conduct a detailed analysis of inpatient laboratory costs that would help inform funding decisions. This function could be structured under a provincial agency.

**Recommendation 20:** Implement and maintain a regular review process for the Laboratory Fee Schedule, to ensure fees reflect current best practice, technology and costs.

**Recommendation 21:** Develop and adopt a standard methodology for assessing consolidation of laboratory services for cost savings purposes. This recommendation is applicable to the consolidation recommendations identified under Service Delivery and Integration.

**Recommendation 22:** Set provincial standards to ensure access for health care practitioners and patients to laboratory medicine services and tests is appropriate, sustainable and evidence –based with proven patient outcomes and other benefits.

**Outpatient:**

**Recommendation 23:** Laboratory Fee Schedule Changes – Implement laboratory fee schedule changes, specifically:

- Restrict the ability to bill for select tests: Vitamin D, Prostate-Specific Antigen (PSA)
- Delist select tests: Barbiturates, Phencyclidine (PCP) aka “Angle Dust”, Lysergic Acid Diethylamide (LSD)
- Change test protocol and fee schedule: *H. pylori*
- Re-cost select testing that have been impacted by technological change: Serum Protein Electrophoresis; Urine Drugs of Abuse Confirmation Testing; Urine Drugs of Abuse Primary Base Fee; Lead, Zinc, Selenium Testing; and Catecholamine, Metanephrine Testing.

**Recommendation 24:** Laboratory Test Utilization Controls – Implement laboratory test utilization controls that include an accountable utilization mechanism for ordering health care practitioners to support adherence to best practice and existing practice guidelines.

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**Recommendation 25:** Laboratory Test Results and Non Laboratory Report Electronic Distribution – Implement electronic distribution of laboratory test results and reports and non-laboratory reports, such as medical imaging, discharge summaries, to physician offices and clinic Electronic Medical Records (EMRs).

**Recommendation 26:** Electronic Order Entry for Laboratory Testing – Implement intelligent order entry and decision support systems for ordering physicians beginning with electronic ordering.

**Quality:**

**Recommendation 27:** Create a Provincial Laboratory Quality Council that establishes provincial quality policies and priorities and aligns with other provincial quality programs and initiatives, such as the BC Patient Safety and Quality Council. This function could reside under a provincial agency.

**Recommendation 28:** Adopt the International Standard Association Quality standard 15189 (ISO 15189) and move to a provincial accreditation program that is ISO 15189 compliant.

**Clinical Guidance:**

**Recommendation 29:** Antimicrobial Stewardship – Establish antimicrobial stewardship processes that support the development, maintenance and adherence to provincial standards and best practices. This function could reside under a provincial agency.

**Recommendation 30:** Blood and Blood Product Stewardship – Review the 2012 American Association of Blood Banks (AABB) Red Blood Cell Transfusion Clinical Practice Guidelines to assess the appropriateness for implementation provincially and identify mechanisms to deploy tighter control on existing provincial transfusion guidelines, including guidelines and policy directives for plasma protein products. This assessment should take place by the provincial Transfusion Medicine Advisory Group, in consultation with transfusion medicine directors, supported by the Provincial Blood Coordinating Office.

**Recommendation 31:** Diabetes Management Program – In view of the projected major cost increases in diabetes care, a clinical impact study between Valley Medical Laboratories and the Ministry of Health should be considered, to validate improvement in cost-sensitive end points (ER visits, hospital days, proximity to targeted diabetic values, diabetic complications) as a result of program enrollment. This activity could provide the basis for determining laboratory integration with chronic disease management.

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## Human Resources:

**Recommendation 32:** Continue the work of the JLMWOC through the establishment of a committee, the Laboratory Medicine Resource Planning Committee, with expanded JLMWOC Terms of Reference, to include academic pathology resource planning.

**Recommendation 33:** The Laboratory Medicine Resource Planning Committee should build on the successful composition of JLMWOC. The committee could be comprised of a BCMA/Ministry of Health structure with representation from the BCMA/BCALP, UBC Department of Pathology and Laboratory Medicine, Health Authorities and the Ministry of Health.

**Recommendation 34:** Until the new committee is in place, consider extending the term of the JLMWOC so that there is seamless transition to the new committee.

**Recommendation 35:** The primary responsibility of the Laboratory Medicine Resource Planning Committee would be to make recommendations to the Ministry of Health on laboratory physician resource planning for all public hospitals throughout BC, based upon continuously updated workload models for anatomical and clinical pathology and to include the provision of academic pathology services.

**Recommendation 36:** The Terms of Reference for the Laboratory Medicine Resource Planning Committee could include the following:

- i. Continue to monitor anatomical pathology workloads for all sites, by Health Authority, on an annual basis.
- ii. Evolve the current L4E Version 1 measurement system to a workload model, which will measure those activities currently not captured by the present system.
- iii. Refine and validate the clinical pathology workload models currently in existence, with a view to utilizing them and monitoring clinical pathology workloads for physician resource planning in these specialties.
- iv. Make recommendations concerning the laboratory physician resources required to fulfill current and future academic mandates.

**Recommendation 37:** Develop and maintain a pathology and laboratory medicine human resource plan by working with human resources teams, the BC Medical Association, the Government and academic institutions to ensure the on-going supply of skilled laboratory professionals. This function could reside under a provincial agency.

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## Technology and Information Sharing:

**Recommendation 38:** Develop a strategic plan for the optimization and rationalization of technology investments to support service delivery integration.

**Recommendation 39:** Establish connectivity between laboratory and patient outcome data to support laboratory utilization management.

**Recommendation 40:** Create an electronic mechanism for information sharing and knowledge transfer at the provincial level that supports:

- Storage of and access to business and clinical policies, practices, education, tools and information.
- Provincial standardization of business/clinical practices and the establishment of provincial business/clinical best business practices.
- Interoperability.

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## 2 BACKGROUND

The LRC was established in conjunction with the negotiations for the 2012 Physician Master Agreement between the Government, the BCMA, and the Medical Services Commission. Its mandate was to develop a plan, which was to be submitted to the Government and the BCMA by no later than February 1, 2013 to:

- a) achieve additional laboratory savings<sup>2</sup> from outpatient laboratory services; and
- b) achieve a more efficient integration of inpatient laboratory services that may include the following:
  - a single operating entity and governance structure to manage operations in the Vancouver and Fraser regions including single medical leadership;
  - a provincial laboratory technology and test assessment process;
  - ability to transition services and associated funding from the MSC payment schedule to an alternative payment arrangement and vice versa;
  - a provincial plan for physician human resources;
  - a single quality framework;
  - the integration of actual services and facilities; and
  - a timeline for achievement of the previously identified \$18 million in annual savings.

There were eight members of the LRC: four representing the Government and four representing the BCMA. One member from the Government and one member from the BCMA were designated as co-chairs. The committee was supported by three Government and two BCMA staff members. Committee membership and staff support were as follows:

### Membership

Government	BCMA
Nichola Manning, Co-Chair Assistant Deputy Minister, Medical Services & Health Human Resources Division, Ministry of Health	Dr. Chris Bellamy, Co-Chair Past President, BC Association of Laboratory Physicians
Jane Crickmore Executive Director, Laboratory, Diagnostics and Blood Services Branch, Medical Services & Health Human Resources Division, Ministry of Health	Dr. Jim Cupples Regional Director, Anatomic Pathology, Fraser Health
John Andruschak Vice President & Consolidation Lead Pathology and Laboratory Medicine Lower Mainland Laboratory Services	Dr. Chris Sherlock President, BC Association of Laboratory Physicians

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<sup>2</sup> The Government has a target of \$25 million in savings. The BCMA does not have a specific savings target however there is support to gain efficiencies and savings.

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<b>Government</b>	<b>BCMA</b>
<b>Mal Griffin</b> Corporate Director, Service Innovation and Chief Information Officer, Interior Health Authority	<b>Dr. Gordon Hoag</b> Medical Director Laboratory Medicine, Pathology, and Medical Genetics Vancouver Island Health Authority

**Staff Support**

<b>Ministry of Health</b>	<b>BCMA</b>
<b>Joanne Philley</b> Senior Clinical Analyst, Laboratory Diagnostics and Blood Services Branch, Medical Services & Health Human Resources Division	<b>Cathy Cordell</b> General Counsel
<b>Kirk Eaton</b> Director, Diagnostic Imaging, Health Authorities Division	<b>Patrick Melia</b> Economics Consultant, Economics and Policy Analysis
<b>Jeremy Higgs</b> Director, Medical Services Economic Analysis, Medical Services & Health Human Resources Division	

The inaugural meeting of the LRC was held on August 2, 2012. It resulted in the identification of:

- Key areas of focus for the committee
- The need for a collaborative and consultative process
- A set of guiding principles
- The need obtain stakeholder input
- Potential mechanisms for obtaining stakeholder input

Subsequently frameworks for the LRC and Working Groups were developed to assist the LRC with achieving its mandate and obtaining stakeholder input. These documents were considered living documents that would be reviewed and revised as required.

Please refer to Appendices A, B and C for additional details.

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## 3 METHODOLOGY

### 3.1 Process

The LRC Terms of Reference were reviewed and used to guide the development of the Plan. The LRC agreed that recommendations resulting in the following types of savings could be attributed to the \$18 million previously identified for the Lower Mainland Consolidation (LMC):

- cost savings
- cost avoidance
- downstream system cost savings
- cost savings related to initiatives that were already in progress

The LRC was unable to reach consensus on the outpatient savings target which was understood by the Ministry to be \$25 million. The BCMA did not have a specific savings target however were in support of working towards gaining efficiencies and savings.

The LRC identified a number of key areas of focus for the Plan and topics to consider within each area of focus; however not all topics were subsequently addressed within the key areas of focus. These key areas of focus included, but were not limited to, the following:

- Governance: review of governance models and impact of consolidation
- Quality: assessment of a comprehensive quality assurance and monitoring program to ensure that the high quality of service is maintained
- Costs: a review of interprovincial factors and individual tests and protocols where there are opportunities for significant cost reductions
- Funding Models: assessment of the funding and models for inpatient and outpatient services
- Service Delivery: review of tests performed, where they are performed and opportunities for integration of services and facilities
- Utilization: review of changes in utilization and expenditures over time and factors that influence the changes
- Human Resources: linkage with the development of clinical and academic workload models
- Technology Assessment: review of current technology in place and potential new technology to increase efficiencies
- Implementation Strategies: assessment of recommended changes to be completed over the short, medium and long term with associated impacts

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The LRC established eight working groups and one sub working group to review the issues and identify opportunities for each area of focus. The working groups and sub working group were:

- Governance
- Service Delivery and Integration
  - Histology Processing Sub Working Group
- Utilization, Costing and Funding
- Outpatient
- Quality
- Clinical Guidance
- Human Resources
- Technology and Information Sharing

Most of the working groups were led by a member of the LRC, or had an LRC member as a participant. Each working group chair identified the key stakeholders, mainly laboratory medicine physicians, to participate on the working groups.

Meetings of the LRC and working groups were scheduled at the call of the co-chairs and working group leads. A total of 8 LRC meetings and more than 13 working group meetings were held between August 2, 2012 and Feb 1, 2013. Ad hoc meetings to support information gathering and analysis were held as required.

The working groups identified opportunities and documented the ones to go forward to the LRC for review using a standard template. Opportunities were consolidated into a master spreadsheet to facilitate review and analysis by the LRC.

It is important to note that the working groups identified a number of opportunities that were not fully assessed by the LRC. Consequently, further analysis of these opportunities, which are identified in the working group reports, would be required.



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## 3.2 Stakeholders

The following stakeholder groups were identified by the LRC as groups that would be impacted by, involved and / or interested in the development of the Plan:

- Ministry of Health (MOH)
- British Columbia Medical Association (BCMA)
- British Columbia Association of Laboratory Physicians (BCALP)
- Health Authorities
- Public Laboratories
- Private Laboratories
- Physicians (GPs, Specialists)
- Patients
- College of Physicians and Surgeons of BC
- Diagnostic Accreditation program (DAP)
- University of British Columbia (UBC), Department of Pathology and Laboratory Medicine
- British Columbian Institute of Technology (BCIT), Medical Laboratory Program
- Health Sciences Association of BC
- Hospital Employees Union
- BC Government Employees Union
- Health Employers Association of BC
- British Columbia Society of Medical Laboratory Technology (BCMLS)
- Provincial Blood Coordinating Office (PBCO)

The LRC's timeline did not enable the direct consultation and involvement of all identified stakeholder groups.

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## 4 RECOMMENDATIONS

As a preface to this section on recommendations, the LRC members, collectively, have observed the value of a process that has enabled the Government, BCMA and BCALP representatives to collaboratively work together to identify directions that provide both value and benefit to patients and providers of British Columbia's health care system.

This section provides a brief overview of the activities of each working group and the subsequent recommendations of the LRC. It is the LRC's intent, that where feasible, recommendations will ultimately be applied at the provincial level. The recommendations are documented by areas of focus, and it is important to note that within each area of focus, the recommendations are not listed in order of priority:

- Governance
- Service Delivery and Integration Opportunities
- Utilization, Costing and Funding Opportunities
- Outpatient Opportunities
- Quality Opportunities
- Clinical Guidance Opportunities
- Human Resources Opportunities
- Technology and Information Sharing Opportunities

Please see Appendices D to L for detailed Working Group Reports.

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## 4.1 Governance

The LRC determined that it would not form a separate working group for governance. A small sub group, however, provided input to the LRC, which in turn reviewed the matter as a whole. In its deliberations, the LRC acknowledged several key points:

- laboratory medicine is a critical medical service in the patient care pathway affecting seventy to eighty percent of all medical decisions by providing diagnostic and treatment insight into the cause, nature and effects of the disease life cycle;
- physicians and other health care providers advocate for a medical laboratory system that provides high quality and timely laboratory medicine consultations; and,
- the laboratory medicine system must be sustainable in terms of efficiency, cost-effectiveness, quality and in terms of the value generated for patients and taxpayers from their investment in the BC laboratory system.

The LRC recognized the benefit of an overarching mechanism such as a provincial agency, which would address these aspects of laboratory medicine practice and provide strategic oversight and direction to laboratory service delivery throughout British Columbia. Such an agency could provide service coordination and integration for the province's pathology and laboratory medicine services by determining and assessing services that best meet patients' needs and outcomes, and ensure fiscal responsibility across all regions of the province.

The Government and the BCMA LRC members were unable to reach consensus on the approach and structure to be taken for establishing a single agency. Consequently, it was agreed that the parties would submit separate governance recommendations. These recommendations are as follows:

### **Government Governance Recommendations:**

The LRC requested a small subset of its Government and BCMA members develop an initial draft of the Governance Terms of Reference. This smaller group held three meetings, each time bringing back drafts of the Terms of Reference to the Laboratory Reform Committee meetings for review by all Committee members.

After the January 21, 2013, LRC meeting, the Government members were under the impression the high level Governance Terms of Reference had reached near-agreement status. However, six working days before the final LRC report was due, the Ministry received notice the governance section would not be agreed to by BCMA members - even though BCMA members provided equal contribution throughout the process in shaping the content. The BCMA proposed an alternate document that it had independently drafted.

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The Ministry entered into the LRC to work collaboratively with the BCMA members and with the understanding that the governance recommendations could be submitted as per instructed in the LRC Terms of Reference.

To that end, the Governance Terms of Reference submitted by the Government members reflect the direction that had been supported by the LRC during its deliberations on the concept of a provincial agency and in relation to provincial and regional governance mandates, guiding principles, medical advisory panel, structure, linkages, and service level agreements.

**Government Recommendation 1:** Establish a provincial laboratory agency that provides provincial direction and leadership for all aspects of the delivery and quality of all clinical laboratory services in British Columbia. This responsibility will include setting the strategic direction, developing operating, funding, capital and human resource plans, identifying service delivery models and the required infrastructure, implementing utilization management programs, establishing quality and technology assessment frameworks as well as designing practice guidelines.

**Government Recommendation 2:** Establish a provincial medical advisory panel that will provide medical and scientific expert advice and recommendations to the agency on how to achieve stated goals and objectives, and the best practices in relation to improving patient outcomes, technology and test utilization.

#### **BCMA Governance Recommendations:**

Although the creation of a provincial governing agency to provide strategic oversight and direction for laboratory medicine services in British Columbia was not part of the original Terms of Reference for the Lab Reform Committee, both the BCMA /BCALP and the Ministry believe that such an agency would be the most appropriate vehicle for this role. However, the BCMA and the BCALP believe that the Lab Reform Committee has not adequately addressed issues related to an agency's structure, reporting and decision-making processes and that further data collection and analysis is needed to help define an agency's budgetary and funding responsibilities. The 2012 Secor Report entitled *Options for Laboratory Transformation*, clearly states that one of the fundamental principles and success factors guiding exploration of alternative governance structures is that we must ensure that such a structure has appropriate medical leadership and a clear reporting and accountability structure. The budgetary and funding framework is also a key element in determining the strategic direction on such an agency. The Government chooses to move forward with the creation of an agency with very high level Terms of Reference and without any collaborative process in place for the parties to resolve the aforementioned issues.

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The Lab Reform Committee did discuss the mandate of an agency and largely agreed that such a mandate would include the following:

1. to establish a provincial vision, goals and objectives for laboratory medicine services;
2. to ensure appropriateness and sustainability of laboratory medicine services through the establishment of standards for practice, access and allocation of funding;
3. to improve quality of patient care using current evidence and best practices;
4. to establish a provincial quality framework;
5. to develop an annual operating plan which includes priorities, allocations and funding for lab medicine services;
6. to establish and maintain a human resources plan;
7. to monitor and set standards for utilization and expenditures;
8. to formulate plans to enable sustainability and innovation;
9. to oversee laboratory IT systems; and
10. to develop provincial services and capital requirement plans to adapt to changes in the medical laboratory environment.

A provincial governing agency is intended to be the backbone of the laboratory system in British Columbia thus its governance structure, strategic direction and associated legal implications must be carefully assessed and planned with appropriate collaborative consultations between the parties, who in turn need to consult with legal and governance experts. If such an agency is hastily or poorly planned, the lab reform initiative is bound to fail.

The BCMA / BCALP take issue with the Government's view of the events which transpired at the LRC with respect to this governance issue. First, it is unfortunate that the Government members were under the impression that the LRC had reached near agreement on the Terms of Reference. The first draft Terms of Reference for an agency were presented to the LRC on January 8, 2013. Subsequently, the BCMA/ BCALP specifically raised the issue of structure, reporting, and decision making. The Government had no concrete response or constructive input on these items and the LRC did not engage in any further discussion. The BCMA/BCALP would never agree to form an agency when such vitally important details were not resolved, especially in light of the large role for this agency that the Government suggests in its recommendations above. Further, the BCMA/BCALP never agreed to give the agency full funding authority and would not do so without further analysis of the implications for patients and our members.

Both parties entered into this process in good faith with a view to coming to consensus recommendations. However, the BCMA / BCALP cannot agree to items which have not been adequately determined within a collaborative process, as per the spirit and intent of the LRC mandate.

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**BCMA/BCALP Recommendation 1:** The BCMA and the BCALP recommend that collaborative discussions with the Ministry continue over the next number of months to address matters related to the governance of laboratory medicine services, including:

1. the structure, reporting and decision making processes and accountability of a provincial laboratory agency functioning within a co-management model;
2. the representation of critical stakeholders in a provincial laboratory agency;
3. the role of laboratory medicine physicians within a provincial governance structure;
4. a budgetary and funding framework for laboratory services and the related responsibilities of a provincial agency.

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## 4.2 Service Delivery and Integration

The Service Delivery and Integration Working Group was the largest working group with 14 members from four health authorities, the Ministry of Health and UBC. In addition, the working group formed a separate five member sub-group of laboratory medicine physicians to assess histology consolidation.

The working group was tasked with making recommendations that would result in the achievement of the previously identified \$18 million in savings related to Lower Mainland Consolidation. As approved by the LRC, the working group was able to identify opportunities that could result in cost savings, cost avoidance and / or downstream system savings that could be attributed to the \$18 million. In addition, cost savings stemming from initiatives in progress were also eligible for consideration for application towards the target.

Four key pre-requisites were identified by the Service Delivery and Integration Working Group as being essential to the success of the opportunities they identified:

- A fully integrated and interoperable, Laboratory Information System Environment. Based upon information from the Lower Mainland Consolidated Laboratories, it is estimated that functional interfaces will be completed for the Lower Mainland in a 12 – 18 month timeframe.
- A robust courier service to support the transfer of tests in a way that specimen integrity is preserved, appropriate turnaround times are met and that the service meets the clinical need.
- Performance metrics/quality indicators be in place, and be continuously monitored through any change process, such that quality can be assured and cost savings/avoidance clearly identified. Both general and discipline specific metrics will be required.
- In recognition of laboratory medicine as a medical practice, the integrity of the on-site consultation service between laboratory physicians and clinicians must be preserved through any test consolidation process.

### **LRC Service Delivery and Integration Recommendations:**

As a preface to the recommendations, the LRC supports the four key pre-requisites that were identified as essential elements for successful consolidation identified by the working group. A fifth pre-requisite was identified by the LRC, specifically that: the provincial integration and interoperability of Laboratory Information Systems are achieved in the anticipated timeline of 24 – 36 months.

As well, the LRC supports the principle that business cases should be completed, as required, to assess the cost benefit of the consolidation recommendations. In addition, the LRC is of the

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opinion that the consolidation initiatives identified for the Lower Mainland should be reviewed for their applicability to all health authorities.

**Recommendation 1:** Consolidation of the microbiology services in Fraser Health to a single site be considered.

**Recommendation 2:** Consolidation of virology to a single site be considered.

**Recommendation 3:** Re-evaluate the role of the public health laboratories in British Columbia by defining services that should be provided.

**Recommendation 4:** Consolidation of microbiology to a single test site in Vancouver be considered.

**Recommendation 5:** Implement Matrix-Assisted Laser Desorption/Ionization-Time Of Flight (MALDI-TOF) in microbiology for rapid microbial identification.

**Recommendation 6:** Consolidation of tumour markers to a single site be considered.

**Recommendation 7:** Consolidation of trace elements to a single site be considered.

**Recommendation 8:** Consolidation of drug screen confirmation testing be considered.

**Recommendation 9:** Close the Radioimmunoassay (RIA) Service at St Paul's Hospital.

**Recommendation 10:** Consolidation of hormone assays be considered.

**Recommendation 11:** Consolidation of stone analysis be considered.

**Recommendation 12:** Consolidation of serum free light chain analysis be considered.

**Recommendation 13:** Investigate the possibility of consolidating testing for complex hematology tests.

**Recommendation 14:** Move to the province wide adoption of testing protocols in the area of HIT testing, hereditary thrombophilia screening and autoimmune testing.

**Recommendation 15:** Introduce standardised work processes and utilization management in flow cytometry in the province.

**Recommendation 16:** Review cytogenetics and molecular diagnostic testing with a view to improving efficiency and centralising evolving expensive technology.

**Recommendation 17:** Consolidation of the histopathology processing laboratories in the Lower Mainland to fewer sites be considered.



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### 4.3 Utilization, Costing and Funding

With representation from two health authorities, the BCMA, BCALP and Ministry of Health staff, the seven member Utilization Management, Costing and Funding Working Group addressed utilization management and costing as well as examined the current funding system for medical laboratories in BC.

As part of this process, the working group undertook the following activities: reviewed the existing literature and the 2012 Secor report, entitled *Options for Laboratory Transformation* (the “2012 Secor Report”); assessed the current processes in place in the province, such as the Collaborative Utilization System Improvement Committee in place under the current two year Laboratory Medicine Fee Agreement between the BCMA and the Government; and, deliberated on the question of whether or not BC had the best funding model for medical laboratory practice and the impact of having two different pieces of legislation governing the laboratory medicine system.

#### **LRC Utilization, Costing and Funding Recommendations:**

**Recommendation 18:** Establish a Provincial Utilization Management working group or committee for both acute and community care laboratory services. This function could be structured under a provincial agency.

**Recommendation 19:** Conduct a detailed cost analysis of inpatient laboratory costs that would help inform funding decisions. This function could be structured under a provincial agency.

**Recommendation 20:** Implement and maintain a regular review process for the Laboratory Fee Schedule, to ensure fees reflect current best practice, technology and costs.

**Recommendation 21:** Develop and adopt a standard methodology for assessing consolidation of laboratory services for cost savings purposes. This recommendation is applicable to the consolidation recommendations identified under Service Delivery and Integration.

**Recommendation 22:** Set provincial standards to ensure access for health care practitioners and patients to laboratory medicine services and tests is appropriate, sustainable and evidence-based with proven patient outcomes and other benefits.

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## 4.4 Outpatient

Outpatient laboratory savings was identified as one of the eight strategic areas for achieving the mandate of the LRC. The dollar amount for potential savings was not specified in the formal agreement and although the Government and BCMA members of the LRC did not reach consensus on the amount, a figure of \$25 million was advocated by the Ministry of Health and this was the amount targeted by the LRC.

An eight member Outpatient Working Group with representation from public and community (private) laboratories, and BCMA, BCALP and Ministry of Health staff with expertise in the fee schedule and fee setting process met three times to identify and assess opportunities for cost savings related to the laboratory test fee schedule, utilization controls and system improvements to the non-analytic portion of laboratory testing.

To identify potential savings in outpatient laboratory expenditures, the working group examined the present laboratory test fee schedule with the accompanying MSP utilization and expenditure data. As well the working group took into consideration one of the short term opportunities “improving ordering practices” identified in the 2012 Secor Report. To this end, the working group attempted to achieve savings by identifying changes that would decrease laboratory test utilization and bring efficiencies to the non-analytic portion of laboratory testing in areas such as patient servicing and report delivery.

### **LRC Outpatient Recommendations:**

#### **Recommendation 23:** Laboratory Fee Schedule Changes

Implement laboratory fee schedule changes, specifically:

- Restrict the ability to bill for select tests: Vitamin D, Prostate-Specific Antigen (PSA)
- Delist select tests: Barbiturates, Phencyclidine (PCP) aka “Angle Dust”, Lysergic Acid Diethylamide (LSD)
- Change test protocol and fee schedule: *H. pylori*
- Re-cost select testing that have been impacted by technological change: Serum Protein Electrophoresis; Urine Drugs of Abuse Confirmation Testing; Urine Drugs of Abuse Primary Base Fee; Lead, Zinc, Selenium Testing; and Catecholamine, Metanephrine Testing.

The LRC recognizes that to implement these test changes there are number of inter-related dependencies; however, it believes that an immediate savings of \$5 million can be achieved through deploying some of these identified fee schedule changes in the next 12 months.

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**Recommendation 24: Laboratory Test Utilization Controls**

Implement laboratory test utilization controls that include an accountable utilization mechanism for ordering health care practitioners to support adherence to best practice and existing practice guidelines.

**Recommendation 25: Laboratory Test Results and Non Laboratory Report Electronic Distribution**

Implement electronic distribution of laboratory test results and reports and non-laboratory reports, such as medical imaging, discharge summaries, to physician offices and clinic Electronic Medical Records (EMRs).

**Recommendation 26: Electronic Order Entry for Laboratory Testing**

Implement intelligent order entry and decision support systems for ordering physicians beginning with electronic ordering.

The LRC recognizes that a pre-requisite for this direction is a more robust, updated patient demographic data set as envisioned with the new BC Services Card that combines a driver's license and health services card.

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## 4.5 Quality

The working group on quality met to discuss recommendations related to quality in laboratories in BC. Members of this working group included medical, administrative and technical representatives from five of the health authorities, the Ministry of Health and UBC. Input was supplemented by information derived from a questionnaire distributed to Health Authority medical and technical leaders.

The quality working group focused primarily on opportunities that would lead to costs savings, increased system capacity and improved patient care through the adoption of international standards and common practices.

The working group also discussed the type of structure that could be used to support a provincial quality system and the requirement for the accreditation process to support provincial needs and goals.

### **LRC Quality Recommendations:**

**Recommendation 27:** Create a Provincial Laboratory Quality Council that establishes provincial quality policies and priorities and aligns with other provincial quality programs and initiatives, such as the BC Patient Safety and Quality Council. This function could reside under a provincial agency.

**Recommendation 28:** Adopt the International Standard Association Quality standard 15189 (ISO 15189) and move to a provincial accreditation program that is ISO 15189 compliant.

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## 4.6 Clinical Guidance

The Clinical Guidance Working Group was led by two LRC members with expert advice being provided by leaders of the relevant programs within the province. The working group was tasked with identifying clinical opportunities that would contribute to achieving a more efficient integration of inpatient laboratory services including opportunities that would contribute to \$18 million in annual savings.

As approved by the LRC, the working group was able to identify opportunities that could result in cost savings, cost avoidance and / or downstream system savings that could be attributed to the \$18 million previously identified. In addition, cost savings stemming from initiatives in progress were also eligible for consideration for application towards the target.

The working group focused on three initiatives:

- Antimicrobial stewardship
- Blood and blood product stewardship
- Diabetes management program

Work recently completed on antimicrobial stewardship and diabetes management within select Health Authorities was leveraged by the working group. A transfusion medicine expert was engaged and information from the Provincial Blood Coordinating Office was leveraged to assist with analysis and development of recommendations for blood and blood product stewardship. The LRC recognized that province-wide adoption of these initiatives would be the ultimate goal, to improve care and maximize cost reductions. Consequently, estimated savings attributed to these initiatives have been based on province-wide adoption.

### **LRC Clinical Guidance Recommendations:**

#### **Recommendation 29: Antimicrobial Stewardship**

Establish antimicrobial stewardship processes that support the development, maintenance and adherence to provincial standards and best practices. This function could reside under a provincial agency.

#### **Recommendation 30: Blood and Blood Product Stewardship**

Review the 2012 American Association of Blood Banks (AABB) Red Blood Cell Transfusion Clinical Practice Guidelines to assess the appropriateness for implementation provincially and identify mechanisms to deploy tighter control on existing provincial transfusion guidelines, including guidelines and policy directives for plasma protein products. This assessment should take place by the provincial Transfusion Medicine Advisory Group, in consultation with transfusion medicine directors, supported by the Provincial Blood Coordinating Office.

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**Recommendation 31: Diabetes Management Program**

In view of the projected major cost increases in diabetes care, a clinical impact study between Valley Medical Laboratories and the Ministry of Health should be considered, to validate improvement in cost-sensitive end points (ER visits, hospital days, proximity to targeted diabetic values, diabetic complications) as a result of program enrollment. This activity could provide the basis for determining laboratory integration with chronic disease management.

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## 4.7 Human Resources

The eight member Human Resources Working Group included representation from two health authorities, the Ministry of Health, and the UBC Department of Pathology and Laboratory Medicine. As part of its process, the working group reviewed the current status of laboratory physician resource planning in BC and other jurisdictions, together with background literature on this subject.

The working group gave consideration to the process, outcomes and limitations of the Joint Laboratory Medicine Workload Oversight Committee (JLMWOC), a committee formed under the January 21, 2011, Laboratory Workload Agreement, between the Government and the BCMA. As well, the working group gave consideration to the seven year process that led to the three year workload agreement. The working group identified the benefit of building on the planning processes to date and identified a number of opportunities for the LRC's consideration.

### **LRC Human Resources Recommendations:**

**Recommendation 32:** Continue the work of the JLMWOC through the establishment of a committee, the Laboratory Medicine Resource Planning Committee, with expanded JLMWOC Terms of Reference, to include academic pathology resource planning.

**Recommendation 33:** The Laboratory Medicine Resource Planning Committee should build on the successful composition of JLMWOC. The committee could be comprised of a BCMA/Ministry of Health structure with representation from the BCMA/BCALP, UBC Department of Pathology and Laboratory Medicine, Health Authorities and the Ministry of Health.

**Recommendation 34:** Until the new committee is in place, consider extending the term of the JLMWOC so that there is seamless transition to the new committee.

**Recommendation 35:** The primary responsibility of the Laboratory Medicine Resource Planning Committee would be to make recommendations to the Ministry of Health on laboratory physician resource planning for all public hospitals throughout BC, based upon continuously updated workload models for anatomical and clinical pathology and to include the provision of academic pathology services.

**Recommendation 36:** The Terms of Reference for the Laboratory Medicine Resource Planning Committee could include the following:

- Continue to monitor anatomical pathology workloads for all sites, by Health Authority, on an annual basis.

- 
- Evolve the current L4E Version 1 measurement system to a workload model, which will measure those activities currently not captured by the present system.
  - Refine and validate the clinical pathology workload models currently in existence, with a view to utilizing them and monitoring clinical pathology workloads for physician resource planning in these specialties.
  - Make recommendations concerning the laboratory physician resources required to fulfill current and future academic mandates.

**Recommendation 37:** Develop and maintain a pathology and laboratory medicine human resource plan by working with human resources teams, the BC Medical Association, the Government and academic institutions to ensure the on-going supply of skilled laboratory professionals. This function could reside under a provincial agency.



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## 4.8 Technology and Information Sharing Summary

The Technology and Information Sharing Working Group was comprised of a cross section of representatives from the Laboratory Reform Committee, British Columbia Medical Association (BCMA), Health Authorities and the Ministry of Health. Two working group meetings were held to identify and assess opportunities for cost savings related to implementation of technology and information solutions.

Technology and information sharing solutions are considered enablers for the provision of a service. As such, the Technology and Information Sharing Working Group identified and assessed a number of potential opportunities to support the mandate of the LRC. Opportunities were identified, assessed and prioritized with the knowledge of existing technology and information initiatives currently underway within the province e.g. eHealth, Provincial Laboratory Information Solution (PLIS).

### **LRC Technology and Information Sharing Recommendations:**

The LRC recognizes that the Technology and Information Sharing recommendations are dependent on the implementation of the governance and service delivery recommendations.

**Recommendation 38:** Develop a strategic plan for the optimization and rationalization of technology investments to support service delivery integration.

**Recommendation 39:** Establish connectivity between laboratory and patient outcome data to support laboratory utilization management.

**Recommendation 40:** Create an electronic mechanism for information sharing and knowledge transfer at the provincial level that supports:

- Storage of and access to business and clinical policies, practices, education, tools and information.
- Provincial standardization of business/clinical practices and the establishment of provincial business/clinical best business practices.
- Interoperability.

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## 5 THE PLAN

### 5.1 Overview

The time frame for completion of the LRC's mandate did not allow for detailed analysis of each recommendation. Consequently a high level assessment for each recommendation was conducted that focused on the:

- Estimated time to complete implementation.
- Anticipated savings or cost avoidance to be achieved from successful implementation.

Additional work is needed to fully inform the Plan, which includes:

- Conducting detailed cost assessments to verify anticipated cost savings /cost avoidance.
- Conducting detailed cost assessments of inpatient laboratory costs to inform funding decisions.
- Completing detailed business cases for consolidation activities to identify the investment required and confirm anticipated savings.
- Reassessing and prioritizing recommendations based on business case results.
- Identifying, confirming and completing required legislative changes to support implementation and sustainment.
- Developing project charters for the implementation of approved recommendations
- Engaging needed resources and building capacity for development, implementation and sustainment of the Plan.

The successful deployment of the Plan is dependent on the outcome of its review by the respective parties.

### 5.1 Estimated Timeline and Savings

The ability to estimate timelines and anticipated savings for the Plan was constrained by the short time line for the LRC and the lack of specificity of data that could be obtained for assessment during this timeline. As result, high level assessments were made as follows:

- Timelines were categorized based on the ability to achieve the desired outcome and anticipated savings in the:
  - Short Term: Less than one year
  - Mid Term: One to three years
  - Long Term: Greater than three years

- High level cost savings /avoidance estimates were based on expert opinion and considered subject to change upon completion of detailed costing and analysis to ensure net savings or cost avoidance.

Estimated timelines and cost savings are summarized in the following three tables.

It is important to note that realization of estimated cost savings stemming from the implementation of some recommendations may take a few years (eg., quality). Once achieved, annual cost savings are anticipated.

**Table1: Short Term (less than 1 year)**

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Service Delivery and Integration			
	Complete detailed business case analysis for Lower Mainland Service Delivery consolidation of :		
	Virology	See Mid Term	
	Microbiology	See Mid Term	
	Tumor markers	See Mid Term	
	Trace Elements	See Mid Term	
	Drug Screen Confirmation Testing	See Mid Term	
	Stone Analysis and Serum Free Light Chains	See Mid Term	
	Hormone Assays	See Mid Term	
	Complex Hematology Tests	See Mid Term	
	Flow cytometry	See Mid Term	
	Cytogenetics and Genetics / Molecular Diagnostics	See Mid Term	
	Histopathology Processing	(See Long Term)	
	Implement MADLI-TOF Technology	\$ 350,000	
	Re-evaluate the role of public health laboratories		
	Close RIA Laboratory at St Paul's	\$ 120,000	

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Utilization, Costing and Funding			
	Establish a Provincial Utilization Management Group	Future savings TBD	Future savings TBD
	Complete detailed costing and analysis of inpatient laboratory services	Future savings TBD	
	Develop and adopt consolidation assessment methodology		
	Set provincial standards to ensure access if appropriate, sustainable and evidenced based	Future savings TBD	Future savings TBD
Outpatient			
	Implement changes to the Laboratory Fee Schedule for Vitamin D, PSA, Barbiturates, PCP and LSD		\$ 4,600,000
	Re-cost Drugs of Abuse Primary Base Fee		\$ 670,000
	Establish a culpable utilization mechanism for ordering physicians and guidelines adherence		\$ 5,000,000
	Implement electronic Laboratory Results / Report Distribution		
Quality			
	Create a Provincial Laboratory Quality Council (~3% system savings costs estimated @ \$18M)	See Long Term	See Long Term
	Adopt the International Standard Association Quality standard 15189 (ISO 15189) upon approval of the Provincial Laboratory Quality Council	See Long Term	See Long Term
Clinical Service Guideline			
	Validate cost savings/avoidance for a Diabetes Management Program for BC	Future savings TBD	Future savings TBD
Human Resources			
	Continue JLMWOC until a new committee is established		
	Expand the Terms of Reference for the		

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
	JLMWOC		
	Establish the Laboratory Medicine Resource Planning Committee		
Technology and Information Sharing			
	To be informed by Governance and Service Requirements	See Long Term	See Long Term
	Total Short Term Estimated Savings	\$ 470,000	\$ 10,270,000

**Table 2: Mid Term (1 – 3 years)**

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Service Delivery and Integration			
	Complete consolidation of:		
	Microbiology ( FH)	\$ 1,000,000	
	Virology (LMC)	\$ 1,500,000	
	Microbiology (LMC)	\$1,500,000	
	Tumour Markers	\$ 250,000	
	Trace Elements	\$ 250,000	
	Drug screen confirmation testing (LMC)	Future savings TBD	
	Stone analysis	Future savings TBD	
	Serum Free Light Chains (LMC)	Future savings RBD	
	Hormone Assays select (LMC select provincial)	Future savings TBD	
	Complex Hematology Tests (LMC)	Future savings TBD	
	Flow cytometry	\$ 250,000	
	Cytogenetics (LMC)	\$ 250,000	

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Utilization			
	TBD	TBD	TBD
Outpatient			
	Implement fee for H. pylori serology testing		\$ 500,000
	Re-cost Laboratory Fees for:		
	Lead, Zinc, Selenium, Catecholamine, Metanephrine		\$ 500,000
	Serum Protein Electrophoresis		\$ 500,000
	Urine Drugs of Abuse Confirmation		\$ 500,000
	Implement electronic non Laboratory Reports Distribution	\$ 4,000,000	
	Implement electronic Laboratory distribution	\$ 1,000,000	\$ 1,000,000
	Implement Electronic Order Entry	Future savings TBD	\$ 8,000,000
Quality			
	Move to an IOS 15189 compliant accreditation program	See Long Term	See Long Term
Clinical Guidance			
	Initiate Diabetes Management Programs	See Long Term	See Long Term
Human Resources			
	TBD	TBD	TBD
Technology and Information Sharing			
	To be informed by Governance and Service Requirements	See Long Term	See Long Term
	Total Mid Term Estimated Savings	\$ 10,000,000	\$ 11,000,000

**Table 3: Long Term (greater than 3 years)**

Area	Recommendation (based on timeline for implementation)	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Service Delivery and Integration			
	Complete consolidation of LMC Histopathology Processing	Future savings TBD	
Utilization, Costing and Funding			
	TBD	Future savings TBD	Future savings TBD
Outpatient			
	Implement CPOE/ Decision Support / Ordering guidelines in concert with utilization management	Future savings TBD	Future savings TBD
Quality			
	Implement quality changes resulting in annual savings	\$ 9,000,000	\$ 9,000,000
Clinical Guidance			
	Antimicrobial Stewardship	\$ 9,555,000	Future savings TBD
	Blood and Blood Product Stewardship (@ \$3.8 M for Blood ; \$2.29 M for IVIG ). (This is a conservative estimate)	\$6,090,000	
	Diabetes Management	Future savings TBD	Future savings TBD
Human Resources			
	TBD	TBD	TBD
Technology and Information Sharing			
	TBD	Savings linked to service delivery , quality, utilization management, outpatient etc.	Savings linked to service delivery , quality, utilization management, outpatient etc.
	Total Long Term Estimated Savings	\$ 24,645,000	\$ 9,000,000

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**Table 4: Savings Summary<sup>3</sup>**

Timeframe	Estimated In-patient Cost Savings	Estimated Out-patient Cost Savings
Less than 1 year	\$470,000	\$10,270,000
1 – 3 years	\$10,000,000	\$11,000,000
Greater than 3 years	\$24,645,000	\$9,000,000
<b>Total</b>	<b>\$35,115,000</b>	<b>\$30,270,000</b>

## 5.2 Assessment

This section provides a consolidated summary of key benefits and challenges for the Plan.

### 5.2.1 Benefits

Key benefits anticipated:

- Enhanced service quality, efficiency and patient safety at the laboratory and system level through reduced redundancy (e.g. consolidation, duplicate test orders, error correction)
- Improved service delivery through standardization, adoption of best practices and quicker access to information (e.g. result distribution)
- Increased accountability and fiscal awareness at the test ordering level
- National recognition of each laboratory's accreditation and ability to benchmark against an internationally recognised medical laboratory standard
- Ability to re-direct health care dollars elsewhere due to laboratory and system cost savings / avoidance
- Confirmation of current system costing and funding requirements.
- Achievement of Triple Aim concepts
- Increased job satisfaction and awareness of laboratory services
- Informed decision making based on data, evidence and analysis

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<sup>3</sup> Does not included ongoing annual savings



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### **5.2.2 Assumptions**

Key assumptions are:

- Identified pre-requisites are in place (e.g. a robust transportation network)
- An accountability mechanism for health care practitioners that accommodates practice variations such as the volume and complexity of patients seen, can be implemented
- Technology to support implementation is available
- Existing technology can be leveraged
- Key clinical, professional and financial performance indicators and metrics are established to measure the impact of consolidation
- Quality will improve after recommendations are implemented
- Effective governance models are in place to support transformation

### **5.2.3 Dependencies**

Key dependencies are:

- Adequate resources to implement recommendations are available
- Required data are available to support analysis (e.g. business cases, physician ordering practices)
- The adoption of electronic solutions increases
- Collaboration between medical and administrative leadership is achieved
- Support and buy in of other agencies and stakeholders is in place
- A change management strategy is developed
- Quality is maintained during implementation of the Plan
- The integrity of laboratory medicine as a medical practice is maintained

### **5.2.4 Constraints**

Key constraints are:

- Current legislation – legislative changes may be required
- The availability of adequate resources to implement the recommendations
- Resources to support detailed analysis and implementation
- Time
- System inflexibility / entrenched practices

- 
- Lack of consensus on best practices
  - Geographic

### **5.2.5 Barriers**

Key barriers are:

- Lack of stakeholder buy-in and mistrust among stakeholders
- Lack of support at all levels (financial, administrative and medical)

### **5.2.6 Risks**

Key risks are:

- Anticipated cost savings are not achieved
- The scope and / or cost for information technology supported recommendations are susceptible to expansion
- Inability to complete implementation in a timely way
- Unintended consequences (e.g. sample loss or damage during transportation)
- Alienation of stakeholders
- Loss of experienced human resources

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## **6 APPENDICES**

- 6.1 Appendix A – Laboratory Reform Committee Terms of Reference**
- 6.2 Appendix B – Laboratory Reform Committee Framework**
- 6.3 Appendix C – Laboratory Reform Committee Working Group Framework**
- 6.4 Appendix D – Government Governance Terms of Reference**
- 6.5 Appendix E – BC Medical Association Governance Terms of Reference**
- 6.6 Appendix F – Service Delivery and Integration Working Group Report**
  - 6.6.1 Histology Processing Working Group Report**
- 6.7 Appendix G – Utilizations, costing and Funding Working Group Report**
- 6.8 Appendix H – Outpatient Working Group Report**
- 6.9 Appendix I – Quality Working Group Report**
- 6.10 Appendix J – Clinical Guidance Working Group Report**
- 6.11 Appendix K – Technology and Information Sharing Working Group Report**
- 6.12 Appendix L – Human Resource Working Group Report**

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**Appendix A**  
**Laboratory Reform Committee**  
**Terms of Reference**

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Date: August 1, 2012

## Laboratory Reform Committee (LRC)

### Terms of Reference

#### 1.0 PURPOSE AND OBJECTIVES

- 1.1 The mandate of the Laboratory Reform Committee ("LRC") is to develop a plan, to be submitted to the Government and the BCMA, by no later than February 1, 2013, to:
  - a) achieve additional lab savings from outpatient lab services; and
  - b) achieve a more efficient integration of inpatient laboratory services that may include the following:
    - o a single operating entity and governance structure to manage operations in the Vancouver and Fraser regions including single medical leadership;
    - o a provincial lab technology and test assessment process;
    - o ability to transition services and associated funding from the MSC payment schedule to an alternative payment arrangement and vice versa;
    - o a provincial plan for physician human resources;
    - o a single quality framework;
    - o the integration of actual services and facilities; and
    - o a timeline for achievement of the previously identified \$18 million in annual savings.

#### 2.0 Consensus

- 2.1 The Laboratory Reform Committee will endeavor to make all recommendations by consensus, which means unanimous approval of the recommendation by the members of the Committee. Failing a consensus the Laboratory Reform Committee may make more than one set of recommendations on a particular topic.

#### 3.0 Structure

##### 3.1 Membership

The Committee will be comprised of eight (8) members: four (4) members appointed by the Government (Ministry of Health) and four (4) members appointed by the BCMA.

3.2 Chair

The Committee will be co-chaired by one Government member and one BCMA member. The co-chairs will chair meetings on an alternate basis.

3.3 Secretariat

The Government will provide secretariat support to the Committee. The secretariat will be responsible for booking meeting space; distributing agendas, minutes and related information in a timely manner; taking minutes; and, maintaining a work plan and a centralized repository of all committee materials.

3.4 Support Staff

The Government and the BCMA may provide up to three (3) support staff each to attend the meetings. The number of support staff can be increased upon agreement of the parties.

**4.0 Meetings**

4.1 Frequency

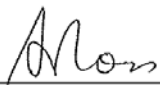
Meetings will be held on a monthly basis until February 1, 2013. Additional meetings may be held on agreement of the co-chairs. Meetings may be held in person or by teleconference.

**5.0 Funding**

Each of the parties will be responsible for any costs related to their members' participation on the committee.

**6.0 Term**

The Laboratory Reform Committee's term is to February 1, 2013.

  
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Signed on behalf of the BCMA by:  
SHELLEY ROSS, PRESIDENT

  
\_\_\_\_\_

Signed on behalf of the Government by:  
NICOLA MANNING, ADM

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**Appendix B**  
**Laboratory Reform Committee**  
**Framework**

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# Laboratory Reform Committee

## Framework

**Date: Jan 30, 2013**  
**Version: V 0.9**



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## SCOPE OF DOCUMENT

This document provides the framework for the development of a plan (the “Plan”) related to discussions held during negotiations of the 2012 Physician Master Agreement, for achieving laboratory reform in BC.

This document is considered a **LIVING** document that will be expanded and refined as the Plan is developed.

For more information please contact:

Laboratory, Diagnostic and Blood Services Branch,  
Medical Services and Health Human Resources Division,  
Ministry of Health  
6<sup>th</sup> Floor, 1483 Douglas Street  
Victoria, British Columbia  
Canada  
V8W 3K4

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- 13. RISK MANAGEMENT**
- 14. DOCUMENT CONTROL**

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## 1 BACKGROUND

The Laboratory Reform Committee (“LRC”) was established in response to the outcomes of negotiations for the 2012 Physician Master Agreement (“PMA”). The mandate of the LRC is to develop a plan, to be submitted to the Government and the BCMA, by no later than February 1, 2013 to:

- a) achieve additional laboratory savings<sup>4</sup> from outpatient laboratory services; and
- b) achieve a more efficient integration of inpatient laboratory services that may include the following:
  - I. a single operating entity and governance structure to manage operations in the Vancouver and Fraser regions including single medical leadership;
  - II. a provincial laboratory technology and test assessment process;
  - III. ability to transition services and associated funding from the MSC payment schedule to an alternative payment arrangement and vice versa;
  - IV. a provincial plan for physician human resources;
  - V. a single quality framework;
  - VI. the integration of actual services and facilities; and
  - VII. a timeline for achievement of the previously identified \$18 million in annual savings.

## 2 GUIDING PRINCIPLES

The following guiding principles have been identified to guide the development of the Plan:

- An increase in efficiencies across the laboratory system that are sustainable, patient focused, affordable and accountable within a high quality system must be achieved.
- All debate is without prejudice.
- All suggestions will be considered.
- Quality and access within the system must be maintained or exceeded.
- Professional autonomy, as defined by the World Medical Association<sup>5</sup>, must be preserved.
- Stakeholder consultation may be required.
- The Triple Aim<sup>6</sup> approach will be leveraged where feasible.

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<sup>4</sup> The Government has a target of \$25 million in savings. The BCMA does not have a specific savings target however there is support to gain efficiencies and savings.

<sup>5</sup> <http://www.wma.net/en/10home/index.html>

<sup>6</sup> “Triple Aim Principles” means the simultaneous pursuit of positively impacting the experience of the individual receiving healthcare services and the healthcare professional providing those services, the health of populations, and healthcare spending.

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### 3 METHODOLOGY

A collaborative and consultative process will be established and utilized throughout the development of the Plan. Every attempt will be made to reach consensus on recommendations for the Plan. In the event that consensus cannot be reached each party reserves the right to submit separate recommendations.

Information required to inform the Plan will be determined by the committee. Sources of information to be assessed may include the 2012 Secor Report, the KMPG Report, Lower Mainland Consolidation documents, the Provincial Laboratory Coordinating Office (PLCO) archives and others.

The processes required to gather additional information, analyze information and build the Plan will be determined by the committee. Processes may include:

- Virtual working group meetings (regularly scheduled e.g. weekly)
- Face to face workshops(half, full or multiple days)
- Surveys (individual, group, electronic, telephone etc.)

The Plan could include, but not be limited to, the following key areas:

- Governance: review of governance models and impact of consolidation
- Quality: assessment of a comprehensive quality assurance and monitoring program to ensure that the high quality of service is maintained
- Costs: a review of interprovincial factors and individual tests and protocols where there are opportunities for significant cost reductions
- Funding Models: assessment of the funding and models for inpatient and outpatient services
- Service Delivery: review of tests performed, where they are performed and opportunities for integration of services and facilities
- Utilization: review of changes in utilization and expenditures over time and factors that influence the changes
- Human Resources (HR): linkage with the development of clinical and academic workload models
- Technology Assessment: review of current technology in place and potential new technology to increase efficiencies
- Implementation strategies: assessment of recommended changes to be completed over the short-, medium- and long-term with associated impacts

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## 4 STAKEHOLDERS

A number of stakeholder groups will be impacted by, involved and / or interested in the development of the Plan. Stakeholder groups may include:

- Ministry of Health (MOH)
- British Columbia Medical Association (BCMA)
- British Columbia Association of Laboratory Pathologists (BCALP)
- Health Authorities
- Public Laboratories
- Private Laboratories
- Physicians (GPs, Specialists)
- Patients
- College of Physicians and Surgeons of BC
- Diagnostic Accreditation program (DAP)
- University of British Columbia (UBC), Department of Pathology and Laboratory Medicine
- British Columbian Institute of Technology ( BCIT), Medical Laboratory Program
- Health Sciences Association of BC
- Hospital Employees Union
- BC Government Employees Union
- Health Employers Association of BC
- British Columbia Society of Laboratory Science (BCSLs)

Representatives from the stakeholder groups may be engaged during the planning process.

## 5 FINANCIAL

The BCMA and the Medical Services and Health Human Resources Division (MSHHRD) will be responsible for the costs associated with their respective members' participation. The MSHHRD Laboratory, Diagnostics and Blood Services Branch (LDBSB) will provide secretariat support.

## 6 DECISION MAKING

Decisions for recommendations will be made by consensus. In the event that consensus cannot be reached each party reserves the right to submit separate recommendations.

Attendance of 50% (2 members) from each party is required for quorum and decision making.

All effort will be made to use robust and consistent cost accounting methods when assessing and / or comparing recommendations.

## 7 COMMUNICATION

The following formal communication channels will be established:

1. Regular LRC meetings (in person and / or conference call).
2. Working group meetings and / or stakeholder consultation through teleconference, in person meetings and / or surveys as required.
3. Ad Hoc meetings as required.

## 8 KEY MILESTONES, DELIVERABLES AND ACTIVITIES

Type	Activity	Deliverable	Target Date
Milestone #1	Kick off meeting held		August 2, 2012
Deliverable #1	First draft of framework completed		August 17, 2012
	Draft framework reviewed by BCMA staff representatives		September 14, 2012
	Framework Revised	Framework document v1.0	Sept 20, 2012
Milestone #2	Framework v1.0 Approved by LRC  Draft initial list of savings options for analysis and development by working groups		Sept 25, 2012
Milestone #3	Stakeholder engagement requirements, participants and processes for working groups confirmed		October 9, 2012
Deliverable #2	Working group recommendations consolidated	Consolidated recommendations document v 1.0	Dec 7, 2012
Milestone#4	Consolidated recommendations reviewed by LRC		Dec 15, 2012
Deliverable #3	Plan developed	Draft "Plan" document	Jan 11, 2013
Milestone #5	Plan Finalized		Jan 31, 2013
Deliverable #4	Plan submitted to Government and BCMA	The "Plan"	Feb1, 2013

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## 9 CONSTRAINTS

The following are the key constraints for the development of the Plan:

- short timeline
- no funding to support the planning process

## 10 BARRIERS

Barriers to achieving a Plan include:

- inability to identify and engage the right people
- lack of time to engage and consult with stakeholders
- laboratory reform fatigue from previous initiatives

## 11 DEPENDENCIES

Key dependencies related to the development of the Plan include the:

- availability of resources to develop the plan
- ability to gather and assess required information in a timely manner

## 12 ASSUMPTIONS

The assumptions related to the development of the Plan are:

- all suggestions will be considered
- solutions that fall outside current legislation and available funding will be identified and considered
- recommendations:
  - will include an assessment of the pros and cons
  - be prioritized and identify the timelines for the implementation of proposed changes
  - that will have upstream or downstream impacts will be considered e.g. antibiotic stewardship
- cost saving related to work in progress such as Vitamin D may be applied towards cost savings analysis

## 13 RISK MANAGEMENT METHODOLOGY

Key risks identified for the development of the Plan are as follows:

Risk	Impact	Impact Assessment Low (L), Medium (M), High (High)	Likelihood Assessment Low (L), Medium (M), High (High)	Mitigation Strategy
Competing Priorities for LRC members	Quality and / or breadth of the Plan will be compromised.  Lack of stakeholder “buy in” for the Plan.	H	L	Establish a regular meeting schedule for the LRC.  Confirm commitment of LRC participants.  Prioritize work plan.
Lack of participation on working groups	Quality and / or breadth of the Plan will be compromised.  Lack of or no stakeholder “buy in” for the Plan.	M	M	Identify and engage key champions and stakeholders early in the process.  Identify and establish engagement processes and schedules ASAP.
Funding required to implement the Plan	Achievement of financial targets / outcomes may be protracted.	M	M	Prioritize recommendations.

## 14 DOCUMENT CONTROL

Date	Author	Version	Change Reference
Aug 9, 2012	J. Philley	V 0.1	Initial draft
Aug 15, 16, 17, 2012	J. Philley	V 0.2 V 0.3 V 0.4	Incorporation of feedback from Jane Crickmore.
Sept 20, 2012	J. Philley	V0.5	Incorporation of feedback from BCMA and MOH LRC representatives
Sept. 26, 2012	J. Philley	V0.6	Changes stemming from the Sept 25, 2012 LRC meeting
Nov 16, 2012	J. Philley	V0.7 – V0.8	Changes stemming from October 30, 2012 LRC meeting
Jan 30, 2013	J. Philley	V0.9	Formatted for inclusion In LRC Report Feb 1, 2013



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**Appendix C**

**Laboratory Reform Committee**

**Working Group Framework**

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# Laboratory Reform Committee

## Working Group Framework

Date: January 3, 2013  
Version: V 0.9

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## SCOPE OF DOCUMENT

This document provides the framework for the 2012 Laboratory Reform Committee (LRC) working groups assisting committee in the development of a plan (the “Plan”); related to discussions held during negotiations of the 2012 Physician Master Agreement, for achieving laboratory reform in BC.

For more information please contact:

Laboratory, Diagnostic and Blood Services Branch,  
Medical Services and Health Human Resources Division,  
Ministry of Health  
6<sup>th</sup> Floor, 1483 Douglas Street  
Victoria, British Columbia  
Canada  
V8W 3K4

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**6. APPENDIX C - HIGH LEVEL BUSINESS CASE**

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## 1 BACKGROUND

The Laboratory Reform Committee (“LRC”) was established in response to the outcomes of negotiations for the 2012 Physician Master Agreement (“PMA”). The mandate of the LRC is to develop a plan, to be submitted to the Government and the BCMA, by no later than February 1, 2013 to:

- achieve additional laboratory savings<sup>7</sup> from outpatient laboratory services; and
- achieve a more efficient integration of inpatient laboratory services that may include the following:
  - a single operating entity and governance structure to manage operations in the Vancouver and Fraser regions including single medical leadership;
  - a provincial laboratory technology and test assessment process;
  - ability to transition services and associated funding from the MSC payment schedule to an alternative payment arrangement and vice versa;
  - a provincial plan for physician human resources;
  - a single quality framework;
  - the integration of actual services and facilities; and
  - a timeline for achievement of the previously identified \$18 million in annual savings.

The following guiding principles have been identified by the LRC to guide the development of the Plan:

- An increase in efficiencies across the laboratory system that are sustainable, patient focused, affordable and accountable within a high quality system must be achieved.
- All debate is without prejudice.
- All suggestions will be considered.
- Quality and access within the system must be maintained or exceeded.
- Professional autonomy must be preserved as defined by World Medical Association (WMA)<sup>8</sup>.
- Stakeholder consultation may be required.
- The Triple Aim<sup>9</sup> approach will be leveraged where feasible.

The LRC has identified seven key areas of focus for the Plan. They are:

1. Governance and Accountability
2. Utilization, Costing and Funding
3. Technology and Information Sharing
4. Quality Framework
5. Service Delivery and Integration

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<sup>7</sup> The Government has a target of \$25 million in savings. The BCMA does not have a specific savings target however there is support to gain efficiencies and savings.

<sup>8</sup> <http://www.wma.net/en/10home/index.html>

<sup>9</sup> “Triple Aim Principles” means the simultaneous pursuit of positively impacting the experience of the individual receiving healthcare services and the healthcare professional providing those services, the health of populations, and healthcare spending.

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6. Human Resources (HR)
  7. Clinical Service Guidance (e.g. Antimicrobial Stewardship, Infection Control)

## 2 WORKING GROUPS

The need for stakeholder participation in working groups has been identified for select key areas of focus. Stakeholders will be recruited from the list of key stakeholders, noted in Appendix A, to participate in one or more of the following six working groups. The following also provides suggested focus for each working group; however, this should not limit the discussions.

The six working groups are:

1. Utilization, Costing and Funding
  - review of changes in utilization and expenditures over time and factors that influence the change
  - a review of interprovincial factors and individual tests and protocols where there are opportunities for significant cost reductions
  - assessment of funding and funding models for inpatient and outpatient services
2. Technology and Information Sharing
  - review of current technology and information in place and potential new technology and information sharing to increase efficiencies
3. Quality Framework
  - assessment of a comprehensive quality assurance and monitoring program to ensure that the high quality of service is maintained
4. Service Delivery and Integration
  - review of tests performed, where they are performed and opportunities for integration of services and facilities
5. Clinical Services Guidance
  - Assessment of economic models for measuring the upstream and / or downstream impacts of laboratory services
6. Human Resources (HR)
  - Build upon the work of the Joint Medical Laboratory Workload Oversight Committee (JMLWOC)
7. Outpatient

The working groups will be responsible for identifying, qualifying and quantifying opportunities that could inform the development of the Plan and achievement of the objectives of the Plan. Each working group should conduct an assessment the short-, medium- and long-term timelines of opportunities and the associated impacts. Each proposed opportunity identified must be documented on the “Opportunities Template” noted in Appendix B.

Half day or all day sessions will be scheduled for each working group to be held between October 15 and 26. Sessions will be lead by a member of the LRC and conducted in person and / or virtually as required. Follow up sessions may be required.

Responsibilities of the working group members are to:

- be available to actively participate and provide opportunities for consideration
- work openly and collaboratively
- obtain and provide information and / or data as required to support proposed opportunities in a timely fashion

Responsibilities of working group leads are to:

- engage working group participants
- ensure all opportunities identified are fully documented
- summarize and present the final recommendations report at the November 14, 2012 meeting of the LRC

Decision making for working groups will be by consensus. In the event that consensus cannot be reached decision making will rest with the working group lead.

Compensation for stakeholder participation will be borne by organization the stakeholder represents.

### Working Group Membership

Working Group	Members
Utilization, Costing and Funding	Dr. Chris Sherlock, BCMA(Lead) Dr. Arun Garg, LMC-FH Pat Melia, BMCA Dr. Frances Rosenberg, BCALP Jeremy Higgs, MOH Ian Dube, MOH Joanne Philley, MOH
Technology and Information Sharing	Mal Griffin, IHA (Lead) Dr. Gordon Hoag, BCMA Pat Melia, BCMA Ed Ratnarajah, LMC Johanne Whalley, NHA Jeremy Higgs, MOH Joanne Philley, MOH Wendy Johnson, MOH Dr. Richard Cleve, LMC-FH Raph Lim, LMC
Quality	Dr. Debbie Griswold, PHC (Lead) Dr. Robert Coupland, LMC – VCH Dr. Michael Noble, POLQM Deborah Cain, VIHA Anita Kwong, LMC - VCH John Andruschak, LMC Ken Winnig, NHA Joanne Philley, MOH

Service Delivery and Integration	<p>Dr. Chris Bellamy, BCMA (Lead)  Dr. Brian Berry, VIHA  Dr. John Galbraith, VIHA  Dr. Robert Coupland, LMC-VCH  Dr. Amir, Rahemtulla, LMC-BCCA  Dr. Wes Schreiber, LMC-VCH/UBC  Dr Jim Cupples LMC-FH  John Andruschak, LMC  Mick Maguire, PHSA  Joanne Philley, MOH</p>
Histology Processing Sub Working Group	<p>Dr. Jim Cupples LMC-FH , Lead  Dr. Blake Gilks, LMC-VCH  Dr. Doug Filipenko PHC  Joanne Philley, MOH  Tom Thompson, LMC - BCCA  John O'Connell, LMC - FH</p>
Clinical Services Guidance	<p>Dr. Chris Sherlock, BCMA (Lead)  Dr. John Galbraith, VIHA  Dr. Edith Blundel-Hill, IHA  Dr. Jim Hutchison  Pat Melia, BCMA  Mick Maguire, PHSA  Joanne Philley, MOH</p>
Human Resources (HR)	<p>Dr. Chris Bellamy, BCMA, (Lead)  Dr. Michael Allard, UBC  Dr Lawrence Haley, LMC-FH  Dr. Lawrence Haley, BCMA &amp; FHA  Dr. Gordon Hoag, BCMA &amp; VIHA  Dr. Brian Berry, VIHA  Dr. Jim Cupples, BCMA &amp; LMC – FH  Jane Crickmore, MOH  Joanne Philley, MOH</p>
Outpatient	<p>Dr. Jim Cupples, BCMA (Lead)  Dr. Frances Rosenberg, BCALP  Dr. Mike Moss, LifeLabs  Pat Melia, BCMA  Ian Dube, MOH  Jeremy Higgs, MOH  Joanne Philley, MOH</p>
Governance	<p>Dr. Chris Bellamy, BCMA (Co Lead)  Dr. Chris Sherlock, BCMA  Dr. Gordon Hoag, BCMA  Dr. Jim Cupples, BCMA LMC-FH  Dr. Arun Garg, FHA  Dr. Debbie Griswold, PHC  Pat Melia, BCMA  Cathy Cordell, BCMA  Nichola Manning, MOH (Co Lead)  John Andruschak, LMC  Mal Griffin, IHA  Jane Crickmore, MOH  Jeremy Higgs, MOH  Joanne Philley, MOH  Kirk Eaton, MOH</p>



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### 3 DOCUMENT CONTROL

Date	Author	Version	Change Reference
Sept 28, 2012	J. Philley	V 0.1	Initial draft
Oct 9, 2012	J.Philley	V 0.2	Incorporation of BMCA feedback
Oct 15, 2012	J.Philley	V 0.3	Incorporation of LMC feedback
Oct 16 - 19 2012	J. Philley	V 0.4 – V0.7	Working group updates
Nov 1, 2012	J. Philley	V0 .8	Working group membership updates
Jan 3, 2013	J. Philley	V0.9	Working group membership updates

### 4 APPENDIX A - STAKEHOLDER GROUPS

Stakeholder groups that will be impacted by, involved and / or interested in the development of the Plan include:

- Ministry of Health (MOH)
- British Columbia Medical Association (BCMA)
- British Columbia Association of Laboratory Pathologists ( BCALP)
- Health Authorities
- Public Laboratories
- Private Laboratories
- Physicians (GPs, Specialists)
- Patients
- College of Physicians and Surgeons of BC
- Diagnostic Accreditation program (DAP)
- University of British Columbia (UBC), Department of Pathology and Laboratory Medicine
- British Columbian Institute of Technology (BCIT), Medical Laboratory Program
- Health Sciences Association of BC
- Hospital Employees Union
- BC Government Employees Union
- Health Employers Association of BC
- British Columbia Society of Medical Laboratory Technology (BCMLS)

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## 5 APPENDIX B - WORKING GROUP OPPORTUNITY TEMPLATE

### Date and Author

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### Title (5 words or less)

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### Description (Summarize the opportunity in 1 – 3 paragraphs)

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### Anticipated Benefits (List all qualitative and quantitative benefits)

Description	Benefit (e.g. quality , cost savings, cost avoidance)	Type (Qualitative or Quantitative)	Anticipated Savings <sup>10</sup>

### Assumptions (list key assumptions)

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### Dependencies (list key dependencies)

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### Constraints (list key constraints)

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<sup>10</sup> As determined through analysis using business case template noted in Appendix C

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**Barriers** (list key barriers)

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**Risks** (List and assess key risks)

<b>Risk</b>	<b>Impact</b>	<b>Impact Assessment</b> Low (L), Medium (M), High (High)	<b>Likelihood Assessment</b> Low (L), Medium (M), High (High)	<b>Mitigation Strategy</b>

**High Level Plan** (Describe a high level plan for implementing the opportunity and key milestones, deliverables and activities)

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Key Milestones (M), Deliverables (D) and Activities (A)

<b>Type</b>	<b>Activity</b>	<b>Deliverable</b>	<b>Target Date</b>

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**Appendix D**  
**Government**  
**Governance Terms of Reference**

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## **B.C. PATHOLOGY AND LABORATORY MEDICINE SERVICES**

### **Terms of Reference**

Laboratory medicine is a critical medical service in the patient care pathway affecting seventy to eighty percent of all medical decisions by providing diagnostic and treatment insight into the cause, nature and effects of the disease life cycle. Physicians and other health care providers advocate for a medical laboratory system that provides high quality and timely laboratory medicine consultations. The laboratory medicine system must be sustainable in terms of efficiency, cost-effectiveness, quality and in terms of the value generated for patients and taxpayers from their investment in British Columbia's laboratory system.

A provincial agency, BC Pathology and Laboratory Medicine Services (BC LAB), will be established to ensure a sustainable laboratory medicine system and provide strategic oversight and direction to laboratory service delivery throughout British Columbia. The provincial agency will be responsible for funding hospital and community-based pathology and laboratory medicine services in the province. To achieve its full mandate, it is anticipated that legislative change may be required and new legislation introduced to support the provincial agency.

The provincial agency will be responsible for all publicly funded laboratory medicine testing services in the province. On an interim basis, funding for laboratory medicine services will be provided directly to the provincial agency for the provision of laboratory medicine services currently funded through the health authorities' global budgets. Though further discussions on expenditure integration will be pursued, outpatient funding would continue to be accessed through the Medical Services Plan under the auspices of the Medical Services Commission.

These terms of reference include statements on: provincial and regional governance; guiding principles; the structure and linkages for the agency; and, service level agreement requirements.

## **MANDATE**

### **Provincial Governance**

The role of BC LAB is to provide service coordination and integration for British Columbia's pathology and laboratory medicine in BC by determining and assessing services that best meet patients' needs and outcomes, and ensuring fiscal responsibility across all regions of the province.

BC LAB is responsible for providing direction and provincial leadership by:

- a. Establishing a provincial vision and strategic plan for BC pathology and laboratory medicine services in British Columbia;

- 
- b. Developing an annual operating and service delivery plan based on a budget that is determined on an annual basis. The annual plan outlines the priorities and resource allocations to meet the goals and objectives of the Ministry of Health, the Health Authorities, and BC Pathology and Laboratory Medicine Services.
  - c. Monitoring and evaluating laboratory utilization including ordering practices, expenditures and performance indicators to ensure BC pathology and laboratory medicine laboratories are achieving quality and safety goals, meeting provider and patient expectations, and supporting the BC LAB mandate and principles.
  - d. Setting priorities and coordinating the informatics plan, in alignment with the provincial eHealth initiative, for an integrated and interoperable provincial laboratory information system environment which includes laboratory diagnostic systems, data repositories, and associated analytical tools.
  - e. Setting provincial standards to ensure access for health care practitioners and patients to laboratory medicine services and tests is appropriate, sustainable, and evidence-based with proven patient outcomes and other benefits.
  - f. Harmonizing clinical practice guidelines and protocols, utilizing current evidence and best practices to improve the quality of patient care;
  - g. Establishing a Provincial Quality Framework that includes clinical, professional and financial key performance indicators and participating in all provincial quality initiatives;
  - h. Developing and maintaining a pathology and laboratory medicine human resource plan by working with human resource teams, the BC Medical Association, the Government, and academic institutions to ensure on-going supply of skilled laboratory professionals;
  - i. Developing and maintaining a capital plan to address the service, equipment replacement and infrastructure needs for BC pathology and laboratory medicine services. BC LAB will collaborate with the Health Authorities and laboratory service providers to secure the required resources.

### **Regional Governance**

Geographic regions are served by a regional laboratory structure in Vancouver Island Health Authority (VIHA), Lower Mainland Laboratory (LM Labs – Fraser, Vancouver Coastal (including Providence), Provincial Health Services), Northern Health Authority (NHA) and Interior Health Authority (IHA). The regional responsibilities are generally accepted to include:

- 
- a. Having an overall laboratory services plan in place within available resources in order to respond to the functional programs within the region;
  - b. Providing programs and services to support the plan;
  - c. Providing the range of services as agreed to and as outlined in the annual funding letter from BC LAB (the Funder);
  - d. Where substantive increases in volumes or new technologies require significant new investment in capital equipment or infrastructure, the parties will collaborate to secure required resources;
  - e. Adhering to provincial and national standards of diagnostic quality programs;
  - f. Having regional quality management systems established that meet the requirements of the health authority and provincial accreditation program.

### Guiding Principles

- Accountability – support for a flexible system that adapts to a single source of accountability for governance of the laboratory medicine system
- Applicability – BC LAB recommendations to be applied provincially
- Autonomy – establishment of an independent agency and acknowledgement of medical leadership for the medical practice
- Best practices – as applied to medical practice and analytical support for business cases and decision making
- Effectiveness – the right test at the right place at the right time with the right medical consultation
- Medical Leadership – to guide clinical practice
- Quality – a formal structure for quality management including quality improvement and risk management for the best patient care.
- Sustainability – having the resources available to support medical practice for patients of the BC healthcare system
- Transparent decision-making processes
- Trust – build and sustain trust between partners
- Value for money
- Visionary - promote a system of coordinated excellence, collaboration, innovation and system optimization

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## Provincial Medical Advisory Panel on BC Laboratory Medicine Services

The Provincial Medical Advisory Panel on BC Laboratory Medicine Services is a standing expert advisory committee, comprised of physician leaders in laboratory medicine in BC. It is responsible to and funded by BC LAB and reports to BC LAB through the senior leadership of the agency. Its mandate is to provide medical and scientific expert advice and recommendations to BC LAB on the full scope of services, technology and test assessment, and best practices.

The Provincial Medical Advisory Panel may call upon the expertise of laboratory system leaders in laboratory sciences and in other relevant disciplines as required.

## BC LAB Structure

BC LAB is responsible for providing direction on, among other things, the cost accounting, funding methodology, and the provision of funding for pathology and laboratory medicine services; service capacity; new technology/test platforms; quality assurance; quality improvement; provincial capital equipment planning and funding under a joint provincial strategy; and generally to provide more transparency between the funder and the provider and ensuring equity across all Health Authorities.

- Senior leadership
  - Medical leadership
  - Administrative leadership
- Agency Secretariat to support agency operations and provide analytical support
  - Departments
    - Finance
    - Decision Support (e.g. utilization and expenditure management)
    - Quality
    - Technology Assessment
    - Service Capacity and Delivery
    - Corporate
    - Human Resources
- Provincial Medical Advisory Panel on BC Lab Services

## Interactions and Linkages

The interactions and linkages include, but are not limited to:

- Patients
- Ministry of Health (MOH)
- Medical Services Commission
- Health Authorities



- 
- College of Physicians and Surgeons of British Columbia
  - Community Laboratories
  - Academic Laboratories
  - British Columbia Medical Association (including BCMA-MOH collaborative committees and the BC Association of Laboratory Physicians)
  - Society of General Practitioners
  - Society of Specialist Physicians and Surgeons
  - University of British Columbia Faculty of Medicine
  - British Columbia Institute of Technology
  - British Columbia Society of Laboratory Science

### **Service Level Agreement**

An annual Service Level Agreement between BC LAB and each provider details the respective roles and responsibilities, provider deliverables including volumes and price. The agreement is performance based with monthly monitoring and year end reconciliation of funding to testing performed.

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**Appendix E**

**BC Medical Association**

**Governance Terms of Reference**

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Although the creation of a provincial governing agency to provide strategic oversight and direction for laboratory medicine services in British Columbia was not part of the original Terms of Reference for the Lab Reform Committee, both the BCMA /BCALP and the Ministry believe that such an agency would be the most appropriate vehicle for this role. However, the BCMA and the BCALP believe that the Lab Reform Committee has not adequately addressed issues related to an agency's structure, reporting and decision-making processes and that further data collection and analysis is needed to help define an agency's budgetary and funding responsibilities. The 2012 Secor Report entitled *Options for Laboratory Transformation*, clearly states that one of the fundamental principles and success factors guiding exploration of alternative governance structures is that we must ensure that such a structure has appropriate medical leadership and a clear reporting and accountability structure. The budgetary and funding framework is also a key element in determining the strategic direction on such an agency. The Government chooses to move forward with the creation of an agency with very high level Terms of Reference and without any collaborative process in place for the parties to resolve the aforementioned issues.

The Lab Reform Committee did discuss the mandate of an agency and largely agreed that such a mandate would include the following:

1. to establish a provincial vision, goals and objectives for laboratory medicine services;
2. to ensure appropriateness and sustainability of laboratory medicine services through the establishment of standards for practice, access and allocation of funding;
3. to improve quality of patient care using current evidence and best practices;
4. to establish a provincial quality framework;
5. to develop an annual operating plan which includes priorities, allocations and funding for lab medicine services;
6. to establish and maintain a human resources plan;
7. to monitor and set standards for utilization and expenditures;
8. to formulate plans to enable sustainability and innovation;
9. to oversee laboratory IT systems; and
10. to develop provincial services and capital requirement plans to adapt to changes in the medical laboratory environment.

A provincial governing agency is intended to be the backbone of the laboratory system in British Columbia thus its governance structure, strategic direction and associated legal implications must be carefully assessed and planned with appropriate collaborative consultations between the parties, who in turn need to consult with legal and governance experts. If such an agency is hastily or poorly planned, the lab reform initiative is bound to fail.

The BCMA / BCALP take issue with the Government's view of the events which transpired at the LRC with respect to this governance issue. First, it is unfortunate that the Government

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members were under the impression that the LRC had reached near agreement on the Terms of Reference. The first draft Terms of Reference for an agency were presented to the LRC on January 8, 2013. Subsequently, the BCMA/ BCALP specifically raised the issue of structure, reporting, and decision making. The Government had no concrete response or constructive input on these items and the LRC did not engage in any further discussion. The BCMA/BCALP would never agree to form an agency when such vitally important details were not resolved, especially in light of the large role for this agency that the Government suggests in its recommendations above. Further, the BCMA/BCALP never agreed to give the agency full funding authority and would not do so without further analysis of the implications for patients and our members.

Both parties entered into this process in good faith with a view to coming to consensus recommendations. However, the BCMA / BCALP cannot agree to items which have not been adequately determined within a collaborative process, as per the spirit and intent of the LRC mandate.

**BCMA/BCALP Recommendation 1:** The BCMA and the BCALP recommend that collaborative discussions with the Ministry continue over the next number of months to address matters related to the governance of laboratory medicine services, including:

1. the structure, reporting and decision making processes and accountability of a provincial laboratory agency functioning within a co-management model;
2. the representation of critical stakeholders in a provincial laboratory agency;
3. the role of laboratory medicine physicians within a provincial governance structure;
4. a budgetary and funding framework for laboratory services and the related responsibilities of a provincial agency.

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**Appendix F**

**Service Delivery and Integration**

**Working Group Report**

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## Service Delivery and Integration

### Executive Summary

Under the Terms of Reference of the Laboratory Reform Committee, a Service Delivery/Integration working group of major stakeholders was convened to address the following:

*To achieve a more efficient integration of inpatient laboratory services that may include:*

- *The integration of actual services and facilities.*
- *A timeline for achievement of the previously identified \$18M in annual savings.*

An extensive review of laboratory consolidation/integration initiatives to date, through the Lower Mainland laboratory consolidation, was done. Background literature reviews of recent reports on this subject were performed, including reports from Secor and Boston Consulting Group. Recommendations from Lower Mainland laboratory special working groups on hematopathology, virology and Level 3 biochemistry were reviewed.

The Laboratory Reform Committee agreed that cost avoidance as well as cost savings could count toward overall cost reduction and the \$18M expenditure reduction target. The calculation of cost avoidance has proved problematic due to the absence of any standard accounting template for cost avoidance in BC public laboratories. Savings through cost avoidance, resulting from initiatives already undertaken through the Lower Mainland Laboratory Consolidation, may amount to several million dollars, but are difficult to quantitate for the reason stated.

The Laboratory Reform Committee also agreed that indirect cost reductions to areas outside the laboratory (e.g. pharmacy, acute care areas) but resulting from laboratory-based initiatives, would count toward the expenditure reduction target.

The working group found that the time constraints of this project and, in particular, the sub-optimal quality of the data sets available to the group, did not permit more than a high level expert opinion on opportunities identified for further study. Next steps should include detailed business planning.

**Four key pre-requisites** are identified by the LRC Service Delivery/Integration Working Group as being essential to the success of these opportunities:

- A fully integrated Laboratory Information System (LIS). Based upon information from the Lower Mainland Consolidated Laboratories, it is estimated that functional interfaces will be completed for the Lower Mainland in a 12 – 18 month timeframe.

- 
- A robust courier service to support the transfer of tests in a way that specimen integrity is preserved, appropriate turnaround times are met and that the service meets the clinical need.
  - Performance metrics/quality indicators be in place, and be continuously monitored through any change process, such that quality can be assured and cost savings/avoidance clearly identified. Both general and discipline specific metrics will be required.
  - In recognition of laboratory medicine as a medical practice, the integrity of the on-site consultation service between laboratory physicians and clinicians must be preserved through any test consolidation process.

Barriers to implementation include:

- Space limitations
- Ageing facilities
- Staff relocation and redundancies
- Existing governance

A new provincial laboratory governance structure would likely be required to lead and support many of the opportunities listed.

The following opportunities for consolidation/integration of services have been identified:

1. Consolidation of microbiology services to a single site in Fraser Health Authority.
  - Anticipated savings \$1M (very conservative)
  - Timeline - Medium
2. Consolidation of virology to a single site should be considered.
  - Cost savings potential of 10% of current costs - \$1.5M
  - Timeline – Medium
  - Complexity level - high
3. The Ministry of Health Services should re-evaluate the role of BCCDC by defining services that should be provided by this organization.
  - Timeline - Short
4. Consolidation of routine bacteriology to a single test site in downtown Vancouver should be considered.
  - Potential cost savings of \$1 – 2M
  - Timeline – Medium
5. Implement MALDI-TOF technology
  - Direct cost savings of \$350,000 in Lower Mainland laboratories.

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- Indirect cost savings far greater and to be estimated
  - Timeline - Short
6. Pursue the idea of single site testing for tumour markers.
    - Anticipated cost savings \$250,000
    - Timeline – Medium
  7. Pursue the idea of single site testing for trace elements.
    - Anticipated cost savings \$100,000 – 400,000
    - Timeline – Medium
  8. Pursue the idea of consolidation of drug screen confirmation testing.
    - Cost savings/avoidance to be determined
    - Timeline – Short
  9. Closure of RIA laboratory at St. Paul’s with anticipated cost savings of \$120,000.
    - Timeline – Short
  10. Pursue the idea of consolidation of hormone assays.
    - Cost savings/avoidance to be determined
    - Timeline – Medium
  11. Pursue consolidation of stone analysis and serum free light chain analysis.
    - Cost savings/avoidance to be determined
    - Timeline – Short to Medium
  12. Flow Cytometry
    - Opportunities for cost savings in flow cytometry exist mainly in the area of utilization control, with anticipated annual cost savings of approximately \$250,000.
    - Limited physical consolidation of flow cytometry between BCCA and Vancouver General should be further explored.
    - Future planning of hematopathology services in Vancouver should consider further consolidation of test sites.
  13. Investigate the possibility of consolidating testing for complex hematology tests.
    - Move to the province-wide adoption of testing protocols in the areas of HIT testing, hereditary thrombophilia screening and autoimmune testing
    - Cost savings/avoidance – to be determined
    - Timeline – Short to Medium
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#### 14. Cytogenetics

- The apparent differences in efficiencies in cytogenetic test sites within the Lower Mainland suggest that they may be an opportunity to optimize operations and merits further scrutiny. Cost savings in the area of \$250,000 may be possible.
- Molecular testing was not examined but rapidly evolving expensive technology in this area suggest that a detailed review of this service be carried out, to rationalize placement of equipment and human resources.

#### 15. Histology processing consolidation

Please see separate report entitled *“Histology Processing Working Group Opportunity Report”*.

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## **Preamble**

Under the Terms of Reference of the Laboratory Reform Committee (LRC), a working group was convened to address the following:

*To achieve a more efficient integration of inpatient laboratory services that may include:*

- *The integration of actual services and facilities.*
- *A timeline for achievement of the previously identified \$18M in annual savings.*

The membership of the working group was as follows:

Dr. Chris Bellamy, BCMA (Lead)  
Dr. Brian Berry, VIHA  
Dr. Richard Cleve, FHA  
Dr. Bob Coupland, VCH  
Dr. Jim Cupples, FHA  
Dr. John Galbraith, VIHA  
Dr. Gordon Hoag, VIHA  
Dr. Mel Krajden, BDCDC  
Dr. Wes Schreiber, VCH  
Dr. Amir Rahemtulla, BCCA  
Mr. John Andruschak, PHSA  
Mr. Mick Maguire, PHSA  
Ms. Wendy Johnson, MoH  
Ms. Joanne Philley, MoH

A subgroup of this committee looked at Histology Processing consolidation and had the following membership:

Dr. Jim Cupples, FHA (Lead)  
Dr. Doug Filipenko, PHC  
Dr. Blake Gilks, VCH  
Dr. John O'Connell, FHA  
Dr. Tom Thomson, BCCA

The main working group held meetings on October 24<sup>th</sup> and December 11<sup>th</sup> 2012. The Histology Processing subgroup met on November 14<sup>th</sup> 2012.

## **Background materials**

At the inaugural meeting, the following background documents were reviewed:

- Laboratory Reform Committee Terms of Reference
- Laboratory Reform Committee Working Group Guiding principles

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- Secor Report (Embargoed) findings on Service Delivery
  - Boston Consulting Group report findings on consolidation of services
  - Lower Mainland Medical Directors submissions to the LRC for VCH, FHA, PHSA and PHA
  - Lower Mainland Special Working group reports on hematopathology, virology, special chemistry

### **Guiding principles**

The LRC established the following principles to guide the development of a Plan addressing the Terms of Reference:

- An increase in efficiencies across the laboratory system that are sustainable, patient focused, affordable and accountable within a high quality system
- All debate is without prejudice
- All suggestions will be considered
- Quality and access within the system must be maintained or exceeded.
- Professional autonomy must be preserved. (World Medical Association, 2009)
- Stakeholder consultation may be required
- The Triple Aim approach will be leveraged where feasible. (Institute for Healthcare Improvement, 2009)

Additional principles agreed to by the LRC are as follows:

- Where possible, rigor and transparency should be applied to the accounting of laboratory cost reduction opportunities identified by the working groups
- In addition to cost savings measures, cost avoidance measures will be allowed as a component of overall cost reduction, to achieve the expenditure reduction targets
- Indirect (system wide) cost reductions resulting from primarily laboratory-based initiatives will count toward the expenditure cost reduction targets identified in the LRC Terms of Reference
- Any cost reduction opportunities deemed worthy of consideration for the Lower Mainland laboratories should have embedded principles which are potentially applicable province-wide
- Performance and fiscal metrics should be identified prior to any planned changes in service delivery, and be monitored through the change process, to ensure that quality is maintained, the service is meeting the clinical need and the cost impact can be clearly identified
- Biggest is not always best – in considering a site for potential consolidation of a service, it cannot be assumed, as a matter of fact, that the largest laboratory has the highest quality or efficiency

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## **Secor Report**

An embargoed copy of the Secor report on 'Options for Laboratory Transformation' was available to the working group membership (Secor, 2012). Sections relevant to Service Delivery and Integration were reviewed. The report used a cross-jurisdictional comparison and stakeholder questionnaire methodology.

The main observations of the BC laboratory system from this report relate to the number of laboratories and the lack of centralization of specialized testing.

Comparison of the British Columbia and Queensland, Australia showed that BC has three times as many laboratories as Queensland for a similar population. Queensland has twice the area of BC.

	<b>BC</b>	<b>Queensland</b>
Population	4.4 million	4.5 million
Public labs	106 - 38 collection sites	33 - 1 central in Brisbane - 8 regional - 24 district
Private labs	3 - 137 collection sites	3
Public hospitals	96 acute care 15 extended care 18 D&T centers 11 outpost hospitals TOTAL = 140	166 acute care 4 psychiatric  TOTAL = 170
Private hospitals	N/A	53 free standing day hospitals 53 other private TOTAL = 106

(Australian Institute of Health and Welfare, 2011), (Ministry of Health Services), (Secor, 2012)

Note is made of the common Laboratory Information System (LIS) for all laboratories and clinical users in Queensland. This is in contrast to the situation in BC.

The following points were raised by BC stakeholders:

- Some medical directors believe there are significant cost saving opportunities exist within public labs through changes in where tests are performed
- Most HA executives believe there are opportunities to increase efficiency in the system through changes to the delineation of tests across public and private labs and through operational change
- Redundant infrastructure

- 
- esoteric tests offered in too many locations
  - some redundancy in Greater Vancouver area in tests such as flow cytometry and cytogenetics
  
  - Barriers to change
    - Multiple fiefdoms, turf wars
  - Cost
    - Needs to be an improved understanding of lab costs
  
  - Drivers of growth
    - Increased focus on disease prevention and early detection
    - Molecular biology and genetics
    - Ageing population
  - Governance
    - Existing governance model for lab services could be a major barrier to improvement

#### Short Term opportunities

- Improved ordering practices for lab tests
- Develop provincial quality framework program
- Conduct detailed cost study – compare collection costs and costs of performing tests across public and private labs in BC

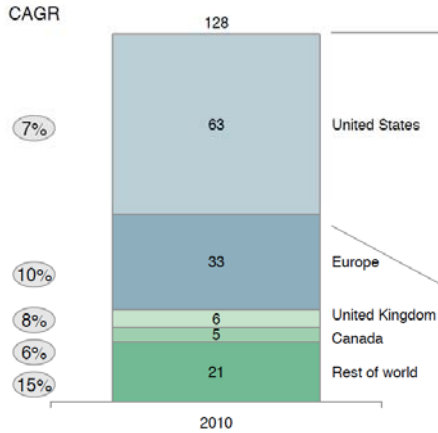
#### **Review of the Boston Consulting Report**

The Boston Consulting Group is a global management-consulting group who recently undertook a global laboratory services industry study, working extensively with stakeholders in Canada, USA and Europe. They recently published a white paper entitled 'From Evolution to Revolution – sustainable approaches to the funding: cost dilemma' (The Boston Consulting Group, 2011), in which the issue of sustainability of laboratory services is discussed in detail.

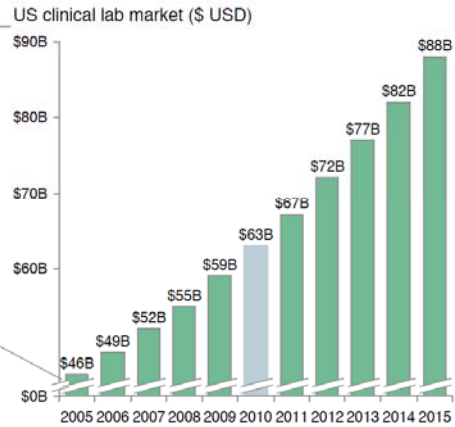
They point to the fact that laboratory spending is outpacing Gross Domestic Product (GDP) in much of the world, creating unsustainable funding economics at a system level. Interestingly, Canada has the lowest rate of increase of the jurisdictions compared:

## Clinical lab industry is a ~\$128B global market

### Global lab testing spend: Over \$128B



### Lab market growth unsustainable



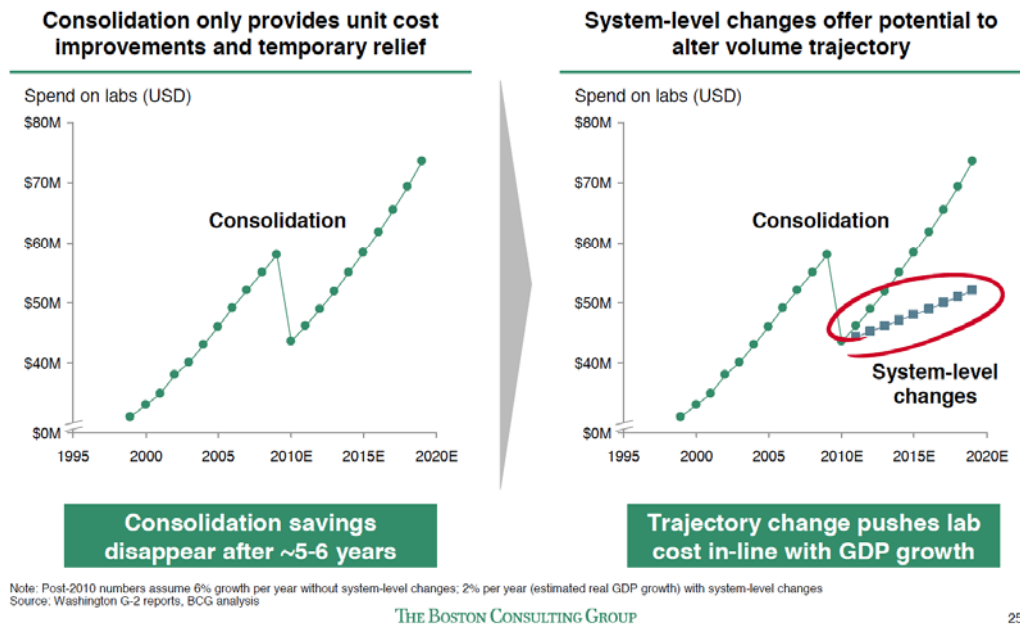
**Market growth outpacing GDP; creating unsustainable funding economics at a system level**

Source: Washington G-2 reports (US), Konzept Analytics report, Carter Review (UK), BCG analysis  
 THE BOSTON CONSULTING GROUP

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Physical consolidation of testing is one strategy commonly used to achieve cost reductions through economies of scale but historical data highlights the very temporary nature of the cost improvements from this maneuver. Within 5 – 6 years, the cost of volume growth will eventually overtake savings due to consolidation:

## System-level changes can bend the cost curve when unit costs and consumption both decline



### Laboratory Consolidation/Integration initiatives under Lower Mainland Laboratory Consolidation.

Reports from the Lower Mainland laboratory medical directors on the Executive Council were reviewed. The following is a summary of initiatives, both completed and underway:

#### **Vancouver Coastal Health Authority (VCHA)**

##### Completed initiatives

- Administrative consolidation – decrease of 1.5 – 2 FTE Operations Directors

##### Underway initiatives

- Common LIS platform
- Consolidating staff scheduling – no savings
- Single call center proposed – no savings

##### Past initiatives within 5 years

- 2006 – single administrative structure with single regional medical director and single regional operations director. 6 disciplines, each with regional technical specialist, medical discipline leader and operations director.

- 
- Hub and spoke model for service delivery – VGH is the hub. All specialized hematology and chemistry, all autoimmune testing performed at hub.
  - 2007 – 2009 – all microbiology from 4 regional sites transferred to VGH – one small additional site under review.
  - 2011 – histology closed at UBC and moved to VGH.
  - 2011 – 2012 – movement of Lions Gate and Richmond autopsy service to VGH.
  - Repatriation of cytology samples from BCCA to Richmond, Lions Gate and VGH.
  - Many LEAN initiatives since 2006, cost avoidance unknown.
  - 2011 – regional quality council established, reporting to VCHA Board Quality and Safety Committee.

Impact on laboratory services:

- Improved efficiency
- Improved quality
- Improved service TAT
- Cost avoidance but actual \$ unknown - could be estimated by analyzing volume increase and FTE increase over time

Ideas about future laboratory cost saving initiatives:

- Numerous opportunities exist to improve lab quality and efficiency.
- Fundamental change in laboratory governance (with appropriate accountabilities) required, to avoid entrenchment in 'status quo' positioning.
- Strategies focusing on one time savings and 'low hanging fruit' not useful in coping with long-term problem of sustainability.

## **Provincial Health Services Authority (PHSA)**

Completed initiatives

- Overall LMC savings of \$3.8M to date through elimination of positions and some contract savings.

Underway initiatives

- LIS integration
- Results distribution
- Call Centre

Cost savings for the above unknown.

- Specific working group initiatives reviewed for flow cytometry, trace elements, tumour markers, and virology – none carried forward.

Ideas about future laboratory cost saving initiatives:



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- Changing test platforms as newer technologies arise.
  - Retire redundant tests or implement new tests in conjunction with clinical colleagues.
  - Implement physician order entry on order sets to manage test utilization.
  - Examine alternate funding models and mechanisms for specific complex tests like genetic laboratory medicine. For example, FISH for rapid cytogenetic analysis of amniotic fluid in high-risk pregnancies (old technology, expensive) is MSP billable; QF-PCR (new technology) is faster and cheaper but non-MSP billable, therefore has to be funded from hospital global budget.
  - Physical consolidation of laboratory tests results in short term cost savings. Attention should be focused on cost avoidance through LEAN initiatives together with utilization control through LIS integration and order entry based on order sets.

### **Fraser Health Authority (FHA)**

#### Completed initiatives

- Cost savings in Lower Mainland laboratories of \$3.8M over 3-year period.
- Cost avoidance over this time period through absorption of significant growth in workload but \$ amount unknown.
- Most of the laboratories in FHA are now rapid response core labs with test menus based on clinical need.
- Closing of active lab at Riverview Hospital with transfer of testing to Royal Columbian Hospital under a significantly reduced budget – estimated cost savings \$500,000.
- All hepatitis testing for FHA centralized to BCCDC.
- Medical microbiology consolidation from 8 sites to 4 in consultation with end users. Initiative to further reduce test sites – time frame 6 months. Cost savings unknown.
- IT/IM integration – fully integrated LIS within FHA.
- AP service in FHA has undertaken LEAN review.

#### Underway initiatives

- Microbiology consolidation
- Telepathology project for use in rapid diagnosis and consultation.
- Standard protocol for urinalysis testing in FHA, reducing # of microscopic studies and urine cultures.

#### Ideas about future laboratory cost saving initiatives:

- Utilization management at point of order, through order entry, standard order sets automatic cancellations etc. Active post-reporting connectivity with clinicians.
- New technology/tests coordinated and introduced through provincial group.

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## Providence Health Authority (PHA)

### Completed initiatives:

- Multiple LEAN initiatives in Histology, Chemistry, Microbiology and Hematology. Cumulative cost savings of approx. \$1M plus much larger cost avoidance, the size of which is difficult to quantify.
- In-house Mass Spectrometry program for 15 analytes – 30 – 50 % of the cost of immunoassays. Cost savings \$400,000 per year.
- Utilization management strategies in microbiology for C. Difficile Toxin, Cystic Fibrosis testing, specimen rejection protocols, approval for specialized testing.
- LEAN AP project in 2004 produced cost savings of \$500,000 per year.

### Underway initiatives:

- Adoption of pre-test protocol for HIT testing, based on VGH initiative – recommended for adoption but implementation to be determined.
- Protocol for deferral of hypercoagulability testing in acute VTE – implementation to be determined.
- Standardization of approaches to flow cytometry for lymphoma and leukemia – implementation to be determined.
- MALDI-TOF instrumentation for rapid ID of bacteria, fungi and mycobacteria. Business case submitted to LMC but decision pending.
- Lab HR and Scheduling consolidation, Sept 2012. Cost Impact unknown.
- Focus groups on Flow cytometry, Virology and Special Chemistry – recommendations made but implementation to be determined.

### Ideas about future laboratory cost saving initiatives:

- Closure of RIA lab at St. Paul's – imminent. Cost savings in avoiding purchase of new gamma counter (\$120,000) plus elimination of costs for radioisotope license and software costs for gamma counter.

## Lower Mainland Consolidation Special Working Group reports (2011)

During the time of the Lower Mainland Laboratory consolidation, 3 special working groups were established to look at opportunities for the consolidation/integration of complex testing. These were established in the areas of Hematopathology, Virology and Medical Biochemistry. The following is a summary of those working group findings:

**1. Hematopathology working group** – draft report May 13<sup>th</sup> 2011 (Hematopathology Working Group, 2011). (Virology Working Group, 2011)

Members – Drs. Griswold, Krikler, Hudoba, Gasgoyne, Ford.

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Recommendations:

**Flow Cytometry** – provided in 5 lower mainland sites.

8 recommendations:

- Establish lower mainland flow cytometry working group
- Address utilization problems – duplicate orders, repeat testing for CD4 and CLL.
- Standardize test panels
- Implement best practices
- Move to higher dimensionality
- Incorporate lab automation
- Eliminate triage activities where appropriate
- Investigate additional opportunities for process/cost efficiencies

The 2011 Working group rejected consolidation of testing sites – service works well at the moment, consolidation would result in onetime cost savings.

**Adopt region-wide protocols or guidelines:**

- Heparin-induced thrombocytopenia – performed at VGH, SPH, and RCH. Recommend widespread adoption of HIT protocol.
- Hereditary Thrombophilia testing – performed at RCH, SPH, and CW; VGH performs gene mutation studies. Adoption of VGH protocol recommended.
- Autoimmune disorders (ANA, ENA) – performed at VGH, RCH, CW. Recommend more judicious use of testing.

The Hematopathology Working Group and corporate support team were unable to assess the financial impact of implementing these recommendations in the allotted time. However, preliminary steps were taken; the laboratories that perform the affected tests provided initial volume data. Should Lower Mainland Pathology and Laboratory Medicine proceed with the recommended next steps, it will be necessary to equate the various test methodologies across the regions, fill existing data gaps, and validate the final summary in preparation for the financial assessment.

**2. Virology working group** – draft report May 13<sup>th</sup> 2011 (Virology Working Group, 2011). Members – Drs. Krajden, Mack, Roscoe, Sherlock, Tilley.

Services currently provided by 3 laboratories - BCCDC, CW, St. Paul's,

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Recommendations:

**Strategic placement of services** – rapid virology testing should be implemented at strategic sites within VCH and FHA.

### **Better Utilization Management**

**3. Level 3 Biochemistry working group** – draft report May 13<sup>th</sup> 2011 (Level 3 Biochemistry Working Group, 2011). (Hematopathology Working Group, 2011)  
Members – Drs. Cleve, Halstead, Holmes, Pudek, Schreiber.

Recommendations:

#### **Consolidating tumour markers**

- CEA and PSA account for 64% of tests.
- Lane Level Lab and Surrey Memorial perform 87% of Lower Mainland tumour markers.
- Potential savings of consolidating all Lower Mainland testing to one site = \$247,910 per year.

#### **Consolidating trace elements**

- Currently performed at 3 hospitals in Lower Mainland – VGH, CW, SMH
- Cost savings approx. \$100,000 but could be greater if MSP fee codes for lead and zinc reduced to same level as other trace elements (additional \$300,000 approx.)

#### **Consolidation of Drug Screen Confirmation testing**

- Currently provided by VGH and Provincial Toxicology Centre
- Suggested consolidation to single site would yield some cost avoidance through avoiding need to replace equipment at VGH and eliminating part of a technologist position at VGH.

### **Opportunities**

A number of opportunities for the consolidation/integration of services have been identified by the working group, and, as such, merit further consideration. The working group wishes to stress that these are 'opportunities' for further scrutiny. Although it was stated at the start of the Laboratory Reform Committee process that sound, transparent accounting principles be applied to cost saving/avoidance opportunities, the time constraints and, in particular, the quality of the data, did not allow for anything more than a high level review and expert opinion

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on the opportunities identified. Although there is a certain validity in this approach, the recommendations being based on a 'common-sense' perspective amongst key stakeholders, more rigorous data collection and formal business case modeling will be required in many cases prior to a final decision being made. The timeframe for the completion of these additional steps could be relatively short if there was a will to move forward.

**Four key pre-requisites** are identified by the LRC Service Delivery/Integration Working Group as being essential to the success of these opportunities:

- A fully integrated Laboratory Information System (LIS). Based upon information from the Lower Mainland Consolidated Laboratories, it is estimated that functional interfaces will be completed for the Lower Mainland in a 12 – 18 month timeframe.
- A robust courier service to support the transfer of tests in a way that specimen integrity is preserved, appropriate turnaround times are met and that the service meets the clinical need.
- Performance metrics/quality indicators be in place, and be continuously monitored through any change process, such that quality can be assured and cost savings/avoidance clearly identified. Both general and discipline specific metrics will be required.
- In recognition of laboratory medicine as a medical practice, the integrity of the on-site consultation service between laboratory physicians and clinicians must be preserved through any test consolidation process.

In addition, there are inherent risks and challenges in changing the delivery of a service that has been evolved and refined over many years, to a point where it is both functional and of high quality. Key factors to success in projects of this type are well known and include early engagement of stakeholders, a primary motivation to improve service delivery and quality and a governance structure that leads and supports this change. There are many ageing laboratory facilities in BC and the laboratory site for the consolidation of many of the opportunities presented in this section of the report, was not, in most cases, readily identifiable to the working group members. Staff relocation and redundancies are also major considerations. As the Secor report alludes to, major change takes time and a cautious staged approach should be considered. It is recognized that a change in governance to a provincial laboratory governance model will likely be required to lead and support the change initiatives outlined below.

### **Medical Microbiology**

As part of the laboratory restructuring in Alberta in the mid 1990s, the consolidation of medical microbiology and histology processing sites are recognized as two of the most successful test consolidation projects. Consolidation of medical microbiology produced major cost savings with a reported improvement in quality. Interestingly, the majority of these savings related to the relative newness of automation in this specialty, a situation not dissimilar to the rapidly evolving technology today. In Edmonton, there is a single virology test site.

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Technological advance in medical microbiology testing is proceeding rapidly with molecular-based and mass spectroscopy-based automation capable of reducing turnaround times and costs substantially.

In many areas of microbiology, there is a need for a 7-day a week service to meet the clinical need. In order to do this, a critical mass of testing is required, which can only be achieved through consolidation of testing.

As an overall vision for the delivery of medical microbiology services, the working group recommended consideration of:

- One 24/7 microbiology laboratory for the Fraser Valley
- One 24/7 microbiology laboratory for downtown Vancouver
- One premium microbiology molecular diagnostics site (Center of Excellence) for the province, supported by regional rapid response molecular diagnostics services in the Northern Health Authority, Fraser Health Authority, Interior Health Authority and Vancouver Island Health Authority.
- One virology laboratory

### **Fraser Health Authority**

The Fraser Health Authority has been successful in reducing the number of microbiology testing sites from 6 to 4 in recent months. The current 4 test sites are Surrey, Royal Columbian Hospital, Abbotsford and Burnaby. There are plans to reduce this to a single test site in the new laboratory at Surrey. It is estimated, based upon relatively robust data, that this will produce a very conservative cost reduction of \$1M.

### **Opportunity #1**

- Consolidation of microbiology services to a single site in Fraser Health Authority
- Anticipated savings \$1M (very conservative)
- Timeline – Medium
- Complexity level - high

### **Downtown Vancouver**

#### **1. Virology testing**

Virology testing is currently performed at 3 sites in downtown Vancouver – BCCDC, St. Paul's and C&W. Routine virology serology is performed at a number of sites on automated analyzers including Vancouver General and BCCDC. Expenditures for 2011/12 (excluding serology testing) are \$13.16M. The volume of virology being performed at C&W is relatively small.

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Weekend service is either very limited or non-existent at the 3 sites.

Within the current system, there are problems with specimen forwarding from other laboratories depending on the specimen source. For instance, the identification of a cytomegalovirus in cerebrospinal fluid is performed at BCCDC; from blood, it is performed at St. Paul's and from pediatric patients, it is performed at C&W – there is no rational basis for this and it creates problems for referring laboratories.

Based upon a detailed review of test volumes, available space of testing sites and current costs, the working group concluded that consolidation of virology testing to a single site, providing service on a daily basis (including weekends and statutory holidays) from at least 7am to 7pm, had the potential to save a conservative \$1.5M.

### **Opportunity #2**

- Consolidation of virology to a single site should be considered.
- Cost savings potential of 10% of current costs - \$1.5M
- Timeline – Medium
- Complexity level - high

There is difficulty in choosing a site for the consolidation of this service because of space considerations, although, in some respects, the working group experts thought that BCCDC would be the most logical. However, a major increase in volume of this type would be very difficult to accommodate without some investment in infrastructure through renovation. In considering this point, the working group found that BCCDC is performing a number of tests that appear to duplicate existing services:

- Routine hepatitis and HIV serology testing performed on automated analyzers.
- Culture of routine microbiology specimens received directly from physician offices.
- Routine stool ova and parasite identification.

Re-evaluation of the role of BCCDC is advised to eliminate redundancy in duplication of test platforms and identify potential space vacancies to be considered for an increase in virology testing. In the area of HIV testing, it was noted that the ability of BCCDC to rapidly identify early HIV infection produces a cost avoidance to the system of \$300,000 per patient lifetime.

### **Opportunity #3**

- The Ministry of Health Services should re-evaluate the role of BCCDC by defining services that should be provided by this organization.
- Timeline - Short

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## 2. Routine bacteriology

Consolidation of routine bacteriology testing has taken place within the Vancouver Coastal Health Authority to a single site, Vancouver General Hospital, with transfer of specimens from Lions Gate Hospital, Richmond Hospital, UBC Hospital and Powell River.

There is some duplication of testing for tuberculosis between VGH and BCCDC.

Although the major cost savings in microbiology are in the areas of virology and molecular testing, there is still some potential for further consolidation of this testing. Following review of test volumes, the expert opinion on the working group estimated that there was the potential for further cost savings in this area through consolidation of test sites, estimated to be approximately \$1 -2 M.

### **Opportunity #4**

- Consolidation of routine bacteriology test sites has potential cost savings of \$1 – 2M.
- Timeline – Medium
- Complexity level – High to Medium

## 3. New technology

Matrix-assisted laser desorption/ionization (MALDI) time-of-flight (TOF) mass spectrometry is a technique for the measurement of large organic proteins, particularly proteins. This technology has recently been developed for the rapid identification of microorganism such as bacteria and fungi.

A business case for the introduction of this technology has been prepared by the Lower Mainland Medical Microbiology Laboratories (Gordos, June 2011).

Advantages over existing technology include:

- Dramatically faster turnaround times - from 36 hours to less than 2 hours.
- Substantially reduced operational costs. – 25-40 cents per test versus \$5 for current technology.
- Reduction of antimicrobial drug costs through an enhanced antimicrobial stewardship program (indirect cost savings).
- Reduced patient mortality and hospital bed costs (indirect cost savings).

The direct savings from introducing this instrumentation into the Lower Mainland Medical Microbiology laboratories is estimated to be approx. \$350,000. The indirect cost savings will be far greater and a component of these – antimicrobial stewardship – will be addressed in a separate LRC report.



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### **Opportunity #5**

- Implement MALDI-TOF technology with estimated direct cost savings of \$350,000 in Lower Mainland laboratories.
- Indirect cost savings far greater and to be estimated.
- Timeline - Short

### **Medical Biochemistry**

Following up on the work of the Level 3 Biochemistry Working Group, a number of opportunities for consolidation of complex tests were identified.

#### 1. Tumour markers

Tumour markers include the following analytes – alpha-fetoprotein, beta-2-microglobulin, carcinoembryonic antigen, CA-15-3, CA 125, CA 19-9, hCG, PSA, SCC antigen and testosterone. (Level 3 Biochemistry Working Group, 2011)The following points noted by the LMC working group are pertinent:

- CEA and PSA account for 64% of tests.
- Lane Level Lab and Surrey Memorial perform 87% of Lower Mainland tumour markers.
- Very little renovation required to consolidate testing.
- Improved quality through single site testing.
- Potential savings of consolidating all Lower Mainland testing to one site = \$247,910 per year.

The Service Delivery working supported the further investigation of single site testing for tumour markers.

### **Opportunity #6**

- Pursue the idea of single site testing for tumour markers.
- Anticipated cost savings \$250,000
- Timeline – Medium

#### 2. Trace elements

The following points noted by the LMC working group are pertinent:

- Currently performed at 3 hospitals in Lower Mainland – VGH, C&W, SMH
- Cost savings approx. \$100,000 but could be greater if MSP fee codes for lead and zinc reduced to same level as other trace elements (additional \$300,000 approx.).
- Very little renovation required to consolidate testing.
- Improved quality through single site testing.

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- The Service Delivery working supported the further investigation of single site testing for trace elements.

#### **Opportunity #7**

- Pursue the idea of single site testing for trace elements.
- Anticipated cost savings \$100,000 – 400,000
- Timeline – Medium

#### 3. Drug screen confirmation testing

The following points noted by the LMC working group are pertinent:

- Currently provided by VGH and Provincial Toxicology Centre.
- Suggested consolidation to single site would yield some cost avoidance through avoiding need to replace equipment at VGH and eliminating part of a technologist position at VGH.

The Service Delivery working supported the further investigation of single site testing for drug screen confirmation testing.

#### **Opportunity #8**

- Pursue the idea of consolidation of drug screen confirmation testing.
- Cost savings/avoidance to be determined.
- Timeline – Short

#### 4. Hormone assays

The working considered a number of other opportunities that had previously been discussed at the Level 3 Biochemistry Working Group. By volume, the major analyte in this category is Vitamin D, together with a number of other lower volume analytes. The preferred methodology for analysis is mass spectroscopy. St. Paul's is planning to close their radioimmunoassay (RIA) laboratory as they switch to mass spectroscopy – anticipated cost savings are \$120,000.

#### **Opportunity #9**

- Closure of RIA laboratory at St. Paul's with anticipated cost savings of \$120,000
- Timeline – Short

Consolidation of testing in this area would likely improve turnaround times, improve quality and avoid costly duplication of mass spectrometers.

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### **Opportunity #10**

- Pursue the idea of consolidation of hormone assays.
- Cost savings/avoidance to be determined.
- Timeline – Medium

5. Other Biochemistry opportunities.

A number of other specific tests potentially amenable to consolidation were discussed. These included:

- Stone analysis
- Serum free light chains – a major utilization problem is evolving with this test. The test is expensive.

The working felt that consolidation of these tests merited further consideration.

### **Opportunity #11**

- Pursue consolidation of stone analysis and serum free light chain analysis.
- Cost savings/avoidance to be determined.
- Timeline – Short to Medium

## **Hematopathology**

1. Flow Cytometry

Currently, flow cytometry services are provided in five locations in the Lower Mainland. The system has evolved such that each location supports different types of programs, many of which are internationally recognized assets:

- BC Cancer Agency – 1 instrument - BCCA Lymphoma program
- Children's and Women's Hospital – 1 instrument - C&W Pediatric Program
- Vancouver General Hospital – 3 instruments - VGH Adult Leukemia service
- St. Paul's – 1 instrument - SPH HIV program
- Surrey Memorial Hospital – 1 instrument

Flow cytometry is used to phenotype populations of hematopoietic cells for a variety of reasons:

- Diagnosis, classification and monitoring of hematopoietic malignancies, including leukemia and lymphoma.
- Determination of CD4/CD8 counts in HIV patients.
- Characterization of primary immunodeficiency syndromes.
- Investigation of selected non-malignant disorders such as paroxysmal nocturnal hemoglobinuria and hereditary spherocytosis.

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- Quantification of fetal/maternal hemorrhage.

In 2005, a review of flow cytometry services was conducted by Ms. Rita Jervis, PHSA. The report cannot be located and Ms. Jervis no longer works for PHSA. In an email communication from her, she recollects that the main conclusions of her report were:

- i. creation of a technologist training program
- ii. creation of centralized staffing structure
- iii. creation of a centralized purchasing structure
- iv. creation and implementation of standardized operating procedures

The working group does not believe that these recommendations have been implemented.

A review of flow cytometry services in Alberta shows the following:

- Calgary – flow cytometry is centralized to a single site (Foothills Hospital) with 5 instruments. Unlike the Lower Mainland situation, the tertiary care cancer and pediatric facilities are both essentially located on the Foothills site.
- Edmonton – flow cytometry is currently performed in 2 centres, the University Hospital with 4 instruments and the Cross Cancer Centre with 1 instrument. These will likely be amalgamated into a single site at the University Hospital in the near future. Like Calgary, oncology, HIV and pediatric centres of excellence are confined to 1 large site.

The situation in the Lower Mainland is therefore different from Alberta in that geographically separate testing sites have evolved, largely serving different program based populations and supporting different research mandates. A working sub-committee with representation of key stakeholders is reviewing the flow cytometry test volumes and staffing data for the Lower Mainland. The initial data set provided to the working group lacked the rigor required for any decision-making. To date, it seems clear that the major opportunity in this area is through cost avoidance, using initiatives recommended by the LMC Hematopathology Working Group:

- Establish a Lower Mainland flow cytometry working group to establish best practice guidelines.
- Eliminate redundant testing.
- Standardize test panels.

The only real potential opportunity for physical consolidation of flow cytometry services is between BCCA and Vancouver General Hospital. As noted, the BCCA supports an internationally recognized lymphoma service, which must not be compromised in any planned consolidation. There may well be merit in consolidating all lymphoma flow cytometry for the province to BCCA. It is reported that this is a highly efficient operation as well as having an undisputed reputation for high quality. Technology is available for remote review/re-gating of flow cytometry panels, which would support hematopathologists at sites remote from the BCCA. As noted with other consolidation opportunities, any change in the delivery of service must continue to meet the clinical need and must not compromise the local laboratory medicine consultation service with clinicians.

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However, it remains problematic for referring hospitals to have a flow cytometer dedicated exclusively to lymphoma panels at one site (BCCA) and another site dedicated to myeloid panels 100 yards away, with no operational linkage between the 2 sites.

A new working group under the LRC was convened to address flow cytometry. Membership of the working group included:

Dr. Brian Berry (lead)  
Dr. Bo Coupland  
Dr. Sam Krickler  
Dr. Jason Ford  
Dr. Michelle Wong  
Dr. Debbie Griswold  
Dr. Andrew Weng  
Dr. Randy Gasgoyne

Recent data on flow cytometry workload and FTEs at the five sites was reviewed. Some of the data is not strictly comparable (TATs, specific costing of reagents etc). However, reagent and equipment costs are standardized across the province through HSSBC.

Although Alberta has a more consolidated model of flow cytometry, there are currently 9 flow cytometers in Alberta as opposed to 8 in BC. The physical consolidation of this service in Alberta is possible due to the proximity of the specialist cancer, pediatric and acute care hospitals. Such is not the case in the Lower Mainland.

Once again, the working group feels that physical consolidation of the existing sites cannot be easily accomplished at this time without disruption to the services. It is possible that limited consolidation could be achieved between BCCA and Vancouver General due to their proximity. However, this is also no simple task.

At the present time, the main opportunities for cost savings in flow cytometry are in the area of process management and utilization control. It is possible that measures brought forward by the working group could produce savings in the area of \$250,000 per annum.

In the future, if there is a will to consolidate the hematopathologist services to fewer sites, at that point physical consolidation of services would be justified.

### **Opportunity #12**

- Introduce standardized work processes and utilization management in flow cytometry in the province.

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## 2. Complex hematology testing

There is some duplication of testing for complex hematology tests and opportunities exist for cost savings through rationalizing where these tests are performed as well as improving utilization. Specifically, the LMC working group had the following recommendations:

### **Adopt region-wide protocols or guidelines:**

- Heparin-induced thrombocytopenia – performed at VGH, SPH, and RCH. Recommend widespread adoption of HIT protocol.
- Hereditary Thrombophilia testing – performed at RCH, SPH and CW; VGH performs gene mutation studies. Adoption of VGH protocol recommended.
- Autoimmune disorders (ANA, ENA) – performed at VGH, RCH, CW. Recommend more judicious use of testing.

The LRC Service Delivery working group supports these recommendations.

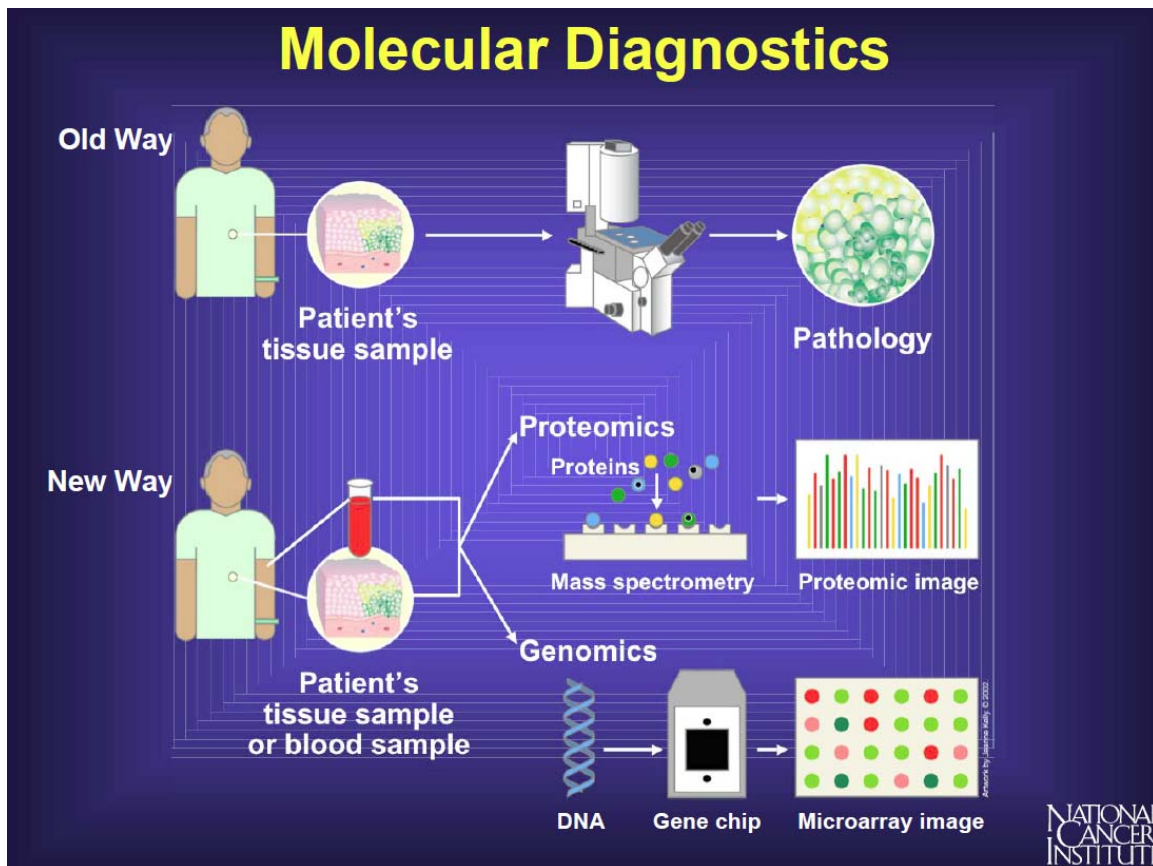
### **Opportunity #13**

- Investigate the possibility of consolidating testing for complex hematology tests.
- Move to the province-wide adoption of testing protocols in the areas of HIT testing, hereditary thrombophilia screening and autoimmune testing.
- Cost savings/avoidance – to be determined.
- Timeline – Short to Medium

## **Cytogenetics**

Cytogenetic testing includes Fluorescence In Situ Hybridization assays (FISH) and karyotype analysis. The analyses are very ‘hands-on’ and labour intensive. As such, there are no real economies of scale in this area.

Molecular diagnostic testing for oncologic and hereditary disorders is a rapidly expanding field that is transforming the practice of medicine. In the field of oncology, genomic microarray testing is used to diagnose various types of cancers, determine how aggressive some of these cancers may be and determine their response to various treatment modalities. Targeted drug therapy for cancers require this technology. The same technology is being used for the diagnosis of hereditary disorders and for predicating the rate of metabolism of certain drugs.



(National Cancer Institute)

Genomic microarray equipment is expensive. Since this technology is automated, economies of scale are possible.

The timeline for detailed review of cytogenetics/molecular diagnostics proved too short to be comprehensive. Therefore, only a high level of review of the services could be accomplished. This was based upon relatively rigorous data concerning workload and FTEs, using 2011/12 data.

## Preamble

- There are four cytogenetic laboratories in the lower mainland of BC, three in Vancouver coastal health and one in Fraser health. In addition there is a single small laboratory in VIHA.
- Cytogenetic laboratories process samples for standard karyotyping, fluorescence in situ hybridization (FISH) and microarray analysis and the tests performed in each laboratory differ somewhat.
- All the tests that are performed in the cytogenetic laboratories are very labour intensive.
- The processing of pediatric and adult samples in cytogenetic laboratories is identical and therefore FTE and workload comparisons are appropriate.

- 
- Molecular constitutional and cancer testing was not evaluated.

**Process:**

- The purpose of this exercise was to gather data in an appropriate way to allow a rational decision as to whether consolidation of cytogenetic laboratories or testing would lead to any substantive savings to the system by looking at FTE requirements.
- Data was gathered to determine the number of individual tests of similar type which were performed in each laboratory. The number of technical FTEs required to do each test of similar type was determined and that calculation was applied to each laboratory's tests in the same way. This calculated total number of technical FTEs required to do all the testing in each laboratory was then compared with the actual total number of technical FTE submitted by each laboratory. Additional information about administrative FTE, clerical FTE and professional FTE was also obtained.

**Conclusions**

1. Economies of scale are not readily apparent; cytogenetic technical work is labour intensive and cannot be automated any further than has already been achieved.
2. The rough data shows variable technical efficiency among labs.
3. There is an opportunity to evaluate those efficiencies and to standardize practices across the province. The savings cannot be quantified but would be modest at most.
4. The use of laboratory space is maximized while reducing transportation costs and providing professional expertise to the local community.

**Opportunity #14**

- The apparent differences in efficiencies in cytogenetic test sites within the Lower Mainland suggest that they may be an opportunity to optimize operations and merits further scrutiny. Cost savings in the area of \$250,000 may be possible.
- Molecular testing was not examined but rapidly evolving expensive technology in this area suggest that a detailed review of this service be carried out, to rationalize placement of equipment and human resources.

**Histology Processing Consolidation**

Please see separate report entitled "*Histology Processing Working Group Opportunity Report*"



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## Supplement to Service Delivery and Integration Working Group Report:

### Report of Flow Cytometry Working Group

January 31, 2013

The Flow Cytometry Service review group has met and discussed the issue of potential short term monetary savings by consolidating these distributed services to a single or reduced number of sites. Dr. Jason Ford and Dr. Bob Coupland did not participate in the conference call but Dr. Ford offered his opinion by Email.

Members of this group have each provided detailed operational and general costing data which has been collectively reviewed and discussed.

There is no indication that significant short or intermediate term savings can be realized from consolidating existing Flow Cytometry services to a single or reduced number of sites.

1. The overall number of flow cytometers in BC in the current distributed model of service delivery is fewer than Alberta which has a more centralized Lab model (2 centers) which corresponds to a more centralized tertiary care model.
2. LM Flow Cytometry services (as well as VIHA) are processing a large number of cases with varying degrees of specialization (according to the local clinical requirements) with minimal staff and single instruments (3 instruments in the case of Vancouver General Hospital). Each has a reasonable back-up plan in case of temporary instrument failure. They appear to be highly efficient.
3. While current instruments (by 2 different vendors) have been financed through some form of reagent leases making detailed accounting difficult, future capital and reagent contracts will be uniform through HSSBC.
4. If the overall goal of repatriating LPD, AL, etc. to FHA for medical /work flow purposes is accepted, there will be no apparent savings by bringing flow services from multiple sites into a single facility in the LM. Each of the facilities outside of Vancouver General
5. Where there are more than 2 instruments in a single institution, a reevaluation of work flow may allow a reduction. Lab leadership can undertake this review if not already done.
6. The down town Vancouver institutions *offering similar or identical assays* could consider moving instruments into one lab facility if and when there is integration of clinical and Hematopathology lab services and when infrastructure such as LIS is sufficiently developed. This should be revisited over time.
7. Improved medical practice and potential saving may be realized (but cannot be quantified in the current review) through Utilization Management strategies. For example:

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- a. Prospective screening of cases either at the source of send-out samples (preferable) or at the site of analysis.
  - b. Avoidance of unnecessary repeat testing through transmission of results /list mode data between labs and through review better LIS capabilities should be a priority.
8. *Where assays are similar or identical*, best practice should be pursued through better integration of the existing Flow Cytometry services where possible through uniformity of antibody panels, analysis strategies, etc.

Brian Berry MD

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# **Appendix F**

## **Histology Processing**

### **Working Group Report**

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## Histology Processing Working Group Opportunity Report

### Introduction

As a subgroup of the Service Delivery and Integration Working Group, the Histology Processing Working Group was asked to report on the feasibility and benefits of amalgamating the 10 histology processing Anatomic Pathology (AP) labs in the Lower Mainland (LM) to as few as two, one in Vancouver and one in Fraser Health. There is a general perception that amalgamating smaller labs into a larger lab would yield operational savings, promote standardization and possibly improve overall quality.

The working group was comprised of a representative group of senior anatomic pathologists from multiple hospitals around the LM. These include:

- Dr. Jim Cupples, FHA and Lead
- Dr. Doug Filipenko, PH
- Dr. Blake Gilks, VCH
- Dr. John O’Connell, FHA
- Dr. Tom Thomson, BCCA
- Ms. Joanne Philley, Ministry of Health

Two working group meetings were held by teleconference on October 18 2012 and November 1, 2012. The discussions centered on the feasibility of amalgamating the labs, identifying areas for savings and the implications for quality.

Quantifying the possible savings was problematic. With the assistance of Norma Page, VP of Clinical Operations, DynaLIFE Dx, Edmonton, an attempt was made to examine the potential scale of operational savings obtained through consolidation.

An estimate of savings was made by comparing Edmonton data with the massaged data from Fraser Health. Fraser Health data from four separate AP labs was available and better understood than the other health regions and was used as a proxy for the whole LM system.

### Opportunities

<b>Opportunity</b>	<b>Benefits</b>	<b>Anticipated Savings</b>
Consolidation to two (minimum) histology labs	-State of the art facilities -Provides for redundancy -Retains element of competition and oversight.	-Primarily capital cost savings, e.g. renovation costs VGH, SPH, and RCH. -Less duplication of equipment e.g. processors. -Less duplication of QA and safety processes -Operational savings especially with a

		LEAN system -Bulk purchasing of consumables
Centralized immuno-histochemistry labs	-Standardization, -Possibly better or consistent quality overall -Better able to monitor quality and utilization	-Savings on QA, antibodies and professional oversight. -Efficiency in technical staff.

The basic review of comparative data from Edmonton and Fraser Health suggested up to a 10% savings in staffing costs but this could be attributed to differences in practice and did not examine other operational expenses like reagent costs that could cancel out other savings. Closer examination would be useful and is warranted.

There is a potential to save on lab renovation costs. Three large AP labs in the lower mainland, because of space constraints will require significant renovations in the three to ten year term. At today's costs, this would require at least \$9M and this does not address the lack of available space for expansion. The capital costs required to develop a suitable replacement site have not been calculated.

If AP lab consolidation were to occur, this would provide an excellent if not a once in a career opportunity to plan and develop AP laboratories that are state of the art, efficient and operated under best practices. There is no existing facility that would be capable of taking on significant extra volume. Moving the tissue and slide processing to an offsite space could allow for sufficient space with a 15 year operational horizon. Offsite space would be less expensive to develop and would allow for storage of tissue blocks. Freed up space in hospitals could then be used to meet the demands of other lab fields.

### Assumptions

- Need to do planning with:
  - Due diligence especially comprehensive business case
  - Benchmarking before and after changes
  - Careful attention to change management
- Need to engage the stakeholders including pathologists, technologists and managers with open and inclusive planning.
- Quality must improve, i.e. savings should not come at the expense of quality.
- Any change must support the needs of any given institution.
- Processing facility will have new governance, i.e. not a takeover by one organization.
- Need for appropriate funding to facilitate change, which would be significant but not prohibitive.
- Investment in courier services is required. Given the geography of the LM, this may prove difficult with only two processing sites.

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## Barriers

- Lack of funding and resources to facilitate change
  - Time and funding to do this right!
  - Lack of any business case
- Mistrust among stakeholders. There is vivid memory of failed consolidations.
- Belief that a large processing site can't/won't meet the needs or mandate of a given organization.
- Absence at present of benchmarking.
- Lack of consensus on best practices.
- Inability to get acceptance from some influential stakeholders.
- Acknowledgement and clarification of the role anatomic pathology plays in academics, teaching and research.
- What effect will change have on the staffing pool? Some staff may not transfer i.e. retire or leave.

## Risks

- To focus on cost savings at the expense of quality.
- Failure by the drivers of change to appreciate that we actually do have a quality system.
- Deterioration in AP quality; not a good thing in today's quality paradigm.
- Rushed inappropriate decisions could impact quality and jeopardize the success of the project.
- Understanding that AP does have rush specimens that have to be dealt with urgently.
- Understanding how cytology fits into the plan.
- Alienation of stakeholders, which could derail the process.
- Failure to recognize that an effective courier system is essential for success.
- Costs of courier system may cancel operational savings.
- Delays in TAT in processing could lead to increased utilization by pathologists.
- Potential for technical staff to "withdraw" in response to change.
- Transporting patient specimens entails risk of loss or destruction of irreplaceable patient materials.

## Risk Mitigation Strategy

- Cultivate buy in from pathologists at each site e.g. early acceptors.
- Invite a small group of AP pathologists and technologists to guide the process.
- Explore and inspect labs or jurisdictions that have gone this way.
- Examine success stories critically to learn what works and doesn't work from a quality as well as an operation perspective.
- Learn from others mistakes.
- Provide the resources to develop a comprehensive believable business plan.

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- Acceptance that new technologies are required to minimize process (pre, analytic, post) errors e.g. bar code technologies.
  - Appropriate IT support.
  - Implementation would have to be done carefully to prevent quality issues.
  - Commitment by leaders that change will not decrease quality i.e. problems will be solved quickly.
  - Implement LEAN-processing philosophy.



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# **Appendix G**

## **Utilizations, Costing and Funding Working Group Report**

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## **Utilization, Costing and Funding Working Group Report – Jan 30, 2013**

The Secor Report “Options for Laboratory Transformation” presented to the Ministry of Health, Medical Services and Health Human Resources Division, in 2012 stated that “...key stakeholders revealed three potential short-term opportunities that could benefit the broader laboratory system. These opportunities would likely not require broader changes to the system (e.g. new governance structures) and hence could be initiated in the short-term, but a multi-year time frame for completion would be anticipated.”

The three opportunities listed in the Secor report were:

1. Improving ordering practices for laboratory tests.
2. Developing a provincial quality framework.
3. Conducting a detailed costing study.

Item 1 would be what most laboratory physicians refer to as ‘Utilization Management’ (UM) and implies several dimensions around a reduction in number of tests ordered as well as, in some cases, tests ordered when they may not have been initially ordered, and some elements of ‘decision support’ for those ordering the tests to ensure appropriateness and timeliness. On item 2, Secor remarked that “this study would aim to determine and compare the actual costs of collecting specimens and conducting specific laboratory tests across different public and private labs in BC”.

The Laboratory Reform Committee (LRC) identified these elements as critical to the success of the lab reform process contemplated by the Committee and, along with a number of other critical elements, recommended that several working groups be formed to make recommendations to further these aims. The Utilization Management, Costing and Funding Working Group was accordingly set up to make recommendations on not only UM and costing but also to examine the current funding system for medical laboratories in BC. A separate working group was set up to examine item 2 to address a provincial quality framework.

The Utilization Management, Costing and Funding Working Group comprised the following individuals:

Chris Sherlock (Chair) (BCMA/BCALP)  
Arun Garg (BCMA/BCALP)  
Frances Rosenberg (BCMA/BCALP)  
Pat Melia (BCMA/BCALP)  
Ian Dube (MoH)  
Jeremy Higgs (MoH)  
Joanne Philley (MoH)

The Utilization, Costing and Funding Working group addressed the three separate topics in turn. Templates were filled out according to the standardized system for the LRC (Appendices 1 to 6).

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## Utilization Management

The Boston Consulting Group, in their report from 2011 titled “From Evolution to Revolution: Sustainable Approaches to the Funding: Cost Dilemma” on controlling medical lab costs, reported that savings from lab consolidation and improvements in operational efficiencies are temporary and cannot contain the inexorable increase in lab costs experienced by Western health care systems. The only effective answer, they contend, is what they refer to as “integrated demand management”. The elements of this that need to be managed effectively are: under utilization (where tests are not ordered when they should be for appropriate patient care, leading to higher outcome costs); over-utilization (tests are order when not necessary); chronic disease management (appropriate tests are ordered at proper intervals to prevent long-term adverse outcomes of chronic disease); and elimination of obsolete or ineffective tests from the test menu.

## Inpatient Testing

The Massachusetts General Hospital Group is one of the few groups that has introduced a comprehensive UM program for lab medicine and meticulously documented statistical changes arising from the program. They have documented a 26% reduction in test utilization per inpatient discharge over a seven-year period. Prerequisites required to achieve such savings were documented and are listed in Appendix A (Notes on UM Planning).

Whilst many good projects to control lab test usage have been accomplished and are ongoing in BC, there has been no comprehensive plan to institute good practices in the Province. The Working Group agreed that this was an essential and worthwhile aim for a central planning agency to undertake. Nonetheless, it was clear to the Group that significant resources will be needed to accomplish a comprehensive approach to UM, many barriers to implementation exist, and that this is a long-term project. An essential component of any such program would be a sophisticated data mining and monitoring program to establish baselines and monitor effectiveness as well as effective decision support software for electronic test ordering. Significant ‘buy in’ from senior hospital management as well as clinical program leaders will be necessary, as well as authority for the laboratory to make decisions independently, if necessary, to ensure the success of UM programs. Once efficacy has been established for practices, the next challenge is to ensure sustainability over the long term for the practice.

The following is an independent assessment conducted by the Working Group Lead.

The Working Group Lead collaborated with John Andruschak, Mick Maguire and Ed Ratnaranjah to provide an estimate of the potential cost savings that would be realized in LMC if such an effective UM program were put into place and matured. We used the Mass General number of a 26% reduction in volume of testing. This does not translate into a 26% reduction in expenditures but the Mass General documented that this would result in a saving of 3.4% for high-volume automated testing. Understanding that to get an accurate picture of test numbers and categorizations is a major undertaking and cannot be achieved in the time frame available for this report, the LMC team and the UM Working Group agreed to assume

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that 50% of total test volume is high-volume automated. The data show that, for high-volume automated testing, this will translate into a saving of approximately \$2,000,000 per annum for the LMC labs. We used an estimate of a 10% saving for the non-automated testing and applied this to LMC lab data; this would realize approximately \$6,000,000 per annum for the LMC labs. In total this amounts to an annual saving of \$8,000,000 for the LMC labs. These numbers exclude expenditures for anatomic pathology services because this program is being examined by a separate working group for savings through consolidation. If these numbers are extrapolated to the province as a whole, again accepting that these numbers are very high level and include some broad assumptions, then the provincial saving would amount to \$21,172,000 per annum, based on the 2010/2011 expenditures of \$316,000,000 in the inpatient sector.

### **Outpatient Testing**

A number of potential tests were identified in the MSP fee schedule that could be assessed for deletion or modification of ordering rules. Vitamin D was first on the list, identified by the CUSIC group. A separate Working Group was set up under Dr Jim Cupples' chairmanship to identify a more comprehensive list.

The Working Group recommended that the lab fee schedule be scrutinized on a regular basis to identify items that may be deleted or modified to reduce costs, as well as to do a re-costing on some items for which changes in technology or pricing of equipment and disposables may have changed the cost/expenditure equation. This is done, to some degree, by Dr Frances Rosenberg via the BCMA/BCALP Tariff Committee, along with some MoH personnel. However, the current practice is far from comprehensive and the funding foundation is shaky. The Working Group recommended that a permanent 'secretariat' be established and funded to carry out these functions on a more comprehensive and continuing basis. It was agreed that the 'pay back' would more than justify the additional funding required to set this up.

### **Laboratory Consolidation**

The Boston Consulting Group report clearly identified that, while consolidation of labs is not an effective solution for long-term sustainability of labs with respect to controlling costs, nevertheless it can, in some cases, provide savings in 'unit costs' when done appropriately. The Working Group debated this issue at some length and made recommendations on how decision-making should proceed when considering consolidation for cost-saving purposes. Not least of which was that in some cases costs may actually increase because of the added expenses of splitting specimens, transportation, delays, etc. Clearly there are many factors to take into account. The Working Group agreed that appropriate support of the clinical programs in the institutions being considered must be the pre-eminent consideration when decisions are made around consolidation.

To assist in decision making in this context, the Working Group compiled a template to be used by all institutions and Health Authorities when approaching consolidation as a means of reducing expenditures or, indeed, improving service to the host clinical programs. This template

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is attached as Appendix B and has been contributed to by many experienced lab personnel, both medical and technical as well as administrative.

## Costing

Two principal issues were addressed in this category: first, a comparison between lab costs for Ontario and BC to determine whether the oft-repeated statement that BC lab costs are significantly higher than Ontario's; second, a detailed cost analysis of inpatient lab testing in BC.

### 1. Ontario vs. BC Lab Costs

After considerable discussion it was concluded that this would be a very labor intensive study to carry out and would not yield information that is useful for any foreseeable purposes in the BC lab system.

Recommendation: A detailed cost analysis across jurisdictions is not considered cost effective nor supported by the Working Group.

- ### 2. The Working Group discussed the utility of carrying out a detailed cost/expenditure analysis of inpatient lab testing in BC. This would need to include not just direct costs but also some measure of overhead costs to be meaningful. The same level of granularity would need to be achieved for comparison purposes of different sites. If appropriate and systematic data collection and analysis were to be achieved this would prove valuable for determining precisely what the costs are for inpatient testing, allow different jurisdictions to share best practices for cost savings, and provide some measure of reassurance to the Government, MoH, and taxpayers that tax dollars are being well spent. A template for cost data collection was submitted by Pat Melia (Appendix C).

**Recommendation:** the Working Group recommended that a process be initiated to accomplish the goal of complete cost-accounting for inpatient testing across BC.

## Funding

The Working Group addressed the question of whether we have the best funding model for medical lab practice as well as the impact of having 2 different sets of legislation governing the funds.

- Secor Report was inconclusive on the best model.
  - A mixed solution may be required e.g. at the discipline level
  - The Working Group considers it worth drilling down on the models identified in Secor report for more details to identify strategies that have demonstrated success.
  - Possibly benchmarks can be considered for success.

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- Principles: no system should be penalized above any other without good reason; a one-size-fits-all formula may not be feasible or desirable; variables such as location and services provided need to be taken into consideration; flexibility to move services is needed to meet future needs; technological change needs to be taken into account.
  - **Recommendation:**
    - Identify a third party with expertise to delve deeper into the funding models in Alberta, Manitoba, Ontario and Queensland, NZ
      - Focus on one jurisdiction may be required in order to get the breadth and depth of information required
      - Define what data and analysis is required

## **Appendices 1 to 7**

Opportunity templates.

## **Appendix A**

### **Notes on Utilization Management Planning**

#### **Hospital practice**

1. Requires hospital committee sponsored by senior leadership.
2. Committee needs to include senior clinical leaders as well as laboratory physicians to participate in planning and decision making and to ensure 'buy in' from all clinical services.
3. Prerequisite is sophisticated data mining and monitoring system to establish baselines and monitor effectiveness.
4. A clinical practice standards system allows committee members to set standards/benchmarks and to establish agreement from all sides on what is acceptable practice and what is not.
5. Active order entry system can be very effective to assist selection of appropriate testing (e.g. 'pop up' windows with guidance and/or practice standards)
6. Review all standing orders (scope and frequency) and monitor on a continuing basis to ensure that over-testing is not occurring.
7. Review orders for daily (or multiple daily) 'routine labs' to ensure these are contributing to patient management.
8. Once hospital wide system is in place to assess, approve and monitor utilization projects, then work should proceed on a project by project basis rather than try to initiate a large number of utilization measures all at once.
9. Collect successful initiatives already undertaken by other institutions, colleagues, etc to learn about actual projects, barriers, keys to success, etc.
10. Education is essential to success, particularly for medical students and residents.

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## **Appendix B**

Notes for issues to consider when planning consolidation of labs

Template for any institution or region considering lab consolidation to assist in decision analysis should include at least the following elements:

- A. Identify labs involved and service and test to health care delivery.
- B. Develop complete test list which tests are being considered for consolidation and those that are not.
- C. Engage all stakeholders in operational review of services and clinical requirements and record results.
- D. Determine the key quality indicators for monitoring success of consolidation at all Phases.
- E. Detail reasons for consideration of consolidation (i. Include financial comparisons of the current unit costs versus anticipated costs if testing is consolidated; ii. Include patient outcomes assessments; iii. Include issues pertaining to equitable access to services; iv. Determine whether valued services such as teaching and research will be compromised at the host institutions following consolidation).
- F. Detail consideration of alternatives to consolidation; improved UM; joint contract arrangements.
- G. Document existing roles and responsibilities and reporting relationships and model how those may change with proposed consolidation.
- H. Document existing operating budgets and model how these may change with proposed consolidation.
- I. Document current and future space, equipment, HVAC, personnel needs and other infrastructure for status quo and consolidated models.
- J. Document existing service and maintenance costs and issues with legacy systems at current and potential consolidated sites, as well as existing contractual obligations and potential for risks around changes to contracts as a result of consolidation.
- K. Establish an effective and comprehensive communications and change management plan, including all stakeholders and institutions potentially involved.

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- L. Review the existing relationships with unions and professional associations to determine if any aspects of laboratory consolidation conflict with existing contracts.
  - M. Determine turnaround times for clinical requirements.
  - N. Determine need for on site clinical consultation services.
  - O. Standing orders in different institutions may introduce conflict and confusion with other institutions and referral lab.
  - P. Assessment must ensure that Information Systems.
  - Q. Identify issues with 'normal ranges' etc reported in different labs and institutions.
  - R. Identify emergency preparedness response issues in a consolidated laboratory.
  - S. Assess impact on existing reporting systems to Infection Prevention and Control and public health authorities.
  - T. Determine potential impact on professional and technical training programs.
  - U. Identify transportation issues: distance; geography; weather issues that may shut down service bridges/roads; frequency of pickup needed to service clinical requirements; de novo transportation service needed or utilize existing system; itemize all costs including overhead, packaging – including dangerous goods packaging and ongoing training and certification for staff, and actual costs of trucks, drivers, fuel, maintenance, etc.
  - V. If entire service is not going to be consolidated, list all samples that may need to be split for transportation and testing on site. Determine whether samples will need to go to more than one referral lab and, if so, identify all samples that may need to be split.
  - W. Additional considerations for centralized testing: i. need for multiple accessioning entry/reporting and LIS and interfaces; ii. Need for changing specimen collection methods; iii. Post-analytic considerations).
  - X. Policies and procedures for critical results.

Developed by the UM and Services Costing Working Group,  
Laboratory Reform Committee, October, 2012.



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**Appendix H**  
**Outpatient**  
**Working Group Report**

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## Outpatient Laboratory Savings Opportunities Summary

### 1 EXECUTIVE SUMMARY

Outpatient laboratory savings was identified as one of the eight strategic areas for achieving the mandate of the 2012 Laboratory Reform Committee that was to be investigated by a dedicated working group. The working group was comprised of a cross section of representatives from the Laboratory Reform Committee (LRC), British Columbia Medical Association (BCMA) and Ministry of Health (MOH).

Three working group meetings were held to identify and assess opportunities for cost savings related to the lab test fee schedule, utilization controls and system improvements to the non-analytic portion of lab testing. The time to explore and implement the opportunity is estimated. It is important to point out that most of the opportunities require rigorous evaluation prior to acceptance. The required capital or development costs have not been calculated.

The working group recommends the following opportunities with a cumulative potential savings of \$25.18M:

#### 1. Fee Schedule or Lab Test Opportunities

Test	Savings (million \$)
Restrict Vitamin D testing to special indications	2.7
Restrict PSA testing	1.65
Change testing procedure for <i>H pylori</i>	0.5
De-list testing for Barbiturates, PCP and LSD	0.157
Re-cost Serum Protein Electrophoresis using new method	0.5
Re-cost urine drugs of abuse confirmation testing	0.5
Re-cost drugs of abuse primary base fee	0.67
Re-cost testing for lead, zinc, selenium Re-cost testing for catecholamines and metanephrines	0.5

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## 2. Utilization Controls

Opportunity	Savings (million \$)
Develop system to monitor lab test ordering by health care practitioners and be able to address inappropriate ordering practices quickly.	5.0

## 3. System Improvements

Opportunity	Savings (million \$)
Implement results distribution by electronic means, provincially	5.0
Develop order entry for lab testing; To be followed by decision support software (savings not included)	8.0

## 2 INTRODUCTION

The Laboratory Reform Committee (LRC) was tasked with achieving “additional lab savings from outpatient lab services”. Although the dollar amount of potential savings was discussed, this was not specified in the formal agreement and there was no consensus among the participants. A figure of \$25M was advocated by the MOH and in spite of lack of agreement, this was the amount targeted by the LRC working group.

Outpatient laboratory services are funded by the Medical Services Plan (MSP) and there is a targeted available expenditure amount of \$324.2M in fiscal year 2012/13. A decrease in expenditures of \$25M is a 7.7% savings. This is a significant change, particularly given the capped available amount. Although there are recommendations for re-costing of fees, there was an attempt to identify true operational savings in the system through utilization controls or system improvements.

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### 3 WORKING GROUP

The Outpatient Working Group was comprised of the following members:

- Dr. Jim Cupples, Lab Reform Committee member and Working Group Lead
- Ian Dube, Ministry of Health
- Dr. John Heathcote, BC Biomedical Laboratories
- Jeremy Higgs, Ministry of Health
- Pat Melia, British Columbia Medical Association
- Dr. Mike Moss, Life Labs
- Joanne Philley, Ministry of Health
- Dr. Frances Rosenberg, BC Association of Laboratory Physicians

Three working group meetings by teleconference were held – December 14, 2012, January 4, 2013 and January 11, 2013.

### 4 PROCESS

To identify potential savings in outpatient lab expenditures, the working group examined the present lab test fee schedule with the accompanying MSP utilization and expenditure data. Tests that represented a significant expenditure, particularly those which have experienced a rapid increase in utilization or tests which have questionable medical indications were subject to closer examination. Although there is a process involving the BCALP, BCMA and MSP for ongoing evaluation of lab test fees, given the large number of tests, the rapid change in technology and the bureaucratic process, this has not always kept up with change. It was noted that the current examination was a “cherry picking” approach that identified items which were possibly overpaid but ignored outpatient lab services which were underfunded or unfunded, e.g. home collections.

There was also acknowledgment that the funding levels had to allow for a sustainable lab system. Cuts to fees can result in quick savings but the sustainability of the lab system provincially and across North America will be facilitated by the implementation of utilization<sup>11</sup> controls and system efficiencies. The Secor Report<sup>12</sup> recommended three “short-term opportunities” of which one was “improving ordering practices for laboratory tests”. To this end, the working group attempted to achieve savings by recommending changes that would decrease lab test utilization and to bring efficiencies to the non-analytic portion of lab testing e.g. patient servicing and report delivery.

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<sup>11</sup> The Boston Consulting Group. (2011). From Evolution to Revolution - Sustainable approaches to the funding:cost dilemma. Boston Consulting Group.

<sup>12</sup> Secor. (2012, Sept. 21). *Options for Laboratory Transformation*. Retrieved from Ministry of Health Services: [www.health.gov.bc.ca/library/publications/year/2012/options-for-laboratory-transformation.pdf](http://www.health.gov.bc.ca/library/publications/year/2012/options-for-laboratory-transformation.pdf)

## 5 OPPORTUNITIES

This section provides the assessment details for the opportunities being recommended.

### 5.1 Laboratory Fee Schedule Changes

This section addresses the review of the lab fee schedule and specific lab tests. Many of the recommendations are contingent on a review of the latest test method and a rigorous costing, prior to any fee changes.

Test	Assumptions	Dependencies/ Constraints/ Barriers	Term <sup>13</sup>	Savings (million \$)
Vitamin D – Restrict ordering	Majority of tests ordered are not medically necessary	Under the present system it is difficult to restrict the ordering of specific high volume tests without adding significant costs or inefficiencies.	Short	2.7
PSA – Restrict ordering	Assumed half of all tests are ordered for screening purposes.	Difficult to restrict high volume testing, however by altering the Standard Outpatient Lab Requisition, to comply with practice guidelines, this may alter ordering patterns	Short	1.65
H. <i>pylori</i> – Change test protocol	Breath test which is more expensive is often ordered as first line test.	As per the practice guidelines, the serology test is the first line test but is not practical given centralization of the serology test while the breath testing is done in the community. Implement fee for H. <i>pylori</i> serology test and promote practice guideline.	Mid	0.5
Barbiturate, PCP and LSD	Not medically necessary		Short	0.157
Serum Protein Electrophoresis	Newer technology has cost efficiencies	Not all labs have converted to this new method and may dispute that the two methods are equal in quality. Requires consensus of expert group.	Mid	0.5
Urine Drugs of Abuse Confirmation	Newer methods can result in savings and	Not all labs have the newer technology. Costing would have to be done to justify fee changes.	Mid	0.5

<sup>13</sup>Term definitions: Short term 1 year, Midterm 1-3 years, Long term greater than 3 years

Testing	potential for volume efficiencies	Office screening tests may be driving utilization of confirmatory testing.		
Drugs of Abuse Primary Base Fee	This has not been costed for years.	A primary base fee reflects the cost of servicing a patient but some of these costs may be already factored into the cost of the individual tests.	Short	0.67
Lead, Zinc, Selenium Testing; Catecholamine, Metanephrine Testing	Variably priced fees yet with similar testing methods	Re-costing of fees will likely result in fee changes.	Mid	0.5

## 5.2 Lab Test Utilization Controls

### 5.2.1 Description

In our system, health practitioners have been given the ability to order any number of lab tests from a fairly expansive test menu. Some specialized low volume tests require prior approval from a lab medicine physician, however for higher volume, non-specialized test, this is not practical. In the name of patient care, health practitioners are given a “blank check” for laboratory testing. Monitoring of lab test ordering is difficult and there is no developed system to deal with abusive ordering practices. It appears that the present system does police health practitioners who financially benefit from their pattern of practice but does not have a method to penalize the ordering practitioner for inappropriate lab test ordering where the practitioner does not financially benefit.

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As has been shown with the ordering of Vitamin D, physician education does have an effect on utilization but this effect can be transitory and unpredictable. It is known that approximately 70 physicians have statistically significant anomalies in their test ordering practices. If these physicians were to alter their ordering practices to be more in line with other physicians, a potential **\$5M could be saved**. Some existing committee, be it the Patterns of Practice Committee or the Audit Branch of the MOH has to take on the responsibility of using the available data to identify abnormal ordering practices, assess and then be able to use both a “carrot and stick approach” if appropriate.

This would be a short term project.

### **5.2.2 Benefits**

Implementation of monitoring and controlling ordering practices in a reasonable and considerate manner would likely affect the ordering practices of the average health care practitioner and possibly result in additional savings. It would instill a fiscal awareness in practitioners.

### **5.2.3 Assumptions**

It is assumed that health practitioner education will not result in long term savings without some mechanism to penalize the worst offenders.

### **5.2.4 Dependencies**

For this to be successful, the MOH must generate the appropriate practitioner specific ordering data on a quarterly basis and that there is a mechanism to assess the data and to respond quickly and repeatedly if necessary. Publicity of this program would be essential to achieve maximum savings.

### **5.2.5 Constraints and Barriers**

Lack of resources might be used as a barrier however even a basic infrastructure to examine the ordering practices of only 70 physicians could result in millions of dollars in savings.

To develop a system with penalties may require legislation.

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To alleviate concerns over an overly zealous system, would require consideration and evaluation of the practitioner's practice to accommodate variations in practice e.g. types of patients seen.

### 5.3 Lab Test Results and Other Report Electronic Distribution

#### 5.3.1 Description

Lab test results have been distributed in paper form but this is gradually being replaced by electronic means. Presently 70% of the outpatient testing results from the Community labs are distributed electronically either to the doctor's office for printing or directly into the office EMR. It has been predicted that when the Lower Mainland labs convert to electronic distribution that there will be \$1M in savings. If the remainder of the Province was to convert and the penetration of electronically distributed reports approached 95%, it is estimated that there would be at least another **\$1M savings**.

Given electronic connectivity between report distribution software and the hospital information systems, it would be possible to distribute a variety of medical reports including but not limited to medical imaging, discharge summaries, emergency visits and clinic visits with follow up recommendations. It is estimated that this could save an **additional \$4M in distribution costs**.

#### 5.3.2 Benefits

In addition to the monetary savings, there would be an improvement in patient care. Presently many reports are either delayed or not even sent to the health care practitioner because of system delays or lack of resources.

Approximately 50% of physicians would have these reports embedded directly into their EMR systems.

#### 5.3.3 Assumptions

It is assumed that the technology largely exists in an operational form but would require some system specific modifications and testing.



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### 5.3.4 Dependencies

For this to be implemented in a short to midterm time frame, existing technology would have to be utilized.

### 5.3.5 Constraints and Barriers

The lack of stakeholder consensus would be detrimental to the quick success. There would be some development costs but they should not be prohibitive.

### 5.3.6 Risks

Information technology projects can become expansive and expensive.

## 5.4 Electronic Order Entry for Laboratory Testing

### 5.4.1 Description

One of the short term opportunities identified and recommended in the Secor Report<sup>14</sup> was “implementing intelligent order entry and decision support systems”. It was agreed by all that this would be a major advance with potentially large cost savings. As a first step on this path, there would be major savings with implementing electronic order entry that lacks decision support features, for outpatients. Based on the time savings for accessioning and processing a patient through a Patient Service Center (PSC), where the order is electronic and then amortizing this saving to all patient encounters, the savings would be in the order of \$17M. If only half of patients’ orders were electronically submitted, approximately **\$8M could be saved**.

As a first step but not additive in savings, a more robust updated patient demographic data set as envisioned in the new BC combined drivers license and health services card would potentially save \$1.2M.

It is predicted that development of an order entry system would be a short to midterm project. The addition of the decision support component would be mid to long term and the cost savings for this have not been estimated.

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<sup>14</sup> Secor. (2012, Sept. 21). *Options for Laboratory Transformation*. Retrieved from Ministry of Health Services: [www.health.gov.bc.ca/library/publications/year/2012/options-for-laboratory-transformation.pdf](http://www.health.gov.bc.ca/library/publications/year/2012/options-for-laboratory-transformation.pdf)

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#### **5.4.2 Benefits**

A basic order entry system would be the first step towards a decision support system. A link to the PLIS database would allow for flagging of recently performed possibly redundant testing enabling additional savings.

#### **5.4.3 Assumptions**

The savings are predicated on the increase efficiency of the PSC staffing. Smaller PSCs with few staff would not be able to achieve the predicted savings. This may provide an incentive for larger PSCs which may have additional system savings, e.g. courier services.

It is assumed that an electronic order entry system design would not disadvantage any outpatient service provider.

#### **5.4.4 Dependencies**

This depends on health care practitioners embracing order entry over hand written forms. Presently greater than 30% of lab requisitions are EMR generated. Given the physician EMR adoption rate<sup>15</sup> of 57%, it is estimated that greater than 50% of physicians with EMRs are ordering “online” and then printing the requisition because electronic transmission is not available. To facilitate developing a user friendly system will require close collaboration with the EMR vendors which will ensure buy in from the ordering practitioner.

E-standards will have to be developed quickly.

#### **5.4.5 Constraints and Barriers**

A lack of stakeholder consensus would be detrimental to the early success. There would be development costs which have not been calculated, but there may be available MOH funding already allocated to improving physician office practice which this would accomplish.

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<sup>15</sup> PITO Data January 21, 2013

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#### 5.4.6 Risks

Information technology projects can become expansive and expensive.

#### 5.5 Additional Proposals

The working group identified additional areas to investigate but the savings would likely be small overall and have not been calculated.

<b>Proposal</b>	<b>Comments</b>	<b>Term</b>
Streamline processes for submitting and reviewing changes to fee schedule.	The present system is slow and cumbersome	Mid
Changes to Standard Outpatient Lab Requisition to reduce utilization	The mandate of the lab requisition is unclear. Is it to discourage utilization or to facilitate the ordering of lab tests by health care practitioners?	Short to mid
Centralization of low volume testing if appropriate to patient care.	There are many low volume tests; many already centralized but there could be additional opportunities.	Short to mid
Implementation of patient registration technologies e.g. similar to an airport setting.	With the new health services card this may be possible.	Mid

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**Appendix I**  
**Quality**  
**Working Group Report**

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## **REPORT TO THE LRC FROM THE QUALITY WORKING GROUP**

### **Summary:**

The working group on quality met twice in the fall of 2012 to discuss opportunities and issues related to quality in public sector laboratories in BC. Members included medical, administrative and technical representatives from five of the health authorities and Dr. Michael Noble, an internationally recognized expert in laboratory quality.

Input from members of the committee was supplemented by information derived from a questionnaire distributed to medical and technical leaders of the health authorities.

A major focus of the discussions was the benefit of achieving improved quality and decreased error rates through adoption of international standards and common practices. The goals include:

- Improved patient care
- Cost savings
- Creating capacity for future needs

The working group also discussed the type of structure that could be used to support a provincial quality system and the requirement for the accreditation process to support provincial needs and goals.

It is anticipated that cost savings of 3 to 4% of operating expenses could be made by the adoption of ISO standards. Partnering of the Diagnostic Accreditation Program with an ISO certified organization such as the Ontario Quality Management Program – Laboratory Services (QMP/LS) could result in cost savings of at least 25% to the accreditation process.

The working group recommends the following:

1. Create a quality council that establishes provincial quality policies and priorities:
2. Subject to review by the quality council, adopt ISO 15189 as the provincial laboratory standard;
3. Move to an accreditation program that is ISO 15189 compliant.

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## Cost of poor quality

It must be recognized that poor quality is costly to the health care system<sup>1, 2, 3</sup>.

- We assume that medical laboratories in BC are operating at a comparable level to other laboratories in industrialized countries with error rates of about 0.3 to 0.6%.
- In Six Sigma terminology, this translates to a sigma value of about 4. It has been estimated that an industry operating at a  $4\sigma$  level could spend up to 20% of revenue on the costs of correcting errors or defects<sup>1</sup>.
- The costs include the following<sup>2</sup>:
  - Internal costs: Costs to the laboratories for error correction
  - External costs, including costs and inconveniences to patients and clinical costs resulting from delays and release of erroneous information

## Impact of error reduction

To reduce errors, both preventive and monitoring strategies are required. It is recognized that prevention is overall more cost effective than mechanisms to catch errors before results are released (the costs of prevention versus the costs of appraisal)<sup>3</sup>.

To this end, laboratories across industrialized countries are adopting ISO standards and using process improvement/standardization techniques such as lean manufacturing and/or Six Sigma.

It is anticipated that cost savings of 3 to 4% of operating expenses could be made by the adoption of ISO standards.

## The current situation in BC

- ISO 15189 (ISO 15189-07 Medical laboratories – Particular requirements for quality and competence) is the accepted standard for medical laboratories, yet BC is one of the few jurisdictions in Canada that has not formally adopted ISO 15189;
- There are recognized vulnerable areas in laboratory medicine, including in anatomic pathology and in the pre-analytical area;
- While performance indicators are used by all health authorities they are not standardized and there is little evidence that commonly used performance indicators impact on the quality of patient care;
- There does not currently appear to be a mechanism to address deteriorating trends in laboratory performance on proficiency testing, specifically in microbiology;
- There are opportunities to share best quality practices, for example in lean processing.

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## **Opportunities for Improvement in Quality Systems**

The working group recommends the following:

### **A. Create a quality council**

1. Responsibilities would include:
  - a. Determine what laboratory standards will be used. The working group strongly recommends that ISO 15189 be used as the framework for quality initiatives in the province;
  - b. Oversee the development of laboratory practice recommendations based on the standards;
  - c. Monitor performance of laboratories in the province, including proficiency testing and quality indicators (note that development of meaningful indicators is required).
  - d. Ensure the development and monitoring of quality parameters relevant to changes in service delivery;
  - e. Establish foundational educational requirements for laboratory staff at all levels and provide reference material on quality;
  - f. Provide access to in-province expertise on applications of quality tools.
2. Membership should include appropriate geographical and professional representation as well as other stakeholder representation;
3. The reporting relationship will depend on the overall governance structure, however there should be a relationship to the BC Patient Safety and Quality Council;
4. Additional relationships may include organizations such as the BC Quality Council and the Community of Practice for Lean.
5. The costs and funding model would have to be determined. There may be some parallels with the Medical Imaging Advisory Committee

### **B. Move to an Accreditation Program to is ISO 15189 Compliant**

BC is one of the few jurisdictions in Canada that has not adopted ISO 15189 as an accreditation standard. Both the Accreditation Canada program and the QMP/LS in Ontario are ISO-compliant. This can lead to inconsistencies in practice and puts BC at odds with other jurisdictions. Adopting an ISO-compliant accreditation program would resolve these issues.

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Options include:

1. Redeveloping the BC program, potentially in partnership with Alberta and other western provinces;
2. Partnering with Ontario, which had a well-developed program that has been used in other provinces.

<b>Anticipated benefits</b>	BC's accreditation program (DAP) would be consistent with other accreditation programs in Canada and worldwide. The cost of maintaining the program would likely be lower, especially with interprovincial collaboration. The approach would have to be evaluated based on a proper business case. Based on preliminary information from laboratories that have undergone surveys from both DAP and QMP/LS, cost savings of >25% would not be unreasonable.
<b>Assumptions</b>	Willingness to undertake this venture on the part of key stakeholders, including the Ministry of Health, College of Physicians and Surgeons, and laboratory providers.
<b>Dependencies</b>	Impact on other accreditation programs provided by the DAP
<b>Constraints</b>	If a redevelopment option is chosen, the cost of redeveloping the program and professional resources to perform the work.
<b>Barriers</b>	Resistance to the concept, as the DAP has been reviewed and extensively revised over the last 10-15 years.
<b>Risks</b>	Lack of support at critical levels Inability to complement with project in a timely way

**The following topics were discussed by the working group and may be considered by the Quality Council as additional opportunities:**

1. Formalize and expand systems for review of anatomic pathology samples:
  - Access to consultant pathologists for pathologists practicing in small communities;
  - Establish a provincial network of reference anatomic pathologists available for consultation on complex cases.
  - Formalize BCCA review of referred-in cases and standardize BCCA review process;
  - Develop means to resolve discrepancies between cervical cytology and biopsy samples;
  - Expand use of telepathology for education and real-time consultation.



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2. Create working groups to implement new CSA standards for sample collection, transport and accessioning.
    - Standardize test names
    - Explore use of electronic barcode readers for positive patient identification.
  3. Create systems to facilitate sharing of best practices for example:
    - Use of lean processing
    - Standardized order sets

### References

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2. Richard Chard O. Carlson et al. A primer on the cost of quality for improvement of laboratory and pathology specimen processes. American Journal of Clinical pathology, 138, 347-354. 2012
3. MA Noble. Counting the Costs of Poor Quality. Power point presentation.  
[http://www.polqm.ca/pdf/NSH2012%20-%20Counting%20the%20Costs\\_F.pdf](http://www.polqm.ca/pdf/NSH2012%20-%20Counting%20the%20Costs_F.pdf)

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**Appendix J**  
**Clinical Guidance**  
**Working Group Report**

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## Clinical Guidance Working Group Report

### **Preamble**

Under the Terms of Reference (TOR) of the Laboratory Reform Committee (LRC), a number of working groups were established to address the main issues within the TOR.

A major impetus was to address the following:

*To achieve a more efficient integration of inpatient laboratory services that may include:*

- *A timeline for achievement of the previously identified \$18M in annual savings.*

In discussing the \$18M target for inpatient laboratory savings from the Lower Mainland Laboratories, the Laboratory Reform Committee agreed that the target could include cost avoidance strategies as well as cost savings. It was also recognized that there are laboratory-based initiatives that have the potential for major cost reductions in other areas of the hospital operation, outside of the laboratory. The LRC agreed that these 'indirect' reductions in costs could count toward the overall expenditure reduction target of \$18M. It was also recognized that province-wide adoption of these initiatives would be the ultimate goal, to improve care and maximize cost reductions. A number of these laboratory-based initiatives were identified:

- Antimicrobial Stewardship
- Blood and Blood Product Stewardship
- Diabetes Management Program

Working sub-groups were established to address each of these initiatives.

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## Antimicrobial Stewardship

Please see separate report entitled “Antimicrobial Stewardship Working Group Report”

## Blood and Blood Product Stewardship

### Preamble

Appropriate use of blood and blood products is a primary goal of transfusion medicine specialists. This constitutes good clinical care by avoiding the risks of giving these products to patients who can be managed by other means.

From a costing perspective, each unit of red blood cells and each blood product is billed directly to the Ministry of Health Services by the Canadian Blood Services. The total cost to BC of these products for the 2011 fiscal year was \$158M. The following is an approximation of blood product costs in Canada from an Associate Medical Director, Canadian Blood Services:

<b>Costs of Transfusion</b>	
<b>Item</b>	<b>Cost</b>
Red blood cells (1 unit)	\$400
Platelets (1 dose)	\$500
FFP (4 units)	\$700
Cryoprecipitate (8 units)	\$225
Albumin 5% (500 mL)	\$100
Pentaspán (500 mL)	\$70
Niaspase (4.8 mg)	\$5,000
Octaplex (1500 IU)	\$2,000

Cost does not include:

- Donor’s time
- Transportation of blood
- Processing unit in blood bank
- Nursing time
- Laboratory tests

(Webert, 2010)

In addition to the above, a single infusion of IVIG to a 70kg adult costs \$5000.

As well as direct costs, it has been estimated that the avoidance of a red cell transfusion saves 77 minutes of nursing time.

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## Overview

To address the issue of blood and blood product utilization, a transfusion medicine working sub-group was convened under the Laboratory Reform Committee. The committee had the following membership:

- Dr. Brian Berry, VIHA (lead)
- Dr. Kate Chipperfield, VCHA
- Dr. Doug Morrison, FHA
- Dr. David Pi, VCHA

Current provincial blood and blood product data was supplied to the committee by Canadian Blood Services and the Ministry of Health Services.

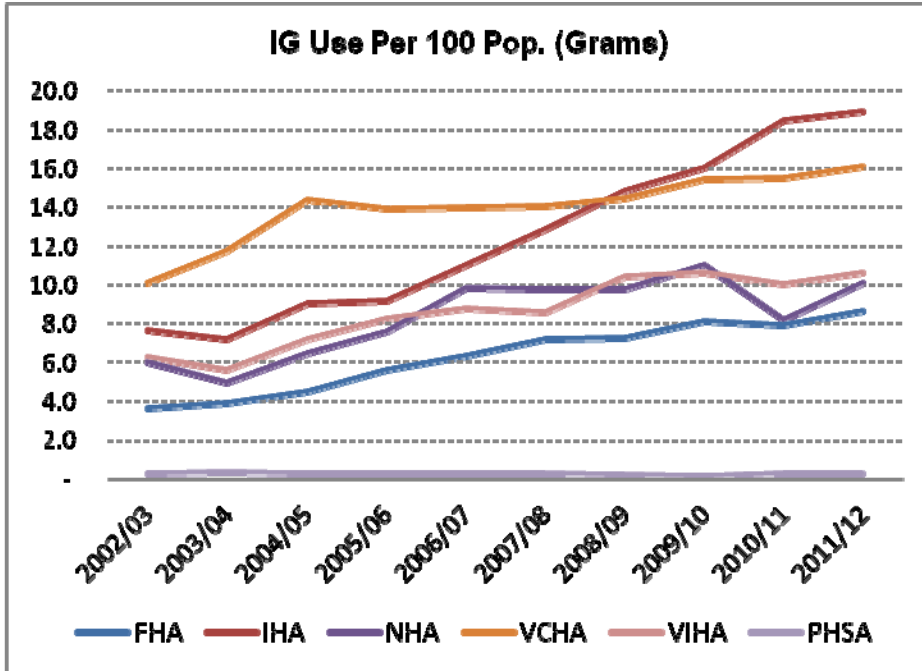
## Blood Product Utilization

It is the opinion of medical leaders in transfusion medicine in BC that utilization management is difficult but possible through a number of different strategies including physician education, prospective screening, retrospective auditing and decision supported physician order entry (DS-CPOE). A number of these strategies are currently in place and are likely very effective (e.g. IVIG), while other strategies are currently being developed. Tools are available to measure the impact of current utilization programs and future strategies that may be implemented. It is certainly our experience and there is evidence in the medical literature that blood components and fractionated products are over-utilized. Given that our province spends \$158M annually for these products from Canadian Blood Services (CBS), there is certainly potential for significant savings.

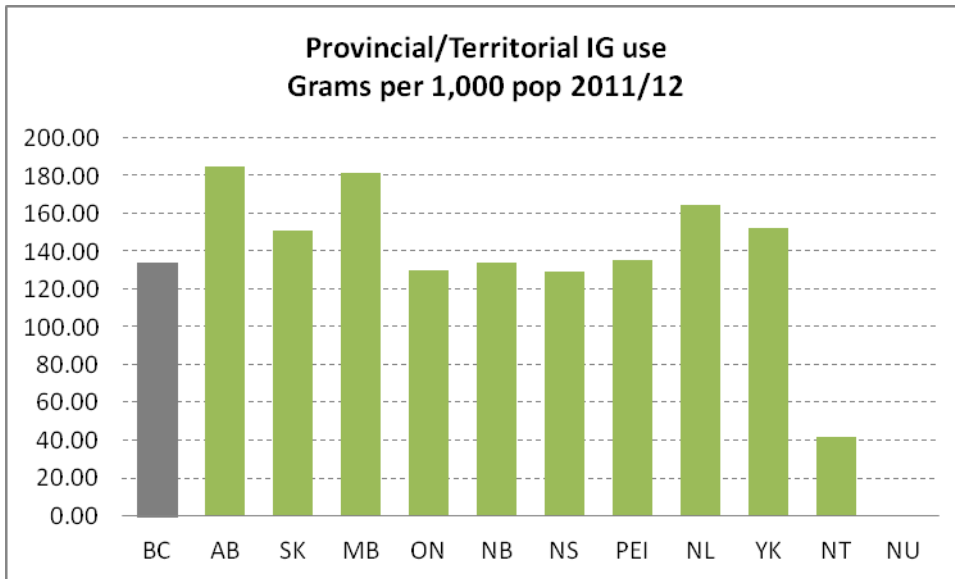
We currently have access to detailed costing and utilization data for IVIG as well as adequately detailed information related to other blood components and fractionated products through the Central Transfusion Registry (CTR). Unit and cost per 1000 population for separate health authorities is available and, knowing the cost per unit through CBS information, we can accurately determine current and future costs. Furthermore, CBS data should allow us to understand per capita costs in other comparable jurisdictions such as the province of Alberta, other provinces or nationally. One could reliably ascribe some or all of the difference between local and comparator costs to the various utilization management programs currently led through transfusion medicine programs.

The following is information provided previously by the Provincial Blood Coordinating Office (PBCO) to regional TM Medical Directors showing the level of detail currently available, which can be used for current and future IVIG cost avoidance estimates. Similar data can be generated for any blood component or fractionated product.

**1. IVIG (gram) )use per 100 population by Health Authority**



**2. Provincial per capita IVIG use (grams) 2011/12**



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From these data, one can estimate the financial savings of current IVIG utilization management programs in various HAs and trend these over time. While the lower mainland labs are of current interest, this strategy can be equally applied to all HAs. Since 2008/09 one-time funding, which is reviewed each year, has been provided to the HAs to support IVIG utilization management programs. This funding can be considered the provincial contribution to be deducted from gross savings in calculating the net utilization savings for IVIG.

Since 2000, there has been an IVIG Utilization Management Program in BC. This has largely been driven by hematopathologists, through aggressive prospective screening, and results in annual savings of approximately \$11M. This has been accomplished by way of considerable additional workload to hematopathologists. Provincial rheumatologists consult on a small number of rheumatology requests.

2011/12 utilization data for IVIG show that, although BC compares very well with other western Canadian provinces (average of 129gm per 1000 population for BC versus 172gm per 1000 population for other western provinces), there remains a considerable range in utilization by Health Authority which is not easily explainable. The range is 87 – 190gm/1000 population. The data indicates that even if the higher utilizers were reduced only to the BC provincial average rather than the level of the lowest utilizer, this would result in additional cost savings of \$4.58M. The expert opinion on the working group consider that this is eminently achievable.

### **Opportunity**

- Collect further IVIG utilization data on those HAs who exceed the provincial average.
- Build upon best practice of IVIG utilization control to align high utilizers with the provincial average.
- Review utilization control measures of IVIG in the two large low-cost HAs (87gm/1000 population and 108gm/1000 population respectively) to guide further province-wide reductions in IVIG utilization.
- Anticipated cost savings/avoidance = \$4.58M.

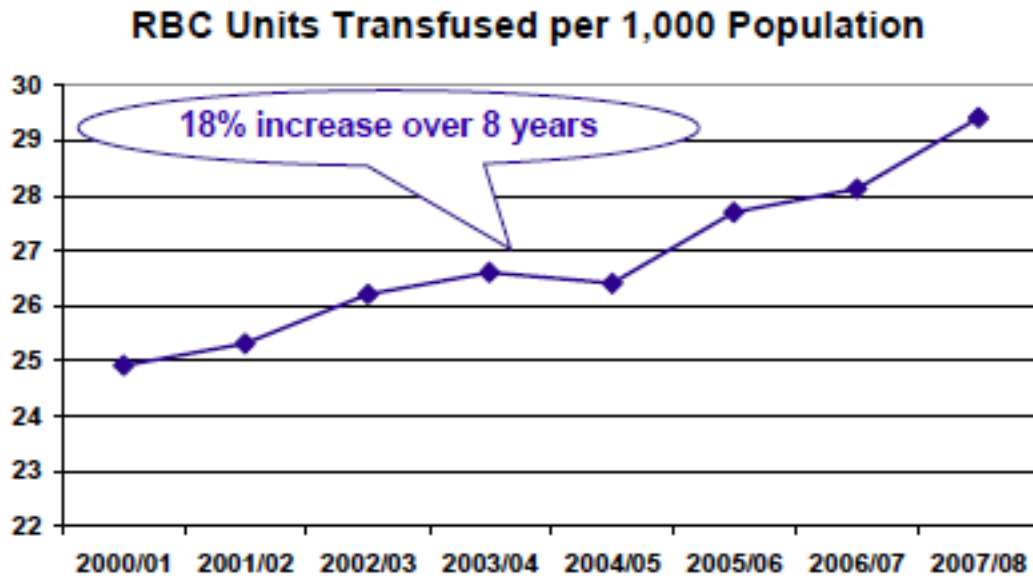
While blood product availability and indications have remained relatively static, in certain situations, this can be complicated by new products becoming available and significant changes in medical indications. For example, frozen plasma use has predictably decreased with the availability of Prothrombin Complex Concentrates (Octaplex, Beriplex). However, these complexities can be overcome and reasonable estimates of utilization management program effects can be made.

In summary, transfusion medicine physicians have undertaken utilization management of blood components and fractionated products to optimize patient's care and safety. While this has significant downstream cost saving implications (decreased lab technology expenses, decreased nursing costs, decreased transfusion reactions, decreased adverse events, etc.), more immediate cost savings in avoidance of blood product use can be accurately estimated through CBS data and existing provincial resources including the CTR. This can be appropriately applied

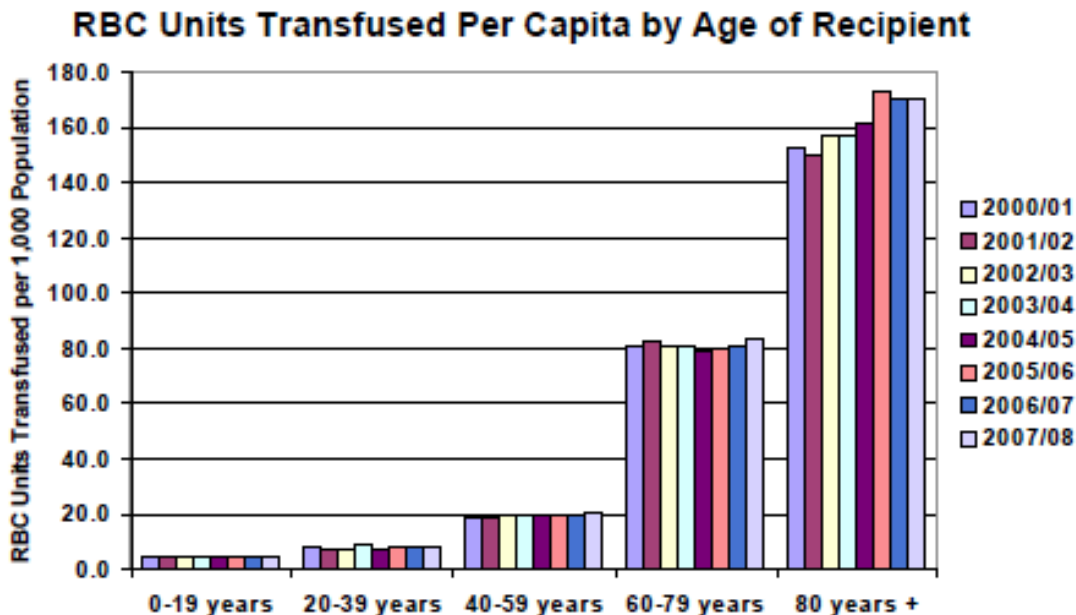
to the desired savings in lower mainland lab cost savings an analogous to savings expected through antibiotic stewardship programs.

### Red Blood Cell Utilization

The number of Red Blood Cells (RBC) transfused in BC grew by 28.2% between 2000/01 and 2007/08, with a per capita increase of 18% (Selin, Lewis, & Wadsworth, 2009):



Adjusting for population growth, the greatest increase in volume transfused was in the age group of 80 and over:





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This substantial increase in RBC use in BC is accounted for by an increase in the number of patients receiving transfusions and in the number of transfusion episodes, rather than an increase in the volume of red cells transfused per patient. (Selin, Lewis, & Wadsworth, 2009)

Recent guidelines from the American Association of Blood Bankers (AABB) could have a dramatic effect on red cell utilization (Carson, et al., 2012). Based upon a systematic review of the literature on randomized clinical trials evaluating transfusion thresholds, the AABB guideline uses evidence-based procedures to make three recommendations:

- Adhering to a restrictive rather than liberal transfusion strategy in hospitalized, stable patients.
- Adhering to a restrictive transfusion strategy in hospitalized patients with preexisting cardiovascular disease.
- Transfusion decisions be influenced by symptoms as well as hemoglobin concentration.

The authors conclude that:

*'If a restrictive transfusion strategy were widely implemented and replaced a liberal strategy, exposure of patients to RBC transfusions would decrease by an average of approximately 40%. This would have a large effect on blood use and the risks for infectious and noninfectious complications of transfusion.'*

In addition, there would be a major savings in nursing time.

A review of RBC utilization trends in BC, together with an inter-hospital comparison of RBC transfusion intensity (Units/patient) within Vancouver Coastal HA has been undertaken by Dr. David Pi (Pi, Jan 23, 2013). Dr. Pi also reviewed recent literature on the subject of RBC utilization. Although this research is limited by time and crude data, it is felt that adoption of, and adherence to, the recent AABB guidelines regarding RBC transfusion, could result in a province-wide 10% reduction in RBC utilization, yielding savings in the range of \$7.6M.

### **Opportunity**

- With implementation of, and adherence to new guidelines, together with tighter control of existing guidelines, the working group estimates that a 10% reduction in Red Blood Cell Utilization is realistic.
- Cost savings/avoidance, province-wide = \$7.6M. This is a conservative estimate. Further indirect savings through nursing time and avoidance of the complications of red cell transfusion could also be expected, the magnitude of which could only be roughly approximated at this time.
- Timeline – Short

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## Implementation Strategies for Utilization Control in Transfusion Medicine

The Provincial Blood Coordinating Office (PBCO) and the Transfusion Medicine Advisory Group (TMAG) are valued provincial assets and have been successful in developing guidelines for the use of the more common blood products (red cells, plasma, platelets, IVIG). Successful adherence to existing and new guidelines rests heavily on the shoulders of regional and local transfusion medicine physicians through a variety of mechanisms. One approach that has been used successfully is the Massachusetts General Hospital, Boston model (Kim, Dzik, Dighe, & Lewandowski, 2011).

There are 2 basic approaches according to blood product type:

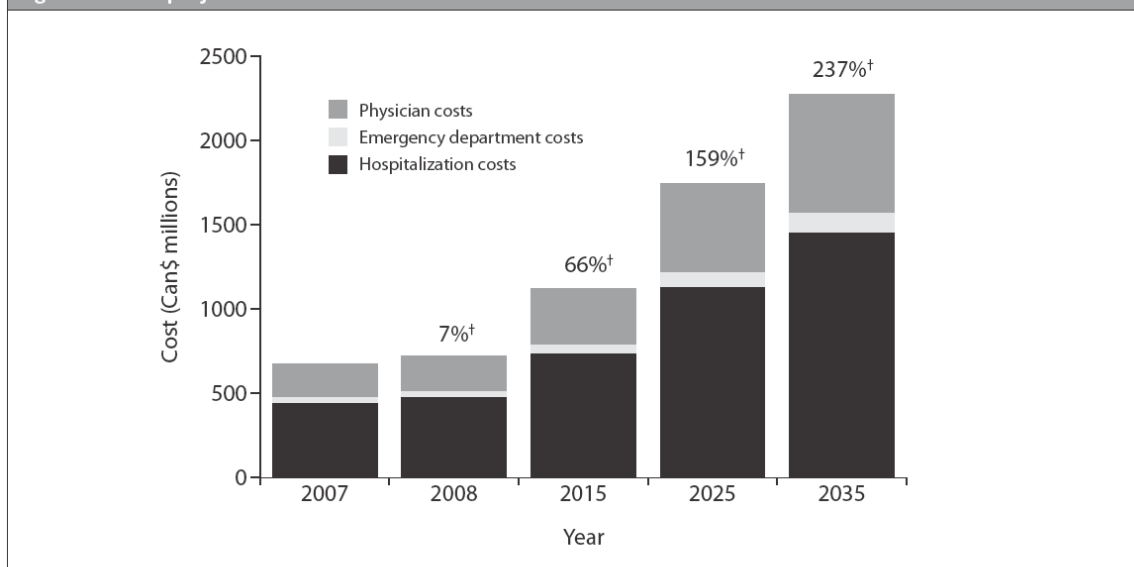
1. High-volume, low-cost products (e.g. RBC, platelets, FFP)
  - Retrospective computerized review of transfusions according to set criteria.
  - Computer flagging of all cases not meeting set criteria.
  - Review of all these cases by transfusion medical director.
  - Email message to ordering physician describing case details and reiterating transfusion criteria, including links to educational websites.
  
2. Low-volume, high-cost products (e.g. IVIG, recombinant factor VIIa)
  - Consultant-gatekeeper approach.
  - Requests for all these products require approval by transfusion medicine physician prior to release. This approach requires 24-hour transfusion medicine physician coverage.
  - Standard guidelines for product utilization used.

In BC, the reality is that some of this is done in many places, some of the time, but is applied very unevenly and sporadically throughout the province. Adopting a standard approach like this and ensuring adherence, will achieve cost savings/avoidance. However, the acknowledgement of the pivotal role of transfusion medicine physicians is paramount to the success of this initiative.

## Diabetes Management Program

Diabetes mellitus is on the rise in Canada and around the world. Major contributors to this growing prevalence are obesity and an aging population. Diabetes is associated with higher use of general practitioners, specialist services, emergency services and hospitals. A recent paper in the Canadian Journal of Diabetes developed a life table model to predict the prevalence and costs of diabetes from 2008 to 2035 in Alberta (Rau, Ohinmaa, & Johnson, 2011). The model predicts a 248% increase in diabetes in this time period with a 237% increase in the costs of care:

Figure 5. Total projected healthcare costs for diabetes in Alberta\*



\*2007 Canadian dollars

†Increase from 2007

The breakdown of these costs is as follows:

Table 2. Estimated healthcare costs for treating diabetes in Alberta (\$ millions)\*

Costs	2007, \$	2008		2015		2025		2035	
		\$	Increase from 2007, %	\$	Increase from 2007, %	\$	Increase from 2007, %	\$	Increase from 2007, %
Hospitalization	440	473	8	730	66	1125	156	1452	230
Emergency department	34	36	6	56	65	88	159	115	238
Physician	199	214	8	335	68	532	167	705	254
Total healthcare	673	723	7	1121	67	1745	159	2272	238

\*2007 Canadian dollars

The Kelowna Diabetes Program was developed by Valley Medical Laboratories in 2001, to improve the care of patients with diabetes in the Kelowna area. The program has grown to the point where there are now 7000 enrolled, with 99% of the family physicians in Kelowna participating. The program is structured as follows:

- Patients enrolled in the program are seen 4x/year by Valley Medical Laboratories.
- Testing follows the 2008 Canadian Diabetes Association Clinical Practice guidelines for testing.
- Each patient receives a report after each visit, detailing A1C level, Lipid levels and systolic blood pressure, relating them to target values.
- Reminders are sent to patients about their next appointment.

Outcome analysis reveals the following:

- The compliance rate for testing is 97%, compared with the BC average of 51%.

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- Significant improvement has been seen in target values between 2001 and 2011.
  - There has been a 60% reduction in acute coronary syndrome events for the patients enrolled in the program, compared with Central Okanagan patients not enrolled.
  - The administrative costs of running the program are approximately \$16 per participant per year.

This compelling preliminary data regarding reduction in acute coronary events requires further verification by way of a collaborative clinical impact study between Valley Medical Laboratories and the Ministry of Health Services. A report from a similar program run by ValleyCare Diabetes Disease Management Program in Los Angeles, California suggests similar benefits in terms of achieving target diabetic values and reducing emergency room visits and hospitalization (Los Angeles County Department of Health Sciences, 2008). In this study, there was an 83% reduction in hospital admissions and a 95% reduction in inpatient days. Cost avoidance calculations were performed and predictably showed major savings. A similar but much smaller program is run through the Vancouver Island Health Authority.

This project was discussed at the Laboratory Reform Committee. It was pointed out that there are a number of diabetic management initiatives underway in the province. There was agreement that, in view of the looming cost crisis in diabetic management, a clinical impact study should be considered as a pilot with Valley Medical Laboratories. As well as improving the care of the enrolled patients, it appears that there are major cost benefits to the system that accrue from such an initiative. The minimal operating costs of the program are noted.

### **Opportunity**

- In view of the projected major cost increases in diabetes care, a clinical impact study between Valley Medical Laboratories and the Ministry of Health should be considered, to validate improvement in cost-sensitive end points (ER visits, hospital days, proximity to targeted diabetic values, diabetic complications) as a result of program enrollment.
- Cost savings/avoidance – to be determined but likely to be major.
- Timeline - Short

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**Supplement to Clinical Guidance Working Group Report:**

**Summary of IVIG review**

First, we would like to make sure that the report strongly expresses that IVIG utilization management, where successful, is primarily accomplished by aggressive prospective screening by Hematopathologists (and secondarily to the provincial Rheumatologist group that consults on a small number of Rheumatology requests). This offers the opportunity to educate the ordering MD's re: approved and appropriate indications, adverse reactions, cost, etc. In the long term, these interactions result in a more educated medical community which begins to order more reasonably. The cost saving should be credited to this Pathologist activity and not be mistakenly credited to the PBCO which offers infrastructure assistance but does not directly involve itself with utilization. Furthermore, the infrastructure programs that the PBCO is involved in are the result of TMAG (Medical) advice (CTR, Data extracts and reports, Rheumatology screening program, neurology screening program, etc.).

Second, we would like to point out that the **current Utilization program** largely driven by Hematopathologists (excluding infrastructure costs of \$721K below) is already saving the province \$11 million annually. This has been an **additional professional workload** since the BC IVIG Utilization Management Program's inception in 2000.

Third, we provide the current cost of the utilization management infrastructure (\$721K), the current BC savings relative to comparator western provinces (\$11 million), potential annual Lower Mainland savings (\$2.08 million) and potential annual provincial savings (\$4.58 million).

**The current HA utilization profile, provided by Canadian Blood Services:**

HA Average Supply gm/1000 pop.	Total annual IVIG cost \$
VIHA 107	4.5M
NHA 101	1.6M
FHA 87	7.8M
<b>VCHA 161</b>	<b>10.2M</b>
<b>IHA 190</b>	<b>7.8M</b>
PHSA 3	0.7M
<b>BC average 129.2</b>	<b>BC Total 32.7M</b>

**Western Canadian Average = 172 gr/1000pop**

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### Current cost of IVIG Utilization Management Program

1. Direct MoH to HA funding	\$456,000
2. Rheumatology screening program (Rheumatologist & PBCO staffing costs for screening program)	\$100,000
3. PBCO staffing to IVIG program	\$180,000
<b>Total cost</b>	<b>\$736,000</b>

Rheumatology program costs are included as we cannot separate the Rheumatologist impact on cost savings below. Cost savings accrued to Rheumatology diagnoses are the combined effort of Hematopathologists and Rheumatologists.

### Current annual cost savings

**\$11,000,000** Relative to Western provinces (excluding BC) (129 gr/1000 pop vs 172 gr/1000 pop)

### Possible future annual Lower Mainland savings:

#### 1. VCHA utilization down to current BC Avg

- VCHA \$10.2 million (161 gr/1000 pop) to \$8.12 million (129 gr/1000 pop)
- ***potential savings*** ***\$2.08 million***

#### 2. Possible future annual Provincial savings

- VCHA and IHA utilization down to current BC Avg
- VCHA \$10.2 million (161 gr/1000 pop) to \$8.12 million (129 gr/1000 pop)
- IHA \$7.8 million (161 gr/1000 pop) to \$5.3 million (129 gr/1000 pop)

**Total potential savings** **\$4.58 million**

Dr. Brian Berry MD FRCPC  
Hematopathologist  
Vancouver Island Health Authority

28<sup>th</sup> January 2013

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**Supplement to Clinical Guidance Working Group Report:**

**Avoidance of Unnecessary RBC Transfusion through  
Promotion of AABB Clinical Practice Guideline  
In British Columbia**



Avoidance of Unnecessary RBC Transfusion through  
Promotion of AABB Clinical Practice Guideline  
In British Columbia

A Short Report to Laboratory Reform Committee  
Dr. David Pi, MBBS, FRCPC, MBA  
Jan 23, 2013

I. Introduction

Dr. Chris Bellamy, co-chair of the Laboratory Reform Committee, has asked me to provide estimation on the potential reduction in unnecessary RBC transfusions through the promotion of AABB Red Blood Cell (RBC) Transfusion Clinical Practice Guideline<sup>1</sup> among hospitals in British Columbia. This paper presents my crude opinion on this subject matter. It must be pointed out that my goal is not to predict what could be accomplished through the efforts of utilization management. The short timeline of the study and the general inaccessibility to current information on RBC utilization and clinical transfusion practice in hospitals have made this task impossible. Instead, two more realistic aims of my study are listed as follows:

- How does the RBC utilization rate in BC hospitals compare to the utilization rate seen in the other health jurisdictions (among Western countries)?
  
- What information can we obtain from the results of hospital transfusion utilization review and audits studies on the inappropriateness RBC transfusion practice?



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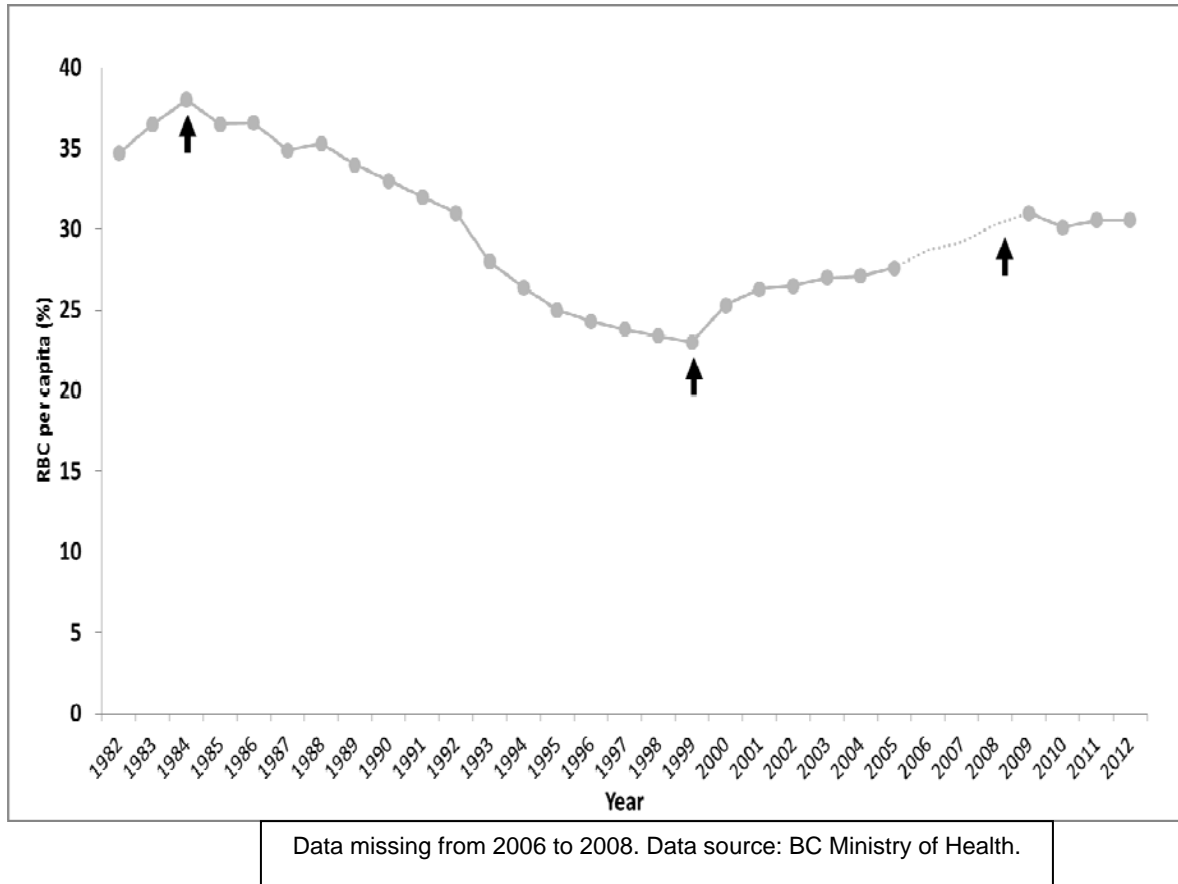
My limited research is based on a crude analysis of the RBC supply data to BC hospitals, followed by a brief review of the medical literature. In order to provide a glimpse of the current state of transfusion practice in this province, I have supplemented the analysis with a review of available aggregated RBC demand data at Vancouver Coastal Health (VCH). However, the weakness of this empirical analysis must be duly acknowledged. Assessment of the provincial utilization impact through extrapolation of crude VCH demand data has major drawbacks, as there are invariably regional variations in demography and clinical practices among health regions and hospitals in the province. There is evidence to suggest higher proportion of inappropriate RBC transfusions in the rural and community hospitals<sup>2</sup>. Hopefully this paper is able to provoke some useful thoughts into development of effective blood product utilization management programs in hospitals, without which, the ultimate goal of the delivering evidence-based transfusion practice cannot be achieved.

## II. RBC Utilization Trend Analysis

### a. National/Regional Demographic Studies

It is of interest to study the long term RBC utilization trends (inferred from RBC supply data to hospitals, adjusted with the normalizing RBC wastage rates) among hospitals in British Columbia (**Figure 1**). The estimated crude RBC utilization rate showed a sharp decline during the era of HIV and HCV viral epidemics with the RBC utilization rate peaked at 38/1,000 population in 1984/85 (HIV screening of the blood system started in 1985), to a nadir rate of about 23/1,000 population in 1999 (Krever Commission on Blood Safety released its final report in 1998). In the past decade, the RBC utilization rate has steadily increased, starting with a rapid rising phase in consumption during the early years of the new millennium (17% from 1999 to 2001), to be followed with a gentler increase in trends (3.7% from 2001 to 2004). The current RBC utilization rate has plateaued to about 30/1,000 population in recent years.

Figure 1 - Trend of RBC Utilization in British Columbia



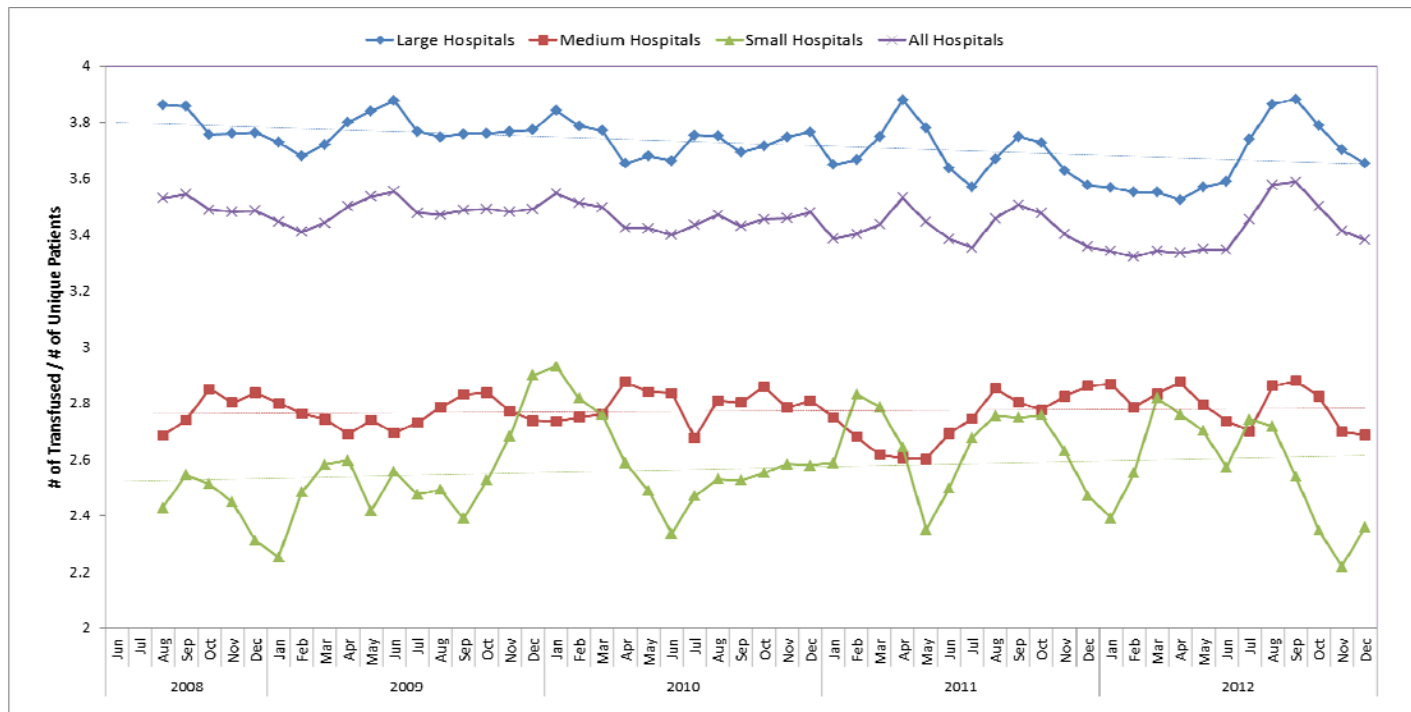
In reviewing the demographic studies published in the medical literature, several noteworthy points can be made:

- i. The fluctuation pattern of RBC utilization rate observed here in BC is not a unique phenomenon. A survey conducted among hospitals and blood centers in US<sup>3</sup> reported similar pattern of changes. In the study, a rapid rise in the volume of RBC transfusions from 1999 to 2001 (13.2%) was noted among hospitals in US, to be followed with a slower increase in consumption rate of 2.7% from 2001 to 2004<sup>4</sup>.
- ii. Studies in US and Europe<sup>5</sup> consistently show a gentle rising trend in RBC utilization in recent years; indeed, most studies projected this rising trend in RBC consumption to continue in future decades, despite promotion of evidence based transfusion practice. This is primarily due to changing clinical practice and demographics of increasing aging populations worldwide.
- iii. Demographic studies conducted in Europe and US during mid 2000s, have shown wide variations in RBC consumption rates in various regional districts at US and European countries, ranging from <40 to >50 per 1,000 population<sup>5,6</sup>. In my opinion, BC's RBC consumption rate is within the lower quartile among the regional or national data published by the WHO and US studies (Other Canadian provincial or national data are not available for review).

## b. RBC Utilization at VCH Hospitals

The RBC transfusion intensity (RBC units per patient) in VCH hospitals showed a slight decline in recent years (-3.23% from 2008 to 2012, **Figure 2**). This is primarily driven by the reduction in RBC transfusion per patient among large VCH hospitals (-4.73%), compared to a small growth in RBC utilization among medium and small hospitals (1.31% and 4.3% respectively).

Figure 2 - RBC Transfusion Intensity (Units/Patients) at VCH Hospitals



## III. Clinical RBC Transfusion Practice Analysis

Earlier studies, conducted before 2000s, reported great variations and high rates of inappropriate RBC transfusions in hospitals (20 to 60% inappropriate transfusions according to one systematic review<sup>6</sup>). There were liberal prescriptions of blood products at the time, as physicians tended to under-recognize the true risks and over-estimate the true benefits of transfusion therapy. In the past decade, advancements in transfusion medicine and technology have brought on several transformational changes to the blood system. On the supply side, the large scale adoption of molecular diagnostic screening tests has mostly eliminated the risks of known viral pathogen transmissions in the blood system. On the demand side, we have witnessed an era of active promotion of evidence based transfusion guidelines or blood alternative/conservation strategies, led by physician champions and professional organizations, including AABB. These clinical transfusion guidelines centred on the use of pre-transfusion Hemoglobin (Hb) as the primary

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clinical decisional tool for the initiation of transfusion therapy. Until recently, the studies on clinical transfusion guidelines were mostly conducted among patients seen in intensive care units or surgical specialties, as more synchronized patient population and enclosed study environments permitted easier study design and measurable patient outcome evaluation. Most of the studies demonstrated no significant difference in patient outcomes between the use of a restrictive transfusion policy (pre-transfusion Hb < 80 g/L), compared to higher pre-transfusion Hb levels. However, despite all of these utilization efforts, it is fair to conclude successful integration of transfusion guidelines into clinical practice, has been slow and inconsistent. More recent studies continue to show varying inappropriate RBC transfusion rates among clinical specialties or hospitals in different regions and countries (in the 15-20% range)<sup>7,8</sup>. Two reasons are provided here for consideration:

- ❑ Demographic studies have shown there is a significant shift in the major clinical indications of transfusion in hospitals in the past decade. The majority of red cells are now prescribed in a medical setting, particularly among hematology/oncology and gastroenterology patients (GI bleed)<sup>6,9,10</sup>. This is also observed at Vancouver General Hospital where in 2012, the majority of the transfusion uses (proxy by location code) was for medical conditions including hematology and gastroenterology (40%), compared to smaller proportions of transfusions occurring at intensive care (31%) and surgical units (29%). Conceivably, RBC transfusion for medical indications may involve a more complex decisional process, beyond the consideration of pre-transfusion Hb level, due to the diversity of clinical conditions and more importantly, the therapeutic goals of patient management. Even with AABB clinical transfusion guidelines, the expert panel was only able to provide strong recommendation in adhering to a restrictive transfusion strategy (<80 g/L) in patients with a stable clinical course of disease. It is evident that more researches into evidence-based clinical guidelines for appropriate RBC transfusion in various medical indications are needed. However, it is encouraging to cite a very recent publication<sup>11</sup>, which documented that a restrictive strategy significantly improved outcomes in patients with acute upper gastrointestinal bleeding (transfusion trigger of Hb < 70 g/L), as compared with a liberal transfusion strategy (Hb 70 g/L to < 90 g/L). An interesting study in Australia<sup>8</sup> also highlighted the opportunities brought on by the shifting clinical transfusion indications. When an audit was conducted as part of the contingency planning process, 17.3% of the RBC transfusions among hospitals in their health region were considered inappropriate, and most of the RBC transfusions were for medical indications. The authors concluded that in blood shortage situation, strict adherence to clinical transfusion guidelines to prevent inappropriate transfusions offered the single largest potential for red cell reduction, compared to the strategy of cancellation of elective surgery, which only contributed to further 5.5% of red cell reduction.
  
- ❑ Blood product utilization management is often not considered as a core professional responsibility among laboratory physicians. It is important to recognize the essential role of pathologists in the field of utilization management, as part of the value chain process in clinical support. Effective transfusion medicine program assumes a vital role in facilitating changes and promoting the delivery of evidence based clinical practice, in collaboration with physician leaders in the hospital. Most importantly, the hospital and health authority must embrace strong organizational culture in support of utilization management initiatives, as part

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of the quality management agenda. The introduction of hospital/regional blood management programs, through collaborative partnership with clinical physicians, with the primary objective to optimize clinical transfusion practices have been demonstrated to improve physician performance both in US and European countries<sup>12,13</sup>. There are many effective utilization strategies which can be deployed ranging from physician education, pre-print blood request forms with the reminder of specified transfusion guidelines and transfusion triggers, with or without the aid of computer-based clinical decision support (DS) systems, to periodic audits and peer review, as part of the quality management program in hospitals<sup>14,15</sup>. However, program execution is very time-consuming and requires strong interests and devotion of blood bank physicians and allied staff in the laboratory. Furthermore, without formalized program organization and devoted funding on a regional basis, the goal of effective utilization control cannot be achieved. As noted earlier, there is evidence in the medical literature (and also among smaller VCH hospitals), to suggest that in smaller hospitals, physicians tend to transfuse more liberally than large hospitals and academic centres. Presumably, the improvement in the appropriateness of transfusion practice among smaller and community hospitals is dependant upon the delivery of good regional transfusion medicine programs by the hub hospital.

#### IV. Conclusion

In summary, this empirical study provides evidence that implementation of effective transfusion medicine programs at regional hospitals is able to reduce RBC transfusion in hospitals. However, my estimation is that even with full program implementation, the reduction in RBC usage will be modest (in my view, in the 10% range) for the following reasons: (i) BC's RBC utilization rate is already lower than many of the other regions/countries in demographic studies, (ii) A general rising trend in RBC transfusion is likely to continue due to demographic changes. (iii) Large regional transfusional systems, like VCH, already benefited from partial success in effective utilization management strategies, as evident from slight decline in RBC transfusion intensity among large hospitals in recent years. Nevertheless, there are many collateral benefits of providing resource support to facilitate the establishment of effective regional blood product utilization programs beyond the financial goals. The performance goals should also target achieving the clinical objectives of improved quality of patient care. The challenge is to establish clinical performance indicators, in partnership with clinical specialty physicians, in order to gain acceptance and to objectively evaluate the clinical benefits of the program. I think utilization resource and efforts should first focus on hub regional hospitals to strength their transfusion medicine programs, which in return will be in a position to assist with the promotion and implementation of AABB clinical transfusion guidelines within their own facilities and also among the smaller hospitals nearby. My estimate that these smaller hospitals, which account for the majority of hospitals in BC and consumes at least 40% of the total RBC usage, will benefit most from blood product utilization programs. Based on the review of the provincial data for 2011/12, there were 139,190 red cell units delivered to hospitals and if we assume about 2% outdated rate and negligible in-date wastage, the transfusion volume is about 136,000 units annually. If we assume 10% reduction in red cell transfusion volume is a tangible target to achieve with effective and equitable utilization programs in health regions, then the estimated provincial blood budget savings would be in the range of \$7.6 millions.

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**Supplement to Clinical Guidance Working Group Report:**  
**Antimicrobial Stewardship Working Group Report**

The AMS working group was constituted as follows:

Dr. Chris Sherlock, Chair

Dr. Marc Romney, Medical Director, Infection Control and Prevention Program; Member, Antibiotic Utilization Committee; Providence Health Care.

Dr. Victor Leung, Infection Prevention and Control Physician; Member, Antimicrobial Stewardship Subcommittee and Antibiotic Utilization Committee, Providence Health Care.

Dr. Jennifer Grant, Medical Director, Antimicrobial Stewardship Program and Medical Microbiologist, Vancouver Coastal Health.

Drs. Leung and Grant, as well as Dr. E Bryce (Medical Director, Infection Prevention and Control, Vancouver Coastal Health), provided written reports describing the proposed programs for Providence Health Care (PHC) and VGH group hospitals. These program proposals are the initiatives of laboratory physicians and the medical leadership for the programs comes directly through the laboratory physicians in the respective institutions. Thus, the cost avoidance resulting from successful implementation of these programs can be attributed to the laboratory physicians but, of course, much of the actual costs of the programs are borne by the laboratories whilst the return on investment accrues to the institutions at large.

### **What is Antimicrobial Stewardship?**

Antimicrobial Stewardship (AS) is an inter-professional effort to prevent the inappropriate prescription of antimicrobials, and to optimize appropriate prescriptions (in terms of drug selection, dosing, route and duration). A formal and comprehensive Antimicrobial Stewardship Program (ASP) empowers this effort, ensures that it is consistent throughout the organization, and enables accurate tracking of cost containment and cost avoidance.

Multiple studies on the subject suggest that an effective ASP would directly save between \$200,000 and \$900,000 in drug costs alone, simply by preventing unnecessary prescriptions. Of course, the magnitude of savings is partly dependent on the overall drug budget.

The prevention of improper prescriptions offers other significant benefits. The most immediate is a reduction in drug-related adverse effects such as *Clostridium difficile* Infection (CDI). CDI outbreaks lead to lengthy hospital stays, are costly to manage, and can be life-threatening. Improper use of broad-spectrum antibiotics often trigger these adverse effects by unnecessarily destroying harmless bacteria within the body, presenting an opening for colonization or infection by *Clostridium difficile* and other harmful organisms.

A more complex but equally critical benefit is reducing the emergence of antimicrobial-resistant organisms (AROs) such as methicillin-resistant *Staphylococcus aureus*. The emergence of drug resistance makes existing, cost-effective antimicrobials useless, requiring treatment with much

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more expensive novel drugs. The improper use of antibiotics can create selective pressure within the body environment for bacteria with evasive capabilities, such as the production of the enzyme NDM-1 which protects organisms from the potent carbapenem family of drugs – a crucial group of antibiotics which are relied upon as an option for treating severe infections. These issues are exacerbated by a lack of effective antibiotics in the development pipeline. Antimicrobial Stewardship is endorsed by multiple international, national and provincial expert and patient safety groups including:

- the World Health Organization (WHO)
- the Centers for Disease Control and Prevention (CDC)
- the Society for Healthcare Epidemiology of America (SHEA)
- the Institute for Safe Medical Practices of Canada
- the Institute for Healthcare Improvement
- Accreditation Canada

Furthermore, AS has been recognized as one of the two most recent **Clinical Care Management/British Columbia Patient Safety and Quality Council** priorities.

The PHC ASP group provided a business case model for a more focused program of antimicrobial usage and documented the anticipated savings, conservatively, from such a program (Table - Appendix 1). The VGH ASP group proposed a more extensive program that would include what they describe as the four cornerstones of a comprehensive program to reduce healthcare-associated infections: Hand Hygiene, standardized Infection Prevention protocols, Environmental Cleanliness and Antimicrobial Stewardship. This group also provided a business case with estimates of anticipated savings to the organization (Table - Appendix 2).

These program models are based on documented programs in existence elsewhere and thus provide realistic expectations of savings. As both business cases show, investment at the front end is required but the return on investment is realized within three years, at which point cost avoidance becomes a net positive for the institutions.

### **Anticipated Cost Avoidance for the Lower Mainland and Province**

The PHC review of AS looked at inappropriate prescriptions which will result in reduced costs and improved care. Under their approach, increased pharmacist, physician and IT/project management resources will result in net drug utilization savings of \$30,895 in the first three years. However, the savings for years four to six increases to a total of \$575,089 or an average almost \$192,000 per year. The report notes that there are additional savings for the reduction in *Clostridium difficile* infections, targeted antimicrobial-resistant organisms and hospital length-of-stay. However, they did not attempt to estimate savings in these areas.

An excerpt from this report is provided in Appendix 1.



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The objectives of the VGH AS review were to improve cleanliness, ensure appropriate and cost effective antibiotic use, decrease healthcare associated infections and to have a risk-managed approach for the isolation of Vancomycin-Resistant Enterococcus (VRE). Their approach includes renovations and other capital and operating costs in addition to the pharmacist, physician and IT/project management resources identified by PHC. As a result, there are higher start-up costs (\$4.5M for the first two years) with the program becoming self-sustaining in the third year and delivering savings for almost \$177,800 annually.

The report did look at costs outside of the laboratory and identified significant cost avoidance savings. It notes that once implemented, a number of items will be have reductions including about “17,500 VRE routine admission screens and 55% of management and isolation costs including personal protective equipment use, cohorting and blocking of single rooms, patient transfers and bed moves, double room cleans, increased nursing time, and use of more expensive disinfectants.”

The expected cost avoidance at VCH is about \$3M annually, due to a reduction in the number of new VRE patients. The report estimated that of the 612 patients, 55% will be eliminated for a cost avoidance of about \$8,730 per patient or \$2.94 million annually. See Table 4 of the report excerpt, which is provided in Appendix 2.

Based on these two studies, the direct cost savings are in the \$177,800 to \$192,000 range annually or an average of \$185,000. Additional cost avoidance is \$3 million at VCH due to the reduced VRE cases.

The following attempts to provide a provincial estimate of the annual savings after the antimicrobial stewardship program is in place and fully operational (e.g. year three and onward). This is based on the number of VCH beds and extrapolating to the provincial number of beds. It is noted that this is a rough estimate and a more rigorous analysis may be considered to refine the estimates.

There are 1,070 acute care, rehabilitation, paediatric and obstetric beds in VCH and 6,712 provincially. VCH accounts for 16% of these beds and based on this, the VCH cost avoidance could be increased by a factor of six for the provincial impact. However, to be conservative, a factor of three is used for the provincial extrapolation. The direct cost savings are estimated to be \$555,000 annually and the system savings for the reduced VRE cases are estimated at \$9,000,000 annually. The combined total is for the provincial estimate is \$9,555,000 annually.

## Appendix 1—Excerpt from PHC Antimicrobial Stewardship Report

### 6 FINANCIAL AND PATIENT-CARE GOALS AND METRICS

#### 6.1 Financial Savings and Return on Investment

The financial goals for the ASP are conservative and based on other programs which use an active interventional model (i.e. audit and feedback). Based on 2011's in-patient antimicrobial costs of \$2.34 million, we estimate that PHC will save approximately 10% per year on direct drug costs. However, to show a very conservative estimate of direct drug cost savings ranging from 3-5% per year for the first 3 years of the program, we performed a return on investment (ROI) calculation showing that even at these rates of savings, the cumulative ROI is 1.03, and the internal rate of return is 13%. These calculations are based on a discount rate of 5%. Further details for these calculations can be found in appendix 4.

##### Return on Investment Analysis

	Discount Rate <span style="background-color: yellow;">5%</span>				
	Pre-implementation	Intervention Year			Total
		1	2	3	(All Years)
<b>Investment in Antimicrobial Stewardship Program</b>					
Initial Investment Costs	\$ 47,674				
Operating Costs		\$ 325,929	\$ 342,226	\$ 359,337	
Total Annual Investment Costs	\$ 47,674	\$ 325,929	\$ 342,226	\$ 359,337	
x Present Value Factors	1.00	0.95	0.91	0.86	
<b>Total Discounted Annual Investment Costs</b>	<b>\$ 47,674</b>	<b>\$ 310,409</b>	<b>\$ 310,409</b>	<b>\$ 310,409</b>	<b>\$ 978,901</b>
<b>Incremental Savings (Increases) from Antimicrobial Stewardship Program</b>					
Estimated Incremental Utilization Increases	\$ -	\$ -	\$ -	\$ -	
Estimated Incremental Utilization Savings	\$ 173,558	\$ 381,480	\$ 577,063		
Total Annual Incremental Savings (Increases)	\$ 173,558	\$ 381,480	\$ 577,063		
x Present Value Factors	\$ 1	\$ 1	\$ 1		
<b>Total Discounted Annual Incremental Savings (Increases)</b>	<b>\$ 165,293</b>	<b>\$ 346,014</b>	<b>\$ 498,489</b>		<b>\$ 1,009,795</b>
<b>Incremental Return on Investment Summary</b>					
<b>Undiscounted Annual Net Cash Flows</b>	<b>\$ (47,674)</b>	<b>\$ (152,372)</b>	<b>\$ 39,254</b>	<b>\$ 217,726</b>	<b>\$ 56,934</b>
<b>Cumulative ROI</b>		0.46	0.76	1.03	1.03
<b>Net Present Value</b>					<b>\$ 30,895</b>
<b>Internal Rate of Return</b>					<b>13%</b>

We have presented a positive net present value (NPV) of \$30,895 for the three-year program. However, it is expected that ASP is here to stay. By projecting the savings to six years, the net present value (NPV) of the program (at a discount rate of 5%) is \$575,089. Even at an unrealistic discount rate of 15%, the NPV of the program is \$343,663.

Cost savings are additionally measurable in 3 other areas:

1. Estimated reduction in *C. difficile* infections, using published attributable costs data to make cost estimates;
2. Estimated reduction in targeted AROs, via the same method;
3. Measured reduction in hospital lengths-of-stay.

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## Appendix 2—Excerpt from VCH Antimicrobial Stewardship Report

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### 7 Return on Investment

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Once all the Cornerstones are in place, a risk managed approach to VRE can be implemented to sustain the initiative. This approach would entail:

- Stopping routine admission screening except for a) patients at higher risk for an infection (Bone Marrow and Solid Organ Transplant, Dialysis and Intensive Care Unit patients: 9% of our population) and b) those most at risk of transmission of VRE (36% of our current cases - patients with diarrhea and/or patients with both *Clostridium difficile* and VRE)
- Isolation precautions only for those a) with VRE in the above-mentioned high-risk populations for infection and b) patients with VRE and diarrhea most at risk of transmitting VRE and/or acquiring an infection (45% of our population)
- Removal of the majority of electronically flagged VRE patients
- Prevalence screening only for ICU, BMT and SOT wards continue; no cost recovery
- Screening of *Clostridium difficile* stools for VRE continue for years 3 and 4; no cost recovery

This approach would eliminate ~17,500 VRE routine admission screens and 55% of management and isolation costs including personal protective equipment use, cohorting and blocking of single rooms, patient transfers and bed moves, double room cleans, increased nursing time, and use of more expensive disinfectants.

By changing VRE management, we could expect a cost avoidance of approximately \$3M annually (Table 4a) for reinvestment.

This approach has not been recommended in any guidelines to date; however, a refocused VRE management strategy and reallocation of dollars saved to address the root causes of transmission can help provide a strong and sustainable infrastructure to reduce HAIs.

**Table 4. Potential VCH Savings – VRE Expenditures 2010-2011**

VRE Intervention (2010-11 Data)	Cost (\$\$) per year	~Savings (\$\$)
Lab Screening	Reduction in Lab Supplies	\$ 60,000
ICP Time Flagging VRE Pts (n = 612)	612 pts x 0.55 eliminated x 0.5hrs x \$48/hr	\$ 8,700
Other Management Costs for new VRE Cases (n = 612)	1683 pts x 0.55 eliminated x \$8728*	\$ 2,938,000
<b>Total Savings Annually</b>		<b>\$ 3,006,700</b>

**Table 4b. Housekeeping Savings – BIS December 2011**

Facility	2011/12 YTD P4				VRE		Total to P4(\$)	Projecte d P5 to 13 (\$)	Total Annual		FTE
	Internal Transfer	Ext Transfe r	Dischg e	Tota l	Time / Clean (min) *	Rate (\$/min )			\$	Hrs	
VGH	67	176	141	384	30	0.382	4,400.64	9,901.44	14,302.08	624.00	0.32
RHS	13	25	25	63	30	0.382	721.98	1,624.46	2,346.44	102.38	0.05
LGH	337	326	313	976	30	0.382	11,184.96	25,166.16	36,351.12	1586.00	0.81
									52,999.64	2312.38	1.18

\*The time shows the reduction on total isolation cleaning time by removing the second VRE clean.

**8 Capital Investment and Return on Investment**

Our total request for year one and two is \$4.5 Million. It will require two years to renovate the spaces required for the centralized equipment, hire and train personnel to clean, bar code the inventory, repair the equipment, introduce the new cleaning system and use of isolation carriers and manage the change associated with a centralized equipment purchasing system.

Similarly the infrastructure and software must be built for the antimicrobial stewardship program, the antimicrobial utilization committees established at RH and LGH, and the various interventions introduced before we will see any associated reductions in antimicrobial costs.

**Table 5. Capital Investment and Return on Investment**

COSTS				
	Year 1 - Request	Year 2 - Sustainment	Year 3 - Sustainment	Comments
<b>Capital Costs</b>				
Renovations	-\$ 450,000	\$ -	\$ -	For centralized space at LGH, VGH and RH
Buckets	-\$ 5,700	-\$ 575	-\$ 575	Separate cloths for toilets, surfaces etc
Microfibre Cloths	-\$ 230,000	-\$ 16,000	-\$ 10,000	Better cleaning and IC (research)
PPE Carriers	-\$ 120,000	-\$ 10,000	-\$ 10,000	To clear the floors for better IC
Bar Coding	-\$ 10,000	-\$ 2,000	\$ -	For software and scanners
<b>Sub-Total</b>	<b>-\$ 815,700</b>	<b>-\$ 28,575</b>	<b>-\$ 20,575</b>	
<b>Operating Costs</b>				
MPs/EAs	-\$ 1,000,000	-\$ 1,000,000	-\$ 1,000,000	To move and clean equipment
1 FTE Project Manager	-\$ 120,000	\$ -	\$ -	To manage and implement the project
<b>Sub-Total</b>	<b>-\$ 1,120,000</b>	<b>-\$ 1,000,000</b>	<b>-\$ 1,000,000</b>	
<b>Antimicrobial Stewardship Costs</b>				
0.5 FTE pharmacist	-\$ 64,046	-\$ 64,046	-\$ 64,046	VGH and program development
0.25 + 0.25 FTE pharmacists for VGH & LGH and RH	-\$ 64,046	-\$ 64,046	-\$ 64,046	VGH and program development
1.0 FTE programmer/data analyst	-\$ 73,800	-\$ 73,800	-\$ 73,800	For data analysis
0.5 FTE Microbiologist/ID specialist	-\$ 163,850	-\$ 163,850	-\$ 163,850	To manage the program
Software Costs	-\$ 2,000	\$ -	\$ -	To manage the program electronically
<b>Sub-Total</b>	<b>-\$ 367,742</b>	<b>-\$ 365,742</b>	<b>-\$ 365,742</b>	
<b>Total</b>	<b>-\$ 2,303,442</b>	<b>-\$ 2,210,017</b>	<b>-\$ 1,414,892</b>	
<b>Potential Annual Cost Avoidance</b>				
PPE Supply Savings (20% error; ALOS 13.7 days; 55% reduction)	\$ -	\$ 124,000	\$ 124,000	No longer spending this money to isolated VRE patients
Wasted Supplies Savings (20% error; 3 transfers; 55% reduction)	\$ -	\$ 269,650	\$ 269,650	Decreased hoarded supplies in isolate VRE rooms
Equipment Savings	\$ -	\$ 300,000	\$ 300,000	No longer need to order as much equipment
Laundry Savings (curtains + gowns)	\$ -	\$ 148,000	\$ 148,000	No longer need to change curtains after each use and use as many isolation gowns
Cleaning Savings (terminal cleans)	\$ -	\$ 53,000	\$ 53,000	ARAMARK savings
ABx AS Savings per 12 months	\$ -	\$ 636,000	\$ 636,000	Antibiotic Savings
Cost Reduction in use of Lab Supplies	\$ -	\$ 62,000	\$ 62,000	Decrease in lab supplies
<b>Sub-Total</b>	<b>\$ -</b>	<b>\$ 1,592,650</b>	<b>\$ 1,592,650</b>	
<b>Total</b>	<b>-\$ 2,303,442</b>	<b>\$ 1,592,650</b>	<b>\$ 1,592,650</b>	
Annual Cost Avoidances		-\$ 617,367	\$ 177,758	By the 3rd year the project will pay for itself

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## 9 Sustainment

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There will need to be a well supported change management process in order to realize the cost savings. This will impact on our purchasing and the associated cost centres. For example:

- 1) Antimicrobial Stewardship – savings from this initiative will need to be agreeably relocated to manage the cost of the ID/Medical Microbiologist and Programmer annually.
- 2) Laundry & Cleaning – at the time of renegotiation of the contract reallocation of the costs for Micofibre Cloths and FTEs must be considered.
- 3) FTEs for Material Porters/Equipment Aides (MP/EA) – savings in supplies and isolation costs from the units will need to be agreeably re-allocated from each unit to support the cost of the FTEs of MP/EAs annually.
- 4) The programs established by Antimicrobial Stewardship will be implemented and sustained region-wide and supported by clinical pharmacists.

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## 10 Conclusions

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The new strategy to manage health care acquired infections is the right thing to do. We can better spend our money with initiatives that fit into the over arching strategy of VCH that is fundamental to good patient care.

The benefit of the new approaches is self-evident. By investing in the new environmental program and antimicrobial stewardship, we will not only be contributing to decreased infections at VCH, we will also be proactively implementing antimicrobial stewardship before it is made mandatory by the Ministry.

With an initial investment of \$4.5M, we will become self-sustaining by year 3. Once the foundation has been well established, then we can become a template for other facilities.

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**Appendix K**

**Technology and Information Sharing**

**Working Group Report**

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## **Technology and Information Sharing Opportunities Summary**

### **EXECUTIVE SUMMARY**

Technology and information sharing was identified as one of the eight strategic areas for achieving the mandate of the 2012 Laboratory Reform Committee (LRC) that were to be investigated by a dedicated working group. The Technology and Information Sharing Working Group was comprised of a cross section of representatives from the Laboratory Reform Committee, British Columbia Medical Association (BCMA) Health Authorities and Ministry of Health (MOH).

Two working group meetings were held to identify and assess opportunities for cost savings related to technology and information solutions. Opportunities identified were assessed and ranked against a common set of criteria. Three opportunities were selected to go forward as the recommendations to the LRC.

The working group recommends the following opportunities:

4. Pursuing optimization of technology enabled laboratory service delivery consolidation.
5. Establishing connectivity between laboratory and patient outcome data to support laboratory utilization management.
6. Creating an electronic mechanism for information sharing and knowledge transfer at the provincial level that supports:
  - Storage of and access to business and clinical policies, practices, education, tools and information.
  - Provincial standardization of business/clinical practices and the establishment of provincial business/clinical best business practices.
  - Interoperability.

### **Caveat**

Technology and information sharing solutions are considered enablers for the provision of a service. The recommendations being put forward by the Technology and Information Sharing Working Group are considered to be supportive of the mandate of the LRC. Their acceptance and inclusion in the LRC's Plan are dependent on the governance structure and service delivery model recommendations. Consequently, cost impacts related to these recommendations were not conducted by the working group. It is anticipated the cost benefits analysis for technology and information sharing solutions will be conducted as part of analysis conducted for the governance structure and specific service delivery area(s) to be enabled.



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## **INTRODUCTION**

Technology and information sharing was identified as one of the eight strategic areas for achieving the mandate of the 2012 Laboratory Reform Committee (LRC) that was to be investigated by a dedicated working group. The purpose of the LRC Technology and Information Sharing Working Group was, but not limited to, identification, qualification and quantification of short term and long term cost savings that would stem from technology and information sharing related solutions.

It is important to note that technology and information sharing solutions are enabling solutions. As such, adoption of any solution identified would be dependent on business requirements.

## **WORKING GROUP**

The Technology and Information Sharing Working Group was comprised of the following members:

- Mal Griffin, Interior Health Authority and Working Group Lead
- Ed Ratnarajah, Lower Mainland Consolidation
- Dr. Gordon Hoag, Vancouver Island Health Authority
- Johanne Whalley, Northern Health Authority
- Pat Melia, British Columbia Medical Association
- Jeremy Higgs, Ministry of Health
- Jildiz Shabdanalieva, Ministry of Health
- Wendy Johnson, Ministry of Health
- Joanne Philley, Ministry of Health

Two working group meetings were held - October 25, 2012 and November 7, 2012. The first meeting was a half day face to face meeting focused of the identification and assessment of opportunities. The second was a half day teleconference to review the opportunities and recommendations to be submitted to the LRC for consideration.

## **PROCESS**

An assessment of keys areas for consideration and existing assets within the system was conducted by the group to help inform the identification of areas of opportunity.

Keys areas of consideration identified by the group included the:

- Need for a system with utilization management and order entry functionality.
- Inclusion of test results that are not currently captured in the LIS, i.e. Point of Care Testing, to support a more complete patient record with the Health Authority.
- Need for a single provincial LIS versus a fully integrated, interoperable system.
- Anticipated life span of existing legacy systems.
- 2012 Secor report

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Key existing assets identified where divided into IMIT and technology assets and included:

- IMIT:
  - iEHR/PLIS solution
  - Multiple result distribution mechanism
  - Multiple data repositories
  - Provincial registries e.g. renal, cancer and data center
  - Secure networks e.g. ENG, PPN
  - EMPI and active integration
  - Informatics Specialists (scarce resource)
  - Telepathology
  - Business intelligence tools in non laboratory areas
  - Multiple Quality management Information Systems
  - Knowledge sharing between Health Authorities (HAs)
  - Adoption of the standards for the exchange of information E.g. Clinical document Architecture (CDA)
  - Clinical Practice Order Entry (CPOE) and clinical documentation integration for analysis in some HAs (e.g. IHA)
  - Patient access to test results in the private sector e.g. My eHealth
- Technology:
  - Multiple automation
  - Auto verification rules
  - Integrated order entry
  - Standardization of testing platforms across some Health authorities
  - Standards e.g. nomenclature
  - MOH Provincial Health Technology Group

Twenty one (21) opportunities were identified by the working group. Please see “opportunities summary” for all opportunities identified.

All opportunities identified were assessed and ranked against four key elements. The key elements included:

- Term: Defined as length of time to achieve the anticipated benefits.
- Quality: Defined as the number of Triple Aim<sup>16</sup> concepts met by the opportunity.
- Cost: Defined as the funds required for implementing the opportunity.
- System Savings: Define as the estimated system savings.

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<sup>16</sup> Triple Aim Concepts: 1) Patient experience 2) provider satisfaction 3) sustainability

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The following ranking system was used to assess each opportunity.

Element	Ranking	Definition
Term	Short = 1	Less than 1 year
	Medium = 2	1 to 3 years
	Long = 3	Greater than 3 years
Quality	Low = 1	Achieves 1 Triple Aim concept
	Medium = 2	Achieves 2 Triple Aim concepts
	High = 2	Achieves 3 Triple Aim concepts
Cost	Low = 1	Less than \$1M
	Medium = 2	\$1 - \$5M
	High = 3	Greater than \$5M
Estimated System Saving	Low = 1	Less than \$1M
	Medium = 2	\$1 - \$5M
	High = 3	Greater than \$5M

The working group selected five opportunities to go forward to the LRC for initial assessment and analysis in conjunction with opportunities identified by other working group. Subsequently, two opportunities were combined and one was deleted.

## RECOMMENDATIONS

The working group recommends the following opportunities:

1. Pursuing optimization of technology enabled laboratory service delivery consolidation.
2. Establishing connectivity between laboratory and patient outcome data to support laboratory utilization management.
3. Creating an electronic mechanism for information sharing and knowledge transfer at the provincial level that supports:
  - o Storage of and access to business and clinical policies, practices, education, tools and information.
  - o Provincial standardization of business/clinical practices and the establishment of provincial business/clinical best business practices.
  - o Interoperability.

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## OPPORTUNITIES

This section provides the assessment details for three opportunities being recommended.

### **Consolidation Optimization**

#### **Description**

The Consolidation Optimization opportunity builds upon experience related to implementation of automation and consolidation within the system and efficiencies gained to date. The scope of implementation and potential savings related to this opportunity will be driven by the governance structure and service delivery model selected.

#### **Benefits**

Anticipated benefits stemming from the Consolidation Optimization opportunity indentified to date include:

- Improved service quality, reliability and predictability stemming from increased stability in the workforce and equipment refresh cycles.
- Reduced capital and operating costs stemming from purchasing economies of scale and reduced sustainment costs e.g. service contract costs with appropriate refresh cycles.
- Cost avoidance related to future renovations of existing sites to accommodate incremental growth and new technology.

#### **Assumptions**

A key assumption for Consolidation Optimization is that technological change/advancement and volume growth will align. Embedding additional capacity when consolidating services may be needed.

#### **Dependencies**

Achievement of the anticipated benefits is dependent on the:

- Use of intelligent design.
- Establishment of a good transportation network.
- Medical and political support.
- Interoperability of Lab Information Systems.
- Funding to support consolidation efforts.

#### **Constraints and Barriers**

Constraints and barriers to implementation Consolidation Optimization include:

- Geography within certain areas in the province e.g. NHA.
- Capacity for change.
- Existing lab facilities may not be able to accommodate automation.
- Existing governance structure.
- Available funding.

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## **Risks**

Key risks for Consolation Optimizations are:

- Anticipated benefits are not achieved.
- Increasing operating costs and high switching costs if a single source vendor solution is obtained.
- Lack of system redundancy to support disaster planning.

## **Connectivity between Laboratory Information Systems and Patient Outcome Data**

### **Description**

The Connectivity between Information Systems and Patient Outcome opportunity builds upon the iEHR-PLIS eHealth initiative and current information management integration within select Health Authorities, e.g. IHA. It involves linking and analyzing laboratory test results with patient outcome data, e.g. discharge summary reports, to support laboratory service utilization management.

### **Benefits**

Key anticipated benefits of provincial connectivity of information systems are the ability to:

- Monitor and perform root cause analysis of laboratory services utilization.
- Inform the development of clinical order set and best practices for utilization of laboratory services.
- Support health care delivery and planning decision making.

### **Assumptions**

Two key assumptions for this opportunity are:

- PLIS data can be made available for secondary use.
- Privacy related issues can be addressed and managed.

### **Dependencies**

Interoperability between the different data sources (laboratory and patient data) is the primary dependency for this opportunity. Linkages have been made in some Health Authorities, e.g. IHA, that could help inform provincial requirements.

### **Constraints and Barriers**

The current capacity within the Health Authorities and at the provincial level is a key constraint. In particular, Information Technology and Information Management resources required to implement the opportunity are a scarce resource.

The current privacy requirements, legislation and governance structure within BC are seen as the top three barriers to moving forward with this opportunity. The provincial eHealth initiative may remove these barriers.

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## **Risks**

The risk related to connectivity would be similar to the provincial eHealth initiative. A key risk would be the inability to integrate systems that do not meet current standards requirements.

## **Provincial Electronic Information Sharing and Knowledge Transfer**

### **Description**

The provincial electronic information sharing and knowledge transfer opportunity would provide broader access to clinical and business information used by health care professionals. This information is currently housed in multiple locations and repositories. The opportunity would build upon existing infrastructure and provide an avenue for continuous and expanded information sharing and knowledge across the province.

### **Benefits**

A key benefit stemming from a Provincial Electronic Information Sharing and Knowledge Transfer Mechanism would be an enhanced ability to develop standards, best practices and clinical care sets. Other benefits include:

- Enhanced quality of service and reduced duplication of orders and unnecessary orders stemming from enhanced access to information and development of provincial standards, best practices, and clinical care sets etc.
- Enhanced flow of information through interoperability.
- System flexibility through ease of movement of human resources.
- Decreased non value-add activities and system redundancy.

### **Assumptions**

Key assumptions for development of this opportunity include:

- Standards and best practices developed will be adopted.
- Information will be maintained and sustained to ensure currency and relevancy.
- Existing infrastructure (SharePoint sites, Wikis, Websites etc.) can be leveraged.

### **Dependencies**

The establishment of Provincial Electronic Information Sharing and Knowledge Transfer Mechanism is dependent on the:

- Presence of electronic infrastructures, access, networks and data warehouses.
- Oversight of a standards governance structure.
- Creation of an infrastructure to ensure information is maintained and sustained to ensure data integrity.

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### **Constraints and Barriers**

Constraints and barriers that will impact the development of this opportunity are:

- Availability of human resources and funding for development and sustainment of mechanism.
- The number of competing priorities.
- Lack of interoperability standards.
- Vendor capability and capacity.
- Stakeholder buy-in.

### **Risks**

Key risks for a Provincial Electronic Information and Knowledge Transfer Mechanism include:

- Creation of increased bureaucracy for development and implementation of changes.
- Limitations of vendors systems that could lead to development at the lowest common denominator.
- Loss of innovation and profession autonomy.
- Additional complexity related to integration.

### **CAVEAT**

As noted above, technology and information sharing solutions are considered enablers for the provision of a service. The recommendations being put forward by the Technology and Information Sharing Working Group are considered to be supportive of the mandate of the LRC. Their acceptance and inclusion in the LRC's Plan are dependent on the governance structure and service delivery model recommendations. Consequently, cost impacts related to these recommendations were not conducted by the working group. It is anticipated the cost benefits analysis for technology and information sharing solutions will be conducted as part of analysis conducted for the specific governance structure and service delivery area(s) to be enabled.

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## OPPORTUNITIES SUMMARY

### Opportunity #1 – Automation Optimization (1)

Term: M

Quality: 3 predictability, TAT

Cost: M @ HA level, H @ provincial level

Savings: M @ HA level, H @ provincial level

Considerations:

- need provincial inventory of high volume automation and capacity to support / determine consolidation and relocation

Benefits:

- address work force issues

- more frequent and regular refresh cycle for equipment

  - build refresh into contracts

- potential to support centralization medical microbiology ( 4 – 5 sites)

  - VIHA currently undergoing a review by Kiestra- subdivision of BD –

  - MALDI-TOF can be integrated ( includes a digital pathology solution )

  - LMC will be reviewed also

Issues:

- intelligent design required to determine when implementation and consolidation would occur e.g. see model used in Sweden

- NHA physicians are concerned about the impact on TAT that would occur if further consolidation of micro is done in NHA ( now down to 5 sites)

- transportation structure needed to support consolidation

- need medical and political support

Challenges:

- Need to consider geography

### Opportunity #2 - Provincial Procurement Extension to Include Private Sector

Term: M

Quality: 2

Cost: L (HHSBC is in place)

Savings: H

### Opportunity #3 – Optimized Provincial Advisory Groups

Term: M

Quality: 2-3

Cost: L (secretariat support required)

Savings: TBD (variable and system cost avoidance)

Considerations:



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Governance model required to support establishment of Provincial  
Laboratory Information Advisory Group and Provincial Laboratory  
Technology Advisory Group

Must be standards and quality based

#### **Opportunity #4 - Specimen Tracking (internal and external)**

Term: M - H

Quality: 3 (difficult to measure)

Cost: M (requires interoperability)

Savings: L - M (variable depending on sending site)

Discussion:

Single standardized provincial bar code

Internal tracking in Cerner at VIHA and NHA (CP and AP)

Labor savings for follow up

VIHA has a faxing tracking mechanism for external referrals

#### **Opportunities #5 - Information Sharing across All Healthcare Sectors**

Integration of information systems with long term care (LTC) facilities e.g. antibiotic  
information, real time patient information

Term – L (external organizations e.g. LTC , pharmacies, )

Quality – 3

Cost – H

Savings – TBD (system level savings)

#### **Opportunity #6 – Connectivity between Information Systems to Support Utilization**

Management (data mining and linking data from different sources – lab and discharge summary  
e.g. PROMIS; informs CPOE)

Term: L

Quality: 3

Cost: M: H (labor, special skill and sustainment )

Savings: H

Considerations:

Requires two phases to implement

Data bases are already in place

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### **Opportunity # 7 - Integration of POCT Results From Outside the Lab into the LIS (2)**

Term: S (start with glucose meter results)first)

Quality: 3

Cost: L (~30K for integration within in IHA MediTech system)

Savings: TBD (system saving , medical records storage savings)

Comments:

In progress in IHA and NHA

Suggestion : remove reimbursement for POCT

Requires a two step approach:

Step 1: results from within health authority clinical care setting ( e.g. hospital/  
remote locations)

Step 2: results from physician offices, patients home

### **Opportunity # 8 - A Fully Interoperable LIS Backbone (3)**

Term: L

Quality: 3

Cost: H

Savings: TBD

### **Opportunity #9 - PLIS**

Term: S

Quality: 3

Cost: L

Savings: TBD

Comments:

Leverage existing data for system planning  
EMRs and CIS/LIS

### **Opportunity #10 - Synoptic Reporting**

Term: M

Quality: 3

Cost: M

Savings: TBD

Comments:

Provincial RFP negotiations underway

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**Opportunity #11 - Image Integration**

Term: L

Quality: 2

Cost: H

Savings: TBD

Comments:

Digital images( Microscopic and macroscopic e.g. slides, gross sections)

Virtual images

**Opportunity #12 - Voice Recognition (how does this link with synoptic reporting?)**

Term – S

Quality – TBD

Cost – TBD

Savings – TBD

Benefits:

Cost savings from transcription reduction

**Opportunity # 13 - Telepathology**

Term: L

Quality: 3

Cost: H

Savings: TBD

**Opportunity #14 - BTS / TM Automation**

Term: M

Quality: 3

Cost: M

Savings: TBD

Comments:

Implemented in NHA

**Opportunity #15 - Integration with CBS (subsequently deleted)**

Term: TBD

Quality: TBD

Cost: TBD

Savings: TBD

Other repositories:

Histotrack in PHSA

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### **Opportunity # 16 - MIS Standardization**

Term: TDB

Quality: TBD

Cost: TBD

Savings: TBD

Recommendations:

- Assess the value of MIS

- Standardize to current MIS standard in all HAs/ sites (e.g. CW)

Issues:

- Lack of standardization across jurisdictions

Benefits:

- Assist benchmarking across sites, UM

### **Opportunity #17 – Outpatient Patient Scheduling**

Term: M

Quality: 3

Cost: L

Savings: L (improved flow)

Comments:

- NHA has a model and has it in use in some areas

- Life Labs has a booking system

Suggestions:

- Leverage Calgary on line patient registration system

### **Opportunity #18 - Patient Access to Results**

Term: M

Quality: 3

Cost: L

Savings: TBD

### **Opportunity #19 - Standardization and Interoperability across Province (2)**

Term: M

Quality: 3

Cost: H

Savings: TBD

Comments:

- Timeline dependant

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**Opportunity # 20 – “Leaning” of IMIT and Involving IMIT in the Process**

Term: S (ongoing)

Quality: 3

Cost: L ( limited capacity)

Savings: cost avoidance through reduction in non value add activities

Considerations:

Incorporate Lean into IMIT planning and developing process

Culture change required

**Opportunity #21 - Development of Provincial CPOE Order Sets**

Term: L

Quality: 3

Cost: H

Savings: H

Comments:

Provincial strategy needed

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**Appendix L**  
**Human Resource**  
**Working Group Report**

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## **A Provincial Plan for Laboratory Physician Human Resources**

### **Executive Summary**

Under the Terms of Reference of the Laboratory Reform Committee, a working group was convened to address 'A Provincial Plan for Physician Human Resources in Laboratory Medicine'.

The working group reviewed the current status of laboratory physician resource planning in BC and other jurisdictions, together with background literature on this subject. The shortcomings of the current planning process in BC were explored in detail. The absolute need for such a planning process to exist was affirmed and the following recommendations made:

1. Quality, patient safety and appropriate utilization of laboratory resources are fundamental issues in laboratory medicine. Since these are related to physician workload and staffing, there is an absolute requirement for provincial laboratory physician resource planning, linked to the provision of adequate resources, to satisfy this mandate.
2. The work of the Joint Laboratory Workload Oversight Committee (JLMWOC) should be continued through an organization with expanded JLMWOC Terms of Reference, to include clinical activities at teaching hospitals.
3. The new organization, a Laboratory Medicine Resource Planning Committee, should build on the successful composition of JLMWOC and be a bi-partite BCMA/MoHS structure with representation from BCMA/BCALP, UBC Dept. of Pathology, HAs and MoH.
4. Until the new organization is put in place, the term of the JLMWOC should be extended so that there is seamless transition to the new organization.
5. The primary responsibility of the committee would be to make recommendations to the Ministry of Health about laboratory physician resource planning for all public hospitals throughout BC, based upon continuously updated workload models for anatomical and clinical pathology and to include the provision of clinical service at teaching hospitals.
6. The Terms of Reference of the new organization would include the following:
  - i. Continue to monitor anatomical pathology workloads for all sites on an annual basis.
  - ii. Evolve the current L4E Version 1 measurement system to a workload model that will measure those activities currently not yet captured by the present system.
  - iii. Refine and validate the clinical pathology workload models currently in existence, with a view to utilizing them for physician resource planning in these specialties.
  - iv. Make recommendations concerning the laboratory physician resources required to fulfill current and future clinical needs in community and academic settings.
7. Human resource requirements in academic pathology and laboratory medicine should be addressed as a matter of high priority.

- 
8. The UBC Department of Pathology and Laboratory Medicine with the Faculty of Medicine, partners and stakeholders should develop and establish an academic accountability framework that will not only provide critically important planning, coordination and allocation of resources, but will also quantify academic output, to ensure that sites and individuals are meeting academic mandates and provide quantifiable evidence of changes in academic workload that may occur over time.

### **Preamble**

Under the Terms of Reference of the Laboratory Reform Committee (LRC), a working group was convened to address item 1.1 b):

- A provincial plan for physician human resources.

Members of the human resource-planning group were:

Dr. Chris Bellamy, BCMA (lead)  
Dr. Mike Allard, BCMA & UBC  
Dr. Brian Berry, BCMA & VIHA  
Dr. Jim Cupples, BCMA and FHA  
Dr. Lawrence Haley, BCMA & FHA  
Dr. Gordon Hoag, BCMA & VIHA  
Ms. Jane Crickmore, MOH  
Ms. Joanne Philley, MOH

### **Background**

#### **1. BC Laboratory physician numbers**

As of October 2012, there are approximately 293 laboratory physicians licensed by the College of Physicians and Surgeons of British Columbia (College of Physicians and Surgeons of British Columbia, 2012), distributed by Royal College of Physicians and Surgeons of Canada specialty as follows:

- |  |     |
|--|-----|
| • Anatomical Pathology (including forensic and neuropathology) | 107 |
| • General Pathology  | 89  |
| • Hematological Pathology                                      | 36  |
| • Medical Biochemistry   | 18  |
| • Medical Microbiology   | 43  |

It should be noted that these numbers do not equate to full time equivalents, the FTE count being less than this total, likely in realm of 245. Some laboratory physicians hold specialist qualifications in more than one laboratory medicine specialty and the above numbers attempt to correct for the major area of practice of these individuals.



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## 2. BC Laboratory Services Review 2003

The working group reviewed pertinent section of the BC Laboratory Services Review, July 2003, submitted by Lillian Bayne & Associates (Lillian Bayne & Associates, 2003). The following comments in the report are pertinent to laboratory physician resource planning:

- Approximately 35% of pathologists in Canada are in the pre-retirement age group (50 – 59) and more than a third of pathologists in BC's teaching hospitals are 55 years of age or older.
- Retention of all graduating residents over the next 5 years would meet only half of the projected need.
- An external review of the UBC Department of Pathology and Laboratory Medicine found lack of protected academic time for teaching and research a major barrier to recruitment and retention of junior faculty members. Under reforms undertaken in Alberta, the academic mandate was perceived to have seriously suffered through funding cuts.
- Efforts should be made to ensure that human resource planning in the lab sector is linked to overall health human resource planning efforts underway in the Ministry of Health Planning.
- Roles of laboratory physicians are expanding.
- Non-urban areas of the province experience significant recruitment challenges.

## 3. Canadian Laboratory Physician Supply (Pollett, Lajoie, & Colgan, 2011)

A recent paper in the Canadian Journal of Pathology, *Canadian Laboratory Physician Supply: Falling behind*, was reviewed. The following comments are pertinent to laboratory physician resource planning:

- From 1998 to 2008, the Canadian population grew by 10.7%, whereas there has been an overall decrease in the supply of laboratory physicians over the same time period by 1.8%. In BC, there was a decrease supply of 5.9%, by population-to-pathologist ratio.
- Over the same time period, there was an increased ratio of clinical physicians to laboratory physicians in BC of 13.3%.
- Whereas laboratory automation has greatly improved productivity in the technical components of laboratory testing, it has not provided the same opportunities for improved efficiencies in the medical practice of laboratory medicine.
- The demands on laboratory physicians are increasing with a growing list of new and expanding activities.

## 4. Secor report

An embargoed copy of the recent Secor report 'Options for Laboratory Transformation', September 2012 was available to the working group members. Although no direct reference to human resource planning in laboratory medicine was made, there was considerable discussion about the importance of a provincial quality framework and utilization control of laboratory tests, both of which require adequate laboratory physician resources to implement.

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## **5. Expansion and Distribution of the UBC Faculty of Medicine**

The MD Undergraduate Program of the UBC Faculty of Medicine has more than doubled its enrolment since 2004 and, simultaneously, distributed its presence with clinical training, education, and health sciences research now spread across the province. The expansion and distribution of the UBC Faculty of Medicine MD Undergraduate Program was carried out in partnership with the provincial government, the University of Victoria, the University Northern British Columbia, and all six Health Authorities. Four geographically distinct regions that span the province comprise the MD Undergraduate Program and include the Island, Northern, Southern, and Vancouver Fraser Medical Programs. In addition to education and training at academic university campuses, the students receive their education at more than 80 clinical facilities throughout the province, providing them with experience in urban, regional, community, and remote settings. Because of its expansion and its provincial scope, the MD Undergraduate Program not only impacts the traditional teaching hospital sites, but also has far reaching effects that have led to new academic demands at sites and upon individuals who were not previously engaged in such activities.

## **6. “Unfinished Business”-Human Resource Requirements for Academic Pathology and Laboratory Medicine in BC**

The original intent of the Provincial Laboratory Coordinating Office (PLCO), initiated some 8 years ago now, as a final phase of addressing laboratory physician staffing, was to look at the academic community. This work was never started. More recently, it was agreed in the Laboratory Medicine Workload Agreement that the *Clinical and Academic Learning and Innovation (CALI)* framework established by the Ministry of Health would be used to determine laboratory physician requirements in the academic environment, with Vancouver General Hospital/UBC, BC Children’s and Women’s Hospital and St. Paul’s Hospital being recognized in the Agreement as the primary teaching hospitals. To date, this has not proved a functional framework to address this issue and no progress has been made. There is now an urgent need to address the longstanding human resource requirements in the academic setting as soon as possible.

## **7.Excessive Workload and Quality**

The provision of a high quality service is one of the fundamental goals of all physicians, and laboratory medicine is no exception. It is recognized within the health care profession that excessive workload correlates with higher error frequencies. This is well documented amongst registered nurses, hospital interns and cytotechnologists. Excessive workload has been cited as a contributing factor in some of the scandals that have plagued laboratories and pathologists in Canada in recent years. The perception that excessive workload amongst laboratory physicians could contribute to higher error rates was a prime motivator for the Royal College of Pathologists of the UK to start to develop workload models in all specialties of pathology, starting in the 1992.

A recent report from the Royal College of Pathologists of Australasia addresses the impact of anatomical pathology workload on quality and safety. (Royal College of Pathologists of Australasia, 2011). The report found that 71% of those working above their full capacity

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indicated that there had been times they were too busy to quality assure their work, 73% indicated that their workload compromised quality and 45% reported that there had been times when patient care had been compromised.

Recent papers in the North American literature also support the contention that workload and error rates in anatomical pathology are related (Vollmer, 2006 and Raab et al 2006).

### **The rationale for a physician human resources plan in laboratory medicine**

The working group strongly recommends a provincial plan for laboratory physician resource planning for the following reasons:

1. To maintain and improve on quality and patient safety in laboratory medicine.
2. To ensure sufficient resources to control the utilization of laboratory tests.
3. To ensure sufficient resources to lead those laboratory-based initiatives, which result in major improvements in, care delivery and cost savings outside the laboratory (antimicrobial stewardship, blood product utilization control etc.).
4. To provide sufficient resources for the education of all medical students and residents, in order to instill those principles of laboratory medicine, test ordering and blood product utilization necessary for a high quality medical practice and to disseminate knowledge related to new analytical tools and approaches.
5. To recruit and retain the highest quality personnel.
6. To facilitate the process of discovery and to bring new discoveries, innovations and approaches into clinical practice.

The provision of a high quality service is one of the fundamental goals of all physicians, and laboratory medicine is no exception. It is recognized within the health care profession that excessive workload correlates with higher error frequencies. This is well documented amongst registered nurses, hospital interns and cytotechnologists. Excessive workload has been cited as a contributing factor in some of the scandals that have plagued laboratories and pathologists in Canada in recent years. The perception that excessive workload amongst laboratory physicians could contribute to higher error rates was a prime motivator for the Royal College of Pathologists of the UK to start to develop workload models in all specialties of pathology, starting in the 1992.

A recent report from the Royal College of Pathologists of Australasia addresses the impact of anatomical pathology workload on quality and safety. (Royal College of Pathologists of Australasia, 2011). The report found that 71% of those working above their full capacity indicated that there had been times they were too busy to quality assure their work, 73% indicated that their workload compromised quality and 45% reported that there had been times when patient care had been compromised.

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### **The current status of laboratory physician resource planning in BC**

- **The Joint Laboratory Medicine Workload Oversight Committee**

British Columbia is the first Canadian province to have a negotiated Workload Agreement in place for laboratory medicine, in which funding derived from the Second Renewed Laboratory Fee-for-Service Agreement of April 1<sup>st</sup> 2010, was used to provide for additional laboratory physician resources through workload measurements. The Laboratory Medicine Workload Agreement of April 1<sup>st</sup> 2010 was the culmination of work performed under the direction of the Provincial Laboratory Coordinating Office (PLCO) dating back to 2004, in which there was an attempt to develop workload models for the specialties of laboratory medicine that could address human resource planning of laboratory physicians in BC. The Joint Laboratory Medicine Workload Oversight Committee (JLMWOC) was set up to administer the agreement. The committee is a bi-partite BCMA/MoH committee with representation from government, BCMA/BCALP and Health Authorities. The Agreement established workload benchmarks for anatomical and clinical pathology, to be applied to practice groups of laboratory physicians. The anatomic pathology benchmark is based upon the Level 4 Equivalent workload model developed by Dr. Raymond Maung (Maung R. T., 2005), a specimen complexity weighting system whereby all specimen types are reduced to a single Level 4 value ( the 'L4E'). Clinical Advisory Groups were set up through the PLCO to attempt to develop similar workload models for hematopathology, transfusion medicine, medical biochemistry and medical microbiology. These met with variable levels of success with medical biochemistry being the most successful, followed by hematopathology. It was finally decided to terminate the activities of these clinical working groups with government and the British Columbia Medical Association (BCMA) agreeing to use a surrogate marker for the clinical pathology benchmark, namely a ratio of Anatomic Pathology FTEs: Clinical Pathology FTEs, for the 3 year term of the Agreement. This ratio was based upon that which existed in BC at the time of the Agreement – 2.3:1. The anatomic pathology benchmark in the Agreement is 4750 L4Es/FTE. During the time of development of this workload model, there was a provincial moratorium on the hiring of new laboratory physicians.

The L4E workload model, as initially developed, is primarily applicable to a general community based laboratory medical practice. It falls short of adequately capturing all anatomical pathology workload when applied to tertiary level and academic institutions. Furthermore, it was always appreciated that human resource planning of clinical pathology positions through the application of a simple ratio based on anatomic pathology, lacked the rigor of any scientific methodology or validation and became meaningless when applied to large sub-specialized groups.

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The JLMWOC received applications from 16 sites to evaluate anatomic pathology workload and calculate adjustments to staffing based on this data. The committee has now completed its work in this area and funding for an additional 15 FTEs has been allocated accordingly. An extensive data base for anatomical pathology workload across BC has been built from this work, and will be of great value in the future.

Although one of the Terms of Reference of the Committee was to monitor clinical pathology workloads throughout BC, this was never a realistic goal, given the lack of validated clinical pathology workload models. However, 2 large groups, namely the Vancouver Island Health Authority (South) and the CJ Coady group in the Fraser Health Authority, have continued to evolve the work started in the PLCO Clinical Advisory Groups. Two members of this human resource working group presented data from VIHA for discussion. In general terms, the workload models were evolved from the anatomic pathology L4E model, the medical biochemistry model having, in fact, been approved for further development at a PLCO meeting in January 2009. It was agreed that the work had much merit but needed further refinement in some areas, followed by regional and provincial validation. It was appreciated that much of this work could be accomplished from within the laboratory physician community.

The term of the JLMWOC and Workload Agreement expire on March 31<sup>st</sup> 2013 with no plan at present to continue this work.

- **The Cochrane report**

Following reports of suspected misdiagnosis on CT scans by 3 BC radiologists in 2010, the Minister of Health Services requested a review by the BC Patient Safety and Quality Council, chaired by Dr. Doug Cochrane. The Phase 2 report, tabled in August 2011, made 35 recommendations, some of which have far reaching consequences for human resource planning in laboratory medicine. (Cochrane, 2011). As a result of this report, it seems clear that quality assurance activities in diagnostic specialties will be expanded and standardized, with the funding models for these activities to be developed by the Ministry of Health (Recommendation # 34). It is crucial that these additional quality assurance activities have appropriate human resources to perform them and that, as noted above in the report from the Royal College of Pathologists of Australasia, they do not fall by the wayside.

### **Human Resource Requirements in Academic Pathology and Laboratory Medicine**

Pathology and Laboratory Medicine is a medical specialty concerned with diagnosis of disease and a scientific investigative discipline (Crawford, 2007) dedicated to understanding mechanisms and pathogenesis of disease, with both aspects ultimately devoted to improving the care, treatment, and well being of patients. A characteristic feature shared by these two sides of Pathology and Laboratory Medicine is knowledge, with Academic Pathology and Laboratory Medicine playing a foundational role in the pathway of knowledge from its creation to its integration, dissemination, application, and interpretation.

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As a consequence of this foundational role, Academic Pathology and Laboratory Medicine has a broad and significant impact in medicine and other health-related fields. New analytical tools and approaches are dramatically altering the goals of pathology and laboratory beyond diagnosis and classification to detailed molecular characterization of conditions and the ability to determine prognosis, predict risk, and guide targeted therapy to maximize its effectiveness and prevent therapeutic complications (Compton, 2006) (Wall & Tonellato, 2012). From a practical perspective, this means that the volume of relevant data and complexity of analysis of these data will increase for pathology and laboratory medicine personnel. It will also demand a greater involvement in creation of knowledge and translation, implementation, and validation of discoveries and innovations to clinical practice, an increased need for dissemination of new knowledge across the entire spectrum of health care providers and trainees, and, finally, a far greater role in management of test utilization and the interpretation of results obtained with more direct involvement in patient care decisions. Simply stated, academic activities in pathology and laboratory medicine will be at the forefront of and central to more personalized care, educating and training the next generation of pathologist and laboratory physicians, assurance of diagnostic and interpretive quality, and management of laboratory utilization, processes that will lead to improved outcomes for patients and greater effectiveness of the health care system.

### **The Need for Human Resources in Academic Pathology and Laboratory Medicine**

As mentioned, there has been a more than two-fold (>100%) expansion in student numbers in the UBC MD undergraduate program with distribution of students across the province. The residency program in the UBC Department of Pathology and Laboratory Medicine has also doubled in size over the same time period. Pathology and laboratory physician staffing has not kept pace with this increased academic demand with professional staffing levels in the primary teaching hospitals responsible for the majority of the educational activities being relatively unchanged. In a similar manner, the total number of faculty members in the entire province have also not kept pace, having increased less than 25% over the same time period. This situation differs from other departments in the Faculty of Medicine at UBC and from other Departments of Pathology and Laboratory Medicine across the country where the changes in faculty numbers are more well aligned with increases in student and trainee numbers. For instance, faculty increased by an average of nearly 98% from 2003 in clinically intensive departments in the Faculty of Medicine at UBC, including Anesthesia, Pharmacology, and Therapeutics, Family Practice, Medicine, Obstetrics and Gynecology, Ophthalmology and Visual Sciences, Orthopedics, Pediatrics, Psychiatry, Radiology, and Surgery. The increase in professional staff in Departments of Pathology and Laboratory Medicine at other institutions in Canada, including the University of Alberta, University of Calgary, and the University of Toronto, also shows a correspondance to the increased academic demands, being on average more than 90% of the relative rise in student and resident trainee numbers.

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## **'The Academic Lift'**

Dr. Mike Allard, Professor and Head of the Department of Pathology and Laboratory Medicine at UBC presented a framework that has been developed to address the shortfall in academic staffing in BC, entitled "The Academic Lift" (Allard, et al., June 21, 2012). This was developed in collaboration with key stakeholders amongst the academic community and outlines a mechanism to calculate the additional staffing required to support the teaching of medical students and residents and to support research activities. This approach, which is flexible, is applicable province wide, and is capable of clearly delineating personnel requirements, has been endorsed by the British Columbia Association of Laboratory Physicians (BCALP). Dr. Allard has calculated that an additional 8.2 FTEs are required province-wide to support the educational activities of the department. Of these, 5.8FTEs (or >70%) will be dedicated to clinically integrated teaching activities where teaching of residents (or students) occurs simultaneously with patient care and clinical service delivery. Unlike other specialties, residents are not essential to delivery of patient care and clinical service in pathology and laboratory medicine. As such, their involvement and the resultant educational needs add significantly to professional staff workloads over and above that arising from patient care and clinical service delivery. It is worth noting that these numbers for clinically integrated teaching refer only to educational requirements specifically for pathology and laboratory medicine. Physicians in pathology and laboratory medicine play a critical role in educating trainees in other specialties, where rotations in pathology and laboratory medicine are mandatory and essential for these programs to meet accreditation requirements. One (1.0) FTE is required to meet these extra educational demands.

An additional 6.3FTEs are required to support research activities in the UBC department. Nearly 80% of these FTEs will be devoted to research activities that have an impact on clinical service and patient care by means of translating, integrating, and/or applying new discoveries, innovations, and approaches that will lead to improvements in patient health and care and the health system overall. Not only are these research positions critical to the process of discovery and to bring new discoveries, innovations, and approaches to practice, but they are also essential components required for both medical undergraduate student and resident trainee program accreditation. In summary, 15.5FTEs are required to address the shortfall in academic staffing in pathology and laboratory medicine.

### **A Commitment to Accountability**

In line with responsibility as the Academic Head of ensuring that the academic mandate of the university, the faculty, and the department is met and the need to be accountable for resources dedicated to support academic activities, Dr. Allard will lead a process and work with the Faculty of Medicine, partners, and stakeholders to develop an academic accountability framework. This framework will build upon existing processes currently used to assess performance of faculty members in relation to expectations and standards of performance in the UBC department, all of which are aligned with academic deliverables of the UBC Faculty of Medicine. The framework to be developed and established by the UBC department will not only provide critically important information for planning, coordination, and allocation of resources,

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but will also explicitly quantify academic output to determine if each site or individual are meeting their academic mandates and provide quantifiable evidence of changes in academic workload that may occur over time.

### **Approaches to Laboratory Physician resource planning in other jurisdictions**

#### **1. Royal College of Pathologists of UK**

The Royal College of Pathologists of the UK has been active in developing staffing and workload guidelines for laboratory medicine physicians since 1992. The latest guidelines for anatomical pathology and cytopathology departments were released in April 2012 and update the previous guidelines of 1999, in recognition of the fact that, as medical and surgical practice is constantly evolving, so too must these guidelines, to ensure that a sustainable, high quality service is provided for the benefit of the patients. (Royal College of Pathologists of UK, 2012). The workload model assigns points to each surgical specimen type, assessed prospectively and based upon complexity. This model does not capture additional workload such as conferring with colleagues, looking up information, discussing with referring clinicians, reviewing previous histology and seeking external opinions. The Royal College recognizes that additional resources are necessary to address these essential quality assurance activities.

The Royal College has other staffing and workload guidelines for hematopathology, medical biochemistry and medical microbiology. (Royal College of Pathologists of UK, 2001)

#### **2. Canadian Association of Pathologists**

The Canadian Association of Pathologists published updated guidelines for the measurement of pathologist workload in 2010 (Maung R. , 2010). These guidelines build on Version 2 of the Level 4 Equivalent Anatomical Pathology Workload Model with the addition of relative values for workload previously uncaptured in Version 2, including important quality assurance activities such as internal consultation, complex case consultation, external case review (cancer centre, external request), together with the addition of some highly specialized specimen types and special stain interpretation. It became clear during the JLMWOC evaluations of site anatomical pathology workload data, that such revisions were essential if this workload model was to be applied to tertiary and academic centres. The guidelines indicate how this workload model relates to other models, including The Royal College of Physicians and Surgeons of Canada, Royal College of Pathologists of UK, Medical Group Management association (US) and the Manitoba Model and contains recommendations for the number of L4Es that a full time equivalent should be expected to perform per annum. There are also suggestions as to how this workload model might be applied to clinical pathology specialties, along the lines that some of the PLCO Clinical Advisory Groups had been proceeding.



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## **A future model for laboratory physician resource planning in BC**

Much has been accomplished to address laboratory physician resource planning in BC over the past 8 years. The Workload Agreement, administered through the JLMWOC, has been successful in addressing human resource shortfalls in most community-based laboratories. As noted above, the committee has also established a valuable peer-reviewed database of workload statistics in laboratory medicine for many sites in the province. However, unless a plan is put in place by March 31<sup>st</sup> 2013, there is the very real possibility of human resource planning in laboratory medicine falling into the same abyss that existed prior to 2004. This would be extremely unfortunate, at a time when the diagnostic specialties are under the microscope to comply with the Cochrane report and assure the public that high quality in laboratory medicine is being achieved through expanded quality assurance activities. Physician resource planning has proved problematic in many areas of medicine. However, laboratory medicine is ideally placed to move ahead, with many of the tools required for successful implementation having already been developed and at our disposal.

The working group recommended the following:

1. The work of the JLMWOC should be continued through an organization with expanded JLMWOC Terms of Reference, to include clinical activities in teaching hospitals.
2. The new organization, a Laboratory Medicine Resource Planning Committee, should build on the successful composition of JLMWOC and be a bi-partite BCMA/MoHS structure with representation from BCMA/BCALP, UBC Dept. of Pathology, HAs and MoH.
3. Until the new organization is put in place, the term of the JLMWOC should be extended so that there is seamless transition to the new organization.
4. The primary responsibility of the committee would be to make recommendations to the Ministry of Health about laboratory physician resource planning for all public hospitals throughout BC, based upon continuously updated workload models for anatomical and clinical pathology and to include clinical activities at teaching hospitals.
5. The Terms of Reference of the new organization would include the following:
  - i. Continue to monitor anatomical pathology workloads for all sites on an annual basis.
  - ii. Evolve the current L4E Version 1 measurement system to a workload model, which will measure those activities currently not yet captured by the present system.
  - iii. Refine and validate the clinical pathology workload models currently in existence, with a view to utilizing them for physician resource planning in these specialties.
  - iv. Make recommendations concerning the laboratory physician resources required to fulfill current and future clinical needs in community and academic settings.

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6. Human resource requirements in academic pathology and laboratory medicine should be addressed as a matter of high priority.
  7. The UBC Department of Pathology and Laboratory Medicine with the Faculty of Medicine, partners, and stakeholders will develop and establish an academic accountability framework that will not only provide critically important information for planning, coordination, and allocation of resources, but will also explicitly quantify academic output to determine if each site or individual are meeting their academic mandates and provide quantifiable evidence of changes in academic workload that may occur over time.

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