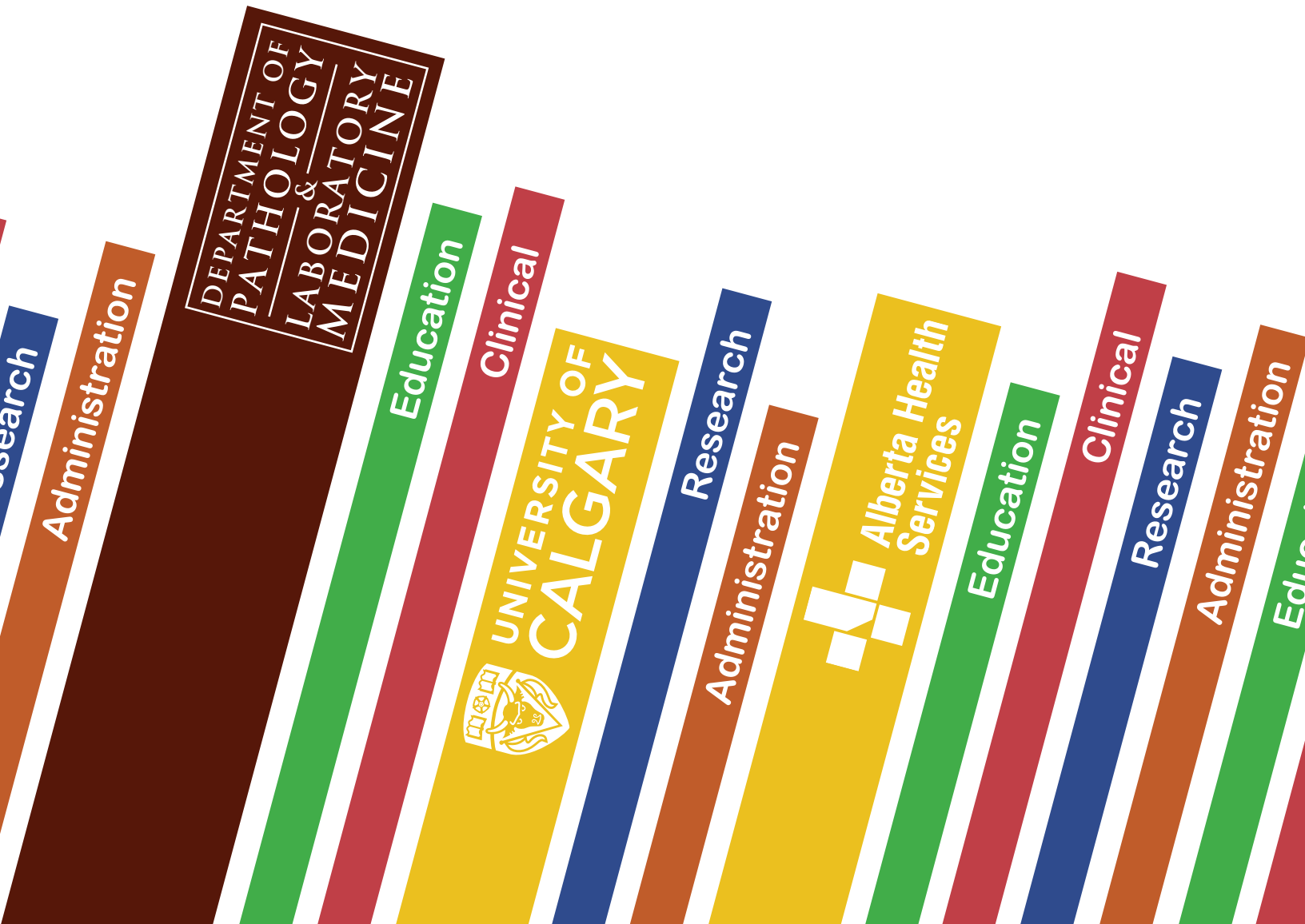
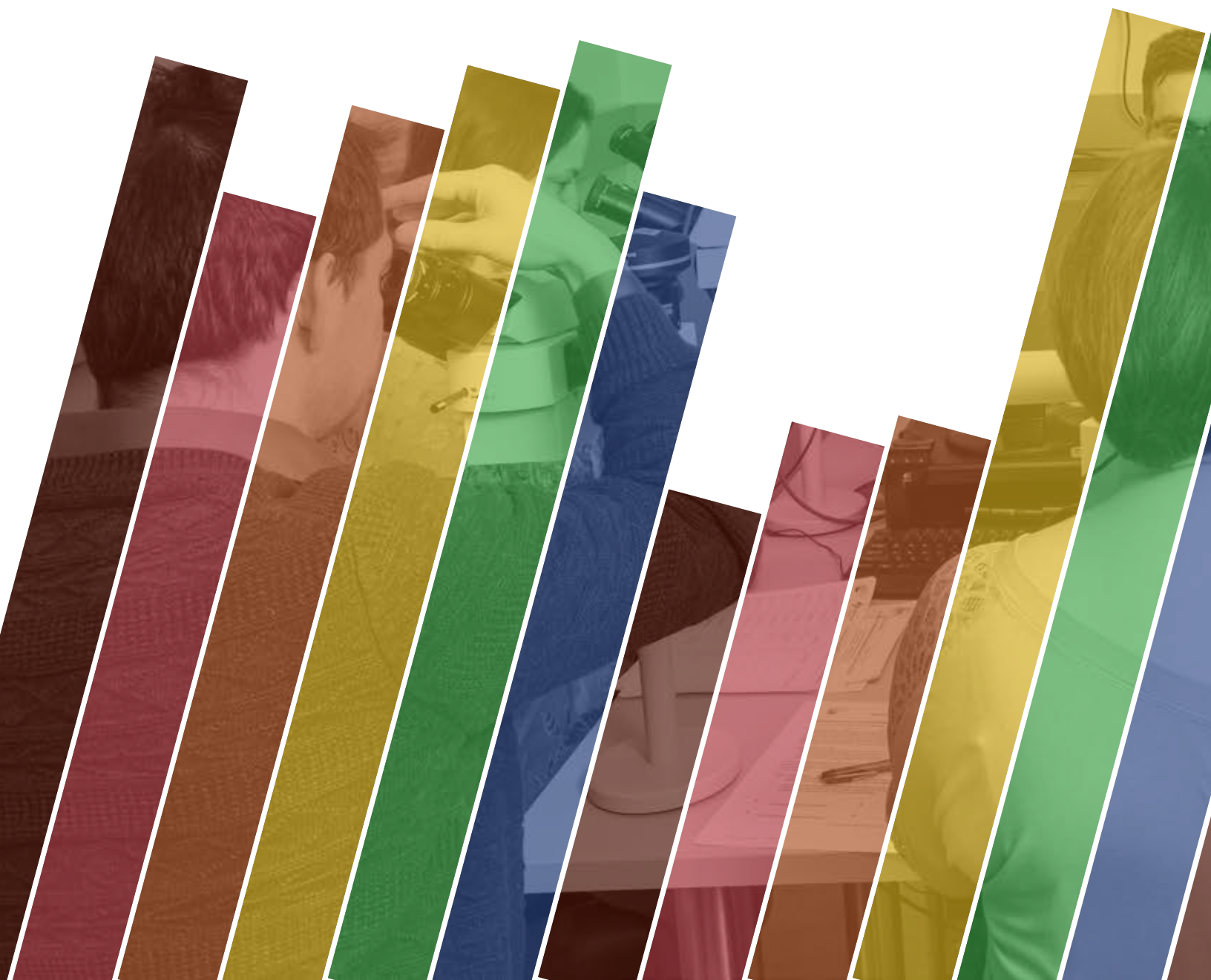


2014 ANNUAL REPORT





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Supervisors



Executive Summary

Department Structure and Organization

The Department of Pathology & Laboratory Medicine (DPLM) comprises the medical and scientific staff for Calgary Laboratory Services (CLS). Throughout 2014 it was composed of 5 CLS Clinical Sections (n.b., a 6th Clinical Section was approved at the end of the year) and had 82 primary clinical MD appointees and 13 clinical PhD scientists. There were 28 members with University of Calgary GFT and 67 members with Clinical Faculty appointments. The Medical/Scientific staff are located at all 5 acute-care hospital sites, at CLS' central laboratory facility the Diagnostic & Scientific Centre (DSC), and at the University of Calgary Health Sciences Centre, Heritage Medical Research Building, and Health Research Innovation Centre.

Accomplishments and Highlights

The major clinical accomplishments of each of the 5 Sections are described individually in the report and are too numerous to list here. Some organization-wide accomplishments included performing > 25 Million laboratory tests (equates to ~70,000 tests every day), obtaining full CPSA laboratory accreditation, recruiting 11 new faculty members, improving efficiency at Patient Service Centres by increasing the percentage of appointments, continuing to improve support for Calgary Zone Rural Labs, and enhancing our preparedness for dealing with pathogens such as ebola. Our postgraduate clinical training programs (Anatomic Pathology, General Pathology, and Neuropathology Residency training programs and Fellowship programs in a variety of areas) trained 17 AP, 6 GP, and 2 NP residents as well as 8 fellows in 2014. Our faculty contributed several thousand hours of post-graduate medical education and ~1200 hours of undergraduate medical education teaching. We held \$2.96 million in external grant funding as principle investigators, and we published 144 peer-reviewed papers as well as 15 book chapters and 3 books in 2014. The mean Impact Factor of the journals we published in for the year 2014 was 3.82. Eleven faculty members (4 GFT and 7 Clinical) were either promoted or are in the midst of consideration for promotion.

Challenges

Every year, we face the challenge of providing increased services without proportionate increases in funding; our only hope is to optimize laboratory test utilization so that we can achieve savings by minimizing inappropriate or unnecessary testing. Operationally, our biggest challenge is the lack of sufficient capital funding to buy new equipment allowing us to implement new and often more efficient technologies. Other major challenges are space limitations in acute care sites and the DSC and insufficient IT support.

Workforce Planning

Because pathology and laboratory medicine are services, we have no ability to control our own workload, as this is determined by numbers of surgical procedures, orders for laboratory tests, etc. Since laboratory physicians are not fee for service, there is no simple mechanism to fund new positions based upon workload expansion. Although historically a chronic problem, AHS has put very substantial new funding into creating new laboratory physician and scientist positions over the past few years and we have hired many highly qualified personnel. Once these are all in place and we are at full staffing, we will assess if there are additional needs.

Quality Programs

CLS's comprehensive quality assurance program is based on a Quality Management System model designed to support high quality, cost-effective laboratory services with a strong focus on patient safety. Laboratory-wide performance indicators are reported to AHS monthly and there are formal systems in place for serious adverse event, and patient concerns reporting and resolution. CLS and other laboratories around the province have also implemented the AHS provincial laboratory services' Anatomic Pathology Quality Assurance Plan.

Future Directions and Initiatives

The year 2015 will be a year of major change. I will be completing my second and final five year term as University and Zone Clinical Department Head and the search process for my replacement is currently underway. Paula Hall, the Chief Operating Officer for CLS, has announced her upcoming retirement and so there will soon be a search process initiated to find her replacement as well. Paula has been with CLS since its inception and I would like to personally thank her for her years of service to the organization, the healthcare system, and the public we serve. Obviously, leadership changes create short-term uncertainty but are important in the longer term as they create opportunities to gain new ideas



and perspectives. There are several exciting initiatives which will keep the new leadership busy. Other exciting changes on the near horizon include a planned amalgamation of the Alberta Children's Hospital's three genetic testing laboratories into CLS and, through a Provincial "Hub & Spoke" Model, it is anticipated that we may provide some additional laboratory services in the AHS South Zone.

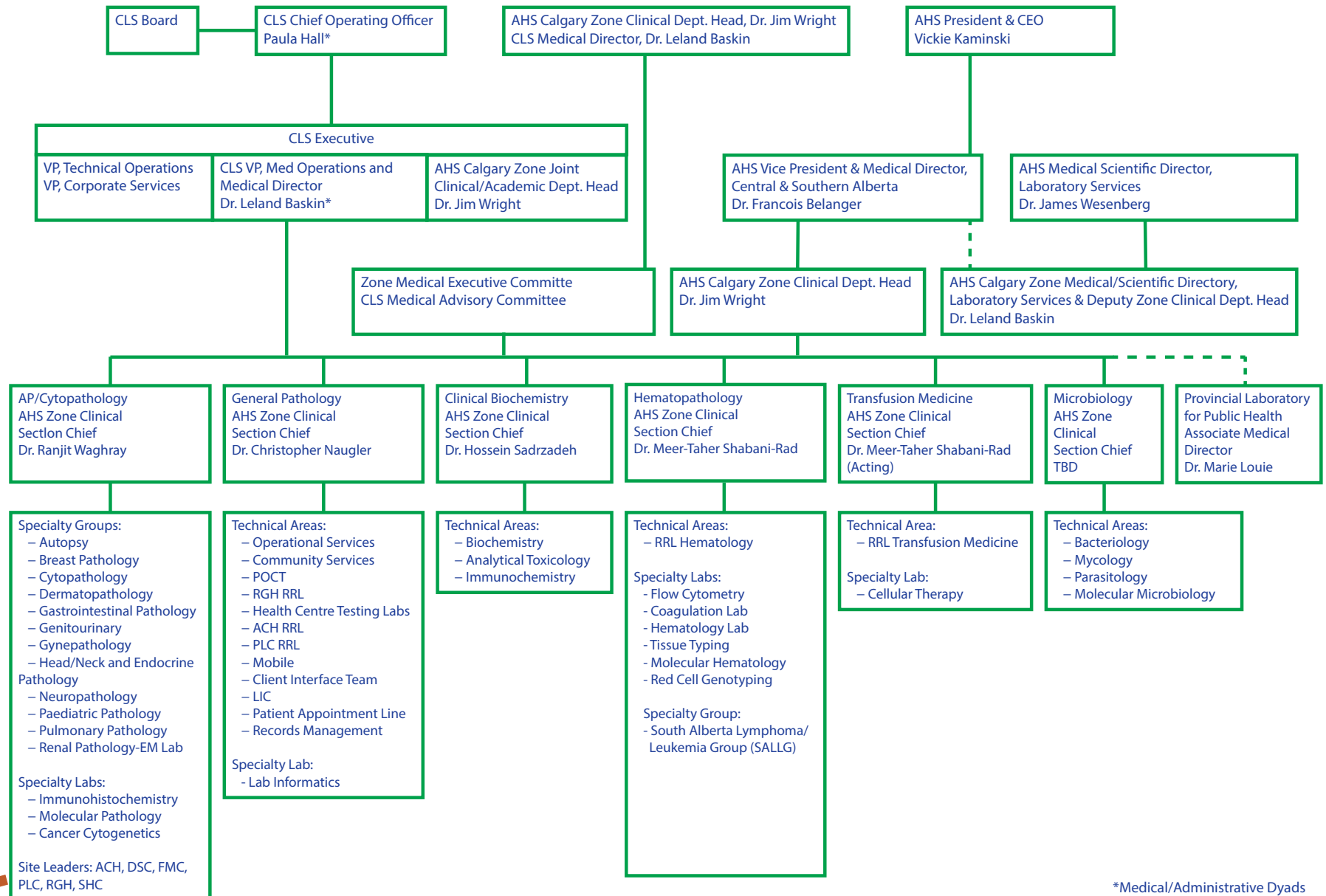


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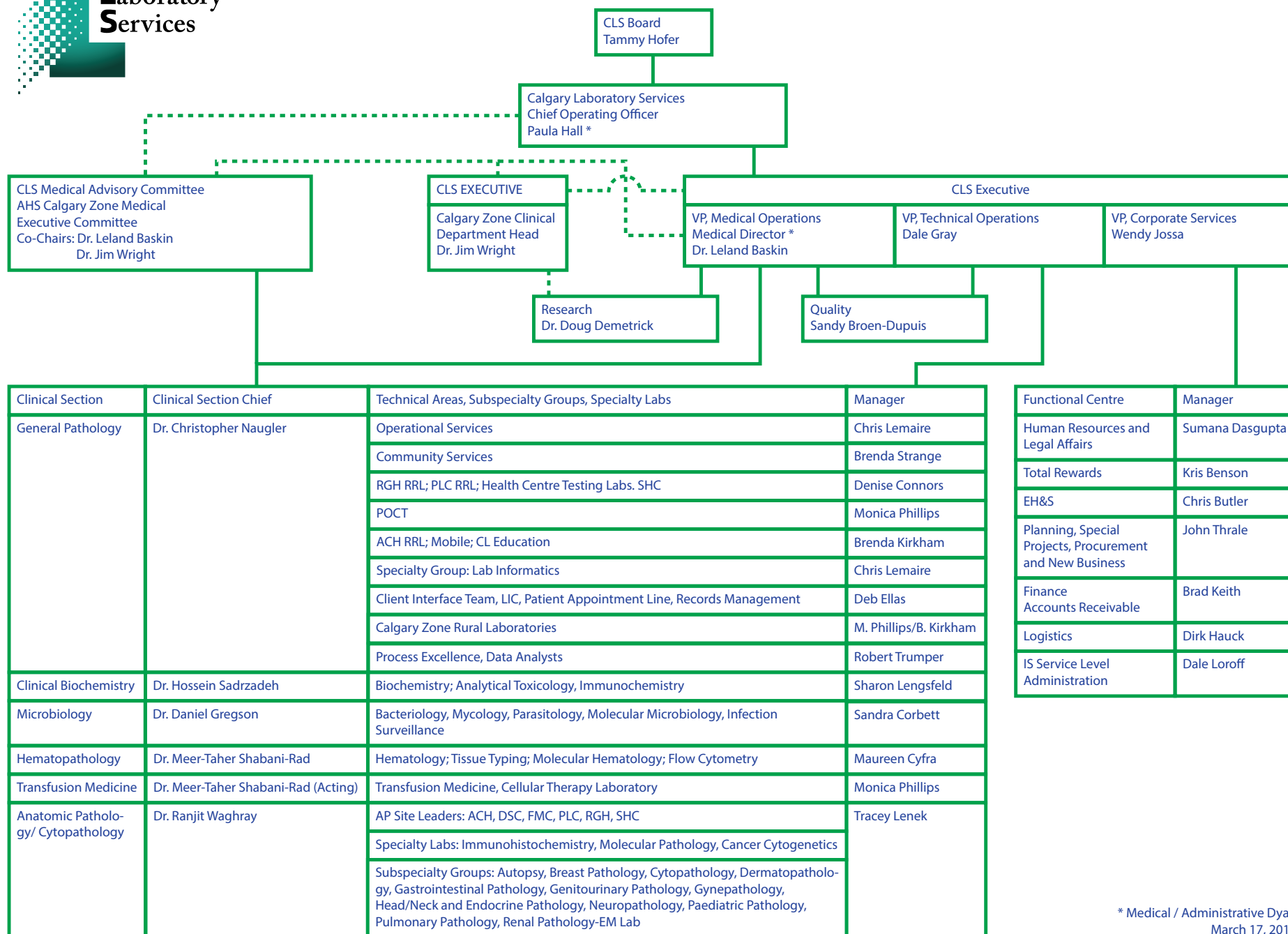
Governance

It should be noted that Clinical Sections & Section Chiefs are Divisions and Division Heads in the U of C organizational structure.

AHS CALGARY ZONE DEPARTMENT OF PATHOLOGY & LABORATORY MEDICINE



CLS GOVERNANCE AND REPORTING STRUCTURE



Departmental Committees

CLS Medical Advisory Committee/AHS Calgary Zone Medical Executive Committee

Dr. Leland Baskin, Medical Director & VP of Medical Operations, CLS, Co-Chair
Dr. Jim Wright, Zone Clinical Department Head (ZCDH), DPLM, Co-Chair
Ms. Paula Hall, Chief Operating Officer, CLS
Dr. Ranjit Waghray, Clinical Section Chief, Anatomic Pathology/Cytopathology
Dr. Hossein Sadrzadeh, Clinical Section Chief, Clinical Biochemistry
Dr. Christopher Naugler, Clinical Section Chief, General Pathology
Dr. Meer-Taher Shabani-Rad, Clinical Section Chief, Hematology/Transfusion Medicine
Dr. Daniel Gregson, Clinical Section Chief, Microbiology
Dr. Travis Ogilvie, AP Site Leader, Foothills Medical Centre (FMC)
Dr. Steve Gorombey/Dr. Andrew Schell, AP Site Leader, Peter Lougheed Centre (PLC)
Dr. Erik Larsen/Dr. Kelly Guggisberg AP Site Leader, Rockyview General Hospital (RGH)
Dr. Marie-Anne Brundler, AP Site Leader, Alberta Children's Hospital (ACH)
Dr. Steve Gorombey, AP Site Leader, Diagnostic & Scientific Centre (DSC)
Dr. Karl Anders, AP Site Leader, South Health Campus (SHC)
Mr. Dale Gray, VP Technical Operations
Ms. Sandy Broen-Dupuis, Quality Manager

Department of Pathology & Laboratory Medicine Clinical Safety Committee

Dr. Anna Sienko, Chair, Lead Cancer Pathologist Calgary Zone, CLS
Dr. Leland Baskin, Medical Director & VP of Medical Operations, CLS (Chair Alternate)
Dr. Jim Wright, ZCDH, DPLM/CLS
Ms. Paula Hall, Chief Operating Officer, CLS
Mr. Dale Gray, VP Technical Operations, CLS
Dr. Amid Abdullah, Consultant Pathologist, Calgary Zone Rural Laboratories
Ms. Sandy Broen-Dupuis, Manager, Quality Department, CLS
Ms. Brenda Kirkham/Monica Phillips, CLS Manager, Calgary Zone Rural Laboratories
Ms. Patricia Boutilier, Clinical Safety Advisor, CLS

CLS Department of Pathology & Laboratory Medicine Business Meeting

This is a quarterly meeting of all laboratory medicine medical and scientific staff in the Region. Co-chaired by the Department Head and CLS VP Medical Operations

Anatomic Pathology Residency Training Committee

Dr. Lisa DiFrancesco/Dr. Dan Fontaine, Chair
Dr. Travis Ogilvie
Dr. Iwona Auer-Grzesiak
Dr. Margaret Kelly
Dr. Hallgrimur Benediktsson
Dr. Duane Barber
Dr. Vincent Falck
Dr. Elizabeth Brooks-Lim
Dr. Andrew Kulaga
Dr. Tarek Bismar



Dr. Chad Luedtke
Dr. Lothar Resch
Dr. Marie-Anne Brundler
Dr. Amy Bromley
Chief Resident (rotates)
Junior Resident (rotates)
Dr. Jim Wright (Ex-officio)

General Pathology Residency Training Committee

Dr. Christopher Naugler (Chair)
Dr. Amid Abdullah
Dr. Julie Carson
Dr. Iwona Auer-Grzesiak
Dr. Dan Fontaine
Dr. Angela Thompson
Dr. Alex Chin
Dr. Jeffery Gofton
Dr. Jim Wright (Ex-Officio)

Neuropathology Residency Training Committee

Dr. Lothar Resch, Chair
Dr. Leslie Hamilton, Assistant Program Director
Dr. Jeffrey Joseph
Dr. Jennifer Chan
Dr. Tera Jones
Dr. Marie-Anne Brundler
Dr. Jim Wright (ex-officio)
Chief Resident (residents' representative)

Fellowship Committee

Dr. Joanne Todesco (Chair)
Dr. Lisa DiFrancesco/Dr. Dan Fontaine
Dr. Christopher Naugler
Dr. Alex Chin
Dr. Walid Mourad
Dr. Jim Wright (ex-officio)

Divisions, Sections and/or Programs

Alberta Health Services Clinical Sections/University of Calgary, Cumming School of Medicine Divisions

Clinical Section/Division, Anatomic Pathology/Cytopathology
Clinical Section Chief/Division Head, Dr. Ranjit Waghray
Clinical Section/Division, Clinical Biochemistry
Clinical Section Chief/Division Head, Dr. Hossein Sadrzadeh
Clinical Section/Division, General Pathology
Clinical Section Chief/Division Head, Dr. Christopher Naugler
Clinical Section/Division, Hematopathology
Clinical Section Chief/Division Head, Dr. Meer-Taher Shabani-Rad
Clinical Section/Division, Microbiology
Clinical Section Chief/Division Head, Dr. Daniel Gregson
Clinical Section, Transfusion Medicine
Clinical Section Chief/Division Head, Dr. Meer-Taher Shabani-Rad (acting)

Membership (Appendix 1.1)



Accomplishments and Highlights

Clinical Service (by Section)

Anatomical Pathology/Cytopathology Section (AP/Cyto)

Workload

	2014 Specimens	% change (vs. 2013)
Anatomic Pathology (blocks)	519,514	+13.8%
Cytopathology	212,108	-1.8%
Non-Gyne Cytology	11,617	+5.6%

South Health Campus (SHC)

Routine tissue processing and Microtomy has been transferred entirely from Anatomic Pathology (AP) Rockyview General Hospital (RGH) to this site to maximize capacity and staffing resources. This initiative supports the future AP model of “3” centralized routine histology “hubs.”

Equipment

Cancer Cytogenetics acquired “6” (six) new karyotyping workstations and a second fluorescence microscope in March to better manage increases in workload and to maintain quality of patient care.

- Molecular Pathology added a Savant DNA Separator and a Qiacube Robot to their equipment list.
- An automated microtome for AP-DSC was also purchased as part of capital equipment acquisition for 2014.
- IP C cassette labelers were acquired for all sites except SHC to support the implementation of the “Vantage” barcode tracking system.

New Projects

- “Vantage” Barcode Tracking System – The hardware for the “Vantage” barcode tracking system has been installed at all sites except for Foothills Medical Centre (FMC). Installation for the site will occur when lab operations relocates to the McCaig Tower November, 2015. System testing and validation will commence in February 2015, followed by staff training and a tentative “go live” date for mid to late April 2015.
- McCaig move – project planning continues for the FMC 11th Floor AP lab relocation to the 7th Floor of the McCaig Tower in November 2015.
- Dragon Voice Recognition and eScription was trialed and in the process of being implemented on a provincial level to replace antiquated dictation equipment/service.
- Request for Proposal (RFP)s for Automated Immunostainers and Liquid Base Cytology have been developed for potential new instrumentation/platforms.
- Validation of FISH ALK testing continues in Cancer Cytogenetics.

Quality Reviews

An internal quality review was initiated for the FMC Gross Room to identify competing priorities and ongoing distractions to assist with improving workflow and staff/patient safety.

CLS is currently complying with and actively participating in the AHS APQA plan.

College of Physicians and Surgeons of Alberta (CPSA) Accreditation occurred in June and all minor citations have been addressed.

Fiscal Responsibility

Ongoing initiatives continue to identify areas of opportunities for cost savings. Request for Proposals (RFPs) were released for both pre-filled formalin containers and microscope glass slides. The change in vendors is anticipated to provide annual savings of \$68,000 and \$11,000 respectively.

Inventory control project for AP at the PLC and RGH to identify the maximum quantities of consumables to be kept on site in an effort to better manage storage capacity and associated expenditures.



Process Reviews

Molecular Pathology lab participated in a “7” (seven) week LEAN Score event to improve workflow and identify opportunities to maximize efficiency. The lab was 5s’d during the event and several initiatives were completed to address inefficient workflow processes.

Staff

- A new Pathology Scientist SHC/RGH was hired in July with primary responsibilities of providing gross dissection service, training and general supervision of the gross rooms at the sites.
- A new position is currently being trialed for an AP Project Coordinator to assist the AP/Cyto Leadership team with managing projects and performing workflow analysis in various areas when required.

Clinical Biochemistry Section

Important Activities of the Section

- CLS Clinical Biochemistry was selected as the reference laboratory for the Canadian Longitudinal Study on Aging (CLSA). Drs. Alex Chin and Hossein Sadrzadeh have been named as co-investigators. This is a 20-year longitudinal study in which 30,000 Canadian adult volunteers will be tested every three years. CLS Biochemistry will be performing 12 tests on each collected sample. The total estimated revenue for this project is about \$9,000,000 (if all the participants survived).
- Dr. Valerian Dias retired in June 2014. Dr. Hossein Sadrzadeh assumed the additional responsibility of directing the analytical toxicology lab for one year. The savings generated from the latter was used to hire a much needed mass spectrometrists (Dr. Joshua Buse) for one year (please see below). A clinical chemist with interests/expertise in analytical toxicology will be recruited in 2015 to direct the analytical toxicology lab.
- Dr. Joshua Buse (mass spectrometrists) started in October 2014 and has been working closely with Dr. Hossein Sadrzadeh and the toxicology team to develop new tests on LC-MS/MS as described below under “Technical Updates”.
- Replacement of high volume chemistry analyzers at DSC was completed with the installation of the third Roche Cobas 8000 line (replacing two Roche Modular lines). This will allow a more efficient operation, increased capacity and improved turnaround times. Full operation of the third line will not be available until completion of the DSC heating, ventilating, and air conditioning (HVAC) project because of heat issues.
- Roche cITM middleware was installed to replace obsolete Roche PSM middleware for DSC Chemistry and the work was completed in early 2014. The new middleware installment in the RRL laboratories was completed in November 2014. This new middleware automates reporting results at the hospital labs in Calgary. Additional autoverification rules have been added for Therapeutic Drug Monitoring (TDM)s.
- Our proposal for replacing the GC-MS systems with new LC-MS/MS systems in analytical toxicology lab was verbally approved by the CLS board. Our current GC-MS systems are old and obsolete, and will no longer be supported by the vendor. We prepared a business proposal to replace the two old GC-MS systems with 3 new LC-MS/MS. The CLS board verbally agreed to fund two new LC-MS/MS systems. We are waiting for official approval to proceed with RFP for the new instruments.

Technical updates

- A new 3rd generation PTH reagent (complete 1-84 amino acids) replaced a 2nd generation reagent on November 2014. This method exhibits minimal cross-reactivity with the 7-84 fragments.
- A new Aldosterone method went live on August 2014.
- A new evaluation for 1,25-dihydroxyvitamin D method is in progress.
- New biliary artesia protocol put into production; earlier protocol was revised to match provincial guidelines developed by Chemistry Network.
- PLC 2020 osmometer evaluation completed in August 2014.
- A new evaluation of CK-MB Gen4 is in progress at FMC.
- The gamma counter in immunoassay lab is no



longer functional. This provided an excellent opportunity for us to switch from a manual radio immunoassay (RIA) tests to alternate automated non-radioactive methods. The tests that were done by RIA include: 1,25-dihydroxyvitamin D, anti-dsDNA, plasma renin activity, and 17-hydroxyprogesterone. New automated non-radioactive methods that went live in November 2014 are: 1,25-dihydroxyvitamin D on the Liaison XL and anti-dsDNA on the new Bio-Rad BioPlex instrument, which was chosen from Part B of the RFP for autoimmune testing.

- A new renin assay, called direct renin concentration, is implemented on DiaSorin Liaison XL. The new assay is based on the renin concentration in plasma which will be different from the current RIA plasma renin activity. A preliminary cut-off value for the aldosterone-renin ratio was established using direct renin concentration. The new cut-off values will be re-evaluated in collaboration with two clinical endocrinologists, Drs. Kline and Erik Venos, in 2015.
- 17-hydroxyprogesterone (17-OH PG) by LC-MS/MS. The new mass spectrometrist, Dr. Joshua Buse, is developing a new LC-MS/MS method for 17-OH PG. The University of Alberta lab cannot run our samples, as they are changing their own method to an RIA method. Thus, all samples for 17-OH PG will be sent out to a reference lab until a new method is developed in the analytical toxicology lab.
- The RFP for autoimmune testing was concluded in the summer of 2014 and Bio-Rad and Euroimmune instruments were selected for immunoassay lab. The Bio-Rad BioPlex 2200, which utilizes Luminex technology, was installed in October 2014. The new autoimmune test menu will include: anti-tissue transglutaminase IgA and IgG, anti-dsDNA, anti-MPO, anti-PR3, anti-cardiolipin, anti-beta 2 glycoprotein, and anti-glomerular basement membrane antibodies. Collaborations were initiated with Pediatric Gastroenterology regarding the new anti-tissue transglutaminase and anti-deamidated gliadin peptide assays. Automated immunofluorescence microscope will be installed by Spring 2015.
- A new LC-MS/MS method for drugs of abuse in urine has been developed in analytical toxicology. The new method is being evaluated and should be implemented by April 2015. This robust method can simultaneously detect and measure 21 different drugs of abuse (codeine, 6-acetyl morphine, hydrocodone, hydromorphone, oxycodone, noroxycodone, EDDP, oxymorphone, noroxycodone, morphine, methadone, fentanyl, norfentanyl, amphetamine, methamphetamines, MDA, MDMA, cocaine, cocaethylene, benzoylecgonine and heroin, in 100 microliter of urine. In this method, urine is diluted and injected into the system without any need for extraction. This method will replace our current two-step immunoassay screen (done in Core chemistry lab) followed by a GC-MS confirmation method (done in analytical toxicology lab) that can detect 13 drugs of abuse: codeine, morphine, norcodeine, normorphine, hydrocodone, hydromorphone, oxycodone, 6-monoacetylmorphine, heroin, fentanyl, noroxycodone, oxymorphone, promazine hydrochloride, and it takes 4-6 hours. The time for specimen preparation and LC-MS/MS analysis time is about 1hr for detecting 21 different drugs of abuse which is significantly faster than our current time of 12 hours.
- New Critical ranges are being implemented in CLS for drugs to standardize with provincial recommendations from the Toxicology Network.
- New chloridometers are set up at ACH.

Clinical Biochemistry Fellowship Program Updates

- Dr. Isolde Seiden Long has been re-appointed program director. Dr. Hossein Sadrzadeh has been appointed program co-director.
- The CACB has approved the interim report submitted in May 30, 2014 and has invited CLS to apply for 5 year accreditation.
- The second biochemistry fellow, Dr. Dennis Orton (PDY-1) started his fellowship training on July 2, 2014. Dennis graduated with a PhD from Dalhousie University in October 2014. His thesis title was "Towards Biomarker Identification in Congenital Urinary Tract Obstruction". He has authored and co-authored (five first author, one third author) six journal articles. He is awaiting reviewer decisions on two additional manuscripts, as well as his nomination for the Canadian Society for Mass Spectrometry award for best thesis involving mass spectrometry. Dennis has extensive knowledge and skills in the field of LC-MS/MS.
- Dr. Jessica Boyd (PDY-2) received an educational grant from the Rocky Mountain Section of American Association for Clinical Chemistry (AACC) to present her two posters at the 2015 AACC Annual Meeting and Clinical Lab Expo.
- Dr. Jessica Boyd selected toxicology as her specialty and will train with Dr. Hossein Sadrzadeh during her second year. She will become the acting assistant director of analytical toxicology. This will give her an opportunity to have more hands on experience in the day-to-day activities of the lab.
- The Clinical Biochemistry Fellowship Program hosted 2 General Pathology residents and several visiting elective students for July – Sept 2014 and 3 Endocrinology fellows in November 2014.
- December 2014 was the deadline for applications for new fellows starting July 1, 2015. Four applicants were chosen for interviews.
- Preparation is underway for accreditation by CACB in March 2015.



Other Educational Activities (CME sessions for lab staff)

- Session on Ammonia testing presented Oct 23, 2014 as part of CSCC education roundtables – recorded and available for staff CME 2014 (Dr. Long).
- Session on Indices automation that was presented on November 4, 2014 for all FMC/RRL/DSC chemistry staff (Dr. Long).
- Session on Linearity testing and interpretation for techs (Drs. Krause and Long).
- Conference call with group of Nova Scotia clinical chemists and nephrologists sharing Alberta. Experience with implementation of CKD-EPI eGFR calculation in advance of Nova Scotia provincial implementation (Dr. Krause).
- In addition, Clinical Biochemistry Academic Half Day sessions continue on Wednesdays at the DSC.

General Pathology Section

The General Pathology division has medical oversight for close to twenty laboratories in Southern Alberta, as well as operational services and mobile collections in Calgary.

Health Centre Testing Lab (HCTL)

- Successful 2014 CPSA full accreditation at Sheldon Chumir, South Calgary and Cochrane Testing Labs.
- 2014 CPSA Conditional Accreditation at Airdrie Testing Lab.
- 2014 workload increases of 10.7 % at Cochrane Testing Lab and 3.9% at Sheldon Chumir Testing Lab over 2013.
- Discontinued on-site testing of NT-proBNP's at Sheldon Chumir Testing Lab resulting in savings of approx \$2,000/year.
- Discontinued CAP Linearity Surveys on the Vitros 350 at the HCTL's resulting in savings of approx \$2,000/year.
- Implemented HCTL Central ordering for selected inventory at the HCTL's in an effort to save on delivery costs. Approx savings of \$2,050/year.
- HCTL Supervisor worked with CLS Utilization Office and Sheldon Chumir Urgent Care Medical Lead to trial a Laboratory Utilization Report Card for Urgent Care Physicians. The Report Card may be rolled out provincially.
- Transferred 0.2 FTE (MLT) from Airdrie Testing Lab to Sheldon Chumir Testing Lab to assist with the increased workload at Sheldon Chumir Testing Lab.
- HCTL continues to meet the targets as established in the TAT metrics.
- HCTL Supervisor continues to meet regularly with CLS Clinical partners, at the Urgent Care Centres and Outpatient Renal Clinics working through issues resulting in an enhanced spirit of collaboration.
- HCTL Supervisor continues to participate in "Patient Flow Committees" at Sheldon Chumir Urgent Care and Airdrie Urgent Care Centres.
- HCTL Supervisor worked with Sheldon Chumir Urgent Care and AHS IT to streamline and improve the report distribution at Sheldon Chumir Urgent Care. The expedite prints were turned off, final report printing moved from Medical Records to Urgent Care and final reports now print every hour.
- HCTL Senior Staff worked with CLS Quality to establish a HCTL Navigation Index for SoftTech. This index has decreased the amount of time that HCTL staff spending looking for documents in SoftTech.

Rockyview General Hospital (RGH) Rapid Response Lab (RRL)

- Successful Lab Accreditation- storage space citation resulted in acquisition of space in the sub-basement of RGH to store pandemic and other supplies to free up lab.
- Hiring and training of replacement Tech II in Transfusion Medicine at RGH.
- Full complement of Hematology/Chemistry MLT students trained.
- Staff members participated in the Simplification project for more efficient ways to do workload.
- Acquired through capital acquisition a multi-sample automated Osmometer for Chemistry, and new fridge and freezer for Transfusion Medicine.
- Ongoing Emergency Department and Operating Room nursing tours.
- Transfusion Medicine acquired a second tag printer with downtime log printing capability (called Nice label) to reduce manual writing of Transfusion labels.
- Testing in Transfusion Medicine now includes pre-op type and screens to better utilize ECHO reagents.
- Cellavision interfaced with Millenium- go live and validation successful with all staff fully trained.
- Implemented Thrombin Time testing.
- Collaboration with housekeeping to increase garbage and biohazard pickups in order to reduce hallway clutter for staff safety.



- Chemistry and Hematology purchased different Biohazard containers so aerosols are contained.
- Chemistry Citm middleware for the COBAS analyzers implemented, validated and successful completion of training.

- Chemistry fluid testing moved back to RGH from the DSC.
- Chuckwagon study- RGH participating in Troponin testing on horses.
- Chemistry participated in the Biliary Atresia project.
- Transfusion Medicine added additional Coag products to their inventory. (e.g. Feiba, Kogenate and Benefix).
- Transfusion Medicine staff were invited to observe an Operating Room e-sim – simulation of a massive transfusion bleed.



South Health Campus (SHC) RRL

- Prepared staff and RRL for June College of Physicians and Surgeons of Alberta (CPSA) Accreditation including familiarizing staff with the new CPSA Accreditation format. Experienced a very successful accreditation with the CPSA team noting that work stations are well designed thus minimizing ergonomic issues. There were minimal RRL citations.
- Worked in collaboration with AHS on a Code Orange response plan.
- Hired an RRL preceptor to support training MLT students with training beginning in Sept 2014.
- Implemented Data Innovations (Cellavision Middleware) in July 2014 including the training of the RRL staff and site IT validation.
- Work group formed, under the direction of CLS Executive, to review the feasibility of expanding the SHC venous blood gas model to other acute care locations. Business Case was presented to CLS Executive.
- Commissioning of the SHC was captured in a “Lessons Learned report” and is now stored on the common drive.
- Provided “workstation in technical area” to AHS Rural Point of Care Testing (POCT) MLT II.
- Process Excellence performed some RRL timings in the month of Sept/2014. SCORE event is planned (Feb 2015) for the Cobas Biochemistry Analyzer, focusing on introducing the use of the “colored rack system”.
- Supported CRL request for routing of CSF & fluids along with routing of weekend routine testing from Okotoks.
- As a result of the designation of SHC as the adult EBOLA acute care facility, a lot of manpower was spent preparing a room in the RRL for testing, development of protocols and processes, along with Environmental, Health & Safety (EH & S), and Medical Staff to ensure the safety of staff while supporting the clinical needs of these patients.
- Participated in AHS Ebola simulations and meetings as part of the overall SHC Ebola site planning.
- RRL staff validated a number of medical devices to support the needs of the Ebola patients i.e. I-STAT, Gem 4000 etc. Other equipment validations, i.e. Pochi and Piccollo are under way.
- Supported the go live of the Cobas cITM (Middleware) in early Dec 2014 including training of the RRL staff and site IT validation.
- Facilitated the relocation of an unused -70 freezer to Foothills (FMC) Research and a DXH800 slidemaker/stainer to FMC Hematology.
- SHC RRL continues to support laboratory tours, specifically for ED and NICU.
- The SHC laboratory budget continues to be funded by Alberta Infrastructure.
- SHC RRL, specifically Transfusion Medicine, was a part of a number of ICU simulations involving the request and administration of MTP packs.

Rural Lab

- Rectified rural employee list as this was incomplete or inaccurate through the transition from AHS to CLS management.
- Discontinued Generic Log-ins at all sites effective March 12, 2014.
- Initiated Rural Inventory Project, looking for cost savings through sharing of supplies where possible through all rural labs and reducing financial losses through expired reagents. Project in transition to new project lead.
- Discontinued practice of MLAs giving out verbal results.
- Established formal training program for the MLAs based on the CLS MLA training program. Designated primary and backups for rural payroll.

- Arranged access for all rural employees to the common drive, where each site has a designated folder – Spring 2014.
- Discontinued the Anatomic Pathology log in Okotoks. Established this was not a formal AP process anywhere within CLS.
- Clarified/standardized rural transport requirements for blood cultures and established the responsible cost centre for transport outside the routine courier schedule.
- Aligned Blood culture collections with urban requirements of 2 sets ≥ 14 years of age – a best practice initiative.
- Assumed Mobile collections for new Assisted Living Centres in Didsbury District Health Services (DDHS) and High River Hospital (HRH). Two new MLA positions (0.5 FTE for DDHS & HRH) created.
- Circulated best practices identified in the HRH SCORE project to all of the other rural labs.
- Reduced 1 MLT III via attrition – One Senior Tech for Okotoks and Black Diamond.
- Ordered new Hematology atlas/reference material for all of the rural sites.
- Discontinued Theophylline testing in HRH (cost savings).
- Extended evening hours in Didsbury – improving patient care and reducing call back.
- Developed working relationship with AHS WH&S to support Chris Butler and our rural lab integrating the AHS & CLS world and sharing resources.
- Reduced ECG Muse TAT from a range of 48H to 2 weeks to a 24h to 48H maximum TAT improving patient care.
- Extended HRH hours M-F 0600 to 0115, Sat 0700 to 0115, Sun 0700-2315 – improving patient care and reducing call back effective.
- Added Vulcan weekend hours and extended day shift– improving patient care and reducing call-back M-F 0800-1815.
- MLA staff attended Southern Alberta Institute of Technology (SAIT) preceptor training.
- Implemented Phone trees to all rural sites, including directions to call LIC for results, standardization with CLS.
- Improved quality by implementing new Hematology stain recommended by DSC Hematology as the old stain was not acceptable for DSC Hematology or Pathologists.
- Implemented rural specific cleaning & maintenance charts.
- Implemented use of iSTAT in Vulcan – patient care initiative as well as reduce call backs.
- Discontinued post-vas testing.
- CLS Privacy assumed role of running rural audits.
- Ordered name tags for all rural staff.
- Successful accreditation Sept 15 – 17, 2014
- Implemented 24/7 coverage at High River– improving patient care and eliminating call back.
- Transferred responsibility for Mobile collections at Sagewood Assisted living to Strathmore. Lab staff received training and assumed full responsibility from CLS Mobile.
- Discontinued Microbiology cancellations by rural staff – this is in alignment with all other sites within CLS.
- Added a 2nd ECG bed in HRH outpatient collections – providing a reduced wait time for patients requiring ECG.
- Discontinued Direct Antibody Testing (Transfusion Medicine Test) in HRH and CMGH due to low volumes, reagent cost savings and competency concerns.
- Centralized timekeeping at SHC by end of October 2014 – Simplification and task redistribution initiative.
- Implemented documenting rural information/input to CLS QSE charts.
- Implemented autoverification on the LH (Hematology Instrumentation) in Canmore and Strathmore. Simplification and standardization with other CLS sites.
- CRL staff authorized to gain access to Docvue.
- CRL staff authorized to utilize/enter into the Standing order database – awaiting formal training.
- Implemented use of mail merge for all maintenance and QC charts for all rural sites for 2015. This was a simplification initiative.
- Identified new Process Designate for rural labs = Leslie Corbin from Didsbury.
- Assigned Biological Chemical Exposure Response Plan (BCERP) manual for rural staff in Tracess.
- Received approval to purchase Vitros 4600 for High River. The High River Foundation Group is supporting half the cost of this instrument.
- Implemented Clinitek Advantus with interface for High River, Claresholm, Black Diamond and Vulcan.
- Re-route weekend samples originating in Okotoks to South Health Campus rather than going to High River.
- Northern Alberta Institute of Technology (NAIT) CLXT rural practicum students are receiving 2 weeks of Hematology Differential training with CLS Hematology preceptors.



Transfusion Medicine (TM) Achievements/Successes with Calgary Rural Labs

- Switch of unmatched from O Neg to O Pos to conserve O Neg at some of the dispense only sites.
- IVIG Hemolysis investigation for patient safety at all sites.
- HRH and Canmore General Hospital (CMGH) do not need to send in known antibodies as long as strength of reaction does not change. This speeds up TAT and reduces cost of sending in samples.
- Centralization of month end reporting to Canadian Blood Services (CBS). Now will be reported for all sites by FMC.
- Transfusion Tags with lot number and product type already included for derivatives being provided to dispense only sites to minimize transcription errors.
- Referral of Strathmore District Health Services (SDHS) Type & Screen to PLC instead of FMC. Includes maintaining and inventory of red cells at SDHS to decrease TAT.
- TM equipment maintenance is being done in a timely manner (PM checks, alarm checks, etc). In some cases, it wasn't being done at all previously.
- Inventory reconciliation – better recycling and less untracked units.
- Provided TM support for accreditation.
- Centralization of Direct Antiglobulin Testing (DAT) testing to FMC.
- Providing a resource for questions/ concerns.
- Banff now receives all products/components directly from FMC instead of CBS – Means they receive it in a timely manner instead of by greyhound.
- Expanding service in Okotoks for provision of RhIg by the lab instead of through a stock inventory in Urgent Care.
- Standardized Quick References and SOPs at all sites.
- TM Training for new staff may be provided by Regional Trainer. Also standardized training documents.
- Transfusion Safety Officer has gone out and done in-services for nursing staff on provision of blood products/components.
- Introduction of written product orders and dispense requests to meet accreditation standards.
- Discontinuation of the downtime issue log at all sites
- Provided instructions for the pick-up of blood products/components by nursing after hours at all sites.
- Training of new rural Tech IIIs in checking paperwork.

Alberta Children's Hospital

- Suspect Ebola Virus Disease (EVD) patients: Trained staff on the use of Level IV PPE, and for rapid malaria testing. Validated and trained staff on new point of care instrument (iStat) and implemented strategy for handling suspect Level IV patients. Participated in internal and hospital EVD patient simulations. Validation and training on additional instrumentation is ongoing.
- Through clinical education and consultation decreased the number of requests for the 72 Hour Fecal Fat test. Physicians were informed of the analytical inadequacies of the test and were directed to the Fat Globules In Stool test, which is available daily, is less burdensome for the patient and is more cost effective than the 72 hour test.
- Improved TATs and Standardization: Validated and trained staff to use the Excyte, an automated ESR instrument which standardizes the performance of the test and decreases turn around time. The use of EDTA plasma for CRP was validated for possible cases of insufficient sample volume for testing on the Excyte.
- Validated and trained on new chloridometers for sweat chloride testing. New instrumentation meets CLS guidelines. Initiated a process for monitoring the NSQ rate for sweat chlorides. Reasons for NSQ are documented and followed up.
- Secured two research grants in support of clinical service. One is for the development of a new fecal fat method. The second uses a hemolysis index to monitor phlebotomy practices in the zone.
- Implemented the IVIG Hemolysis Process in TM. There is a requirement to follow up patients who have received IVIG to determine if they are undergoing hemolysis due to the IVIG.



- Supported the Trican Hematology/Oncology/Blood and Marrow Clinics in their 6 month pilot project of extended clinic hours two days a week in the Day Treatment unit. The pilot project is ongoing.
- In compliance with a Health Canada requirement, all consumables used in the production/modification of a blood component now have their lot number, manufacturer and expiration date documented.
- Validated and implemented a new TM fridge. The additional space provides for good definition between products which leads to improved patient safety.
- Prepared for and successfully passed CPSA Accreditation.
- Implemented the use of serum indices for automated chemistry testing.
- Implemented new provincial guidelines for bilirubin.
- Data innovations implemented.

Peter Lougheed Centre (PLC) RRL

- Performing on-site testing of Type and Screens of Pre-operative Assessment patients to assure better utilization of reagents and supplies in TM.
- Increased storage of frozen blood products for patient care.
- Increased inventory of coagulation products for diverse patients seen in PLC Specialty Clinic.
- Initiated Herpes Simplex Virus program for patients receiving IVIG.
- Moved equipment to optimize new space created as part of the renovation project.
- Continue to provide STAT TM testing for Strathmore.
- Supported Strathmore Hospital by performing chemistry and hematology testing when Strathmore instrumentation was down.
- Increased nursing tours to include OR and Specialty Clinic staff.
- Validated and implemented Thrombin Time testing as part of a Provincial initiative.
- Implemented Data Innovations middleware to allow full connectivity from Cellavision to Millennium.
- Installed 3 ergonomic benches and monitor arms and increased bench space in hematology, chemistry and transfusion medicine as part of the renovation project.
- Completed 5S Lean initiative to sustain adequate space and functionality of new processes in all three departments.
- Secured both entry doors to the lab by allowing card access only and one-way telephone system into Transfusion Medicine.
- Completed Inventory Management project and initiated LEAN KANBAN ordering system to ensure adequate amount of supplies on-hand.
- Provided a team resource to LEAN for Microbiology and Timekeeping SCORE events.
- Increased inventory levels of chemistry and hematology reagents to support Pandemic preparedness.
- Trained our full complement of students in Chemistry and Hematology.
- Validated and implemented new Osmometer analyzer in Chemistry.
- Supported the DSC when urinalysis and chemistry instrumentation were down.
- Validated provincial reference ranges for chemistry tests.
- Initiated AGAP reporting on all patients and EGFR's on patients greater than 18 years.
- Report indices on all specimens in Chemistry for lipemia, icterus, and hemolysis.
- Validated and implemented new middleware on Chemistry analyzers. (cITm)
- Implemented SOFTTECH document system in RRL.
- Completed competency testing in all three departments by all staff.
- Utilizing e-facilities for maintenance and repair of minor equipment.
- Contributed \$80,000 to rural and \$20,000 to ACH to meet operational savings.
- Participated in meetings with PLC Senior management and EMS to address hallway medicine practice problems around lab entrances.
- Participated in CPSA accreditation and corrected deficiencies.

Mobile Achievements

- Mobile storage areas at hubs were all standardized to assist in ordering. All supplies that are managed from Glenbrook location are now being delivered by Logistics staff, who pick up sharps/biomedical waste. This eliminates use of Mobile MLAs to deliver or pickup supplies.
- Mobile collectors are being trained to data enter simple/one time only requisitions into the Mobile Scheduling module. Saves time of Mobile office clerical staff and saves the MLA1 the waiting time to pull up label for specimen.
 - New process for rescheduling appointments that land on statutory holidays has saved 2-3 days/month of MLAI time. Process now takes 2-3 hours/month.

- Blocking of Christmas Day and New Year's Day in Millennium Scheduler – immediately notifies clerical staff of future appointment landing on blocked day and results in scheduling of appropriate day at the same time.
- Tsuu T'ina lab clinic – after successful pilot project where there was a noticeable # of clients that had never had a blood collection in the community. A contract for a weekly clinic has been established.
- ECG Escalations – All Mobile netbooks have new software that will detect and notify user if any escalation comments are found in tracing comments. This is a very important patient safety initiative.
- Completed 2014 Competency on Lead placement for ECG tracings.
- Transfer of Sagewood patients and partial FTE to Strathmore lab enabling them to hire more staff.
- Provided Mobile Service to the following new 442 beds funded by AHS:
 - Evanston Grand – 102 beds
 - Evanston Holy Cross Manor – 100 beds
 - Walden – increase of 125 beds
 - Greenview Wing Kei – 95 beds
 - Millrise – increase of 20 beds
- New orderable built in Millennium MOBFAS to indicate when patient required to fast. Enabled Mobile to follow new LDL guidelines where fasting no longer required.

Community Services Report

- Continue to support the primary care networks. Worked closely with the Mosaic Group and the Renal Clinic at Sheldon Chumir, as well other specialty clinics within the city and surrounding areas. Not only to understand their needs but to provide a better understanding of CLS role in the care of their patients.
- We have worked with Alberta Health Services (AHS) and the primary care network in establishing a collection site in Chestermere. Site scheduled to open January 2015.
- As of September 1st, 2015 CLS's recurring order process is in alignment with provincial standards.
- Continue to work with AHS Facilities regarding space management.
- Establish a protocol for Dr. Moss Immigration clinic.
- Worked with TB Clinic to address patient and sample integrity concerns.
- Continue to use HUTV for public forum communications not only for PSC specific but other areas such as Patient Appointment Line (PAL), etc.
- Continue to build morale through the Patient Service Centre (PSC) Fun Group with such activities as bowling, scavenger hunt and participants came from various areas throughout CLS.
- Respectful workplace task force is in place. Three representatives of the PSCs are working together with the Occupational Development department (Audrey Ferrier). They are taking part in the initial stages of the training sessions which includes going back to their sites and having informal conversations with the staff and obtaining information and feedback on how we can improve on our working relationships through diversity.
- Dr. Nanji represented Cera and provided an ECG seminar for the LA IIS.
- Increased our appointment availability by 70% which enabled the Patient Appointment Line the ability book appointments in a timelier manner.
- Opened five sites from 7:00 pm – 9:00 pm as appointment only as an additional service to patients.
- Opened Ranchlands and South Calgary Health Centre Patient Service Centre on Boxing Day which provided site availability to patients in the North and the South quadrants.
- Supported the Provincial Utilization Office by taking part in a provincial requisition trial and physicians throughout the Calgary area participated.
- LA II Development series and training. Continue to use the LA II meeting forums for both training and education sessions.
- Data Entry Simplification process – working with Millennium Team and PSC Group, RRL's and Rural to develop a more efficient data entry process to minimize the data entry times and still sustain the quality of work.
- New Hires – identified areas in the new hire training and orientation program that were cumbersome. A new tracking process has been implemented – New Hire Passport. We have also new hires from the rural group upon request of their Supervisor.
- Standing Order Classes – as of November 2014 we have a Standing Order LIS class. Staff are trained on our Standing Order Database program.
- Town Hall Meetings – locations were in North and South vicinity of Calgary. Dale Gray was in attendance at both meetings.
- 15 Minute PSC Weekly Update Meetings – As of November 25, 2015 the PSC Leadership Group and MLA IIs have regular weekly 15 minute update meetings on line. Brief bulleted agenda items discussed and staff par-



ticipation and follow up prior to each week's next meeting. It's been successful thus far and LA IIs feel it's a benefit. All information is shared with the staff at their sites through prepared minutes.

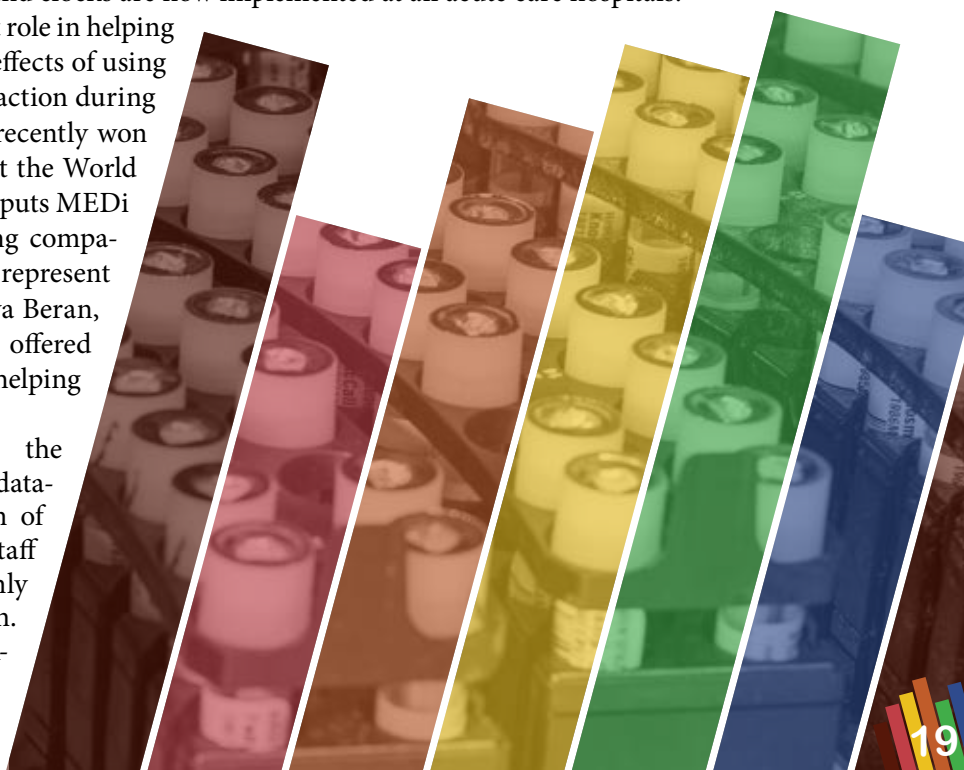
- Long Term Service Awards for PSC staff. Huge success. Event took place in Riverbend Atrium. Well received.
- Zoec - Work with the Province and public health regarding measles outbreaks. Opened after hour clinics to accommodate outbreaks. Ensure that staff and sites had the most current information regarding Ebola and that protocol was followed.
- AED – additional staff training at LA II meeting forum in September of 2014.
- ECG Metrics – worked closely with Telemed and Quality Group. New Prompts now in place to assist with identifying ECGs that require escalation. Orderable created that will notify the ordering physician that their patient had an ECG that required escalation which has been forwarded to our default reading cardiologist.
- Ask Me Hand Hygiene – has been implemented in all PSCs. Posters, stickers, information sessions have been held. This is part of our 15 minute weekly meetings as a standing item to ensure process is continually being followed.

Operational Services

- Ebola – VHF planning and preparedness: Since August 2014, CLS has been engaged in planning for laboratory services for a suspect or confirmed patient with VHF. Operational Services Supervisors, and their teams at South Health Campus and Alberta Children's Hospital, the designated treatment centres, have invested time and resources to ensure total preparedness. Areas of focus include the minutia of details of Infection Prevention and Control and personal protective equipment (PPE) processes including the complex processes of donning and doffing the multiple layers of PPE; the review of Accession phlebotomy and specimen processing procedures to ensure employee/patient safety and specimen/result quality and staff training, engagement and education. The commitment of the staff at these sites, and their leaders, has ensured positive outcomes regarding patient and employee safety should CLS need to contend with an Ebola patient.
- Hand Hygiene (HH):
 - Operational Services commitment towards improved hand hygiene compliance continued in 2014.
 - A CLS Accession "Ask Me" campaign was rolled out at the 5 acute hospital locations. Inpatient and Outpatient phlebotomists wear Ask Me buttons, to create a culture of patient safety and as encouragement for patients that it's ok to ask or confirm that phlebotomists have washed their hands. Some sites designed their own buttons as a staff contest. Ask Me campaign posters and messaging like "What is the right response when someone asks you -Have you washed your hands?-" were used to engage staff and help prepare them on how to interact with patient's questions and concerns. "AskMe" story telling and success was shared across AHS laboratory in the newsletter and with the PreAnalytics network.
 - Operational services implemented an internal, unscheduled hand hygiene compliance and technique audit. Each hospital observes all phlebotomists randomly every year. 2015 will allow for a quarterly report and dashboard of compliance success rates.
 - Our close collaboration with AHS IP&C and Hand Hygiene committee liaisons, allows for CLS to review hand hygiene auditing training materials, and recommend improvements and clarifications. Continued participation by the Accession supervisors at their site's hand hygiene committee facilitates sharing of best ideas and success.
 - Other various strategies for Hand Hygiene (HH) success and engagement implemented at acute care hospital Accession areas include: power point presentations on HH for staff, HH fact sheets distributed in lunchrooms, all phlebotomy trays have 'ask me' stickers on them, Alberta government ICK posters – institute for hand cleaning posters, surface contamination surveillance presentation reviewed with staff, shift huddle discussions, education, and reminders, viewing of Insite HH videos as part of new hire process, HH technique incorporated into monthly safety drills.
- Joint strategies with our division and Occupational Health and Wellness to encourage staff influenza vaccinations are continuous and unrelenting. Opportunities for vaccination clinics and appointments and overviews and in-depth Q&A of the benefits of vaccination are provided to all staff in team meetings and one on one.
- 2014 and continued into 2015 is a high activity influenza season for the Calgary Zone. The Peter Lougheed Centre had one unit in outbreak status (now clear) and Foothills Medical Centre had seven outbreak or precautionary units – all at once. The challenges of altering and managing a staff schedule were overcome, and CLS service levels were maintained. FMC managed to double their employee influenza vaccination rate with a focus on staff awareness.
- Operational Services completed a project to define a standard phlebotomy cycle time, and minimum/maximum phlebotomy cycle times in the adult acute care hospitals. Manual timings and visual inspection on more than 600 venipunctures, from 110 different phlebotomists, with approximately 150 timings per site were collected and studied.
 - A standard phlebotomy cycle time allows for each site to manage their hourly workload demand with well-balanced staff scheduling. This is achieved using Operational Services' workload/scheduling model tool. The

established minimum and maximum phlebotomy cycle times can also be an indicator of staff performance. A pattern below the minimum or above the maximum times, may hint at a struggling employee, and retraining and supportive coaching can be provided.

- HVAC Renovations – DSC: For a ten month duration, from March 2014 to December 2014, DSC Accession and Referrals along with Clinical Biochemistry underwent significant department renovations in order to improve the heating and ventilation in the centre wing of the 4th floor DSC. These renovations were extremely disruptive to departmental workflow, teamwork and communications. Service to patients was not negatively impacted, although employees were challenged with overcoming inefficiencies. Kudos to DSC Accession for being adaptable, flexible, and maintaining a good sense of patience, humour and positive moral during the difficult renovations.
- 2014 established the culmination and completion of the planning of the ~100 bed and Emergency department, of the new Cancer Care Centre, at the Foothills Hospital Campus. Accession was responsible for the functional planning and design of a collections centre, for Inpatient and Outpatient collections, and also for determining the logistics of specimen transportation to FMC McCaig Tower.
- Continued planning working towards the laboratory's move from the Main building to the McCaig Tower building at Foothills Medical Centre is on-going.
- On April 1, 2014, all acute hospital Accession areas transitioned to single use vacutainers. Since implementation there is no evidence of increased A/I/I events related to the transition.
- Operational Services PE Designate Green Belt value stream mapped the Referrals area and improvements were made. The Referrals area has seen a large increase in workload over the last few years and also incorporated an added approval process step as a successful initiative to reduce unnecessary testing. Many improvement opportunities were identified.
- A one stop consolidated Referrals database was created. Up to date Referrals test and cost information, physician/clinic exceptions are in one location. Auto fill approval letters, links to referrals labs, auto-filled fields, all helped to reduce time spent on referrals activities.
- A lack of storage space and excessive time spent re-sorting specimens waiting for approval or action were the impetus to create a visual sample discard system. A discard time frame was established, and a time saving discard calendar and color coded racks are used as an easy visual for specimen discard.
- Renovations in the Referrals area saw their workplace double in size. This made it possible for a reconfiguration of space and equipment, which allowed for reduced motion and more efficiency gains.
- End of year 2013 going into 2014 saw the successful implementation of Accession best practices at the Rockyview General Hospital site. Introduction of the color coded rack and color coded clocks system, streamlines the sample flow and centrifuge processes and allows for an easy way to isolate samples that will time out (exceed turn around time) and for pre-emptive action to be taken. The time saved was redeployed to the phlebotomy bench, where bottle necks tend to occur.
- Best practice of color coded racks and clocks are now implemented at all acute care hospitals.
- ACH Accession played a significant role in helping the study team assess the positive effects of using MEDi the Robot as a positive distraction during pediatric blood collection. MEDi recently won one of three Prizes of Excellence at the World Innovation Day Competition. This puts MEDi ahead of over 200 other competing companies from around the world that represent innovation in healthcare. Dr. Tanya Beran, Professor at University of Calgary, offered her thanks for CLS's support in helping realize MEDi's full potential.
- Enhancements were made to the Non-Conforming Events (NCE) database to capture a better reflection of monthly workload for individual staff members. Previously, the NCE only captured the data entry function. Improvements allowed for the tracking of more duties such as specimen log-in and phlebotomy. The report generates individual and site



non-conforming events rates. It establishes a threshold based on workload and the number of NCEs identified through various audits entered into the database. Other enhancements made to the reporting ability include: individual NCE rates, site NCE rates, a summary report providing a rolling rate for a 1 year time frame, the ability to generate a detailed report for an individual employee for a 1 year timeframe, a monthly report listing the NCE in order of frequency and a yearly report displaying the trends for the year. The purpose of these enhancements is to create a supportive culture for NCE reporting and to facilitate a learning culture that focuses on awareness and education for improved process, accuracy and quality, individual performance, and ultimately patient and lab safety, and NCE prevention.

- Operational services completely transitioned to the standing orders database used by Patient Service Centres. Benefits include a more seamless patient experience, less paper filing, and real time data entry of standing orders.
- Revisions to Unusual Phlebotomy Alert forms were made (including name change of form) to enhance and align patient safety awareness for Medical Laboratory Assistants and for the Inpatient areas. The highlights are: 1) Changed the name to “Unusual Phlebotomy Patient Safety Alert” form; 2) Added informative statements about why/how there is a potential for risk to patient safety; 3) Added instructional statement for “above lock to leave copy on the unit for the patient’s chart” as a benefit to the MLA and the RN.
- Significant impacts to CLS operations were a consequential effect of Provincial Laboratory implementation on the Millennium LIS system. CLS preanalytics and Accession continue collaborative efforts with our ProvLab counterparts to work through these system problems.
- RGH – A measles outbreak at RGH warranted blood collections for immune status on 45 nurses. RGH Accession performed these collections in coordination with OH&W.
- DSC – The University of Calgary’s Chlamydia and gonorrhoea testing blitz took CLS by surprise. DSC Accession, Couriers, and Microbiology pulled together to allow for the logistics and processing of 500 patients.
- ACH – Accession and Chemistry have improved the add-on process for urine culture and sensitivities “C&S”. Specimen integrity is enhanced with more immediate refrigeration, improved storage has created a safer retrieval system for staff, and fewer add-on specimens are rejected.
- ACH – ACH Accession and ACH RRL departments implemented Monday morning joint bench huddle meetings to improve a joint understanding of operations, to support employee engagement and two way communications to build and strengthen the greater ACH Accession/RRL team.
- DSC – Royal blue lavender and red banded vacutainer tubes were changed by manufacturer. The visual colored bands were removed from the tube. To mitigate the risk of confusion between the two types and any patient safety impacts, DSC Referrals is labelling the tubes with colored bands before the tubes are distributed to collection sites.
- FMC – Accession provides job shadowing of phlebotomy and Accession area to Biochemistry and General Pathology Fellows. This provides a hands-on understanding of the challenges faces by phlebotomists in an acute care setting and the different technical aspects involved in drawing specimens from hospitalized patients. Accession workflow such as team collections, difficult draws, newborn collections, ED morning collections and prioritizing RT/TM/ST orders. The experience also provides a better understanding of preanalytics, sample acceptance/rejection, and turn around times.
- PLC – Accession collaborated with Women’s Health Clinic unit manager for improved service to their patients. Medical Laboratory Assistants will be dispatched to Women’s Health Clinic and Gyne Outpatient units for patient blood collections. Anticipated benefits include improved service for the clinics and better patient experience, improved system flow and increased efficiency for the laboratory.
- DSC – Referral laboratory for trace elements has been changed from London Health to U of A. System enhanced with the creation of unique ordering mnemonic for each trace element. This requires less interpretation and decisions for blood collections and therefore less time for phlebotomists to proceed with a blood collection. Also of patient safety benefit are a reduced potential for incorrect tube type or quantity errors.
- As testing is performed by U of A, the results are available also available in Netcare, and turnaround times are shorter which is of benefit to the physicians.
- FMC, RGH, PLC, SHC and Emergency Departments – Accession areas regularly collaborate and meet with their site’s Emergency Departments on workflow scenarios, table top exercises, for continuous improvements to remove barriers, improve communication, to ultimately improve patient flow, workflow and turn around times and patient wait times.
- FMC – Implementation of paperless notification for schedule changes by sending notifications by email to staff members. This significantly reduced duplication of work, photocopying, filing, and errors in scheduling changes. Implementation of a new system for scheduling casual employees. Casual employees indicate the dates available only when they are available to work any shift for that day. This has improved the scheduling availability for casuals and made scheduling easier. And, implementation of use of more 7on – 7off rotation schedules for better coverage.
- SHC – At the request of endocrinologist, SHC has set up the process for Adrenal Vein Bleed stimulation testing at SHC, in addition to the RGH and FMC sites.

- SHC – Accession and testing RRL recently provided a tour for the Project Coordinator, Information Technology and the Change Management Leads who recently finished working on a Lab Information System upgrade project based in Edmonton and the Northern Zone. Within the Information Technology Department, there are several other Lab projects in the queue. The IT Project Coordinator has been assigned to another Lab project and they voiced their appreciation to the laboratory personnel for sharing their time and knowledge and their newfound understanding will be applied to future projects.
- ACH – The Hematology/Oncology/Transplant Clinic (HOT Clinic) at the Alberta Children's Hospital (ACH) collaborated with the Accession department to resolve errors with incorrect encounters and missed tests. Education on the part of the clinic requisition preparation and laboratory staff data entry has resulted in significantly reduced amount of errors.
- SHC – A privacy awareness session was presented to Accession staff outlining the importance of privacy, the audit process review and a question and answer period.
- SHC – For the Outpatient collection lab at SHC, improvements have been made to patient flow and the patient experience by adding more waiting room chairs and having a better queuing system for patients at the doors opening.

Point of Care Testing (POCT)

- The POCT area implemented a Quality Assurance (QA) program for automated POCT urinalysis testing.

Client Services

- Patient Appointment Line (PAL):
 - Short notice appointments have been embedded into the current PSC appointment capacity. PAL agents no longer have to call PSC sites to see if there is room to take additional appointments. Saves time for both PAL & PSC staff. Short notice appointments have been strategically added occur at less busy time for sites. PAL agents are moving patients to sites where short notice appointment availability exists.
 - Updated scripting for PAL agents to include the request of an email address whenever possible. This will provide patients with a confirmation of the appointment and an email reminder 72 hrs in advance of their appointment. Emails also provide an option for patients to cancel their appointments on line with a confirmation number.
 - Worked with HR OD specialist to develop training for PAL staff to manage stress and handle difficult calls. Training completed and well received by call centre agents.
 - Increased the number of incoming phone lines for PAL from 40 to 50 to allow callers more access to the telephone queue and reduce the number of callers who can't get through.
- Patient Appointment Booking System (PABS):
 - An application programming interface (API) was added to on-line scheduling system to simplify the booking process for patients. This is optimized for use with tablets and other mobile devices. In December 2014 approximately 43,000 patients booked their appointments on-line compared to 29,000 in December 2013. Guest function now available so that patients are not required to register a user name and password to book on line.
 - Improved the cancellation page to lessen the confusion for patients. Updated email reminder and confirmation to emphasize the importance of cancelling appointments.
 - Time sensitive testing, Urea breath tests and immigration testing was added to the online Patient Appointment Booking System (PABS) to allow patients and clinics more flexibility for booking appointments for lab testing.
- Lab Information Centre:
 - LIC Clerk: Patient Recall Notification SCORE event. Redesigned and streamlined the recall process within Client Services. Significant time savings for the department and much more consistent process for staff to follow.
 - LIC MLT: Developed process for written follow up with physician for contact problems with critical results. These are now entered in RLS system for better tracking and trending.
 - LIC MLT: Developed process for regular scheduled updates for critical result reporting exceptions. Now have updated all of the existing exceptions following the new process. LIC no longer has to make verbal contact with these physicians and can forward the result to the office by fax. This speeds up communication of critical results.
- Client Interface Team (CIT):
 - Participated in the Multiple Sclerosis Clinic print cessation project. The project was successfully completed and the reports for the clinic are now paperless.
 - Set up on fax distributions for GenCan/Novartis/Apotex / Occupational Health to help reduce the number routine results coming to the LIC Call back queues. Clinics were notified of this change, supplied with new "Client stamps" and standing orders were updated accordingly.



- Worked closely with Provincial Laboratory Quality Coordinators to help develop a Provincial Lab Overlay process.
- Worked closely with Cloverdale Clinic for the collection and transportation of Infliximab samples at their site to help support sick patients.
- Worked to reduce Fax Routine orders from high users. Offices contacted have modified how they order testing to reduce routine fax requests.
- ACH Oncology/Hematology is receiving more copies of their results in SCM correctly after CIT followed up to educate on proper requisition completion at clinic and data entry issues at CLS.
- Working collaboratively with Anatomic Pathology to try to reduce the number of sample deficiencies received. Communicating with physicians/ clinics identified as submitting frequent problem specimens.
- Data Integrity Team (DIT):
 - Records Management Data Maintenance Clerks underwent the exempt job evaluation in the fall of 2014 and were reclassified to Data Integrity Clerk based on the complexity of the work they perform on a daily basis.
 - Took on the role for Provincial Laboratories North and South for data remediation and investigation.
- Records: with the integration of Provincial Laboratory on to the Millennium LIS ER4 is now another option for CLS for electronic report distribution. Results for daily audits for Communicable Disease are now sent through ER4 portal.
- DSC Mailroom: is now responsible for Provincial Laboratory report distributions for Health Care Providers in the Calgary and South Zones.

Hematology/Transfusion Medicine

The Clinical Section of Hematology and Transfusion Medicine (n.b., this Clinical Section split into the Clinical Section of Hematopathology and the Clinical Section of Transfusion Medicine at the end of 2014) pursued major steps in 2014 to achieve goals defined by CLS and AHS. Multiple projects in collaboration with Millennium expanded the accessibility of health care providers to more laboratory results produced by the Section. In addition by implementation of SCM-TM project in collaboration with SCM team, patient safety correlated with administration of blood products was set at new higher standards.

In the Research Section, multiple peer-reviewed publications and abstract presentations by divisional staff have been a great achievement in innovation. In addition, multiple research grants in total amount of \$1,229,087 have been funded to the division.

Two of academic staff members (GFT), Dr. Adnan Mansoor and Dr. Faisal Khan, have been recommended for promotion promoted to full professor and associate professor, respectively.

The following sections identify various initiatives which have been completed during 2014 by the divisional laboratories of the Clinical Section of Hematology and Transfusion Medicine.

Hematology

- Accreditation.
- DI went live.
- McCaig Tower planning resumed.
- Instituted Cellavision Competency to replace ALQEP.
- Installed DXH SMS.
- Trained TM MLAs to help collect bone marrows.
- With the departure of two hematopathologists, Dr. Etienne Mahe has been hired for one HP position and replacement of the second position is in process.
- Clinical Hematologists were added to DI for Cellavision review.
- WBC and PLT fields added to ARE for reporting the numbers.
- Accessioning took over the task of making the cryo kits for collections.
- Started an 8:15 spot for bone marrow collections at TBCC.
- SoftTech training was completed.
- Validated - 70% fill collection tubes for coagulation:
 - Criteria for decreasing the number of slides to be reviewed for cellular interference.
 - Reporting differentials from Cellavision when the count was less than 100.
 - Results from the LH750 with a WBC>140X10E9/L does not have to have further workup done for the HGB when the MCHC was <360.
 - Differentials on albumin slides done on the Cellavision were the same as the microscope.

- All staff completed 2014 competencies.
- Cellavision interfaced with Millennium- go live and validation successful with all staff fully trained – all RRL sites and DSC.
- Implemented Thrombin Time testing in all RRL's.

Special Coagulation

- Thanked Nancy Stein for her efforts to make successful transition as a new supervisor.
- Successfully passed the Laboratory Accreditation.
- Timely and accurate report of all cases.
- Ongoing validation of new kits (different lot number).
- Help set TT test in Calgary.
- Established the relation with Mayo Clinic regarding special platelet disorder tests.
- Beta-testings:
 - Biogen Idec Canada for factor IX
 - Bayer Pharma AG for VIII.
 - Training of new staff.

Molecular Hematology

- Testing:
 - Started development of a multiplex PCR assay for detection of alpha globin gene Constant Spring and Quong Sze mutations.
 - Multiplex PCR assay for detection of CEBP-alpha mutations for prognosis in AML patients without NPM1 and FLT3 gene mutations now in validation stage. Testing should be available by mid-2015.
 - STR analysis utilized to expand hematopoietic cell chimerism testing to include; solid tissue transplants and Fetal-Maternal Engraftment studies.
 - Continued collaboration with Pediatric Stroke Program, performing inherited risk factor for thrombosis testing for this patient cohort.
- Millennium:
 - FLT3/NPM1 built and live in Helix allowing these test results to be accessed through SCM and Netcare. Improves patient safety by eliminating manual reporting.
 - STR build in Helix is in the final stage of validation. This will allow access to STR chimerism reports in SCM and Netcare. Completion delayed by Millennium upgrade but should go live by April 2015.
 - Turn-around-time scripts built in Millennium to capture TAT for Factor V Leiden, Factor II Polymorphism, Alpha Thalassemia, and JAK2 testing. FLT3/NPM1 and STR chimerism script to be built in early 2015. These are an important component in acquiring Quality Assurance data.
- Education:
 - Hematopathology resident/fellowship training program specialized laboratory coordinator and molecular hematology preceptor for trainees in the following disciplines: Adult and Pediatric Hematology, Bone Marrow Transplantation, and Molecular Genetics. Several residents/fellows trained this year.
 - Coordinated DSC tour for Biomedical Engineering students from University of Calgary.
 - Continued involvement in the training of new MLT students by providing seminars and department tours.
- Lab Operations and Training:
 - Continued improvement of workflow in molecular hematology. Staff are now working as one large group providing testing based upon TAT requirements for 7/10 tests. The remaining 3/10 tests are on weekly assignment due to large volume. This workflow continues to promote staff competency and lower re-training costs.
 - Improved training program. Training checklists have been updated and made available to trainers. Training will now allow trainees a longer training period with a trainer in each testing area before moving on to a new area. Two new staff members were fully trained in 2014.
- Quality Assurance:
 - Successful accreditation with ASCP in June 2014.
 - Continued participation and success in College of American Pathologists (CAP) and American Society for Histocompatibility and Immunogenetics (ASHI) quality assurance programs.
- Instrumentation:
 - Instrument upgrade from ABI7500 Real Time PCR System to ABI7500 Fast Real Time PCR System. Acquisition of a second 7500 Fast instrument allowing for in-house back-up and for increased testing volumes.

- Other:
 - Involvement in the design of Molecular Hematology lab for the new Cancer Centre.

Flow Cytometry

- Leukemia/lymphoma results are reported in Millenium/NetCare. With the exception of out of province referrals, faxing Flow Cytometry reports has been discontinued.
- All laboratory patient training, QC/QA and competency records are now electronic. Printing hard copies, faxing and document storage in Iron Mountain have undergone major reductions.
- Test utilization - screening criteria for peripheral blood lymphoma testing implemented in September 2014.
- Antibody QC reduced by 46% by reducing number of orders/shipments.
- Visual inventory management system completed in December 2014 for all lab supplies and reagents.
- Staff self-scheduling implemented October 2014.
- In-house antibody cocktail stability validated and extended to 10 weeks from 4 weeks.
- Rituximab research study funded by the Alberta Cancer Foundation was completed in December 2014.
- DNA Ploidy results now reported in Millenium/NetCare.

Transfusion Medicine

- STARS Unmatched Blood Pilot – Calgary was chosen as the pilot site for a provincial initiative to provide uncross matched blood stock for STARS to store at their hangar to increase their access to this resource for lifesaving treatment during transport. This project required collaboration between STARS, CLS Transfusion Medicine and CLS Courier departments. Two units of O negative uncross matched red cells are stored at the STARS hangar using a Golden Hour cooler. STARS no longer needs to land at a Calgary hospital on their way to accident scenes to pick up blood for emergency transfusion. Since the program launch May 6, 2014, the uncross matched blood has been used twelve times. The success of the Calgary pilot project has led to implementation in Edmonton and Grand Prairie, the other two STARS bases in Alberta.

- O negative red cell inventory optimization – O negative red cells are used for emergency transfusion and are chronically in a short supply across Canada. In 2014 changes were made to our policies for uncross matched red cell selection to limit this resource to females of child bearing age. Additionally, historical use of uncross matched blood for rural sites supplied by CLS was analyzed and those sites that had did not have obstetrics services and had not transfused unmatched units to females of childbearing age had their uncross matched blood stock changed from O negative to O positive. These changes have resulted in a significant decrease in O negative red cell utilization.

- Antibody Investigation Centralization – Antibody identification investigations were centralized to the FMC site and the frequency of identification workups was significantly reduced. This change has resulted in cost savings for all urban transfusion medicine RRL sites; reduced training time required for RRL technologists and eased the challenges of maintaining competency in this specialized testing area without impacting the ability to provide compatible blood products to patients with antibodies.

- FMC Score Event – A LEAN SCORE event was run at the FMC site to balance the technologists' workload on the day and evening shifts. This rebalance has led to a decrease in overtime, reduced the staffing requirements for the evening shift, equalized the work done by different benches and shifts, and allowed for technologists to be assigned time for completing reading assignments and projects.

- MLA Collaboration – MLA's from FMC TM have been trained in



bone marrow collection and have taken over maintenance duties for Flow Cytometry. This collaboration has allowed the MLA's to gain new skills and has eased workload and staffing challenges for the Hematology and Flow Cytometry departments.

- SARAH collaboration – FMC TM collaborated with the Australian Red Cross to characterize a rare red cell antigen named SARAH that has caused two cases of severe HDFN in a Calgary family. Analysis of DNA specimens collected from all 9 family members and sharing of historical serology results from the affected children and mother allowed the researchers to categorize the antigen as belonging to the MNS blood group system. Previously this antigen had only been identified on one Australian family and had not been assigned to a blood group system. The full results of this collaboration have been accepted for publication in the journal “Transfusion” in 2015.

Cellular Therapy Laboratory

- Quality: Enhancing Quality in HealthCare
 - Implemented the CTL Lab Information System, StemLab – allows for complete electronic documentation of CTL processes which increases efficiency and patient safety by eliminating redundancies and reducing transcription errors.
 - Implemented electronic records system for all quality control, quality assurance, and general laboratory files.
 - Initiated research project with CIBMTR (Centre for International Blood & Marrow Transplant Research) for the “Retrospective Assessment of the potential impacts of Bone Marrow Product Quality on the Utilization of Bone Marrow as a Cell Source for Transplant – A Global Study”. Project is currently underway with anticipated completion in Fall 2015. Funded by CIBMTR
 - Submitted FACT pre-inspection documentation in preparation for accreditation inspection in 2015.
- Access: Support increased access to healthcare System
 - Increased our processing services by 30% to accommodate the needs of the Alberta Blood and Marrow Transplant Program and the increased transplant need.
 - Continued collaboration on a novel clinical trial using liver cells to treat urea cycle disorders in infants. Our 4th patient was treated in 2014 with the novel therapy and promising results have been seen so far. Only centre in Canada performing this clinical trial.
 - Provided specialized cellular therapy processing services to other cellular therapy labs in Canada
- Sustainability: Provide value to the healthcare system
 - Implemented StemLab allowing for increased efficiency in product processing.
 - Implemented complete electronic records retention for all CTL product and patient files.
 - Worked with planners to design the new Cellular Therapy Laboratory in future New Cancer Care Centre.
 - Worked with IT planners to design electronic transfer of information CTL to Alberta BMT program.
 - Worked with planners and contractors to finalize CTL facility at McCaig Tower.
- Innovation: Pursue creative solutions to demands in healthcare
 - Completed novel clinical trial using mesenchymal stem cells for the treatment of acute kidney disease following cardiac surgery.
 - Initiated clinical trial on mesenchymal stem cells in treatment of graft versus host disease.
 - Collected and enriched CD34+ Cells from a 2nd Fabry's patient as part of on-going clinical trial.
- Relationship: Build stronger relationships with our healthcare partners
 - Provided continuing education locally and provincial to Flow Cytometry, Transfusion Medicine (Lunch and Learn and Vein to Vein), and Alberta Transplant Research Rounds.
 - Collaborated with other researchers and labs resulting in publications, grants and clinical trials.
- Training and education
 - Completed training of 1 new MLTI in all CTL processes.
 - Completed 6 month competency of new MLTI in all CTL processes.
 - Completed annual competency on ALL CTL staff on ALL processes in laboratory.
 - Provided ongoing training for residents and fellows as part of Specialized Laboratory Training Program.
 - Attended 2014 Annual International Society for Cellular Therapy Meeting.
 - All CTL staffed attended 12-20 hours of continuing education through webinars, teleconferences and weekly rounds/educational sessions.

Tissue Typing Laboratory

- Passed 2014 Interim ASHI Laboratory Accreditation (valid until 08/31/2015).
- Participation in the LDPE National Organ Exchange program.
- Implemented new HSP on-call process for import and export.

- Introduction of new BMT haplo-matching protocol.
- Histotrac Project: Pre-implementation process that including weekly and monthly meetings with program manager, architects, IT, change management, finance, vendor, and clients.
- Served as member of the Southern Alberta Transplant Program Executive (ALTRA) representing the Tissue Typing Laboratory.
- Served in the CBS HLA National Advisory Committee on monthly teleconference and one face to face meeting.
- Worked with the BMT program to lean the antibody screening.
- Worked with Alberta transplant services to acquired partial funding to support the Highly Sensitized Patient (HSP) registry.
- Worked with AHS planners to design the new Histocompatibility and Immunogenetics Lab (HIL) in the future New Cancer Care Centre.
- Completion of two years of training for Histocompatibility Fellow who successfully passed the ABHI board and landed a position.
- Recruited a new Histocompatibility Fellow from Toronto who was trained in most tissue typing benches.
- Two new technologists trained for call-back.
- Trained 3 new techs in Sequence Based HLA Typing.
- Continuing Education through teleconferences, Bone Marrow, Renal Weekly Rounds, and Hematology education sessions.
- Supervised one graduate student whose work was presented at the ASHI 40th meeting.
- Supervised two research postdoc fellows.
- Supervised one summer student who's worked was presented at the ASHI 40th meeting.

Special Hematology

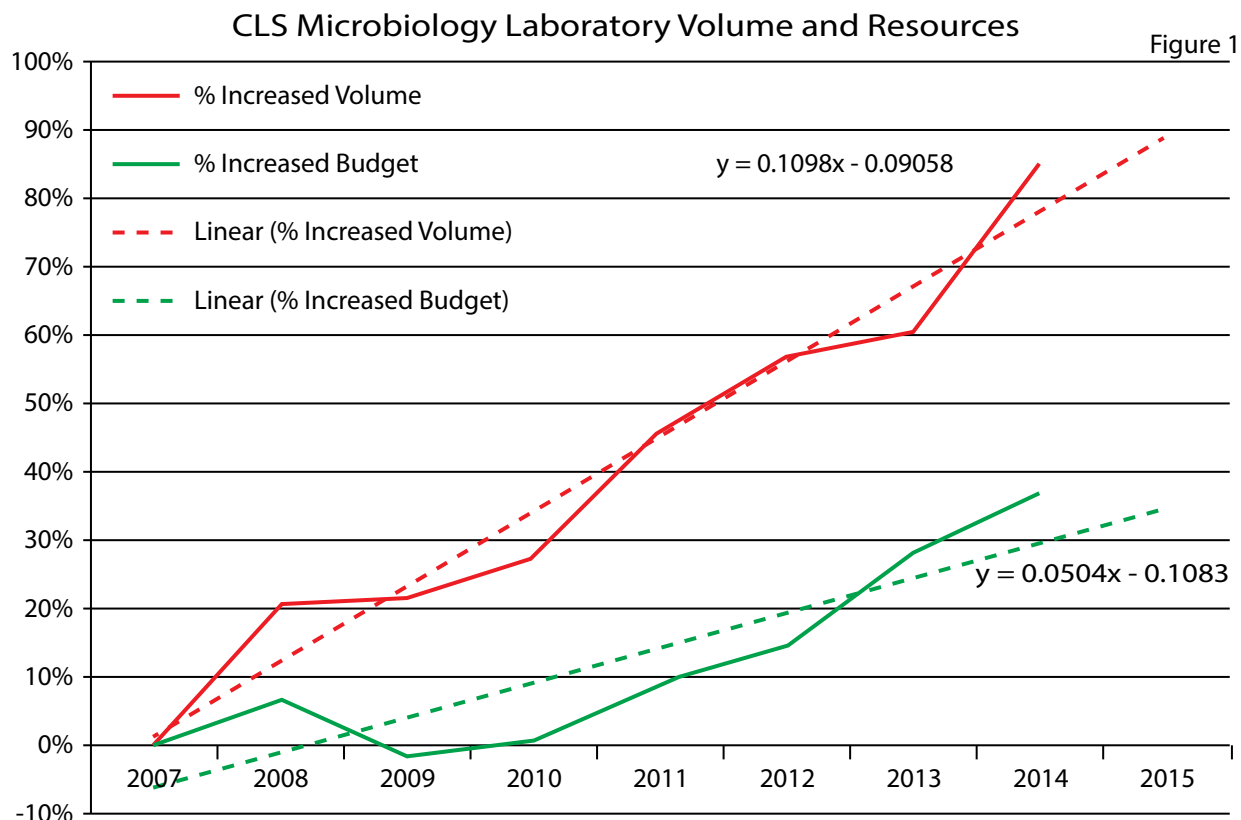
- Successful CPSA Accreditation.
- McCaig Tower Planning.
- Soft Tech training completed.
- Trained summer student to help with staff on vacation.
- Trained BM staff how to do Pyruvate Kinase screen to help out Hgbelec bench.
- Trained fellows/residents on Hgbelec and Bone Marrow.
- 2 Hematologist left Dr Ni and Dr. Patel.
- Continuing education through teleconferences, Bone Marrow survey CAP and QMP-S survey.
- Annual Special Hematology competency was completed by all staff.
- Revised SOP for cytochemical stain and Bio-Rad variant procedures.
- Discontinued printing/filling Hgbelec reports and HPLC chromatogram, we now access reports through Millennium and scan/save HPLC chromatogram.
- Implemented documented intra departmental BM consultation.
- Achieved consistent good TAT for BM and Hgbelec.
- Bi-monthly meeting with case review.
- Was able to cope with increased workload (1861 BM in 2013- 2018 BM in 2014) (5915 Hgbelec in 2013 and 7270 Hgbelec in 2014).
- Verification check for results in Millennium performed by a technologist /Hematologist prior to verification, therefore discontinued duplication of proof reading final report for BM and Hgbelec.
- EQUIPMENT/Bio-Rad Software upgrade 5.2.1 18. NEW PROJECT/ Project planning for the new cancer Care Centre.

Microbiology Section

- Herpes simplex virus (HSV) and Varicella zoster virus (VZV) testing was transferred to Provincial Laboratory in order to provide a more sensitive molecular test than the direct fluorescent test that was provided at CLS.
- A Lean SCORE event was performed on the MLT Urine bench to handle increasing volumes which resulted in the following key improvements: Standardized workflow, urine culture plates being read at the correct incubation times and decreasing the stress on staff at the end of the shift completing the last urine screen.
- A real-time PCR assay was developed and implemented to replace the direct fluorescent antibody (DFA) for *Pneumocystis jirovecii* on BAL specimens. The molecular assay has an improved sensitivity and specificity.
- CLS Microbiology participated in the University of Alberta Wellness Centre Mass STI Screening promoting sexual health education and awareness.
- CLS Microbiology began providing consultation services to the South Zone including Lethbridge and Medicine Hat Regional Hospitals.
- Successful CPSA Accreditation for both DSC and SHC Microbiology laboratories. Microbiology received very few minor citations.
- A Lean SCORE event was performed on the MLT Anaerobe bench to handle increasing volumes which resulted in the following key improvements; improved the layout and organization of the bench, designed the workflow so aerobic and anaerobic culture plates are read at the same time, standardized the work and created a flag system and actions to alert others when assistance is needed on the bench.
- Implementation of chromogenic agar on the urine bench to improve pathogen culture detection, decrease workup required on certain pathogens and reduced the number of culture plates handled by staff.
- Microbiology led in the development of the CLS Viral Hemorrhagic Fever (VHF) protocol, process and procedures. Ebola safety and educational inservices, EFD simulation exercise and lunch and learn sessions provided to staff.
- Myla middleware successfully replaced multiple interfaces between Millennium and Vitek 2, Vitek MS and BacTAlerts.

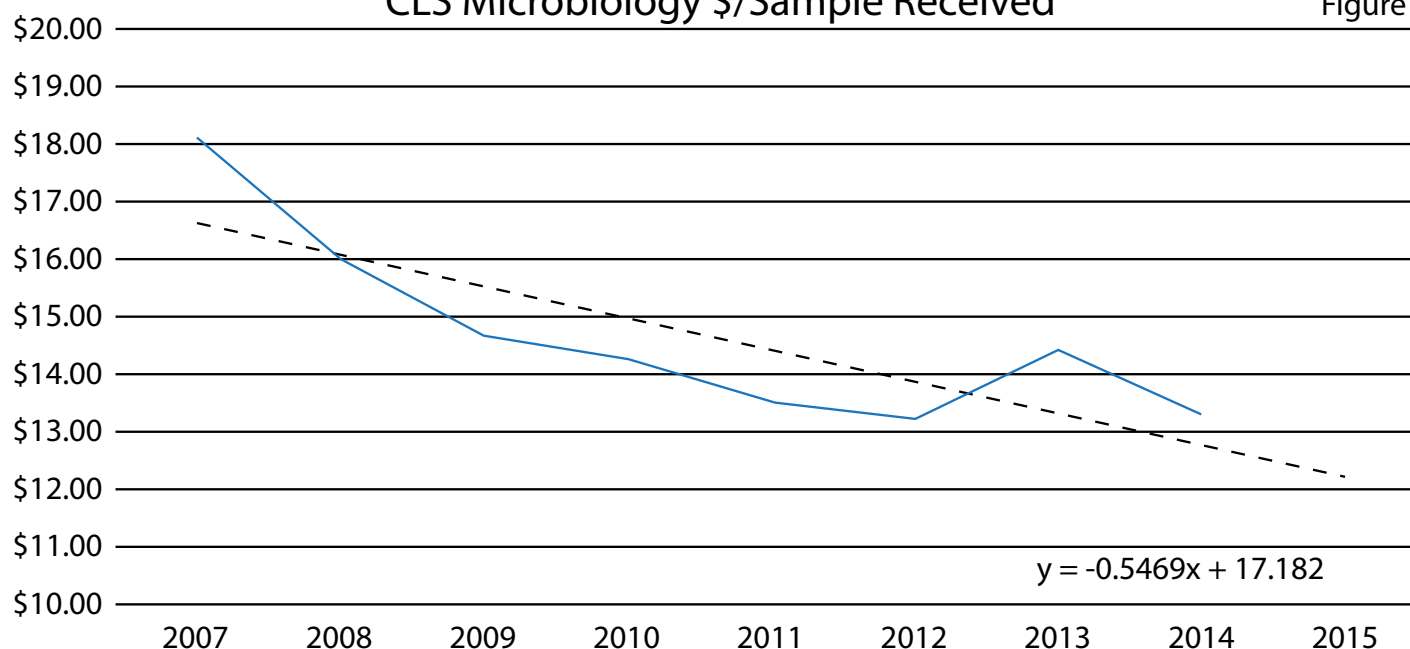
Microbiology Workload

Specimen numbers continue to increase at a rate of over 10% per annum. In relation to funding there is a 5.9% per annum cost avoidance (see Figure 1), which equates to a reduction in \$0.55 cost per sample processed per annum over the last 8 years (see Figure 2).



CLS Microbiology \$/Sample Received

Figure 2



Education

Educational Programs Provided by the Department of Pathology & Laboratory Medicine

The medical and scientific staff of CLS are responsible for a wide array of educational activities that include: (1) residency training programs in Anatomic Pathology, General Pathology and Neuropathology, (2) mandatory rotations (e.g. hematopathology) for a number of other residency programs, (3) lectures and small group sessions in a number of undergraduate courses, (4) the Medical Sciences 515/Biology 515 Course, (5) parts of the Bachelor of Health Sciences program, (6) supervision of elective rotating residents from other programs and rotating clinical clerks, (7) training of fellows, (8) graduate student supervision, (9) summer student supervision, (10) Continuing Medical Education events, and (11) the Pathologists' Assistant M.Sc. program, which continues in its third year, and is now fully accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Anatomic Pathology Residency Training Program (Program Director: Dr. Lisa DiFrancesco/Dr. Dan Fontaine)

This is a five-year program leading to certification in Anatomic Pathology by the Royal College of Physicians and Surgeons of Canada. The Post Graduate Year PGY-1 year is designed to provide exposure to most of the medical and surgical services that rely heavily on the pathology laboratory and to prepare the resident for the Medical Council of Canada qualifying examination part II. The PGY-2 and PGY-3 years constitute the core training with integrated rotations of autopsy and surgical pathology. During the PGY 4th and 5th year, the resident embarks upon mandatory subspecialty rotations (Pediatric Pathology, Forensic Pathology, Cytopathology, Renal Pathology/Electron Microscopy, Dermatopathology, Hematopathology, Neuropathology, Chief Resident, and Lymph Node Pathology) as well as elective rotations (Clinical laboratory subspecialties, Molecular Pathology, Subspecialty surgical pathology, research, etc.). The PGY-5 year may be spent in a variety of electives, which may include any one of the clinical laboratory subspecialties, a clinical rotation, a research rotation or one or more rotations in subspecialty pathology. Involvement in research activities is an integral part of the program and starting in the PGY-3 year, the residents are expected to present their research findings at the annual pathology residents' research day. Funding is available to present their work at North American meetings. The program is designed to give graded responsibility to the resident so that in the final year of training the resident will be expected to perform to the level of a junior faculty member, recognizing that faculty resident supervision is always occurring. In addition to one-on-one teaching, clinical pathological conferences and subspecialty rounds, there are co-ordinated didactic teaching sessions held in a weekly academic half-day (protected time). The residents write the yearly American Society of Clinical Pathology exam and participate in regular in-training evaluations that mimic the Royal College of Physicians and Surgeons of Canada exam. A philosophy of independent self-directed learning underlies the program.

Three excellent new trainees were accepted into the program beginning July 2014 with two transfers from other programs entering our program at the PGY2 level, bringing our total number of trainees for 2014-2015 to 17. Two residents graduated in 2014 and both were successful in passing their Royal College Examinations. Both went on to pursue additional Fellowship training.

The program was given full approval by the Royal College of Physicians and Surgeons of Canada in 2010 and this was supported by an Internal Review in December 2012. An External Review is underway at the end of February 2015. Planning is underway to anticipate adoption of Competency By Design as will be mandated starting in 2016 for Anatomical Pathology by the Royal College of Physicians and Surgeons of Canada.

General Pathology Residency Training Program (Program Director: Dr. Christopher Naugler)

This is a five-year program leading to certification in General Pathology by the Royal College of Physicians and Surgeons of Canada. The University of Calgary through co-sponsorship with Calgary Laboratory Services offer General Pathology Residency Training highlighting on laboratory management and pathology informatics. Upon successful completion of the education program, the residents will be competent to function as consultants in General Pathology and medical laboratory directors.

Residents also benefit from our close association with the highly successful University of Calgary Anatomic Pathology Residency Training Program and our large group of over 90 pathologists and laboratory scientists.

Three key features of the program are General Pathology Mentorship, Community Laboratory Management and Pathology Informatics. The General Pathology Residency Program is 5 years in duration (4 years of laboratory Medicine and one basic clinical year). The basic clinical year is designed to provide exposure to most of the medical and surgical services that rely heavily on the pathology laboratory and to prepare the resident for the Medical Council of Canada Qualifying Examination Part II.

Research: The general pathology faculty has great interest in pathology informatics and so research in this area is promoted. General pathology residents are expected to complete at least one research project during their residency. The Research Committee coordinates resident research. Resident Training Committee monitors the manpower required for the project and our department has special funds available for resident research.

Didactic schedule: Pathology and clinico-pathologic seminars are held weekly on Fridays during academic half-day. Residents are exempted from work commitments during this period. Residents are also expected to present at clinico-pathologic rounds, held weekly in conjunction with the Department of Internal Medicine. Residents may also participate in medical student teaching at the University of Calgary. Presentations at other rounds (Department of Surgery/Nephrology) are also encouraged.

Evaluation: An in-training evaluation report (ITER) is completed after each rotation. The ITER is reviewed with the resident and emphasis is on continuous constructive feedback for the resident. Starting in the PGY2 year, all residents take two exams a year mimicking the fellowship exam by the RCPSC.

Training Sites: Diagnostic and Scientific Centre (DSC), Foothills Medical Centre (FMC), Alberta Children's Hospital (ACH), Peter Lougheed Centre (PLC), Rockyview General Hospital (RGH), Medical Examiner's Office, Community/rural laboratories (provide extensive opportunity for management training), Community hospital rotations are taken at Red Deer General Hospital in Red Deer, AB

Our program is relatively new and so the first resident in our program graduated in 2014 and was successful in passing General Pathology certification exams by the Royal College of Physicians and Surgeons of Canada. He is now completing a Transfusion Medicine Fellowship at Yale and has been hired by CLS with a start date in July 2015. Our second graduate will be writing his certification exams in the Spring of 2015.

Onsite accreditation survey of the University of Calgary's General Pathology Residency Training Program scheduled to take place on February 24, 2015. The first Royal College review of the General Pathology Program was conducted by the Faculty Post Graduate Medical Education Committee in September 2013.

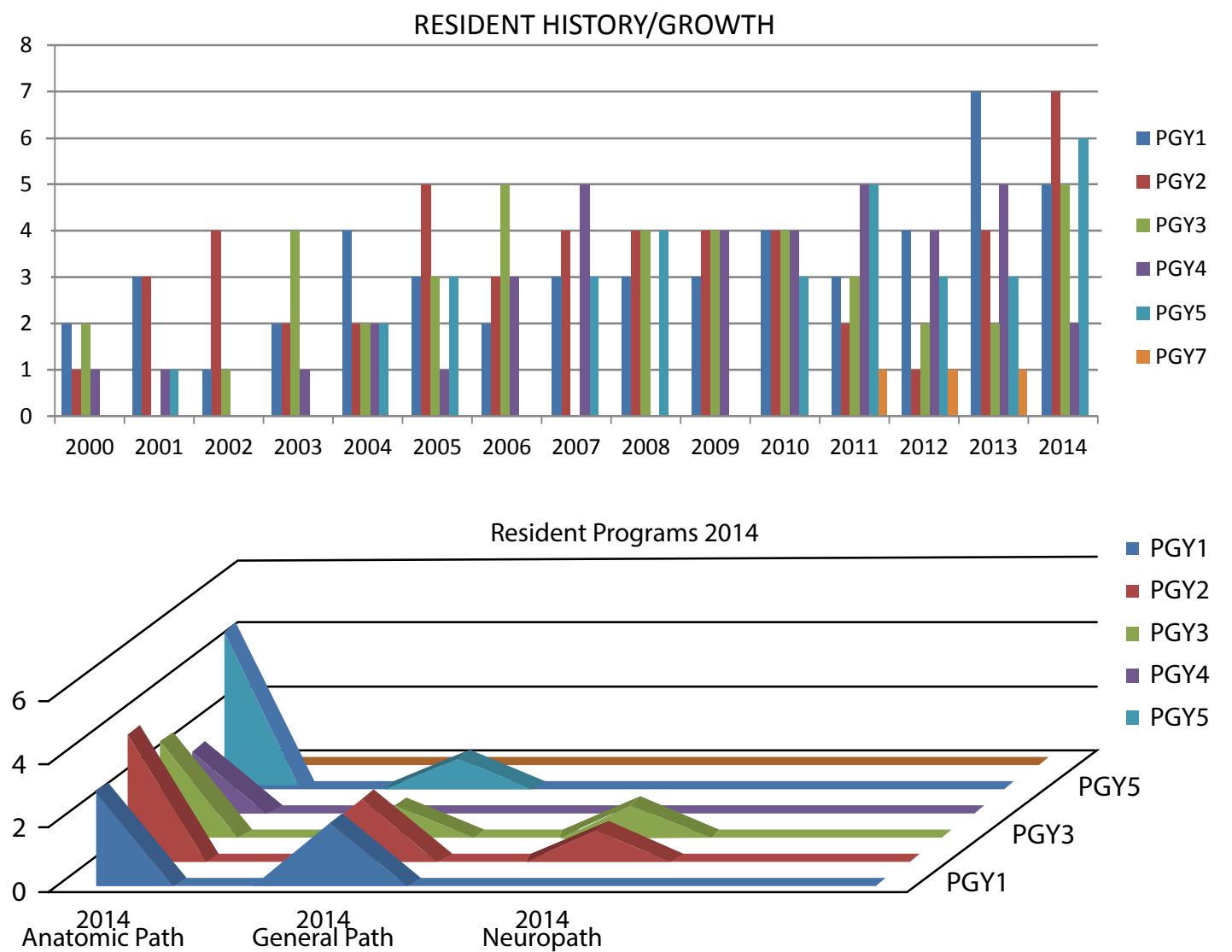
Neuropathology Residency Training Program (Program Director: Dr. Lothar Resch, Assistant Program Director: Dr. Leslie Hamilton)

This is a five-year program leading to certification in Neuropathology by the Royal College of Physicians and Surgeons of Canada. The University of Calgary program includes one year of clinical medicine, one year of anatomic



pathology and three years of neuropathology training, including two core years with graded responsibility in the reporting of surgical and autopsy cases, nerve, muscle and eye material. The fifth year is an elective year and may be spent in service or clinical rotations but participation in research activities ongoing within the department is encouraged. These include research into neuro-degenerative disorders, neuro-regeneration, cerebral ischemia, neuro-oncology and developmental disorders. Trainees gain experience in applications of new technologies in the study of pathogenesis of disease including immuno-pathology, molecular pathology, electron microscopy, flow cytometry and image analysis. Medical-legal and diagnostic consultations are an integral component of this program as is participation in under-graduate and postgraduate teaching programs. In 2014 there were two residents in the program. This number of residents made us one of the more active Neuropathology residency training programs in Canada in 2014.

Resident History/Growth



Medical Sciences 515/Biology 515 Course (Course Director: Dr. Xianyong (Sean) Gui)

The Department is responsible for the development and teaching of this course and it continues to be very well received by students. This year’s enrolment was 28 students. The basis of the course is the cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors and the ways in which this knowledge can be used in the laboratory diagnosis of disease. Our faculty provided 37.5 hours of lectures in this course.

Undergraduate Medical Education (Department Representative: Vacant)

The University of Calgary undergraduate teaching program for medical students follows an integrated approach in accordance with the requirements of the Medical Council of Canada. Pathology is part of the basic sciences component of the curriculum and is taught as part of each integrated course. Small group teaching, as an essential part of pathology teaching, requires an increased teacher-student ratio. The increasing size of the medical student classes has resulted in a significant increased demand for teaching time.

Department members are involved in teaching (lectures and small group sessions) for a number of courses including but not limited to: Cardiovascular, Respiratory System, Applied Evidence Based Medicine, Trial Advocate Course, Renal, Neurosciences, Blood, Molecular Biology of Cancer, Cancer Biology, Pathobiology, Directed Path Research Projects, Integrative Course, Pathology of Neoplasia, Pathology of Hepatobiliary Diseases, Endocrine, Gastrointestinal, Introduction to Medicine, Reproduction, Gynecological Pathology, Environmental Pathology, Upper Respiratory Tract Infections, Pneumonia and Pulmonary Infections, Human Genetics and Musculoskeletal/Skin.

In a typical year, the Department of Pathology & Laboratory Medicine faculty members provide about 1,200 hours of undergraduate medical education teaching.

Postgraduate Clinical Trainees

Geographic Full Time (GFT) faculty members provide greater than 2,000 hours of teaching per year to support postgraduate clinical trainees, including department residency training programs, rotating residents and fellows. Clinical faculty members also make very extensive contributions to teaching residents and fellows; although this time has not been quantified, it is likely similar or greater in magnitude.

Fellowship Programs (Chair: Dr. Joanne Todesco)

Up to 6 internally (CLS) funded positions are available each year. Four of these positions are meant to fund board-certified (or board-eligible) Anatomic Pathology Fellows wanting to develop subspecialty skills in an area of Anatomic Pathology. In some years, we also train externally funded fellows.

The DPLM/CLS Fellowship Committee selects qualified applicants for internally and externally funded Fellowship positions. Positions are open to either MD or PhD applicants, depending upon the field of study. We currently offer fellowships in Cytogenetics, Cytopathology, Breast Pathology, Gynecological Pathology, Histocompatibility, Hematopathology, Renal/Transplant Pathology, Pulmonary Pathology, Urology, and Pediatric Pathology. The Histocompatibility Fellowship is accredited by the American Society of Histocompatibility and Immunogenetics (ASHI) as a Director Training Program. The Cytogenetics Fellowship is accredited by the Canadian College of Medical Geneticists. A new two year Clinical Biochemistry Fellowship Program was launched in 2013 and this has 2 additional hard funded positions (see below).

Dr. Joanne Todesco assumed the Chairmanship of the Fellowship Committee in 2012, when Dr. Keith Brownell stepped down. The DPLM/CLS Fellowship Committee governance structure has been praised and imitated by other clinical departments in the Cumming School of Medicine.

Clinical Biochemistry Fellowship Program (Program Director: Dr. Isolde Seiden Long)

In 2013, CLS and DPLM launched a new fellowship training program in Clinical Biochemistry. The program trains PhDs with an appropriate background in biological sciences to become Clinical Bio-



chemists and to direct clinical biochemistry labs. This program is provisionally accredited by the Canadian Academy of Clinical Biochemistry (CACB) and we plan to seek additional accreditation by the Commission on Accreditation in Clinical Chemistry (ComACC) in the USA. The Fellowship program works closely with the General Pathology Residency Training program to enhance training opportunities for both residents and fellows. Graduates of our program are currently eligible to take the Clinical Biochemistry specialist certification examination in Canada. The first trainee started in July 2013 and the second trainee started in July 2014. Our first trainee will graduate in June 2015. The plan is to accept one fellow per year for a 2 year training cycle going forward. Seven clinical biochemists; Drs. Alex Chin, Lawrence de Koning, Valerie Dias, Richard Krause, Lyle Redman, Isolde Seiden Long and Hossein Sadrzadeh are the program faculty and are directly involved in teaching and training the fellows. Dr. Isolde Seiden Long is the Program Director, and Dr. Hossein Sadrzadeh is the Co-Program Director. The CACB had a site visit in May 2013 and gave the program provisional accreditation; the program will be assessed for full accreditation in March 2015. The program will seek ComACC accreditation in 2015 or 2016.

During 2014 the following Clinical Fellows were trained at CLS:

Fellow	Specialty Area	Supervisor	Funding Source	Year
Jessica Boyd	Clinical Biochemistry	I. Seiden Long	CLS	2013-2015
Etienne Mahe	Hematopathology	I. Auer-Grzesiak	CLS	2013-2014
Arjumand Husain	Breast Pathology	H. Yang	CLS	2014-2015
Kathleen Bone	Cytogenetics	J. van den Berghe	CLS	2014-2016
Michael Bonert	Urological Pathology	A. Yilmaz	CLS	2014-2015
Abubaker Sidahmed	Histocompatibility	N. Berka	CLS	2014-2016
Angela Franko	Pulmonary Pathology	M. Kelly	CLS	2014-2015
Majid Moteabbed	Hematopathology	I. Auer-Grzesiak	CLS	2014-2015

Graduate Students

There is currently no experimental pathology graduate program in the Faculty of Graduate Studies; however, graduate students are supervised by members of the Department.

Faculty	Graduate Students	
	Supervisor	Committee Member
Bismar, Tarek	T.T. Wang (Postdoctorate) S. Hegazy (Postdoctorate) H. Abou-Ouf (Postdoctorate) M. Elfakhani (Postdoctorate)	A. Nabbi (PhD)
Chan, Jennifer	A. Rogers (MSc) C. Perotti (Postdoctorate) R. Dixit (Postdoctorate) W. Wu (Postdoctorate) D. Dennis (PhD)	M. Blough (PhD) M. Mobahat (MSc) C. Chesnelong (PhD)
Demetrick, Doug	M. Al-Mali (MSc) (Co-Supervisor)	S. Gao (PhD) Z. Levacque (MSc) K. Sorenson (MSc)
Green, Francis	P. Choudhury (MSDc) (Co-Supervisor)	D. Polley (MSc) H. Payne (MSc) M. Al Saied (MSc) S. Gtehranian (MSc)
Kelly, Margaret	H. Payne (MSc)	T. George (MSc) M. Amin (PhD) C. Shelfoon (MSc) D. Minor (MSc)

Faculty	Graduate Students	
	Supervisor	Committee Member
Khan, Faisal	A. Liacini (Postdoctorate) (Co-Supervisor) R. Faridi (Postdoctorate) S. Ghandorah (PhD) (Co-Supervisor) G. Tripathi (Postdoctorate) A. Akhter (Postdoctorate) (Co-Supervisor) R. Dabas (PhD) (Co-Supervisor)	
Mansoor, Adnan	S. Osman (MSc) (Co-Supervisor)	
Naugler, Christopher	B. Horn (MSc) E. Mohammed (PhD) (Co-Supervisor) A. Crouse (MSc) B. Dupuis (MSc) (Co-supervisor) B. Gorday (MSc) R. Healey (MSc)	
Wright, Jim	S. Duschesne (MSc) (Co-Supervisor)	
Zhang, Kunyan	J. Zhang (PhD) M. Harding (MSc) (Co-Supervisor) A. Khateb (MSc)	

Pathologists' Assistant M.Sc. (Program Director, Dr. Amy Bromley: Medical Director: Dr. Jim Wright)

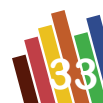
Pathologists' Assistants (PAs) are "physician extenders" for anatomic pathologists. PAs perform delegated medical tasks under the supervision of a medically qualified pathologist. They perform initial examination, dissection, and gross description of surgically removed tissues, assist in dissection of bodies during autopsies, and perform intraoperative frozen sections. They possess a highly standardized skill set related to each of these procedures, allowing pathologists to spend more of their time looking at slides.

The thesis-based Pathologists' Assistants Masters program at the University of Calgary began in 2012 as a specialization within Medical Sciences Graduate studies is in its third year and thriving with six students currently enrolled. The first year students are working through the Medical Sciences Graduate Program and their introductory courses, and eager to start their practical rotations, including autopsy pathology, surgical pathology, and pediatric pathology. The second year students are finishing their research, preparing for thesis defence, and completing their practical rotations.

The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), an American agency that accredits training programs of allied health professionals who work in anatomic pathology or clinical pathology laboratories, visited the program in April 2014 and the program was ultimately accredited in October 2014. Accreditation of our program is a huge benefit to our students, as it makes them eligible to write their American Society of Clinical Pathology board certification exams, which substantiates their training in a standardized fashion. We are now the second NAACLS-accredited training program in Canada. After working through the ranks of the Cumming School of Medicine and the main campus of the University of Calgary, our new Course-Based Pathologists' Assistant M.Sc. program was reviewed by the Ministry of Innovation and Advanced Education and was approved on January 14, 2015. The course-based program will have the first intake of students in July 2016. It will be larger than the current Thesis-based program.

Continuing Medical Education

Department members participate in Continuing Medical Education (CME) events at many levels: (1) Accredited weekly CME rounds that are video-conferenced to each of the hospital sites and host local and visiting speakers (accredited with the Royal College of Physicians and Surgeons of Canada); (2) Pediatric GI Pathology rounds (RCPSC accredited), Renal/Neuro rounds, Pediatric Grand Rounds (RCPSC accredited), Pediatric Pathology Review Sessions (RCPSC accredited), and Liver rounds (RCPSC accredited) are held monthly; (3) weekly Sarcoma Tumor Group Rounds; (4) weekly rounds for Pediatric Gross Neuropathology, Neuro (slide session), Cytopathology, Renal Biopsy (RCPSC accredited), Lymphoma (RCPSC accredited), Gynecology/Oncology (RCPSC accredited), CPC, Breast Tumor Group (RCPSC accredited), Interstitial Lung Disease rounds (RCPSC accredited), Pediatric Oncology Tumour Boards (RCPSC accredited), and autopsy (RCPSC accredited); (5) Friday morning Surgery Pathology rounds (RCPSC accredited); (6) California Tumor Registry slide set (ACCME accredited); (7) Quarterly Combined Surgery - Pathology Rounds (RCPSC accredited); (8) Col-



lege of American Pathologists - Pathology In Practice Program; and (9) Society for Pediatric Pathology Slide Survey (AMA Category 1 accredited); (10) the Banff Pathology Update Course (RCPSC and ACCME accredited).

We have two named CME Lectureships attracting world-renowned external speakers. The Ben Ruether lecturer was not held this year. The Paul Kneafsey lecturer for 2014 was Dr. Jennifer L. Hunt, from the University of Arkansas for Medical Sciences.

The Banff Pathology Update Course is an annual three-day course held in Banff that provides an in depth and comprehensive review of an important topic in Anatomic Pathology each year. Since the year 2000, it has been a joint effort between the Department of Pathology & Laboratory Medicine, University of Calgary and the Department of Laboratory Medicine & Pathology, University of Alberta. The 2014 course was hosted by the University of Calgary, and was once again a very successful event, with an excellent program and 169 registrants. The topic was GI and liver pathology. The Program is shown as Appendix 1.5.

CLS Medical Laboratory Technologists (MLT)/Medical Laboratory Assistants (MLA), Cytotechnology, Combined Laboratory and X-Ray Technologists (CLXT) Education Program (Submitted by Ingrid Buchholz, Supervisor Clinical Education)

As part of the organization's workforce strategy in 2014, CLS partnered with the educational institutes of SAIT (Southern Alberta Institute of Technology), ABES (Alberta Business and Education Services) and NAIT (Northern Alberta Institute of Technology).

CLS provides practicum placements for up to 80 MLA (Medical Lab Assistant) and 40 MLT (Medical Laboratory Technology) students. In 2014 SHC (South Health Campus) received their first MLT practicum students in Clinical Biochemistry and Hematology areas and continue with MLA students in Specimen Accession. Five CLXT (Combined Lab and X-Ray) students were placed at various rural labs within the Calgary region for the 2014/15 practicum year. Additionally CLS supported 6 additional practicums from SAIT's Health Information Management, Medical Office Assistant and Unit Clerk, and Medical Transcription programs.

The CLS simulated labs are located at the DSC Microbiology, ACH (Alberta Children's Hospital) in Transfusion Medicine, Histology, and Clinical Biochemistry (Urinalysis) and SCH Hematology. Under the guidance and mentorship of preceptors, students are able to actively perform technical skills in a controlled learning environment while still being able to observe and participate in the working activity of a medical diagnostic laboratory. Two of the simulated labs utilize state-of-the-art audiovisual equipment: digital camera, microscope and network connection to an LCD screen to enhance student learning. The Sim labs are also available to other CLS staff for reviewing teleconferences and presenting clinical education.

CLS recognizes the need for preceptor education throughout the organization. SAIT offers continuous enrollment to an on-line preceptor course which is available to all preceptors or those interested in teaching within CLS. In May 2014 SAIT sponsored a free Preceptor Continuing Education Symposium offered to all CLS preceptors. In addition preceptors are encouraged to attend "Understanding Yourself as a Leader", "Leading at the Speed of Trust" and other continuing education sessions offered within CLS.

Research (CLS and Externally Funded)

The GFT and Clinical Faculty members within the Department of Pathology & Laboratory Medicine perform research at both CLS and the University of Calgary; however, CLS is a clinical laboratory and, thus, primarily supports research by providing protected time to its academic medical and scientific staff. CLS does not have a mandate to provide dedicated research equipment and laboratory facilities; this is the role of the University of Calgary, Cumming School of Medicine. Much of the research within the Cumming School of Medicine is organized into research institutes and these institutes control most of the Faculty's research infrastructure and laboratory space. Therefore, integration of Departmental faculty into the School's Institute model is critical for research success but it has also proven to be a major challenge, as many of our current faculty member's research interests fall outside of scope of the strategic research priorities of one of the Institutes. These misalignments are not only a problem for our Department and CLS but also for the Cumming School of Medicine as a whole. Pathology and Laboratory Medicine sit squarely at the crossroads between clinical practice and basic sciences; therefore, pathology departments should enable human research. When a pathology department fails in this, it adversely affects the whole medical school and exciting collaborative opportunities are lost. One of our major overall goals over the past few years has been to work very closely with Institute Directors to be certain that new academic recruits to our Department are a "good fit" and welcomed with open arms into a research institute and then are supported and mentored within.

This approach has proven successful for recruiting clinician-scientists.



In 2014, nine Department members (Drs. Bismar, Chan, Demetrick, Green, Kelly, Khan, Kurek, Wright, Zhang)

have research laboratories within the Cumming School of Medicine Health Sciences Centre, Heritage Medical Research Building, HRIC Building, or the Prostate Cancer Centre; these laboratories are associated with Cumming School of Medicine Research Institutes or groups, including Hotchkiss Brain Institute; Southern Alberta Cancer Research Institute; Alberta Children's Hospital Institute of Maternal & Child Health; Snyder Institute for Chronic Diseases; Immunology Research Group; Respiratory Research Group; and Julia MacFarlane Diabetes Research Centre. Using laboratory space provided by Calgary Laboratory Services and epidemiological data, the Division of Microbiology has a strong research presence within the Infectious Disease Research Group and the Division of Clinical Pathology has strong expertise in Lab Informatics and utilization. In April 2013, AHS funded a two year pilot Utilization Office at CLS under the leadership of Dr. Christopher Naugler.

Many GFT and Clinical Faculty perform clinical research related to the practice of pathology and laboratory medicine. CLS has a contractual commitment to support research, through its Affiliation Agreement with the University of Calgary and the Alberta Health Services – Calgary Zone. Clinical research programs are coordinated in partnership with research groups and with CLS. The CLS Research Department provides services for and supports the following types of research: (1) Industry-sponsored clinical trials, (2) Internal research conducted by CLS staff and funded by CLS, (3) Health foundation grant-based research, (4) CLS research competition, and (5) External requests for epidemiology-based research. On an annual basis CLS supports ~800 studies including clinical trials and grant-funded research.

Dr. Doug Demetrick is the CLS Program Leader, Research and Development; this position is responsible for the coordination, facilitation, reporting and communication of research and development activities and outcomes at CLS.

CLS Research Department

Calgary Laboratory Services is committed to supporting research activity that improves the delivery of pathology and laboratory medicine services, and results in the development of new tests and knowledge to improve patient care.

The CLS Research Department, along with physicians, scientists and staff throughout the organization provide laboratory support to more than 700 clinical trials and research projects that involve researchers internal and external to CLS.

The CLS Medical Director is responsible for the direction and leadership of Research within CLS. The CLS Research team also includes the Program Leader for Research and Development, Research and Development Program Coordinator, and Research Supervisor. Four Research Coordinators within the Research Office coordinate all laboratory related clinical trial and study activity that takes place within Alberta Health Services Calgary Zone and the University of Calgary. Three Research Medical Laboratory Assistants provide support for clinical trial/ research specimen collection, processing, packaging and shipping. A Laboratory Specialist at the APRL provides Anatomic Pathology research support to researchers at CLS/ U of C.

A summary of the initiatives undertaken by CLS Research in 2014:

- Completed the 2014 status review and update of all CLS supported Anatomic Pathology (AP) studies.
- Developed guideline for research funding and consolidated research finance tracking for AP studies.
- Dr. Doha Itani was appointed the Research Pathologist Liaison between CLS and the Tom Baker Cancer Centre.
- Re-design for external CLS Research microsite is in final stages.
- Annual revision of the Provincial Price List of Research Tests and Services for 2013-14 was implemented on April 1, 2014.
- Dr. Demetrick met with molecular section heads to assess the feasibility of using a common molecular testing platform as a model that would translate into provision of various clinical molecular tests & services ahead of FDA approval of new drug molecules.
- Dr. Demetrick met with Dr. Gwynn Bebb from Tom Baker Cancer Centre to establish and reinforce support channels between CLS and TBCC/ CRU research.
- Research Office is working with the Alberta Prostate Cancer Research Initiative (APCaRI) regarding collection of prostate cancer specimens for biobanking.
- Research Office is supporting a provincial HPV study which requires cytology samples and data: Surveillance of Human Papillomavirus Among Albertan Women. Dr. Waghray is the CLS PI.
- Research Office facilitated the collection and release of large research data sets for complex provincial initiatives e.g. Trends in GDM (Gestational Diabetes Mellitus) rates and outcomes in Alberta.
- Dr. Demetrick is working with Dr. Bebb, TBCC regarding creation of a Glans-Look Lung Cancer Database as part of a translational research initiative.
- CLS Research Office documented Researcher Outcomes as a result of support provided by the CLS Anatomic Pathology Research Lab (APRL).

- Privacy advisors in collaboration with CLS Research Office created a memo to researchers regarding Access to and Use of Patient information for Research to ensure alignment with the Health Information Act (HIA), research policy and AHS Netcare requirements.
- Research Office and CLS privacy advisors attended a meeting outlining Expanded Access to Netcare for Research. AHS recently announced a change in practice related to Netcare access for researchers/ research coordinators which now requires explicit patient consent. Research access to Netcare will continue to be granted through AHS.
- CLS Research Committee elections were held in June 2014 and Dr. Martin Koebel was elected as chair. The Research Committee terms of reference (TOR) were revised to account for increased research representation from CLS Clinical Sections.
- Research Office met with VP technical operations and RFD team leaders to discuss improved facilitation of research requests for data, including the need for faster TAT's and easier analyst access to Classic (historical) AP data since there are no plans to house research AP data in the CLDR. CLS Research Office is the only gateway for researchers to obtain provincial anatomic pathology data.
- Research Office and 6th Floor Lab MLA phlebotomists are supporting a high profile FMC ER trial: External validation of three emergency department rapid rule-out protocols for myocardial infarction using high sensitivity troponin assay: Dr. James Andruchow.
- The Research Office finalized a revised agreement with the Alberta Cancer Research Biorepository (ACRB) for the provision of tissue and tumour banking services.
- The Research Office continues to play a key role in local and national research collaborations by reviewing scientific protocols, preparing data requests and providing pathology and lab medicine research data to various high impact Canadian medical researcher groups such as the Interdisciplinary Chronic Disease Collaboration (ICDC), GCKD, University of Alberta (U of A), University of Calgary (U of C), Prostate Cancer Centre, etc.
- The CLS/ Renal Biobank (RBB) Initiative commenced with the hiring of the CLS/ RBB employee in January 2015 after many years of groundwork between CLS Anatomic Pathology, CLS Research, CLS Privacy and CLS Executive that paved the way to make this initiative the largest renal repository of its kind in Alberta.
- The Research Office facilitated the adoption of Research funding guidelines and improved tracking of internally supported projects with CLS Executive approval for the following Clinical Sections: Anatomic Pathology: Hematology, Transfusion Medicine and Clinical Biochemistry (in progress). This is intended to fast track high impact research and development initiatives that will translate into improved testing and patient care outcomes.
- Dr. Demetrick has reached a cooperative understanding with the Chair of the Conjoint Health Research Ethics Board (CHREB), where the board accepts the Scientific Review provided by the U of C/ CLS Research Committee. The Committee acts as an expert scientific review panel for Pathology and Laboratory Medicine Research Protocols. The Chair of the Committee is CLS Pathologist, Dr. Martin Koebel. The Committee comprises of representatives from all CLS Clinical Sections.
- The Research Office has concluded its due diligence, review and setup of the Neurodegenerative Disease Autopsy Registry, together with AHS Privacy and Legal. The Registry is expected to obtain final Ethics Approval by end February 2015.
- CLS Research Office has provided feedback to the Provincial Anatomic Pathology Tissue Working Group in the development of Provincial policies for Fixed and Fresh Tissues for Research
- The Research Office is assisting in the Repurposing of Remnant Samples project. The development of a patient consent form is in progress.
- CLS Research Office staff attended the Alberta Clinical Research Consortium Conference (ACRC) and a Health Research Data Symposium at the University of Calgary to obtain further information on the progress of AHS Research streamlining initiative. The anticipated implementation date of the AHS proposed change is stated as 2014 financial year end.
- The widely known Chuckwagon Field Study (Investigating the Physiological Effects of Horse Racing) held an update and information presentation in conjunction with the Department of Pathology and Laboratory Medicine and the Faculty of Veterinary Medicine at the University of Calgary. The presentation of this high impact study that centred on the Calgary Stampede highlighted the valuable data they obtained which was facilitated by CLS and coordinated by the CLS Research Department.
- A review of the research space is underway at the CLS Research Lab in the Special Services Building (SSB) at the TBCC. This lab provides direct support and services to all TBCC clinical trials and other research activities at the Foothills Hospital and TRW building. Increased clinical trials and demand for research services has impacted the limited workspace.
- Functional plan for CLS research was completed for the NCCC.

- The AP Research coordinator position was transferred from the AP Clinical Section to Research in order to streamline AP research service delivery
- CLS Research Office met with Don Morris and team from the Translational Laboratory, TBCC to discuss potential research collaboration opportunities.

The CLS Research Department announced award results for the seventeenth annual CLS Health Services Research Funding Competition. A total of \$118,406.00 was awarded by CLS to researchers in 2014.

One hundred and eighteen projects have received funding through the Research Competition since it began in 1998.

2014 CLS Research Summer Studentship Competitions

The CLS Research Department offers two research summer studentship award programs: Master of Biomedical Technology Program and the CLS Undergraduate Competition. The successful applicants/supervisors were:

Master of Biomedical Technology Competition

No applications were submitted.

Calgary Laboratory Services Undergraduate Competition

Supervisor	Student	Project
Dr. Nouredine Berka	Amir Ahadzadeh	Characteristics of Donor-Specific anti-HLA Antibodies Impacting Renal Allograft
Dr. Lawrence de Koning	Beelal Abdalla	Using routing clinical chemistry data to improve prediction of mortality in heart failure patients
Dr. Margaret Kelly	Chester Liu	Comparison of IL-17A positive cells in lungs of patients with Chronic Hypersensitivity Pneumonitis and Idiopathic Pulmonary Fibrosis
Dr. Tarek Bismar	Delca Genuis	Molecular signatures of aggressive and indolent prostate cancer

Outcomes resulting from CLS Research Competition projects completed in 2014

- Development and Validation of an ITS Broad-Range PCR assay for Detection of Aspergillus and Other Fungi Causing Invasive Pulmonary Disease in Immunocompromised Patients. Dr. Deirdre Church, Dr. Daniel Gregson, Dr. Julie Carson. The objective of the research was to develop a highly sensitive real-time PCR assay for the detection of invasive Aspergillus pulmonary infection. The implementation of the real-time PJP assay has significantly improved our ability to rapidly detect infection in immunocompromised patients. The real-time Aspergillus PCR assay will also assist with diagnosis of invasive pulmonary infections in immunocompromised patients. This applied work has been very valuable for not only improving patient care in the region, but also diagnostic efficiency at CLS. PCR is a much less labor intensive method than either IFA, direct microscopy or culture on BAL samples. Results will be presented at CLS CME Rounds in 2015 when the Aspergillus assay is implemented. Publications were submitted for review:
 - Ambasta, A, DL Church, A Wilmer, H Willisroft, G Ritchie, S Champagne, G Ritchie, D Pillai and DB Gregson. Development and validation of a real-time PCR assay for highly sensitive detection of Pneumocystis jirovecii in bronchoalveolar samples from immunocompromised patients. (Submitted).
 - Ambasta A, J Carson and DL Church. The role of current laboratory methods in the diagnosis of invasive aspergillosis in immunocompromised patients. Mycology (Submitted) [Review]
 - Church, DL, E Lo, S Champagne and D Gregson. Evaluation of the RIDA®GENE Pneumocystis jirovecii (PJ) real-time PCR assay for diagnosis of pulmonary pneumocystosis from bronchoalveolar lavage fluid samples in immunocompromised patients. (Submitted).
- The Vitamin A Absorption Test and Fecal Volatile Organic Compounds: Clinical and Laboratory methods to assess Fat Malabsorption. Dr. Maitreyi Raman, Dr. Kevin Rioux, Dr. Valerian Dias, Dr. Tanis Fenton. The study aim was to assess feasibility and validate novel clinical tests for diagnosis of nutrient malabsorption. The primary objective was to develop a specific test to measure fat malabsorption using vitamin A based blood samples in order to replace the current 72 hour fecal fat test. The study is moving in the right direction by having the ability to change and enhance the methodology to achieve valid outcomes by continuing with the research process. They have been able to collect enough data to determine that a larger, more controlled study will benefit the possible validation of these tools. The project will have educational value by describing the methodology and scientific rationale behind the process of developing new testing for the scientific community. Manuscript in progress.

- Blood Utilization Management Plan (BUMP), A Step Forward to Clinical and Provincial Validation. Dr. Meer-Taher Shabani-Rad, Dr. Adnan Mansoor, Monica Phillips. The Blood Utilization Management Plan was initially developed as a blood shortage contingency program to maximize appropriateness of blood utilization based on novel risk stratification strategies and application of dynamic saving plans (DSP), to minimize the adverse impacts of blood shortage on patient care. A special macro based Excel sheet (Daily Inventory Tracker) was designed to manage the red cell inventory by a standardized protocol and minimizing the impact of subjective decisions. The implementation of BUMP and the use of the “Daily Inventory Tracker” as an inventory management tool resulted in: a 7.4 days decrease in the average age of transfused red cells, a decrease in the total and average number of red cell units transfused to outpatients (from 3.03 units to 2.93 units per patient), a 3.4% decrease in red cell utilization when adjusted for red cells used per 1000 patients, and a decrease in red cell utilization for renal dialysis and Day Medicine patients of 0.62 units and 0.31 per patient respectively. This project provides safe, efficient and cost-saving strategies for management of blood components and also introduces an alternative blood shortage contingency plan with minimal effect on patient care. Multiple abstracts have been published at AABB, CSTM and ISBT abstract books. Manuscripts are in process. The results were presented at the CLS CME Rounds.
- Vitamin D utilization in Calgary: sociodemographic correlates and linkage to external databases. Dr. Christopher Naugler, Dr. Brenda Hemmelgarn, Paul Woods, Dan Henne. This project resulted in 3 peer-reviewed publications which provided valuable new data on the utility of vitamin D testing in Alberta. The results have been used by the Diabetes, Obesity and Nutrition SCN as well as the Alberta Vitamin D working group to inform new testing guidelines in Alberta. The research led to an improvement in methodology and will be presented at the CLS CME Rounds. Publications were submitted:
 - de Koning L, Henne D, Woods P, Hemmelgarn B, Naugler C. Sociodemographic correlates of Vitamin D test utilization in Calgary, Alberta. BMC Health Services Research 2014, 14: 339.
 - de Koning L, Henne D, Woods P, Hemmelgarn B, Naugler C. Non-linear relationship between serum 25-hydroxyvitamin D concentration and subsequent hip fracture. Osteoporosis International 24; 2013: 2061-6.
 - Naugler C, Zhang J, Henne D, Woods P, Hemmelgarn BR. Association of vitamin D status with socio-demographic factors in Calgary, Alberta: an ecological study using Census Canada data. BMC Public Health, 2013, 13:316.

Anatomic Pathology Research Lab (APRL)

The Lab Specialist at the Anatomic Pathology Research Laboratory (APRL) located at the HMRB, FMC continues to provide quality service to accommodate research projects for both internal and external principle investigators. Services offered by APRL include immunohistochemistry (IHC) for method development of novel markers as well as established antibodies, tissue microarrays (TMA), curls/ scrolls or core punch for molecular testing etc. We are very grateful that the APRL was granted a semi-automated TMA arrayer from CLS 2013 Capital funding. The new equipment will increase the annual capacity for TMA construction at APRL.

The APRL converted EBER in situ hybridization (ISH) to an automatic platform and transferred it to the clinical lab in 2012. EGFR ISH was the second ISH tested at APRL, but there was no success for the automatic platform conversion. A few CLS pathologists expressed the need for ISH development so the APRL Lab Specialist arranged for In-situ Hybridization (ISH) by hosting Leica Biosystems to test and demo the Thermo-Brite Elite automated Fluorescence In-situ Hybridization (FISH) machine using 5 various nucleic acid probes. We have accumulated more experience on ISH technology, and identified ISH as potential tests to be established in the near future to meet the needs of our researchers.

There are 38 publications, abstracts or presentations accumulated up to early 2014 due to research services and contributions of the APRL. The workload at the APRL is stable and comparable to 2013. In 2014, we provided laboratory support for 17 pathologists, 19 individual projects and a total of 117 research requests. APRL requests have gradually transitioned towards external investigators and a majority of the requests were from external researchers in 2014.

Publications

Department members with a primary appointment in the DPLM and whose primary remuneration is derived from either CLS or U of C DPLM (i.e., list excludes cross-appointments) published 144 peer-reviewed papers in 2014 (Appendix 1.3). Total number of publications in peer-reviewed journals, the mean Impact Factors of the journals we published in during each calendar year and the number of papers in high impact journals are the metrics that we use for comparing publication productivity from year to year.

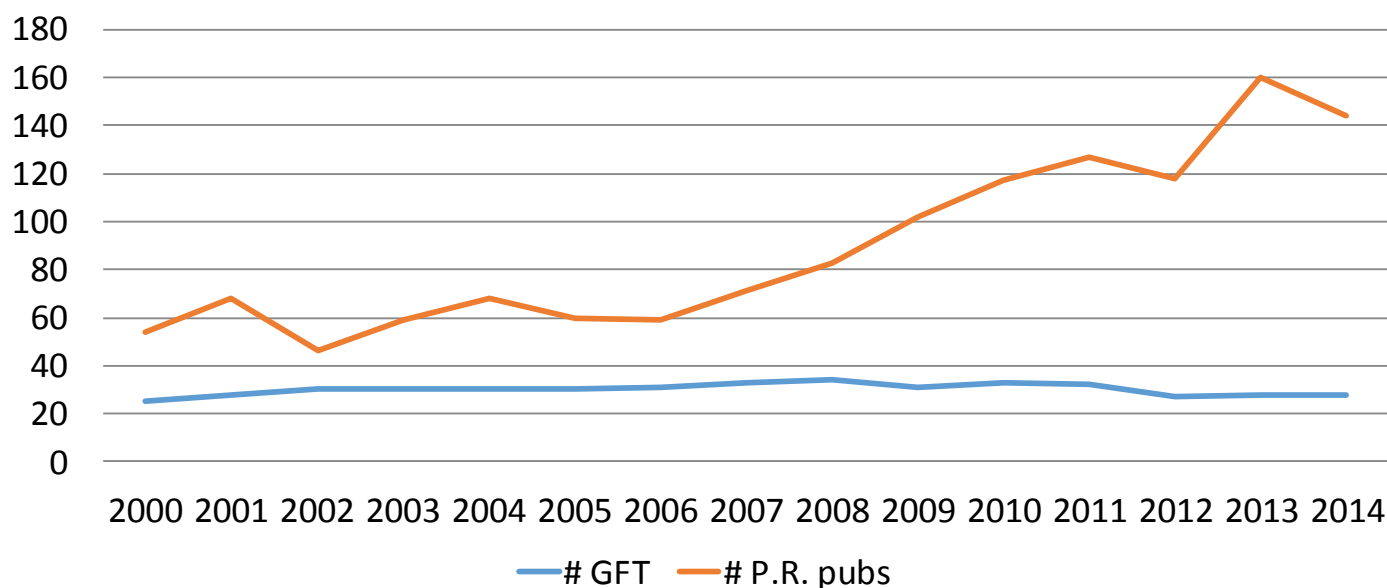


Number of papers in peer-reviewed journals published by faculty members with primary appointments in the DPLM (2005-2014)

Year	Total Papers	Sum of Journal IFs	Mean IF/Paper	IF>10	IF>30
2005	60	172.380	2.87	0	0
2006	59	236.660	4.01	1	1
2007	71	237.693	3.35	1	0
2008	83	390.837	4.71	4	2
2009	102	469.815	4.61	5	1
2010	117	546.823	4.67	10	1
2011	125	461.351	3.72	6	1
2012	119	473.231	4.01	9	1
2013	160	604.378	3.78	9	1
2014	144	550.197	3.82	5	2

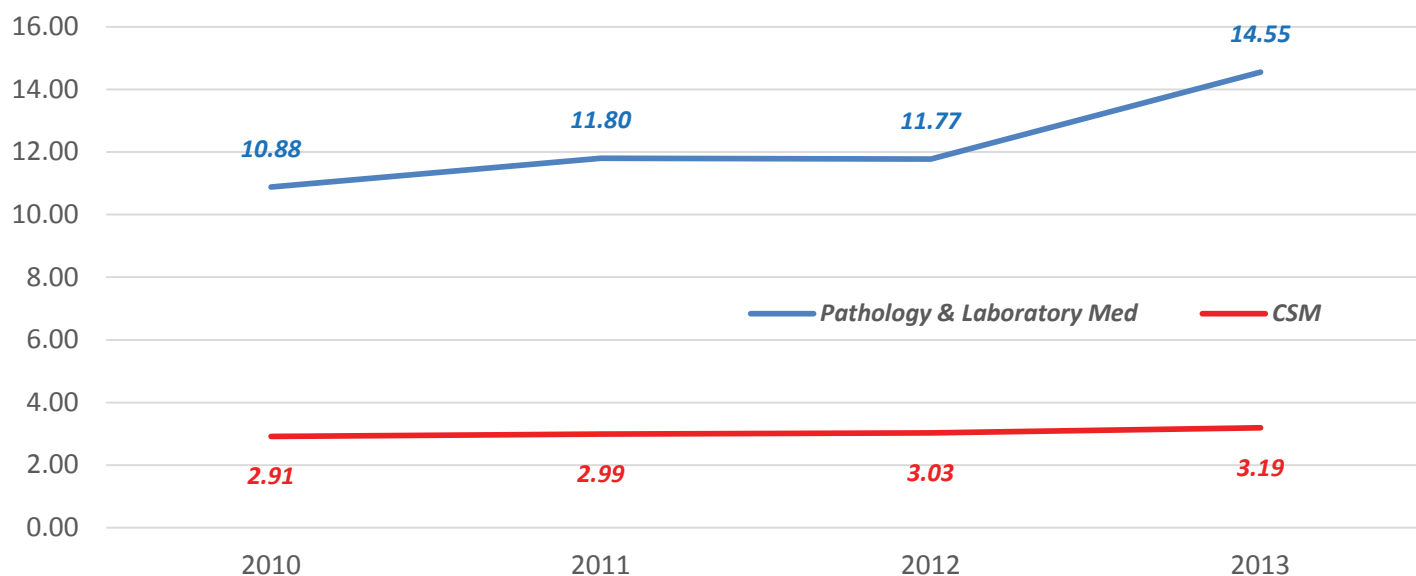
It should also be noted that the DPLM is a purely clinical department; all primary faculty members have clinical roles to fulfill and no one in the Department is a fulltime basic scientist. Our overall percentage of academic protected time (i.e., teaching and research) within the Department (i.e., GFT & Clinical Faculty) is < 20%. The following figure shows that the publication upward trend over a longer period of time cannot be simply attributed to increased number of GFT faculty members.

DPLM: GFTs & Peer Reviewed Publications (2000-2014)



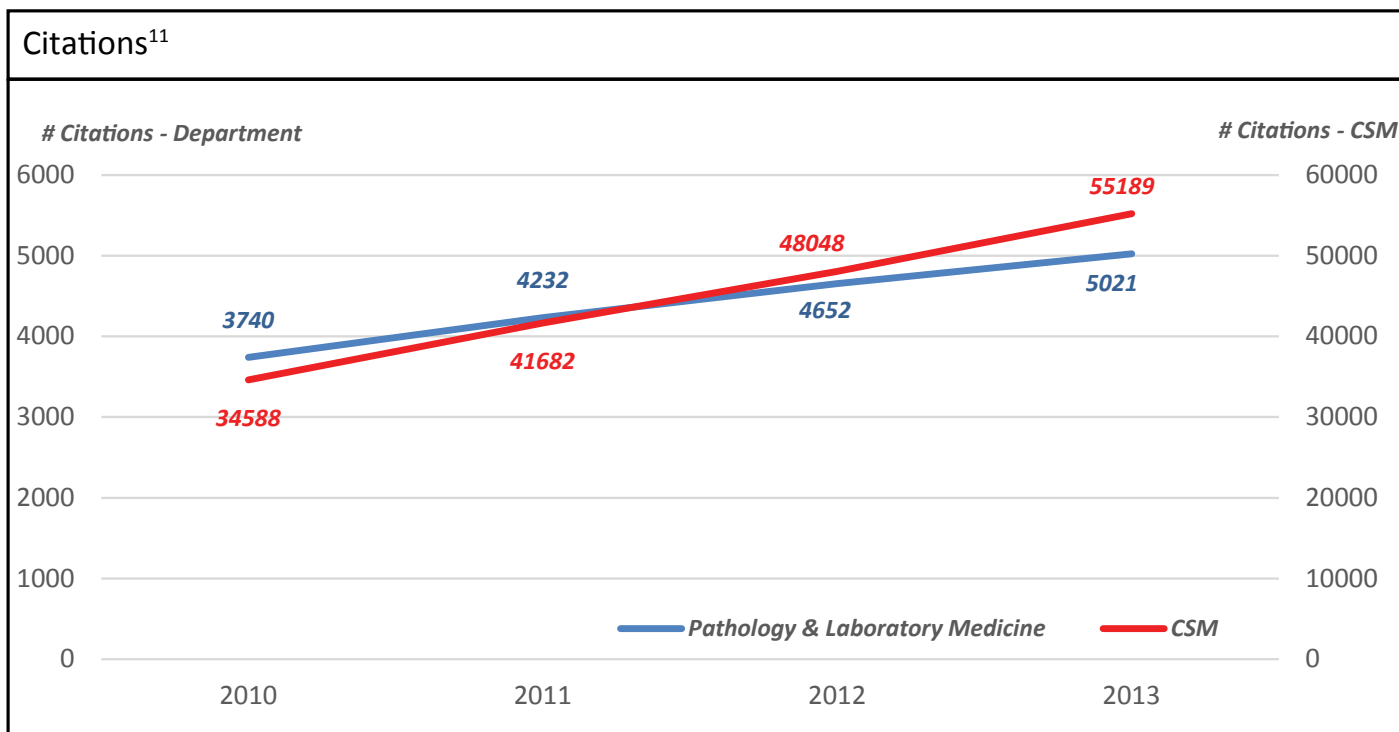
This year, for the first time, the Cumming School of Medicine Research Office provided every department a “Research Report Card”. The data they provided relates only to GFT faculty members and is for the year 2013. According to the data provided, our GFT faculty members’ overall average job profile is 48% clinical, 28% research, 14% education, and 10% administration. When the Research Office adjusts our publication output into “research equivalents” (RE), our productivity is at least several-fold higher than average for the Cumming School of Medicine (CSM).

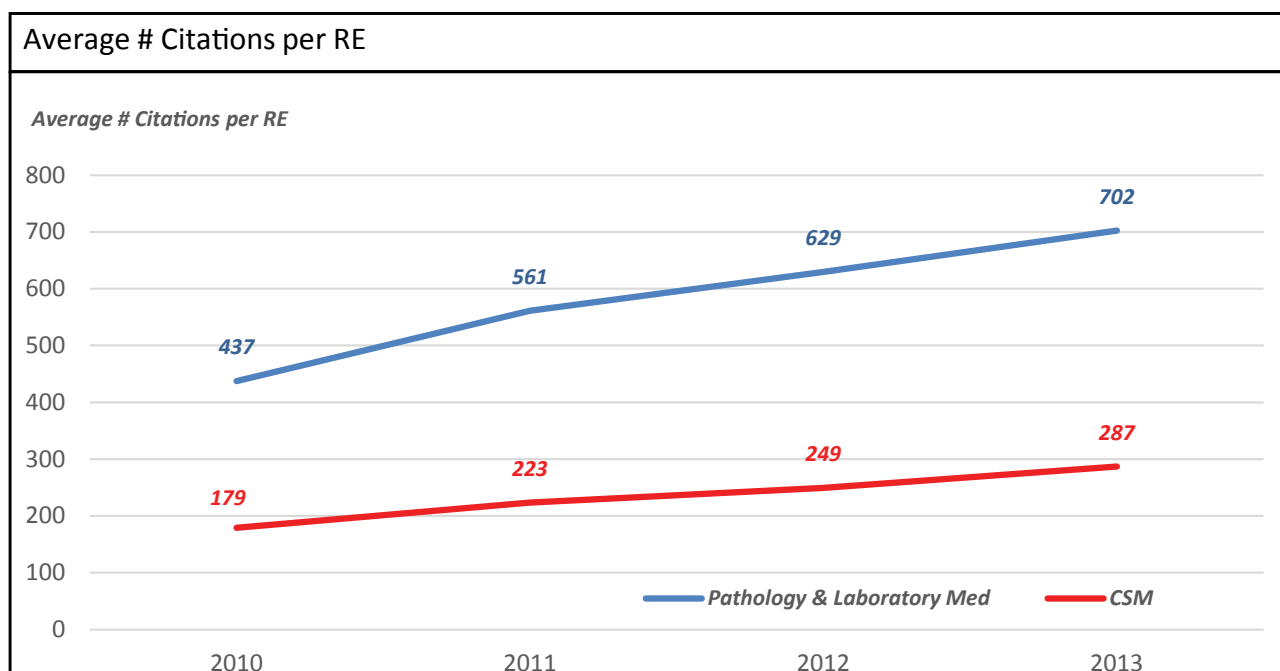
Average # Publications per RE



The Cumming School of Medicine Research Office “Research Report Card” also provides information on the number of citations of publications by GFT faculty members from our Department and for the Cumming School of Medicine. Numbers of citations for both are trending upward. Overall, the DPLM represents approximately 10% of the School’s annual citations. Citations are important as documentation that publications are important and that other investigators in related fields value these contributions to the field.

When the Research Office adjusts our publication citations into “research equivalents” (RE), our productivity is likewise several-fold higher than average for the Cumming School of Medicine.





The next table compares the number of highly cited papers by the DPLM within Cumming School of Medicine. Since the metric being examined is number of papers with 50 or more citations over 5 years, this table shows publications from 2004 through 2009. Clearly over this timeframe, the DPLM has been trending upward and in the last year of the table, we are tied for second place within the CSM with 14 papers cited 50 or more times. This documents the importance of work published by GFT faculty members in the DPLM.

#Publications cited > 49 times in first 5 years							
Department	2004	2005	2006	2007	2008	2009	Total
Anaesthesia							
Biochemistry & Molecular Biology	6	7	4	4	5	5	31
Cardiac Sciences	8	3	5	4	7	10	37
Cell Biology & Anatomy	1	4	4	7	4	7	27
Clinical Neurosciences	15	15	9	16	16	14	85
Community Health Sciences	1	3		8	4	7	23
Critical Care Medicine	2	2	2	1	1		8
Department of Medicine	20	22	17	29	26	41	155
Emergency Medicine							
Family Medicine							
Medical Genetics	1	2		1	2	1	7
Microbiology Immunology & Infectious Disease	4	2	7	6	3	3	25
Obstetrics & Gynaecology				1			1
Oncology	5	3	1	6	3	3	21
Paediatrics	3	1	2	3	3	7	19
Pathology & Laboratory Medicine	3	5	3	4	9	14	38
Physiology & Pharmacology	11	9	13	7	15	5	60
Psychiatry	6	4	5	4	3	3	25
Radiology	2	1		2	6	2	13
Surgery	1	2	3	4	2	2	14



The next table shows the publication numbers trend over a ten year period for the Clinical Sections/Academic Divisions within DPLM. Since there has been some merging of Sections and/or formation of new Sections during this interval (especially related to the current Clinical Sections of Clinical Biochemistry and General Pathology), the numbers for these two Sections are reported together as Clinical Pathology, a previous joint Clinical Section. It is clear that academic productivity has increased in all Sections, but this change has been most dramatic in Clinical Pathology and Hematology/Transfusion Medicine.

Number of Publications by Division					
Year	Total Papers	AP/Cyto	Micro	CP*	Heme/TM
2005	60	39	20	1	0
2006	59	38	16	4	1
2007	71	43	20	4	4
2008	83	59	12	6	6
2009	102	66	17	12	6
2010	117	79	18	14	6
2011	124	72	28	16	8
2012	118	61	30	14	12
2013	160	97	33	23	7
2014	144	89	25	21	9

* Formed from & then split into 2 Divisions: currently - General Pathology & Clinical Biochemistry

The next table shows a breakdown by site of publication numbers over 10 years within the AP/Cyto Clinical Section, our largest Section and the only one present at all Calgary Acute Care Centres and the DSC building. As should be expected, this chart shows that the vast majority of the Section's research productivity comes from sites with one or more GFT faculty members (FMC, RGH, ACH, and DSC). The table also demonstrates markedly increased publication and sustained productivity at RGH in recent years.

Number of Publications in the AP Division by Site							
Year	Total Papers	FMC	RGH	DSC	PLC	ACH	SHC
2005	39	25	3	0	4	7	-
2006	38	25	2	3	3	5	-
2007	43	24	8	5	4	2	-
2008	59	29	10	8	5	7	-
2009	66	39	16	5	4	2	-
2010	79	55	13	3	1	7	-
2011	72	43	12	9	2	5	-
2012	61	38	10	5	1	7	0
2013	97	50	20	11	0	16	0
2014	89	55	17	5	1	11	0

Presentations

Members of the DPLM also presented many scientific papers at prestigious national or international meetings in 2014. While such presentations generally represent the generation of new knowledge, these are not listed here as the assumption is that the important presentations will be turned into peer-reviewed publications and will appear in a subsequent DPLM Annual Report.

Book Chapters and Books



While peer-reviewed publications, in general, represent the generation of new knowledge, the publication of book chapters, which are usually by invitation, is considered more of a measure of stature of faculty members. Department members with a primary appointment in the DPLM and whose primary remuneration is derived from either

CLS or U of C DPLM (i.e., list excludes cross-appointments) published 15 book chapters and 3 books in 2014 (Appendix 1.3). The table below shows this metric since 2005.

Book Chapters & Books Published (2005-2014)		
Year	Books	Book Chapters
2005	1	2
2006	2	1
2007	0	7
2008	0	19
2009	1	11
2010	0	5
2011	0	10
2012	1	11
2013	1	19
2014	3	15

Research Grants

Another measure of research productivity is peer-reviewed grant funding. For a complete list of Departmental research grant holdings, both as principle investigator and as co-investigator, please refer to Appendix 1.4. The metric we use for comparing funding productivity within the DPLM from year to year is total calendar year – adjusted Principal Investigator funding for faculty members with primary appointments in the DPLM and the average PI funding per GFT (see below).

Total “calendar year-adjusted” P.I. grant funding for faculty member with primary appointments in the DPLM (2005-2014)

Year	Total Annual PI Funding	#GFT	\$/GFT
2005	\$1.30 M	30	\$43,333
2006	\$1.56 M	31	\$50,323
2007	\$1.94 M	33	\$58,788
2008	\$2.54 M	34	\$74,706
2009	\$2.44 M	31	\$78,710
2010	\$1.64 M	33	\$49,697
2011	\$2.59 M	32	\$80,938
2012	\$1.83 M	27	\$67,778
2013	\$2.12 M	28	\$75,813
2014	\$2.96 M	28	\$105,876

Although our metric shows an upward trend, the Cumming School of Medicine “Research Report Card” shows that we have much work to do in the funding arena as we have relatively few Tri-Council research grants. This is not surprising as our number of “Research Equivalents” is low and we have no pure basic scientists. That being said the Report Card also shows that because of our low funding levels and our high publication output, our “cost per publication” is amongst the lowest in CSM (data not shown).

Promotions

Drs. Jennifer Chan and Faisal Khan have been promoted to Associate Professor. Drs. Tarek Bismar and Adnan Mansoor have been recommended by the Faculty Promotions Committee for promotion to Professor, pending final approval at the Presidents Office. Seven Clinical Assistant Professors have been strongly recommended for promotion to Clinical Associate Professor but the Clinical Promotions Committee has not yet met. The Department congratulates these Faculty Members and thanks them for their academic contributions.



Medical Leadership and Administration

- Dr. Meer-Taher Shabani-Rad was appointed Clinical Section Chief of Hematology & Transfusion Medicine.
- Dr. Daniel Gregson completed his term as Clinical Section Chief of Medical Microbiology Dr. Leland Baskin is Acting Clinical Section Chief and a search is underway.
- Dr. Andrew Schell was appointed Site Leader for PLC.
- Dr. Lisa DiFrancesco was appointed CLS Group Leader for Bone & Soft Tissue

Challenges

As a laboratory system that performs >25,000,000 tests per year, CLS does have challenges including:

- Providing excellent laboratory service with accurate and timely results to our patients and their physicians.
- Ensuring that CLS operates as efficiently and economically as possible in a time of substantial financial constraint.
- Replacing aging analyzers and other laboratory equipment along with deployment of new technologies when capital funds are scarce.
- Making efficiencies, gains and savings, through process excellence, especially lean sigma, durable and transformative.
- Accommodating for IT resource constraints.
- Training, recruiting and retaining enough competent and qualified medical/scientific, technical and support staff.
- Maximizing throughput and efficiency at our Patient Service Centres by increasing percentages of patient appointments.
- Moving into McCaig Tower in the Summer and Fall and actualizing laboratory service.
- Expand services at SHC to meet expanding needs as clinical services grow and evolve.
- Planning for laboratory services surrounding cancer centre needs in the context of changing plans related to the New Cancer Care Centre (NCCC).
- Space constraints including identifying office space for new pathologists at most sites.
- Logistics of staffing in the context of the new provincial agreement with laboratory physicians defining an FTE as 209 workdays.
- Discerning and meeting the changing local and provincial service needs of our owner and primary customer, AHS.
- Uncertainties related to the Northern provided and its impact on CLS.
- Exploring possibilities to generate new business and hopefully use these funds to subsidize purchase of new capital equipment and development of new technologies.
- Possible expansion of Transfusion Medicine services.
- Improving services provided to Rural Calgary Zone and South Zone.

Responses to Issues, Ongoing Matters and Plan of Action

In the past few years, AHS has taken a Province-wide approach to lab services so as to promote excellent laboratory services throughout the entire Province. This means that DPLM/CLS will take on increasing responsibilities not only in Calgary but also throughout Southern Alberta. Therefore, we need to embrace a less Calgary-centric approach and become fully engaged with Province-wide laboratory planning initiatives and Laboratory Networks. Discussions are underway Provincially to introduce a Hub & Spoke” Model for laboratory services in which Calgary may provide additional laboratory services in the South Zone and a new Edmonton-based service provider, identified through a RFP process, will provide laboratory services for Edmonton and the North Zone. These will be major foci of efforts for the next few years. Currently, we are providing additional services for the South Zone related to consulting in Microbiology and Chemistry.

CLS views the prospect of a single-province wide system as an opportunity to improve, grow, and rationalize service. A related challenge is for us to understand the changing horizon related to decision-making as to when CLS and its medical and scientific staff are allowed to make internal business decisions related to testing vs. when we need to seek approval to do this through AHS Laboratory Services and its Laboratory Networks.

Another exciting initiative for 2015 will be detailed planning around a proposed amalgamation of the three ACH Genetic Lab Services laboratories (constitutional cytogenetics, molecular genetics, biochemical genetics) into CLS. Dr. Francois Bernier, Head of Medical Genetics, approached us about this in mid-2014 and, after extensive stakeholder consultation, it appears that this will move forward in 2015. We look forward to welcoming out new colleagues.

Future Risks

Every year, we face the challenge of providing increased services without proportionate increases in funding. Therefore, we must look for inefficiencies and to consolidate duplicated services which allow for savings which can be reinvested to improve services. Although it is often difficult to gain 100% consensus on such changes, difficult decisions sometime need to be made as this is the only practical way to improve lab services when funding is tight with the plummeting price of oil and gas, the next year looks particularly grim. If this trend continues, provision of modern laboratory services is at risk.

CLS became a wholly owned subsidiary of Alberta Health Services effective April 1, 2009 and, over the past several years, there have been occasional instances where, because of the complex relationship between CLS, AHS (our owner), AHS Calgary Zone (our primary customer), and AHS Lab Services, it has become clear that CLS does not possess a complete understanding of the will of the owner and the desires of the customer. Nevertheless, CLS is accustomed to transformational challenges - from its formation in 1996 from a complicated mixture of hospital - community and public - private laboratories into an integrated Public Private Partnership to becoming a wholly-owned subsidiary of the Calgary Health Region in 2006 – the robustness and professionalism of the CLS staff met the challenges and succeeded.

Workforce Planning

Since pathology and laboratory medicine are services, we have traditionally had little ability to control workload as this is determined by numbers of surgical procedures, orders for laboratory tests, etc. To further complicate workforce matters, laboratory physicians are not fee for service and are funded via the AHS budget, and, thus, there is no simple mechanism to fund new positions based upon workload expansion. Nevertheless, through the diligence, dedication, and hard work of our highly skilled medical and scientific staff, the work gets done and there are no waitlists. However, we are trying to be more proactive and change this trend CLS and AHS established a new Utilization Office under the direction of Dr. Christopher Naugler in April 2013 as a two year pilot study. The Utilization Office is trying to curb inappropriate laboratory test utilization and optimize test utilization through a combination of laboratory informatics-based research, end-user education, creation of barriers for frequently abused tests, and other innovative techniques. The Alberta Health Services Laboratory Utilization Office has been coordinated by CLS since April 2013. The medical director, Dr. Christopher Naugler is a pathologist with the DPLM. The office serves as a clearing house for all laboratory utilization data requests in the province and completes about 50 such requests per year. The office also provides expertise in utilization management to support the work of the provincial Strategic Clinical Networks and various groups within Alberta Health Services and the Alberta Medical Association. Additionally, the office has a mandate to support education and research. The Medical Director delivered approximately 25 invited presentations of utilization management in the US and Canada in 2014. Specific initiatives resulted in an estimated Alberta health system savings of \$300,000 to \$400,000 in 2014.

Fortunately, in the past few years, there has been a very significant influx of funding with 14 new medical and scientific staff FTEs hired in 2012. In 2013, we received funding for an additional 3.5 Anatomic Pathology FTEs related to implementation of a new Province-wide QA plan for AP as well as funding an additional 3.0 laboratory physician FTEs related to a new contractual agreement between AHS and the pathologists that may eventually result in the funding of the clinical portions of all pathologists' salaries moving into the Trilateral Master Agreement (TMA).

In 2012, we recruited 12 new medical and scientific staff with start dates in that calendar year. The next year, we recruited 7 more pathologists with start dates in 2013. This year we recruited 11 more pathologists (10 Clinical Faculty and 1 GFT) with start dates in 2014 and 3 other pathologists who will start work in the summer of 2015. We had 4 faculty members leave or retire in 2014. Although our staffing has increased drastically in the last few years, we have a few areas that are under staffed because the above-mentioned new contractual agreement resulted in less pathologist workdays per FTE per year.

Summary of Recruitment

Medical Staff Recruitment			
Medical Staff	Start Date	GFT/Clinical	Primary Division
Bures, Nicole	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Caragea, Mara	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Chan, Elaine	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Galman, Lanie	2014 February	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Gottipati, Srinivas	2014 August	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Hamilton, Leslie	2014 August	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Kim, Byung	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Kurek, Kyle	2014 September	Assist. Professor	Anatomic Pathology/Cytopathology
Lee, Sandra	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Naert, Karen	2014 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology
Swanson, Paul	2014 July	Clinical Full Professor	Anatomic Pathology/Cytopathology
Medical Staff - Departures			
Bruecks, Andrea	2014 June	Clinical Assoc. Professor	Anatomic Pathology/Cytopathology
Cota, Ana	2014 September	Clinical Asst. Professor	Anatomic Pathology/Cytopathology
Dias, Valerian	2014 June	Clinical Assoc. Professor	Anatomic Pathology/Cytopathology
Ni, Hongyu	2014 December	Clinical Assoc. Professor	Hematology/Transfusion Medicine
Patel, Jay	2014 October	Clinical Asst. Professor	Hematology/Transfusion Medicine
Xiong, Wei	2014 July	Clinical Asst. Professor	Anatomic Pathology/Cytopathology

Current Needs

Currently, we are advertising for three replacement clinical positions: one in Clinical Biochemistry, one in Anatomic Pathology/Cytopathology, and one in Hematopathology. We are also currently recruiting jointly with Provincial Laboratory for a newly funded Medical Microbiologist Clinical Faculty position who would work half-time at CLS and half-time at Provincial Lab. We are recruiting to fill two GFT vacancies: a replacement for an academic Dermatopathologist and a new basic science position in Cancer Genomics/Informatics a joint recruitment with Southern Alberta Cancer Research Institute (SACRI).

Future Needs

The current hiring spree addresses our chronic shortage of laboratory physicians and scientists. Once all of the new recruits have arrived and a new steady state has been achieved, the new Department Head can address whether there are additional needs, especially in subspecialty areas.

Goals and Strategies

One of the ways we have dealt with the increased clinical workload over the past 9 years has been to switch GFT positions to Clinical faculty positions or to decrease the percentage of academic protected time for some GFT positions. Nine years ago, the DPLM was 46% GFT faculty members, one of the highest percentages of any clinical department at U of C. In some instances, it appeared as if the academic protected time associated with some of these GFT positions was not being optimally utilized and so, each year, we have tried to hold faculty members increasingly accountable for their protected time. Furthermore, we have tried to set the bar very high for hiring new GFTs and now preferentially hire clinical faculty members. Since 2005, ~85% of our new hires have been Clinical faculty. Slowly replacing GFT faculty members, who have contractually protected time for academic pursuits with Clinical Faculty who do not, has helped us meet our increasing clinical workload requirements but this change will not help us train the next generation of laboratory physicians and scientists. Thus far, this has been offset by raising the bar higher when hiring Clinical Faculty members. All of our new hires want to teach and many want to do clinical research; therefore, our academic output has still flourished. However, this approach is probably not sustainable as eventually academics will suffer. A further risk is that as senior GFTs retire, there is

no longer assurance from the Cumming School of Medicine that the DPLM will retain the Fund 10 dollars associated with those positions which could further decrease our GFT numbers.

Also to help address workload issues, we plan to increasingly utilize M.Sc. trained, board-certified Pathologist's Assistants to perform certain repetitive medically delegated tasks such as "grossing" surgical specimens and assisting on autopsies. This will allow our pathologists to spend more time looking at slides. To facilitate this, we opened a new training program several years ago and will be further expanding it in 2016. (see Education - Pathologists' Assistant M.Sc.)

Impact on other departments and regional resources

Since we are a service provider recruitment or expansion of other clinical services impact the laboratory rather than the other way around. We try to be proactive and become aware of upcoming clinical expansions so that we are able to meet their laboratory service requirements.

Although the laboratory participates in AHS budget cuts like other areas, there is not much "fat" to cut as laboratory services are already "lean", as provincial laboratory services took a 40% budget cut, higher than any other medical service in 1997 and funding since then has been such that we have never caught up.

Quality Assurance, Quality Improvement, and Innovation

General

- To support the provision of cost effective and high quality patient care in Alberta, CLS developed a strategic framework aligned with the AHS Health and Business Plan and the Alberta Quality Matrix for Health and structured around the following pillars: quality, access, sustainability, innovation and relationships.
- AHS Laboratory Services and CLS maintain systematic programs to monitor quality and the appropriateness of laboratory services. These programs are based on a Quality Management System model and are designed to meet accreditation, legal and regulatory requirements, recognized standards of practice and operational needs.
- A comprehensive internal and external audit program exists to ensure laboratories meet recognized laboratory standards.
 - The College of Physicians and Surgeons of Alberta (CPSA) conducted on-site accreditation assessments at all CLS and CLS-managed laboratories in June and September, 2014. The assessment cycle is still in progress; to date:
 - Ten (10) sites have been granted full accreditation
 - The remaining eight (8) sites remain at full accreditation status based on the 2009 assessments; review and approval of additional responses by the College is pending.
 - The Tissue Typing laboratory completed the 2014 self-assessment and successfully demonstrated compliance with all mandatory American Society for Histocompatibility & Immunogenetics (AHSI) Standards; accreditation was granted and is valid until August 31, 2015. The next on-site assessment will occur in 2015.
 - An internal self-assessment audit for all CLS and CLS-managed laboratories in the Calgary Zone was conducted in March 2014.
- The F2015-F2016 CLS Strategic Plan for Quality and Patient Safety was adopted in July 2014. The two-year plan outlines strategies to enhance the existing quality and patient safety culture to one where quality and safety are considered the top priorities and are the responsibility of everyone in CLS. This plan complements the F2014-F2016 CLS Strategic Plan for Environmental Health and Safety (EH&S) which outlines the strategic components that form the foundation of the EH&S management system.
- A web-based document management system for Calgary Zone laboratories was implemented as of November 20, 2014 and supports the Laboratory Services provincial initiative to standardize and streamline the process to manage policy, process and procedure documents. This system replaced the previous manual process for approving and managing controlled documents including policies, procedures, and forms.
- All of the provincial Anatomical Pathology Quality Assurance Plan metrics currently approved for implementation at the provincial level are implemented and are being regularly monitored at CLS.
- The AHS Healthcare Provider Survey was distributed to CLS clients in the Calgary Zone as part of the provincial initiative to seek feedback on laboratory services. Improvement initiatives are in progress.

Access of Family Physicians to specialists – N/A



Patient flow through the Emergency Department

CLS has participated in initiatives to improve patient flow through the Emergency Department. Lab has not been identified as a problem in the arena.

Future Directions and Initiatives

The year 2015 will be an exciting one with the arrival of new Medical & Scientific Staff bringing diverse new expertise to CLS and the recruitment of a new joint Academic and Clinical Department Head, who will bring new ideas and new perspective. There will be extensive change in lab leadership in Calgary as Paula Hall, Chief Operating Officer for CLS, has announced her retirement in October. With the current low price of oil, there will be an intense focus on finding cost savings throughout CLS and AHS Laboratory Services in general. CLS must remain nimble and try to meet the changing needs of AHS. Considerable changes in how lab services are provided can be foreseen. The RFP process to identify a single corporate provider for lab services in Edmonton and the North is ongoing. Additional consolidation of lab services in Calgary Zone seems highly probable. The 3 AHS genetic lab services clinical labs at Alberta Children's Hospital have approached us about merging into CLS. This is currently being considered by AHS. Through a Provincial Hub & Spoke" Model, it is anticipated that we may provide some additional laboratory services in the South Zone and possibly the Central Zone. All of these initiatives will be overseen by new lab leadership in Calgary.

Appendices

1.1 Membership Lists

Clinical Section of Anatomic Pathology/Cytopathology				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Abi Daoud, Marie	Clinical	Assistant Professor	DSC	Dermatopathology
Anders, Karl	Clinical	Associate Professor	SHC	Surgical Pathology
Barber, Duane	Clinical	Associate Professor	DSC	Dermatopathology
Benediktsson, Hallgrimur	GFT	Professor	FMC	Renal Pathology, Transplantation
Bismar, Tarek	GFT	Associate Professor	RGH	Genitourinary Pathology, Anatomic Pathology
Bromley, Amy	Clinical	Assistant Professor	FMC	Autopsy Pathology
Brown, Holly	Clinical	Assistant Professor	DSC	Dermatopathology
Brundler, Marie-Anne	GFT	Professor	ACH	Pediatric Pathology
Bures, Nicole	Clinical	Assistant Professor	DSC	Cytopathology, Breast Pathology
Caragea, Mara	Clinical	Assistant Professor	SHC	Bone & Soft Tissue Pathology
Chan, Elaine	Clinical	Assistant Professor	ACH	Pediatric Pathology
Chan, Jennifer	GFT	Assistant Professor	FMC	Neuropathology
Demetrick, Douglas	GFT	Associate Professor	HSC	Molecular Pathology
DiFrancesco, Lisa	GFT	Associate Professor	FMC	Soft Tissue & Bone Pathology
Duggan, Maire	GFT	Professor	FMC	Cytopathology, Gynecological Pathology
Dvorakova, Marie	Clinical	Assistant Professor	DSC	Cytopathology
Eidus, Leslie	Clinical	Associate Professor	RGH	Gastrointestinal Pathology
Falck, Vincent	Clinical	Associate Professor	FMC	Gastrointestinal Pathology, Surgical Pathology
Fontaine, Daniel	Clinical	Associate Professor	DSC	Cytopathology
Galman, Lanie	Clinical	Assistant Professor	SHC	Breast Pathology, Oncologic Surgical Pathology

Clinical Section of Anatomic Pathology/Cytopathology				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
George, David	Clinical	Associate Professor	FMC	Renal Pathology
Gorecki, Margaret	Clinical	Assistant Professor	DSC	Surgical Pathology, Cytopathology
Gottipati, Srinivas	Clinical	Assistant Professor	SHC	Renal Pathology, Surgical Pathology
Gough, James	Clinical	Professor	FMC	Renal Pathology, Cytopathology
Green, Francis	Clinical	Professor	FMC	Pulmonary Pathology, Autopsy
Guggisberg, Kelly	GFT	Assistant Professor	RGH	ENT Pathology, Dermatopathology
Gui, Xianyong (Sean)	Clinical	Assistant Professor	FMC	Gastrointestinal Pathology
Hamilton, Leslie	Clinical	Assistant Professor	FMC	Neuropathology
Hunter, Charlene	Clinical	Assistant Professor	DSC	Surgical Pathology, Dermatopathology
Itani, Doha	Clinical	Assistant Professor	FMC	Molecular Genetic Pathology, Hematopathology
Joseph, Jeffrey	GFT	Professor	FMC	Neuropathology
Kelly, Margaret	GFT	Associate Professor	FMC	Surgical Pathology, Pulmonary Pathology
Khalil, Moosa	Clinical	Associate Professor	FMC	Cytopathology, Surgical Pathology, Endocrine Pathology
Kim, Byung	Clinical	Assistant Professor	PLC	Cytopathology, Surgical Pathology
Klonowski, Paul	Clinical	Assistant Professor	DSC	Surgical Pathology, Lab Informatics
Koebel, Martin	GFT	Associate Professor	FMC	Gynecological Pathology, Autopsy
Kulaga, Andrew	Clinical	Associate Professor	RGH	Genitourinary Pathology, Surgical Pathology
Kurek, Kyle	GFT	Assistant Professor	ACH	Pediatric Pathology
Lee, Sandra	Clinical	Assistant Professor	SHC	Gynecological Pathology
Luedtke, Chad	Clinical	Assistant Professor	SHC	Breast Pathology
Medlicott, Shaun	Clinical	Associate Professor	RGH	Gastrointestinal Pathology
Minoo, Parham	Clinical	Assistant Professor	FMC	Surgical Pathology, Hematopathology
Morava-Protzner, Izabella	Clinical	Associate Professor	PLC	Surgical Pathology
Naert, Karen	Clinical	Assistant Professor	DSC	Dermatopathology
Ogilvie, Travis	GFT	Associate Professor	FMC	Breast Pathology, Gynecological Pathology, Molecular Pathology
Oryschak, Allan	Clinical	Associate Professor	RGH	Ophthalmic Pathology, Surgical Pathology
Paslowski, Doreen	Clinical	Assistant Professor	RGH	Breast Pathology, Surgical Pathology
Pinto-Rojas, Alfredo	GFT	Associate Professor	ACH	Pediatric Pathology
Rashid-Kolvear, Fariborz	Clinical	Assistant Professor	DSC	Cytogenetics
Resch, Lothar	GFT	Associate Professor	FMC	Neuropathology
Schell, Andrew	Clinical	Assistant Professor	PLC	Gastrointestinal Pathology
Schinstine, Malcolm	Clinical	Associate Professor	DSC	Cytopathology, Surgical Pathology, Clinical Biochemistry
Sienko, Anna	Clinical	Professor	PLC	Surgical Pathology, Cytopathology
Simpson, Roderick	GFT	Professor	FMC	Head & Neck Pathology
Swanson, Paul	Clinical	Full Professor	FMC	Bone & Soft Tissue, Gastrointestinal Path, Breast Path, Lung & Thoracic, ENT
Teman, Carolin	Clinical	Assistant Professor	FMC	Surgical Pathology, Hematopathology

Clinical Section of Anatomic Pathology/Cytopathology				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Trotter, Martin	GFT	Professor	DSC	Dermatopathology
Trpkov, Kiril	GFT	Professor	RGH	Genitourinary Pathology, Renal Pathology
Urbanski, Stefan	Clinical	Professor	FMC	Gastrointestinal Pathology, Liver Pathology, Pulmonary Neoplasia
van den Berghe, Janette	Clinical	Assistant Professor	DSC	Cytogenetics
Waghray, Ranjit	Clinical	Associate Professor	PLC	Surgical Pathology, Cytopathology
Wang, Yinong	Clinical	Assistant Professor	DSC	Surgical Pathology, Cardiac Pathology
Wright, James	GFT	Professor	DSC	Pediatric and Perinatal Pathology, Experimental Pathology
Yang, Hua	Clinical	Assistant Professor	FMC	Breast Pathology
Yilmaz, Asli	GFT	Associate Professor	RGH	Genitourinary Pathology, Surgical Pathology
Yu, Weiming	Clinical	Associate Professor	ACH	Pediatric Pathology, Cardiac Pathology
Clinical Section of Clinical Biochemistry				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Chin, Alex	Clinical	Assistant Professor	DSC	Immunochemistry, Clinical Chemistry
de Koning, Lawrence	Clinical	Assistant Professor	ACH	General Pathology, Pediatric Clinical Chemistry
Krause, Richard	Clinical	Assistant Professor	DSC	Clinical Biochemistry, QA/QC
Sadrzadeh, Hossein	Clinical	Professor	DSC	Endocrinology, Nutrition, Pharmacogenomics, Clinical Biochemistry
Seiden Long, Isolde	Clinical	Assistant Professor	FMC	Clinical Biochemistry
Clinical Section of General Pathology				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Abdullah, Amid	Clinical	Assistant Professor	DSC	General Pathology
Baskin, Leland	Clinical	Associate Professor	DSC	Chemical Pathology, General Pathology
Flynn, Ethan	Clinical	Associate Professor	SHC	General Pathology
Gorombey, Steve	Clinical	Assistant Professor	DSC	Cytopathology, General Pathology
Larsen, Erik	Clinical	Assistant Professor	RGH	Surgical Pathology, Clinical Chemistry
Mourad, Walid	Clinical	Professor	DSC	General Pathology, Hematopathology, Cytopathology
Naugler, Christopher	GFT	Associate Professor	DSC	Lab Informatics, General Pathology
Redman, Lyle W.	Clinical		DSC	Point of Care, Clinical Chemistry
Clinical Section of Hematology/Transfusion Medicine				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Auer-Grzesiak, Iwona	Clinical	Associate Professor	FMC	Flow Cytometry, Lymphoma
Berka, Nouredine	Clinical	Assistant Professor	DSC	Tissue Typing
Fourie, Thomas	Clinical	Assistant Professor	FMC	Hematological Pathology, Flow Cytometry
Jiang, Xiu Yan (Sue)	Clinical	Assistant Professor	DSC	Hematopathology

Clinical Section of Hematology/Transfusion Medicine				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Khan, Faisal	GFT	Assistant Professor	HMR B	Tissue Typing
Mansoor, Adnan	GFT	Associate Professor	FMC	Hematopathology
Prokopishyn, Nicole	Clinical	Assistant Professor	FMC	Stem Cell Lab
Shabani-Rad, Meer-Taher	Clinical	Assistant Professor	FMC	Hematopathology
Sinclair, Gary D.	Clinical	Adjunct Associate Professor	DSC	Molecular Hematology
Clinical Section of of Medical Microbiology				
Medical Staff	GFT/Clinical	Rank	Site	Special Expertise
Carson, Julie	Clinical	Assistant Professor	DSC	Mycology, Enterics, Wounds
Chan, Wilson	Clinical	Assistant Professor	DSC	Telediagnosics, Mycology, Parasitology
Church, Deirdre	GFT	Professor	DSC	Medical Microbiology, HIV Diagnostics, STDs, Anaerobes, Mycology
Gregson, Daniel	GFT	Associate Professor	DSC	Virology, Sirology, General Microbiology
Pillai, Dylan	GFT	Associate Professor	DSC	Molecular Diagnostics, Parasitology
Pitout, Johann	GFT	Professor	DSC	Anitbiotic susceptibility/ARO Bacteriology, Parasitology

1.2 Current Workforce Plan (see Workforce Planning)

1.3 Scholarly Publications

Publications in Peer-Reviewed Journals

1. Adeleye A, **Kelly M**, Wright NA, **Yu W**, Anselmo MA. Granulomatous lymphocytic interstitial lung disease in infancy. Can Respir J. 21(1):20-2, 2014
2. Al Bashir S, Alshalalfa M, Hegazy SA, Dolph M, Donnelly B, **Bismar TA**. Cysteine- rich secretory protein 3 (CRISP3), ERG and PTEN define a molecular subtype of prostate cancer with implication to patients' prognosis. J Hematol Oncol. 7(1):21, 2014
3. Al Bashir S, **Yilmaz A**, Gotto G, **Trpkov K**. Long term outcome of primary urothelial papilloma: A single institution cohort. Pathology. 46(1):37-40, 2014
4. Alfadda AA, Shaffer EA, **Urbanski SJ**, Storr MA. Eosinophilic colitis is a sporadic self-limited disease of middle-aged people: a population-based study. Colorectal Dis. 16(2):123-9, 2014
5. Amin MB, Epstein JI, Ulbright TM, Humphrey PA, Egevad L, Montironi R, Grignon D, **Trpkov K**, Lopez-Beltran A, Zhou M, Argani P, Delahunt B, Berney DM, Srigley JR, Tickoo S, Reuter VE. Best Practices Recommendations in the Application of Immunohistochemistry in Urologic Pathology - Report from the International Society of Urologic Pathology Consensus Conference. Am J Surg Pathol. 38(8):1017-22, 2014
6. Amin MB, **Trpkov K**, Lopez-Beltran A, Grignon D and Members of the ISUP Immunohistochemistry in Diagnostic Urologic Pathology Group. Best Practices Recommendations in the Application of Immunohistochemistry in the Bladder Lesions: Report from the International Society of Urologic Pathology Consensus Conference. Am J Surg Pathol. 38(8):e20-34, 2014
7. Andonequi G, Krein PM, Mowat C, Brisebois R, Doig C, **Green FH**, Leger C, Winston BW. Enhanced production of IGF-I in the lungs of fibroproliferative ARDS patients. Physiol Rep. 2(11):1-12, 2014
8. Appelman HD, Matejcic M, Parker MI, Riddell RH, Salemm M, **Swanson PE**, Villanacci V. Progression of

esophageal dysplasia to cancer. In Proceedings of the 12th OESO World Conference: Cancers of the Esophagus. Ann NY Acad Sci. 1325:96-107, 2014

9. Bayih AG, **Pillai DR**. Mouse studies on inhibitors of Plasmodium falciparum Hsp90: progress and challenges. Parasitology. 141(9):1216-22, 2014
10. Billington EO, Phang SH, **Gregson DB**, **Pitout JD**, Ross T, **Church DL**, Laupland KB, Parkings MD. Incidence, risk factors, and outcomes for Enterococcus spp. bloodstream infections: A population-based study. Int J Infect Dis. 26:76-82, 2014
11. Blom RL, Bogush T, Bruecher BL, Chang AC, Davydov M, Dudko E, Leong T, Polotsky B, **Swanson PE**, van Rossum PS, Ruurda JP, Sagaert X, Tiulandin S, Schraepen MC, Sosef MN, van Hillegersberg R. Therapeutic approaches to gastroesophageal junction adenocarcinomas. In Proceedings of the 12th OESO World Conference: Cancers of the Esophagus. Ann NY Acad Sci. 1325:197-210, 2014
12. Borman MA, **Urbanski S**, Swain MG. Anti-TNF-induced autoimmune hepatitis. J Hepatol. 61(1):169-70, 2014
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Book Chapters

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2. **Naugler C, Flynn E**. Lab Literacy for Doctors: A Guide to Ordering the Right Tests for Better Patient Care. Brush Education Inc., Edmonton, AB, 325 pages, 2014
3. Horn C, **Naugler C**. Gross Pathology Handbook: A Guide to Descriptive Terms. Brush Education Inc., Edmonton, AB, 182 pages, 2014

1.4 Research Grants

2014 CLS Health Services Research Funding Competition Projects Awarded Funding

Competition Year	Principal Investigator/Co-Investigators	Topic	Budget
2014	Dr. Adnan Mansoor Dr. Meer-Taher Shabani-Rad, Dr. Fahad Farooq, Dr. Abid Qureshi	Validation of the "nCounter leukemia Fusion Gene Expression Assay Kit" by NanoString technologies to determine multiple genetic aberrations for classification of Acute Leukemia	\$9,800
2014	Dr. Chad Luedtke	Testing of Her2 Gene Amplification in Breast Cancer Using a Custom Nanostring nCounter® CNV Assay	\$10,000
2014	Dr. Constance Finney Dr. Angel Chu, Dr. Ranjit Waghray, Dr. Ron Read, Dr. John Gill	Characterising Oral Human Papilloma Virus Infections in HIV Positive Men who have Sex with Men	\$10,000
2014	Dr. Johann Pitout Gisele Peirano	Rapid detection of ST258 among <i>Klebsiella pneumonia</i> that produce carbapenemases	\$9,943
2014	Dr. Lawrence de Koning Dr. Christopher Naugler, Dr. Steven Martin, Dr. Maitreyi Raman	Development of a quantitative fecal fat test based on microscopy and automated image analysis	\$10,000
2014	Dr. Tarah Lynch Dr. Deirdre Church	Use of MiSeq (Illumina) Next Generation Sequencing Compared to a Microscopic Nugent's Score to Improve Detection of Vaginal Microbiome Changes Consistent with a Diagnosis of Bacterial Vaginosis (BV): A Pilot Study	\$9,889
2014	Dr. Parham Minoo Dr. Oliver Bathe, Dr. Doha Itani	Epigenetic Combination Therapy in Xenografted Sporadic Microsatellite Instability-high (MSI-H) Colorectal Cancers	\$31,777
2014	Dr. Dylan Pillai	Characterization of the Kelch Propellor domain in global isolates of <i>P. falciparum</i> : validating the mechanism of artemisinin resistance	\$27,000
Competition Total			\$118,406

2014 External Research Grants and Awards

(held by DPLM Faculty) Does not include those of cross-appointments.

Medical Staff	Year	Funding Source	Total Award	*PI/ Co-Inv
Benediktsson, Hallgrimur				
"Renal Biobank"	2013-16	Canadian Foundation for Innovation; Alberta Health Services; Calgary Laboratory Services	\$768,771	Co-PI
Berka, Nouredine				
"Development of novel kidney biopsy tissue based molecular genetics approach to identify donor's HLA type from transplanted organs"	2014-16	National Science, Technology and Innovation Plan/KACST	\$533,302	Co-Inv
Bismar, Tarek				
"Blood based detection of the migration switch in prostate cancer to predict metastatic disease"	2014-17	Prostate Cancer Canada – Movember Translation Acceleration Grant	\$1,495,000	Co-Inv
"Innovative diagnostics to improve the management of urothelial carcinoma"	2014-17	Collaborative Research and Innovation Opportunities	\$750,000	Co-PI
"Movember GAP1 tissue biomarker project"	2014-15	Prostate Cancer Canada – Movember GAP1	\$141,793	PI
Chan, Jennifer				
"MicroRNA functions in cerebellar development and disease"	2010-17	Alberta Heritage Foundation Clinical Investigator Award	\$770,000	PI
"A novel platform for glioma modeling to accelerate the therapeutic targeting of GBM"	2011-14	Terry Fox Research Institute, New Investigator Award	\$397,614	PI
"Stratifying and targeting medulloblastoma through genomics"	2011-14	Genome Canada (with multiple co-funding sources)	\$208,384	PI
"Modeling and therapeutic targeting of the clinical and genetic diversity of glioblastoma"	2011-16	Terry Fox Research Institute (with multiple co-funding sources)	\$252,090	PI
"The role of CIC in oligodendroglioma"	2014-19	Canadian Institutes of Health Research	\$656,900	PI
Church, Deirdre				
"Infection of the gut by HIV-1"	Renewed 2012-15	Canadian Institutes of Health Research	\$144,100	Co-Inv
de Koning, Lawrence				
"Refined prognostician in coronary artery disease using routine laboratory test data"	2014-16	MSI Foundation Research Grant	\$98,000	PI
"Improving blood collection in Calgary Zone nursing units through electronic surveillance of the hemolysis index and education"	2014	Alberta Health Services Chief Medical Officer Quality Improvement Initiative Grant	\$12,379	PI

Medical Staff	Year	Funding Source	Total Award	*PI/ Co-Inv
"Establishing a biorepository for specimens from the Alberta Provincial Project for outcomes assessment in coronary heart disease"	2014	Libin Cardiovascular Institute of Alberta Equipment Grant	\$25,000	PI
Demetrick, Doug				
"Auditing: An evaluation of tissue specimen misidentification"	2011-14	Canadian Institutes of Health Research	\$380,000	PI
"Uncovering mechanisms of cell regulation in human chronic disease"	2014	Ruth Barker Foundation	\$22,500	PI
"Cholesterol-mediated surfactant dysfunction – mechanisms and treatment"	2013-16	Alberta Innovates – Health Solutions	\$700,000	Co-Inv
Gregson, Dan				
"The importance of international travel in the spread of extended-spectrum <i>β</i> -lactamase-producing <i>Escherichia coli</i> "	2012-14	Merck Frost Canada Ltd.	\$75,000	Co-Inv
Kelly, Margaret				
"The innate immune response in the pathogenesis of hypersensitivity pneumonitis"	2009-16	Alberta Heritage Foundation for Medical Research	\$1,170,000	PI
"Smooth muscle-myofibroblast transition in asthma"	2014-15	Canadian Lung Association NGR Grant	\$30,000	PI
"Smooth muscle-myofibroblast transition in asthma"	2014-15	Cumming School of Medicine Bridge Funding	\$50,000	PI
Khan, Faisal				
"Non-HLA immunogenetic biomarkers important for pathogenesis and therapy of complications of paediatric hematopoietic cell transplantation"	2011-15	Alberta Children Health Foundation. Cancer Care Collaborative	\$500,000	PI
"Toward improved outcomes of anti-thymocyte globulin-conditioned hematopoietic cell transplantation"	2013-15	Alberta Innovates-Health Solutions.	\$750,000	Co-Inv
"Immunogenetic Biomarkers important for pathogenesis and therapy of complications of Hematopoietic Cell Transplantation"	2011-15	Alberta Children's Hospital Foundation: Barb Ibbotson ACHF Investigatorship Award in Pediatric Hematology	\$120,000	PI
"Development of a novel kidney biopsy tissue based molecular genetics approach to identify donors' HLA type from transplanted organs"	2014-16	National Plan for Science and Technology; King Abdulaziz City for Science and Technology	\$650,000	Co-Inv (PI in Calgary)
"5+14=0: A new Maths based on KIR genes to reduce Graft versus host disease after allogeneic HCT"	2014-15	Buckley Family Cancer Research Excel Award	\$140,000	PI

Medical Staff	Year	Funding Source	Total Award	*PI/ Co-Inv
Koebel, Martin				
“A Pan-Canadian platform for the development of biomarker-driven subtype specific management of ovarian carcinoma”	2011-15	Terry Fox Research Institute	\$4,070,000	Co-Inv
“Mitochondrial DNA and ovarian cancer risk and survival”	2012-17	National Institute of Health	\$296,940	Co-Inv (local PI)
“Molecular subtypes of high-grade serous ovarian cancer: Leveraging of TCGA, OCAC, OTTA and AOCS genome and genomic datasets”	2013-15	Department of Defence	\$65,000	Co-Inv (local PI)
“PIK3CA mutation and associated pathway activation status and survival in patients with cervical cancer: quantifying the risk and testing the solution”	2013-15	Alberta Innovates-Health Solutions	\$750,000	Co-Inv
“The role of thymidylate synthase polymorphism and expression in ovarian cancer”	2014-15	Cancer Research Society	\$44,000	PI
Kurek, Kyle				
“Non-heritable genetic diseases of the skeletal system: pathogenesis and treatment”	2014-19	NIH-NIAMS	\$500,000	Co-PI
Mansoor, Adnan				
“Predict benefit and improve outcomes of conventional high dose therapy/stem cell transplantation for lymphoma patients through molecular biomarkers”	2014-16	Alberta Cancer Foundation/Stephure Directed Donation	\$200,000	Co-PI
“Follicular lymphoma: identifying Proliferative Molecular Signature as a predictor of aggressive clinical disease and its validation through routine immunohistochemistry techniques”	2014-16	Calgary Health Trust Hematology Education and Research Fund	\$15,000	Co-Inv
“Metabolomics profiling of follicular lymphoma”	2014-16	Cancer Research Society	\$15,000	Co-Inv
“Reovirus as a viable therapeutic option to target therapy resistance of multiple myeloma”	2013-15	Cancer Research Society	\$120,000	Co-Inv

Medical Staff	Year	Funding Source	Total Award	*PI/ Co-Inv
Naugler, Christopher				
“Implementation and evaluation of a clinical pathway for chronic kidney disease in primary care”	2013-16	Canadian Institutes of Health Research	\$524,421	Co-Inv
“Pilot Lab Utilization Study”	2013-15	Alberta Health Services	\$1,000,000	PI
“Refined prognostication in coronary artery disease using routine laboratory test data.”	2014-16	M.S.I. Foundation	\$98,000	Co-Inv
“Clinical and technical performance of Active B12 against total B12”	2014-15	Abbot Pharmaceuticals	\$27,250	Co-Inv
“Improving the efficient and equitable care of patients with chronic medical conditions”	2014-19	Alberta Innovates Health Solutions, CRIO Team Grant	\$1,000,000	Collaborator
Pillai, Dylan				
“Canada-UK team in bacterial resistance to Beta-Lactam antibiotics”	2011-14	Canadian Institutes of Health Research	\$3,565,700	Co-Inv
“Toward a rational and novel therapy for Clostridium difficile infection”	2012-15	Canadian Institutes of Health Research / Natural Sciences and Engineering Research Council	\$558,000	Co-Inv
“Clinical validation of the molecular-based automated BD MAX enteric extended bacterial panel”	2014-15	Becton Dickinson	\$83,000	PI
“Heat shock drugs for malaria”	2013-14	Canada Grand Challenges – Rising Stars	\$113,000	PI
Pitout, Johann				
“The importance of international travel in the spread of extended-spectrum β -lactamase-producing Escherichia coli”	2012-14	Merck Frost Canada Ltd.	\$75,000	PI
Sadrzadeh, Hossein				
“Evaluation of clinical importance of measuring Active Vitamin B12 in elderly”	2014	Abbott Laboratory	\$27,250	PI
Zhang, Kunyan				
“The Alberta Sepsis Network”	2009-14 2012 increase	Alberta Heritage Foundation for Medical Research	\$4,998,191 \$2,257,734	Co-Inv
“Detection and tracking of hospital outbreaks of pathogenic microbes using rapid whole genome sequencing”	2013-15	Calgary Health Trust	\$106,050	Co-PI

1.5 Banff Pathology Course

2014 Banff Pathology Course Program
Gastrointestinal/Liver Pathology
Rimrock Resort Hotel, Banff National Park
September 3-6, 2014



Time	Event	Location
Wednesday, September 3, 2014		
5:00 - 6:30 PM	Registration	Wildrose Prefunction
Thursday, September 4, 2014		
6:30 - 7:30 AM	Registration and Full Breakfast	Wildrose Prefunction/Salon A
7:30 - 7:40	Dr. Jim Wright - Introductory Remarks and Welcome	Salon BC
7:40 - 8:30	Dr. Elizabeth Montgomery "Upper GI Biopsy: R/O EoE, R/O HP, R/O Celiac"	Salon BC
8:30 - 9:15	Dr. Paul Beck and Dr. Sean Gui "A Gastroenterologist's Perspective on Upper GI Biopsies"	Salon BC
9:15 - 10:15	Dr. Robert Riddell "Handling the Tough Questions in IBD"	Salon BC
10:15 - 10:30	Break	Wildrose Prefunction
10:30 - 11:15	Dr. Subrata Ghosh and Dr. Sean Gui "Clinical and Pathological Correlation in IBD"	Salon BC
11:15 - 12:15	Dr. Marie-Anne Brundler "Pediatric GI Pathology for the Non-Pediatric Pathologist"	Salon BC
12:15 - 1:15 PM	Question & Answer Period (for AM Session)/ Working Lunch	
1:15 - 2:00	Dr. Robert Riddell "Drug-Related GI Pathology"	Salon BC
2:00 - 3:00	Dr. Henry Appelman "Just When You Think You Know Something, You Find Out You Don't: Mimics in Diagnostic GI Pathology"	Salon BC
3:00 - 4:00	Interactive Session with Interesting Case Presentation Dr. Ross Mclean Case #1, Dr. Julinor Bacani Case #2 Dr. Shaun Medlicott Case #3, Dr. Stefan Urbanski Case #4	Salon BC
5:30	Pub Night at the Rock	Wildrose Prefunction/Salon A
Friday, September 5, 2014		
6:30 - 7:30 AM	Registration and Full Breakfast	Wildrose Prefunction/Salon A
7:30 - 7:40	Dr. Hallgrimur Benediktsson - Introductory Remarks	Salon BC
7:40 - 8:40	Dr. Matthew Yeh "Approach to the Medical Liver Biopsy - Patterns of Injury"	Salon BC
8:40 - 9:20	Dr. Sam Lee and Dr. Stefan Urbanski "A Hepatologist's Perspective on the Medical Liver Biopsy"	Salon BC
9:20 - 10:00	Dr. Matthew Yeh "Diagnosis of Primary and Metastatic Liver Neoplasms"	Salon BC
10:00 - 10:15	Question & Answer Period	Salon BC
10:15 - 10:30	Break	Wildrose Prefunction
10:30 - 11:10	Dr. Elizabeth Montgomery "Upper GI Tract Polyps and the Company They Keep"	Salon BC
11:10 - 11:50	Dr. Henry Appelman "The Democratic Approach to Lower Bowel Polyps: Topics by Consensus"	Salon BC
11:50 - 12:30	Dr. Robert Hilsden and Dr. Andrew Schell "Clinician and Pathologist Roles and Interaction in a Colorectal Cancer Screening Program"	Salon BC

Time	Event	Location
12:30 - 12:45 PM	Question & Answer Period	Salon BC
12:45 - 2:00	ASLP General Annual Meeting and lunch (RSVP required)	Salon A
2:00 - 6:30	Afternoon Free	
6:30-7:30	Cocktails (Cash Bar)	Salon A-B
7:30	Banquet	Salon A-B
Saturday, September 6, 2014		
6:30 - 7:15 AM	Registration and Full Breakfast	Wildrose Prefunction/Salon A
7:15 - 7:25	Dr. Jim Wright - Introductory Remarks and Welcome	Salon BC
7:25 - 8:15	Dr. Elizabeth Montgomery "Updates in Lower Gastrointestinal Malignancy"	Salon BC
8:15 - 9:00	Dr. Robert Riddell "Endocrine Proliferations of the GI Tract"	Salon BC
9:00 - 9:45	Dr. Doug Demetrick "Molecular Pathology of GI Neoplasms"	Salon ABC
9:45 - 10:00	Break	Wildrose Prefunction
10:00 - 10:40	Dr. Tony Maclean and Dr. Vincent Falck "A Colorectal Surgeon's Perspective on the Colorectal Cancer Pathology Report"	Salon BC
10:40 - 11:20	Dr. Iwona Auer "Lymphoproliferative Disorders of the GI Tract"	Salon BC
11:20 - 12:15	Dr. Henry Appelman "Cancers and Their Precursors In and Around the GE Junction"	Salon BC
12:15 PM	Final Questions and Answers, and Dr. Jim Wright "Closing Remarks"	Salon BC

Guest Faculty / Keynote Speakers

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