# DEPARTMENT OF PATHOLOGY & LABORATORY MEDICINE **2013** Annual Report







# Table of Contents

Executive Summary	
Departmental Structure and Organization	5
Governance	5
Departmental Committees	7
Divisions, Sections and / or Programs	8
Membership (Appendix 1.1)	
Accomplishments and Highlights	9
Clinical Service (by Section)	9
Clinical Biochemistry Section	
General Pathology Section	
Hematology/Transfusion Medicine	
Microbiology Section	
Education	25
Publications	
Research Grants	
Medical Leadership and Administration	
Challenges	
Responses to Issues, Ongoing Matters and Plan of Action	
Future Risks	
Workforce Planning	
Summary of Recruitment	
Current Needs	
Future Needs	
Goals and Strategies	
Impact on other departments and regional resources	
Quality Assurance, Quality Improvement, and Innovation	
General	
Access of Family Physicians to specialists – N/A	
Patient flow through the Emergency Department	
Future Directions and Initiatives	40
Appendices	
1.1 Membership Lists	
1.2 Current Workforce Plan (see Workforce Planning)	
1.3 Scholarly Publications	
1.4 Research Grants	
1.5 Banff Pathology Course	61

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Submissions from: Division/Section Heads Managers 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 2013 it was composed of 5 CLS Divisions and had 76 primary clinical MD appointees and 14 clinical PhD scientists. There were 28 members with University of Calgary GFT and 62 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, 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 the recruitment of many new clinical faculty members (including 7 with start dates in 2013 and 10 with start dates in 2014), initiating a Laboratory Utilization Office, installing and making operational 3 new Chemistry analyzer lines, helped Alberta Health Services/College of Physicians & Surgeons of Alberta develop and implement new privileging processes for laboratory physicians which will be the template for all physicians in the Province, and provided continuous laboratory services during the June flood. Our postgraduate clinical training programs (Anatomic Pathology, General Pathology, and Neuropathology Residency training programs and Fellowship programs in a variety of areas) trained 15 AP, 4 GP, and 4 NP residents as well as 12 fellows in 2013. Our faculty contributed several thousand hours of post-graduate medical education and ~1200 hours of undergraduate medical education teaching. We held \$2.12 million in external grant funding as principle investigators, published 160 peer-reviewed papers as well as 19 book chapters, and 1 book in 2013. The mean Impact Factor of the journals we published in for the year 2013 was 3.78. Four faculty members were promoted this year.

### Challenges

CLS performs >25 million laboratory tests per year. Every year, we face the challenge of providing increased services without proportionate increases in funding. Operationally, our biggest challenges are capital funding and space limitations in acute care sites and DSC.

### 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 and we have hired many highly qualified personnel in the past year. Once these are all in place, we will assess if there are additional needs.

### Quality Programs

CLS' 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 monthly and there are formal systems in place for serious adverse event, and patient concerns reporting and resolution. CLS continues to support provincial laboratory services standardization initiatives including the implementation of the province-wide Anatomic Pathology Quality Assurance Plan.

### Future Directions and Initiatives

The year 2014 will be an exciting one with the arrival of many new Medical & Scientific Staff bringing diverse new expertise to CLS. CLS will remain nimble and try to meet the changing needs of healthcare. Through a Provincial "Hub & Spoke" Model, it is anticipated that we may provide some additional laboratory services in the Southern Zone and possibly the Central Zone.

James R. Wright, Jr, MD, PhD Head, Department of Pathology & Laboratory Medicine University of Calgary Faculty of Medicine/Alberta Health Services – Calgary Zone

Alberta Health Services

# AHS Calgary Zone Department of Pathology & Lab Medicine



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	LS Board mmy Hofer	rvices Chief Operating Officer 3ula Hall*		CLS Executive	VP VP	Technical Operations Corporate Services Dale Gray Wendy Jossa		-Dupuis -Dupuis	Planning, Special John Thrale	Manager Projects, Procurement	Chris Lemaire and New Business	Brenda Strange Finance Brad Keith	Denise Connors Accounts Receivable	Monica Phillips Logistics Dir Hauck	Brenda Kirkham Administration	Chris Lemaire	anagment Deb Ellas	Monica Phillips, Functional Centre Manager	Leslie Laurie and Legal Affairs Sumana Dasgupta	Sharon Lengsfeld Total Rewards Kris Benson	nfection Sandra Corbett EH&S Chris Butler Communications	try Maureen Cyfra Organizational	Monica Phillips Development	Tracey Lenek		ithology, ology, * Medical/Administrative Dvad
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Alberta He			-S Medical Advisory Committee AHS Calgary Zone Medical	Executive Committe	Co-Chairs: Dr. Leland Baskin	Dr. James R. Wright, Jr. Departm Dr. James I				nical Section Clinical Section Chief Techr	eneral Pathology Dr. Chris Naugler Opera	Comn	RGHF	POCT	ACH	Specia	Client	Calgar	Proce	nical Biochemistry Dr. Hossein Sadrzadeh Bioch	icrobiology Dr. Dan Gregson Bacte	:matology/TM Dr. Meer-Taher Hema	Shabani-Rad Trans	atomic Pathology/ Dr. Ranjit Waghray AP Sit	topathology Speci	Subsp Derm Gynei

January 10, 2014

# 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. Adnan Mansoor, Clinical Section Chief, Hematology/Transfusion Medicine Dr. Dan Gregson, Clinical Section Chief, Microbiology Dr. Travis Ogilvie, AP Site Leader, Foothills Medical Centre (FMC) Dr. Shaun Medlicott/Dr. Steve Gorombey, AP Site Leader, Peter Lougheed Centre (PLC) Dr. Erik Larsen, AP Site Leader, Rocky View General Hospital (RGH) Dr. Cynthia Trevenen/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. Carol Boechler, Director, Laboratory Integration and Standards, Alberta Health Services 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, 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 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. Lisa DiFrancesco Dr. Angela Thompson Dr. Alex Chin Dr. Elizabeth Brooks-Lim Dr. Jim Wright (Ex-Officio)

### Neuropathology Residency Training Committee

Dr. Lothar Resch, Chair Dr. Jeffrey Joseph Dr. Jennifer Chan Dr. Jim Wright (ex-officio) Chief Resident (residents' representative)

### Fellowship Committee

Dr. Joanne Todesco (Chair) Dr. Lisa DiFrancesco 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, Faculty 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, Hematology/Transfusion Medicine, Clinical Section Chief/Division Head, Dr. Adnan Mansoor Clinical Section/Division, Microbiology Clinical Section/Division, Microbiology Clinical Section Chief/Division Head, Dr. Daniel Gregson

# Membership (Appendix 1.1)

# Accomplishments and Highlights

# Clinical Service (by Section)

### Anatomical Pathology/Cytopathology Section (AP/Cyto)

### Workload

	2013 Specimens	% change (vs. 2012)
Anatomic Pathology	456,428 (blocks)	+3.50%
Cytopathology	216,832	-7.41%
Non-Gyne Cytology	10,866	+1.07%

### Optimization of Anatomical Pathology (AP) Services:

Previously raised concerns have been addressed; the optimization committees are currently working to complete the last few items remaining prior to disbanding.

### South Health Campus:

The AP laboratory is continuing to process work from other CLS locations as in-hospital work is increasing slower than anticipated.

### Equipment:

A barcode tracking system Request for Proposal (RFP), as required by the AHS AP Quality Assurance (QA) plan, has been finalized. CLS has three representatives on the AP QA selection committee. All tissue processor except for the Peloris at RGH have been installed with remote alarms. Also, an auto-aligning microtome has been ordered as part of the F2014 capital equipment budget to reduce the amount of tissue loss during the recuting process especially for Immunohistochemistry requests.

### New Projects:

Project planning for the New Cancer Care Center has begun to include molecular diagnostics, paraffin block storage, Fine Needle Aspirate Clinic and potential frozen section service. Most equipment is to be purchased for the AP lab at the McCaig Tower and transferred.

### **Quality Reviews:**

A gap analysis for both AP and Cytology has been performed for the upcoming 2014 College of Physicians and Surgeons of Alberta accreditation. An action plan has been developed.

### Fiscal Responsibility:

Cost saving initiatives continue to be explored for the Clinical Section including reducing the number of preventative maintenance operations performed on microscopes from "2" to "1" annually. Anticipated cost savings are \$40,000.00 annually. Elimination of pre-ordered special stains – Giemsa and Alcian Blue-PAS for GI protocols could create additional savings over \$35,000.00 per year. Elimination of one of the 2 slides prepared for fluid cytology will offer additional savings of approximately \$36,000.00.

### Process Reviews:

A review of AP has been completed to identify areas of high risk that could negatively impact the quality of patient care. A total of five recommendations were made for consideration. Leadership review of the recommendations is in progress. A review of AP at the RGH site was also completed by the Process Excellence Department to identify options for improving Turnaround Times (TAT) and workflow. Recommendations are

being implemented. A Lean SCORE event was initiated in October 2013 to identify improvement opportunities for the existing slide and block delivery process within a multi-site AP service Model.

### **Clinical Benefits:**

Sunrise Clinical Management (SCM) on-line ordering for AP is currently in development. One hurdle is the requirement for a single AP requisition. We are currently utilizing a minimum of five separate acute care site requisitions based on tissue type.

### Staff:

A second Pathology Scientist (Pathologists' Assistant) has been hired with responsibilities for the Rockyview General Hospital and South Health Campus. A new 0.9 temporary full-time equivalent (FTE) position for a Cytogenetics Tech has been posted to assist with the increasing workload in the department. An existing vacant 1.0 FTE Path Tech I position was used to facilitate the Cytogenetics posting. In July a new 0.6 FTE Document Administrator for AP was hired to assist Leadership with managing the section's policies and procedures.

The long service award recipients for AP and Cyto were treated to a catered lunch at the end of October at the DSC to celebrate their continued contributions. We are also in the final draft phase with the "New Pathologist's Handbook" and will be rolling it out once it is completed.

Two Cyto Technologists are in the process of being trained to perform document administration duties for Cyto. Two administrative assistants are also being trained to build and test synoptic reports for AP.

# **Clinical Biochemistry Section**

Clinical Biochemistry Section has been working as an independent department since 2013 and Ms. Apple Cebedo was hired (0.6 FTE) as the administrative assistant to Clinical Section Chief, Dr. Sadrzadeh and the coordinator of the Clinical Biochemistry fellowship Program, Dr. Isolde Seiden Long.

The Section covers the chemistry laboratories at ACH, FMC, RGH, PLC, and SHC. In 2013, Dr. Naugler asked Dr. Sadrzadeh to oversee the technical and clinical functions of chemistry parts at Rural Labs, as well. Currently, there are seven Clinical Biochemists who work at ACH, FMC, different sections of the main lab at DSC, and oversee the chemistry section at Rockyview Hospital (RGH) and Point of Care (POC). In addition, six clinical pathologists are also involved in clinical biochemistry sections at different medical center labs.

Clinical Biochemistry continues to be the largest section of the Department of Pathology and Laboratory Medicine (DPLM). In 2013 the Chemistry Section performed greater than 25 million tests with an annual increase of approximately 6%.

Improving service/patient care has been one of the major goals of the Clinical Biochemistry Section. In order to initiate successful physician education, regular quarterly meetings between the biochemists, clinical endocrinologists, and cardiologists occur, to openly discuss and educate one another for better patient care. The following represents examples of the completed continuous service improvement initiatives in the section:

- Implemented new lipid profile report comments that will be standardized in the province. In consultation with Dr. Todd Anderson and James Stone, the leading authors of the 2012 Canadian guidelines for assessment of lipid disorders, we prepared new comments to report lipid profile. The new comments were presented to the Chemistry Network, which were well received with minor revisions. It will be presented to lab leaders for implementation in the province.
- Established the "analyte of the month" practice in Biochemistry Section to start in January 2014. This practice will add another level of quality check to our day-to-day operation and ensures highly accurate results at all CLS labs. A committee was formed to carefully examine all patients results for different analytes (focusing on one or two analytes each month) in order to detect any analytical problem (e.g. shift) for measuring those analytes (e.g., sudden increase in Amylase values in normal individuals). The results are

discussed at the weekly biochemistry leaders meeting and all medically important issues will be shared with clinicians. This new practice will increase the quality of lab results at all chemistry labs in CLS.

• Continue regular quarterly meetings with endocrinologists that was started in 2013. These meetings have had major positive impact on our interactions with the endocrinologists and have helped both sides to present and resolve issues more efficiently.

### Evidence Based/Utilization Initiatives:

One of the major goals of the Biochemistry Section since it was established in 2013 has been the implementation of evidence based approach for the use of clinical laboratory tests. Physician education is an important factor to successfully promote appropriate test utilization. So far, the following practices have been approved and established:

- In collaboration with the Emergency Department and Mental Health Clinic, we have been able to reduce the number of stat urine drug screen by Triage Drugs of Abuse testing in the acute care sites by 95%. Triage is a highly expensive Point of Care device that has been used inappropriately for many years at different acute care sites for stat urine drug screen. This new practice has resulted in a net cost savings of \$10,000/ month for chemistry section and was accomplished by:
  - Involving Poison and Drug Information Services clinical toxicologists who helped in educating the ordering physicians.
  - Limiting and removing the STAT urine test from ordering panels in the HIS system.
- In collaboration with the Departments of Cardiology, Cardiovascular Surgery, and Emergency Medicine, we have been able to reduce monthly CK-MB workload from 646 tests/month to 34 tests/month. This initiative was accomplished by educating physicians, changing ordering requests and testing frequency. The results of this work will be presented at the national meeting of Canadian Society of Clinical Chemists.
- · Immunosuppressant back-up instrumentation that eliminated the need to use U of A lab as our immuno-



suppressant back-up. This initiative reduced TAT for results when our instrument is non-operational with a cost–savings of \$6,000 annually.

- Discontinuation of techs being on call for evening and weekends for tests (immunochemistry aldosterone, 17-OH progesterone and ACTH) This can save us \$10,000 annually.
- As of October 2013, all allergen-specific IgE referrals from the primary care physicians must be approved by the Medical/Scientific Staff. This new practice has reduced utilization by 43%, so far. Primary care physicians who order allergen-specific IgE for more than 5 individual allergens are contacted by the laboratory director to discuss the appropriate use of allergy panels. However, allergists/clinical immunologists are still allowed to order at least 10 allergens.
- Removal of Triglycerides (for adults) from the stat test menu.
- Discontinued CSF pH testing, due to lack of evidence for clinical usefulness.
- Continue to educate physicians about the proper use of vitamin D testing [i.e., 25 (OH) vit.D].

### New Instrumentation/Method:

The new instruments in the Biochemistry Section are state-of-the art that not only will improve the quality of testing, but also increase our capacity for running more tests and coping with our normal growth, without the need for more FTEs. The following represents the new instruments and/or methods that have been implemented in the labs during 2013:

- Replaced Roche modulars with 3 Roche 8000 chemistry analyzers. This increased the number of immunoassay analyzers from 4 to 6 instruments increasing our capacity for adding additional work. It is important to note that each new chemistry analyzer is about 3 times faster than our previous 2 modular chemistry analyzers. These major analyzers generate a great deal of heat and require an efficient air conditioning system to control the lab temperature. Due to a defective air conditioning system in the main lab at DSC, only 2 of the 3 lines are operational. Hopefully, AHS will help us to fix this problem in 2014 and use all three lines.
- New LCMSMS system (Agilent 6460) was installed in analytical toxicology in January 2013. In addition to immunosuppressant methods, we have completed evaluation of two other methods; plasma metanephrines and clozapin. Also, the old LCMSMS system (Agilent 6410) has been prepared as the backup method for immunosuppressants. Furthermore, a new Diode Array module for the Agilent 1100 chromatography system including upgrade to Chemstation software, has been completed.
- New method developed for Ammonia. Compared to the old method, in which 25% of clinical specimens showed interference and did not work, the new method is much more robust to common interferences allowing a much higher percentage of clinical specimens to be reported, with less staff manual handling of specimens and improved TAT.
- New Gas Chromatomagraphy (GC) method for Ethylene Glycol. The new method has significantly better low end sensitivity and precision at the clinical decision level of 3 mmol/L. Also, this new improved method performs much better in College of American Pathologists (CAP) survey than the old photometric assay.
- We are in the process of completing installing new middleware from Roche Company. This middleware will connect all of our Roche instruments throughout the CLS labs to our LIS system. At DSC chemistry the new middleware will allow us to directly process whole blood tubes on the analyzers which should help reduce filling many trays daily with cups and tips; resulting in cost savings. A team of 5 experienced Medical Laboratory Technologists (MLTs) have been working on this process to standardize different Quality Control (QC) and autoverification rules, as well as training other technologists.
- In conjunction with Patient Services Centres and Rural Laboratories, Biochemistry Section installed balances at each site to accurately measure 24 hr urine volume. This will significantly improve the accuracy of our results, as prior to this, the urine volumes were measured inappropriately.
- As an effort to improve the overall quality of chemistry lab results, Rural Labs now participate in Chemistry's Intersite Comparison Program (the accuracy of instruments in CLS labs will be checked on regular basis).
- Correction of reference ranges for fecal fat in pediatric population. It was discovered that adult reference ranges had been reported for 72-hour fecal fat analysis in pediatric population at ACH for many years. The correct pediatric reference range has been adopted.
- Implementation of Reformulation serum and urine Calcium, Magnesium and serum direct bilirubin. The reformulation has improved the overall test performance by reducing interferences or new method standardization.
- Following implementation of high-sensitivity Troponin T (which is 15X more sensitive than the previous troponin T assay) in all Calgary Zone adult hospitals and community, we have been examining different approaches to improve the TAT. Specifically, we have been looking at the impact of hemolysis or suspending particles in the plasma samples.
- All Troponins have been done in plasma samples. The change was based on the National Academy of Clinical Biochemists recommended to use only plasma for Troponin testing.
- Implemented running indices (hemolysis, bilirubin and Lipemia) on many analytes. This allows consistent cancellation of tests based on clinical criteria and the index.
- Reporting of Mono Test results has been changed to conform to provincial reporting model.
- New instrument (Sercon ABC A2 IRMS) to do Urea Breath Testing for H. pylori.
- New Siemens Immulite XPi will replace the current Immulite 2000.
- An automated ESR analyzer (Excyte) was implemented at ACH.
- Implemented chromagranin A testing resulting in costing efficiencies and improved TAT.

- Clinical Laboratory Standards Institute (CLSI) reference intervals for sweat chloride have been implemented (ACH).
- Reporting the results of drugs of abuse screen has been changed. All the "positives" will be reported as "presumptive positive" with disclaimer explaining that confirmation by GC/MS is needed. This will hopefully prevent future unnecessary actions for an unconfirmed positive result in paediatrics population.
- In addition to the above, we continuously look at ways to reduce repetitive strain injuries.

### New Revenue Sources:

• Canadian Longitudinal Study on Aging. Drs. Chin and Sadrzadeh will be Co-investigators for this study which is the first in Canada and will be done at McMaster University. The study involves 40,000 individuals who will be followed for 20 years. CLS has been selected as the site to perform the chemistry testing for 20,000 subjects who will be selected and tested for biochemical and molecular analysis. This study not only generates great revenue for CLS, but also provides an excellent academic opportunity for both faculty and trainees.

### Clinical Biochemistry Fellowship Program:

The new fellowship training program in Clinical Biochemistry that was established in 2013 has been moving forward smoothly. The program was inspected by two commissioners of the Canadian Academy of Clinical Biochemistry (CACB), Drs. Cynthia Balion and Steven Hill from McMaster University in Hamilton, Ontario in May 2013. Following the inspection, CACB has granted CLS a 2 year provisional accreditation. CACB will have a follow-up visit in spring of 2015, before our first fellow graduates.

The fellowship program has accepted a new fellow who will start in July 2014. We will work on accreditation by the Commission on Accreditation in Clinical Chemistry (ComACC) from US, in 2015. Dr. Sadrzadeh has >20 years experience training fellows in the USA and has been the director of several different ComACC fellowship programs; he will play a major roll in helping Dr. Seiden Long establish the dual certification.

### Other Educational Activities:

- Weekly academic half-day sessions that were started in July 2013 have been successfully continued. The sessions are on Wednesdays from 10:00 am to 12:00. Residents, fellows and several medical and clinical staff attend the presentations at DSC and via teleconference at FMC, ACH and SHC.
- Clinical Biochemistry Provincial Rounds started in September 2013 and the first speaker was our Clinical Biochemistry Fellow, Jessica Boyd. These rounds have been well received and well attended.
- One of the clinical biochemists (Dr. Richard Krause) has been invited to be a member of the Expert Advisory Group, Alberta Institute of Health Economics review of first and second trimester screening.

# **General Pathology Section**

### Health Centre Testing Lab (HCTL):

- Acquired, through capital acquisition, a replacement refrigerator at the Airdrie Community Health Centre (ACHC) Testing Laboratory.
- Annual workload variations over the year with workload increases upwards of 9.5 % at the Cochrane Community Health Centre (CCHC).
- Efforts were coordinated, including the deployment of Sheldon M Chumir (SMCHC) staff, during the June/2013 floods in Calgary. The HCTL Leadership remained in constant contact with AHS leadership ensuring that the laboratory itself, as well as the equipment, was in a state of readiness when the facility reopened.
- The HCTL contributed \$~51,000 towards meeting Operational savings targets.
- HCTL leadership mapped out laboratory processes that supported the installation of a generator at the ACHC UCC facility.
- Supported a resource fair at SMCHC highlighting the services provided by the SMCHC Health Centre Testing lab.
- HCTL continues to meet the targets as established in the TAT metrics.

to FMC Transfusion Medicine.

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### SHC RRL:

- Hired final staff complement for the RRL lab.
- Continued the process of cross training the RRL staff in 3 departments.
- Supported the centralization of Antibody screening to FMC Transfusion Medicine.
- RRL hours of service became 24 x 7 on January 14, 2013 with the opening of the Emergency Department and Rapid Access Unit. Additional Patient Care Units opened in a gradual sequence. All PCU's were opened by September 3, 2013. Current bed occupancy is at ~ 267 IP beds with the Emergency Dept seeing ~ 180 patients/day.
- Collaborated with Okotoks Health and Wellness Centre to reroute samples for testing to the SHC RRL.
- Provided Lactate and Troponin testing for a Horse research study.
- Participated with AHS Clinical Departments in "Code" simulations.
- Provided a team resource from SHC, as part of the RGH RRL LEAN SCORE event, scheduled in Oct/ Nov 2013.
- Reduced the RRL new hire training/orientation depending on the skill set of the hired staff member.
- Met with site Clinical and Medical Leadership to highlight accomplishments and challenges.
- Gathered information from the SHC Team and Operational areas regarding Lessons Learned as part of the SHC Commissioning process.

- •The HCTL Supervisor continues to meet with our clinical partners, at the Urgent Care Centres and Outpatient Renal Clinics, working through issues resulting in an enhanced spirit of collaboration.
- •The HCTL Supervisor participated in a "Patient Flow Committee" at the SMCHC Urgent Care Centre.

# RGH Rapid Response Lab (RRL):

- •P2H Initiative Supported the change in sweep times, which increased the early morning workload in an effort to provide test results earlier so patients could be discharged earlier.
- •Lab tours provided to ED nursing and OR nursing. Feedback indicated that a video should be made, which would provide valuable laboratory information to all nursing staff. We are following up with CLS Communications.
- •7 week LEAN/SCORE event ran from October to end of November 2013 with successful implementation of best practices in Biochemistry, better flow in Hematology, first thing in the AM, as a result of bench changes and break coverage. With the bench changes, we were able to amalgamate and balance work duties reducing by one the overall bench coverage in Hematology and Biochemistry.
- •Full complement of MLT students trained in Hematology and Chemistry.
- •Reduction of staff on weekends in response to reduced RRL workload.
  - •Reduced the RRL new hire training/orientation program from 20 weeks to 14 weeks. This has resulted in staff being able to work off shifts ~ 6 weeks sooner than in the past.

•Supported the centralization of Antibody screening

- Reduced service contract costs by shutting down one Neo Analyzer and one Slide Maker Stainer associated with the DxH 800 Hematology Analyzer. Work volumes did not warrant these systems being operational.
- Developed an "internal RRL" TAT Metrics Report at SHC that was rolled out to include the RGH RRL and HCTL's.
- · Provided workstations and offices for a number of CLS staff and one AHS staff member
- Supported the P2 H initiative in an effort to provide test results earlier so patients could be discharged earlier
- Developed an Issue Brief regarding the learning's associated with the SHC Venous Blood Gas Project.
- SHC RRL Supervisor mentored two newly hired rural Supervisors.

### Rural Lab Achievements:

### Point of Care Testing (POCT):

- Centralized ordering of i-STAT reagents at one site Oilfields. This saves money on shipping and on reagents, as minimal QC needs to be done at each site, and calibration verification at only one site. Better utilization of cartridge lot numbers.
- 2013 ER POCT i-STAT analyzer for after lab hour use.
- OGH performed the Provincial validation on new Quality material for Troponin I testing on the i-STAT; data compiled and evaluated by POCT and submitted for provincial use in all zones.
- Reduction of stools rejected by CLS for being overfilled -Oilfields.
- We developed a brightly colored sticker that goes on the packaging when we give out stool specimen containers – it says "Do Not Overfill Containers – Watch for Fill Line".
- Oilfields adjusted the start time of our second morning shift from 815 back to 745.
- The physicians requested inpatient results be completed before they did rounds at 9 a.m. and this worked very successfully to achieve that goal.

### Occupational Health and Wellness Center (OHWC):

- Transfer of routine urine specimens from OHWC to SHC.
- Implementation of PT testing on site.

### High River Hospital (HRH):

- Transfer of routine blood specimens from HRH (this was routine specimens that originated in OHWC) to SHC.
- LEAN event at HRH to address Pre-Examination workflow.
- POCT-February 2013 program implementation of the ER POCT i-STAT analyzer for after lab hour use.

### Claresholm:

• POCT-May 2013 program implementation of the ER POCT i-STAT analyzer for after lab hour use.

### **Didsbury:**

• POCT-June 2013 program implementation of the ER POCT i-STAT analyzer for after lab hour use.

### POCT:

- Completion and publication of the provincially used i-STAT- ER manual. Includes operating instructions, quality testing, and education/competency material. To be used provincially by all AHS sites using the i-STAT in the ER setting.
- POCT programs in full operation to include operating manuals, quality/maintenance requirements, and competency requirements. iSTAT -(4), Cliniteks Urine Testing -(12), POCT Pregnancy testing, and Roche Inform II Glucose meters- (75).
- Complete validation on 7 new Clinitek Status analyzers.

### All Sites:

- Completion of the transition of AHS CRL SOP's to CLS SOP's
- Completion of reading of all CLS SOP's in Traccess
- Development of a document management system for Rural staff for transition of SOP's

- Implementation of the Safety Designate Program to all Rural sites by EH&S
- Completion of new Competency Assessment Program for MLT/CLXT/MLA for Chemistry, Hematology, Urinalysis, TM, Phlebotomy.
- Rural staff added to the Non-Conforming Event database
- Rural staff included in Privacy Audits
- Development of the MLT/CLXT Training Manual
- Smear Morphology review completed for all CLR staff by Hematology
- Implemented Consultant Visit forms for use

### Alberta Children's Hospital:

### Hematology:

- Modified verification process for Stat CBCs to decrease turn around times and thereby improve patient care.
- Automated testing of some fluid samples to improve TAT and standardization.
- Provincial critical reference range changes in Hematology (platelets, absolute neutrophils, WBC) and Chemistry (calcium, phosphorus, magnesium).
- Using Cellavision routinely for dayshift.
- Automated ESR analyzer (Excyte) installed and validated.
- QC frequency decreased from every two hours to every four hours.

### Transfusion Medicine (TM):

- Modified the dispensing product process for blood products in TM.
- Purchased, validated and installed a new TM freezer which improved utilization of blood products provincially and nationally (reduced use of AB FFP).
- Validated use of pneumatic tube for transportation of blood products (implementation on hold).
- Modified processes to support antibody investigation centralization.
- Four new hemophilia products brought into inventory.
- Supporting ECPR (ECMO + cardiopulmonary resuscitation), an accelerated extra corporealmembrane oxygenation (ECMO) procedure (patient is being resuscitated while waiting for ECMO to be made ready).

### Chemistry:

- Purchased new osmometer.
- Completed LLQ and linearity study for sweat chlorides. Modified reference range.
- Completed MTX stability study and patient correlation study with Toronto Sick Kids.
- Completed LLQ for PHENO and PTN.
- Provincial critical reference range changes in Chemistry (calcium, phosphorus, magnesium).
- Modified reference range for pediatric 72 hour fecal fats.

### **RRL**:

- Trained one new MLTI, Completed training of two MLTIs and started training of two other MLTIs.
- Competency assessments completed in all three areas.
- Trained approximately 40 SAIT MLT students in Urinalysis, and two MLT students in Hematology.
- Increased usage of on line/ conference call meetings.

### PLC-RRL:

- Adopted the new on-line dispense process in Transfusion Medicine to standardize ordering processes and products from the nursing units and reduced phone call interruptions in the TM department.
- Validated and implemented 2 new Echo analyzers in Transfusion Medicine part of reagent lease agreement.
- Changed inventory levels in TM to support the BUMP (Blood Utilization and Management Program) initiative.
- Supported the movement of Antibody testing from PLC to FMC for standardization of testing, expertise, competency and reagent savings.

- •Established an inventory of most common antigen negative red cell units to ensure patient safety to support the centralized antibody testing initiative.
- •Decreased wait time, transport time, and reduced costs by transferring Strathmore TM testing from FMC to PLC.
- •Supported Strathmore Hospital by performing chemistry and hematology testing when Strathmore instrumentation was down.
- •Created a working plan to renovate the existing space within the lab to assign more room for transfusion medicine testing (Accreditation requirement and necessary for new programs at PLC in future).
- •Added 2 more staff onto earlier shifts to assist with AHS Pathway to Home (P2H) initiative.
- •Adopted best practises from other LEAN events. Eg. colored clock and rack from accession FMC
- •Reduced training time in the RRL by 8 weeks from 22 weeks to 14 weeks.
- •Hired and fully trained 3 new staff members.
- •Trained our full complement of students in Chemistry and Hematology.
- •Integrated rural sites into chemistry Quality Control Management program – organized and maintained by RRL staff.
- •Supported the DSC when urinalysis and chemistry instrumentation were down.
- •Validated provincial ranges for chemistry and hematology tests.
- Completed competency testing in all three departments by all staff.
- •Secured space within PLC to move the out patient collection lab to a location closer to the hospital entrances and out-patient clinic areas to provide better patient access and service.

### Mobile Achievements:

- •Initiated self scheduling for Mobile staff working stat holidays.
- •Implemented shift report for weekends and on-call to track what collections we are being called out for.
- Member of Provincial Mobile Network committee have developed Province wide eligibility standards as well as new requisition.
- Developed Phlebotomy aftercare flyer to be distributed to INR community patients.
- Flood / Mobile response Diverted staff to all quadrants of city so that we could respond to stat collections as necessary. Also went to evacuation areas to collect patients as needed.
- Communicated new INR Protocol (from Anticoag Management) to many groups that order Mobile collections (LTC and Supportive living site leaders, physicians, Pharmacists with AHS and SL). This has helped the department manage workload.
- Approval to not accept reoccurring orders for STAT collections (ordered as routine)

- Approval to not accept reoccurring fasting orders (ordered as random) ...this implementation delayed due to LIS issues.
- Addition of new Mobile Collector hub in NW Calgary (Beddington) ...resulted in redistribution of patients within regions 2, 4 and 5 to even out workload on each day of week.
- Mobile service extended to new C3 program opened in Beddington Mall by Integrated Seniors and Supportive Living (AHS)

### Community Services Report:

### Provide High Quality of Patient and Service Safety, Timely and Accurately

- Through LA II Development series and training. Staff continues to participate on a quarterly basis at the LA II forums.
- Representatives from Sheldon Chumir Renal Clinic provided overview of what the clinic process.
- Worked with Province on incorporating the Escalation Process.
- Worked with Mosaic have translation signs placed in their clinics to encourage patients booking their appointments.
- Quarterly Safety Bulletin is issued by PSC Supervisors to all sites addressing reported issues.

### Continue to Improve Accessibility and Customer Service in all Areas

- Volunteer program on going still continue to work with for volunteers
- Had student summer hire that helped with Time Trade kiosk helped with promoting booking appointments on line.
- Working with Time Trade to have a Walk In patient management system in place.

# Promote Appropriate Test utilization. Continue to gain efficiency. Demonstrate fiscal prudence throughout cost-effective business practices:

- Trialed Community Requisition Change demographics.
- Urine Trial encourages patient safety. Implementing at all sites.

### Support research and education. Capitalize on areas of expertise. Optimize CLS processes through innovation, process excellence, informatics and technology.

- Health Unlimited Television (HUTV) announcements on going. Through HUTV have also been able to utilize other department information and use HUTV resource to display (i.e. privacy, EH&S info).
- Adjustment to the new hire schedule to enhance with their post orientation training.

### Build engagement. Enhance relationships and Trust.

- Worked with HR to develop respectful workplace at all sites and have been rolled out at team meetings.
- Continued morale building. Bowling, Christmas Decorating, will have future venues such as scavenger hunt.
- PSCs lead MLA Getaway this year.
- Contributed to Flood victims' cause.

# Hematology/Transfusion Medicine

The clinical section of Hematology and Transfusion Medicine pursued major steps in 2013 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.

Multiple publications and abstract presentations by divisional staff and acceptance of CLS-BUMP (Blood utilization management plan) principals by national advisory for monitoring national blood inventory have been great achievements in innovation.

The following sections identify various initiatives which have been completed by different laboratories by the Clinical Section of Hematology and Transfusion Medicine during 2013.

### Hematology and Special Coagulation:

- DSC went "LIVE" with the stool FIT analyzers November 18, 2013. (Screening for colo-rectal blood) in Calgary and Southern Alberta. This is replacing the stool Occult Blood cards.
- Analysis of body fluids by DxH cell counter was signed off.
- Establishment of New Thrombin Time (TT) testing at FMC to screen the patients on Dabigatran
- All staff completed competencies.
- Changed fibrinogen testing method by using a new fibrinogen reagent QFA Thrombin
- Integration of Hemophilia products into SCM ordering system.
- Evaluated Sysmex XE5000 as a part of search plans for different equipment options for general hematology labs.

### Molecular Hematology Lab:

- Complete take-over of Alpha thalassemia testing for the province as of February 2013.
- Move towards developing an assay for Constant Spring and Quong Sze mutation testing (Go-live planned for mid-2014).
- Work on the STR Chimerism build in Helix continues. This will allow access to STR chimerism reports in SCM and Netcare. Progress has been hampered by ProvLab Millennium build but should go live by mid-2014. About 50% complete in the build domain.
- Build and testing of FLT3/NPM1 in Helix. This will allow these test results to be accessed through SCM and Netcare. About 75% complete.
- Request for Q-PCR BCR-ABL build in Helix. This will be a huge gain for our clients as currently we are resulting about 70 QPCPPH1' tests per month.
- Continued collaboration with Pediatric Stroke Program ACH, performing inherited risk factor for thrombosis testing for this patient cohort.
- Development of in-house methodology for detection of CEBP-alpha mutations for prognosis in AML patients without NPM1 and FLT3 gene mutations. This is just entering the validation stage and should go live in early to mid-2014.
- Implementation of International Standard Scale reporting for quantitative assessment of BCR-ABL1 fusion transcripts in CML with improved test sensitivity and specificity (February 2013).
- Hematopathology resident/fellowship training program specialized laboratory coordinator and molecu-lar hematology preceptor for trainees in the following disciplines: Adult and Pediatric Hematology, Bone Marrow Transplantation, and Molecular Genetics. Several residents/fellows trained this year.
- Continued improvement of workflow in molecular hematology. Newest model has staff working as two groups rather than as 10 individuals. This not only helps to maintain staff competency and decreases retraining but allows for first-in, first-out testing to occur as appropriate.

### Flow Cytometry:

### Quality: Enhancing quality in healthcare

- Replaced all Pacific Blue and Krome Orange conjugated antibodies with superior fluorochromes Brilliant Violet 421 and 510.
- Implemented paperless, streamlined quality monitoring system.

### Access: Support increased access to the healthcare system

- Redesigned the Flow Cytometry requisition:
  - Simplified and clarified leukemia/lymphoma testing options.
  - Expanded the ordering options for immunodeficiency testing.
- Added leukemia/lymphoma reports to NetCare to improve real time access for all Alberta healthcare providers.

### Sustainability: Provide value to the healthcare system

- Added CD45RO to identify/enumerate memory T Cells and improve the immunodeficiency screening panel interpretation.
- Added Regulatory T Cell assay to test menu to support Alberta Immunologists/Hematologists investigating primary immunodeficiencies.

- Reduced the number of antibodies tested for leukemia/lymphoma panels by 25% by adopting a screen/ reflex panel algorithm for testing.
- Retired one flow cytometer thereby reducing operational costs.
- Implemented paperless system for 50% of flow cytometry testing.
- Reduced the complexity of ordering leukemia/lymphoma panels by implementing generic ordering mnemonics and using third party software to capture necessary workload statistics in the background.

### Innovation: Pursue creative solutions to demands in healthcare

- Awarded an Alberta Cancer Foundation grant to investigate the mechanisms of Rituximab mediated cell death in primary B Cell Non Hodgkins lymphoma.
- Participated in the evaluation of stem cell enumeration and reticulated platelets on a Hematology analyzer (Sysmex).
- Developed a unique analysis strategy for investigation of minimal residual disease in acute leukemia where staff can simultaneously review the current sample with a normal bone marrow and the original disease sample for reference.

### Relationship: Build stronger relationships with our healthcare partners

- Lab Scientist invited to McMaster University to present Minimal Residual Disease.
- Collaborated with other research labs resulting in four publications.

### **Training and Education**

• Trained 3 new technologists.

### Transfusion Medicine:

- SCM/Millennium Transfusion Medicine Upgrade Project was implemented at all Calgary urban sites. This improved the process for ordering, dispensing and transfusing blood products/components as well as reporting and classification of transfusion associated adverse reaction. Patient safety and efficiency was also enhanced through the following ways:
  - Additional patient information was provided to Transfusion Medicine for appropriate product selection.
  - Ordering coagulation factors by brand to avoid errors.
  - Blood reaction project made available the historical moderate to severe adverse reactions in patient's health issue profile to ordering physicians at the time placing a blood product order in SCM.
  - Permitting dispense request only if an active blood product order exists.
  - Improving charting of transfusions in SCM.
  - Decreasing the number of phone calls required between TM and nursing units to determine patient's product requirements.
  - Significant improvement in TAT of transportation of blood products by hospital porter system
- Acquisition of a multi-drawer plasma freezer at ACH site to optimize CLS transfusion medicine of AB plasma. This resulted in a savings of 159 units of group AB plasma.
- Platelet inventory optimization project.
  - Reduction in the discard rate for platelets to an average of 9% in 2013.
  - Expiration of 691 platelets (227 apheresis and 464 pools) in 2013 compared to 1596 platelets (302 apheresis and 1294) in prior year (57% decrease in expired platelets).
  - An annual cost savings of \$748,176 was seen at Canadian Blood Services (CBS) in the production of the pools.
- BUMP principals and inventory index was accepted by National Advisory Committee (NAC) for monitoring of national blood inventory.

### Cellular Therapy Laboratory (CTL):

- Liver Cell Infusion for Treatment of Infants with Urea Cycle Disorders.
  - CTL has been involved in this clinical trial since fall 2012. A total of 4 patients have been treated using this protocol. We are the only centre in Canada performing this protocol. This is a corporate sponsored international study.

- A Health Canada Clinical Trials Division inspection was performed in July 2013 in regards to this clinical trial. The laboratory had no deficiencies.
- Actively participated in Canada's first gene therapy clinical trial for treatment of Fabry's disease.
  - CTL was responsible for isolation of CD34+ enriched stem cells from the blood of a Fabry's patient. These cells are being utilized in pre-clinical animal model studies. It is anticipated the results will be available in mid-2014 which will allow for move forward to patient treatment with this gene therapy clinical protocol.
  - Cells from 2 distinct Fabry's patient donors have been collected.
- Utilization of Mesenchymal Stromal Cells (MSC) for treatment of Acute Kidney Injury (AKI) following Cardiac Surgery.
  - CTL is the processing facility for the clinical trial initiated in Spring 2013 with the Libin Cardio Vascular Group at FMC. CTL is responsible for storage, thaw, and processing of these cells that are delivered to patients.
  - This is a corporate sponsored multicentre double blind, Health Canada approved clinical trial. Inspection by Health Canada Clinical Trials Division in December 2013 – no deficiencies in CTL.
  - A total of 9 patients have been treated to date. The goal of the study is to improve outcomes in these patients suffering AKI which will decrease hospital stay and life expectancy.

### **Research & Publications**

- Dr. Prokopishyn received a CIBMTR (Centre for International Blood & Marrow Transplant Research) grant 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 2014.
- Abstract Presentation: International Society for Cellular Therapy 2013, Auckland, New Zealand "Retrospective Assessment of The Potential Impacts Bone Marrow Product Quality Has On Utilization of Bone Marrow As A Cell Source for Transplant – Experience at A Single Centre"
- Presented findings to date at FACTs (Fabry's Gene Therapy Clinical Trial) meeting Feb. 2013.

### Improvements in Quality Assurance & Patient Care

- Complete electronic processing and documentation was validated in CTL in 2013. Projected Go-Live of paper-less system in April 2014. This will result in increased efficiency, reduced redundancy and increased patient safety by allowing direct electronic transmission of information within CTL and between our transplant program partners.
- High capacity, high efficiency vapour Liquid Nitrogen Cellular Therapy Product (CTPs) storage freezer was obtained and is in use. This freezer will reduce the costs of Liquid Nitrogen while ensuring ultimate safety of the one-of-a kind life-saving products stored by CTL for blood and marrow transplant patients.
- Operational modifications initiated by CTL involving the infusion of CTPs has reduced overtime costs while ensuring CTPs are infused into patients in the safest way possible.
- Operational modifications to a protocol for isolation of highly purified stem cells has resulted in increased recovery in cells and more transplantable material for patients with decreased collection times which translates to increased patient safety and decreased costs.

### Tissue Typing Laboratory:

- Passed 2013 ASHI Laboratory Accreditation (valid until 08/31/2015).
- Passed American Society of Histocompatibility and Immunogenetics (ASHI) site inspection of the Histocompatibility fellowship (valid until 08/30/2018).
- Participation in the LDPE National Organ Exchange program.
- Streamlined the LDPE Process in-house.
- Acquired funding to support the Highly Sensitized Patient (HSP) registry.
- Initiated a monthly HSP/LDPE meeting with the transplant program
- Worked with planners to design the new Histocompatibility and Immunogenetics Lab (HIL) in the future New Cancer Care Center.
- Completion of first year of training for the current Histocompatibility Fellow.

- Two new technologists trained for call-back.
- Dropped SSP Low resolution typing back up method for deceased donors.
- All technologists completed training on plate method for flow crossmatching.
- Trained 4 new techs in Sequencing.
- Validated LabXpress automation of SSO Luminex Typing method and trained technologists
- Trained one tech in DNA.
- Trained one tech in SSO.
- · Presented two Continuing Education lectures to the Solid Organ Transplant Research Rounds
- Presented a Hematology round.
- Continuing Education through teleconferences, Bone Marrow, Renal Weekly Rounds, and Hematology education sessions.
- Supervised one graduate student.
- Supervised two research postdoc fellows.
- Obtained CLS funding for two projects.
- Obtained funding from Cancer-CRIO/Alberta Innovates- Health Solutions (AI-HS)
- Published two peer review research papers in Am J Transplant. 2013 Apr;13(4):1026-33 and BMT 2013:48:772-728.
- Two abstracts were presented by laboratory technologists at ASHI 39th Annual Meeting.
- One abstract was presented by the Histocompatibility fellow at ASHI 39th Annual Meeting.
- Eight other abstracts were presented by the research team at ASHI 39th Annual Meeting.
- Travel award for research presented by one of our postdoc at the Annual meeting of Federation of Clinical Immunology Societies (FOCIS).
- ASH Achievement award 2013 for the abstract presented in the annual meeting of American Society of Hematology by one of our postdoc.
- Best research award from Department of Pathology and Medicine for presentation by one of our postdoc.
- Funding obtained by one of our postdoc fellow from Kids Cancer Care Chair Training Fellowship Program.

### Special Hematology:

- Discontinued sample handling and reporting free plasma haemoglobin that were referred to U of A. Samples are now handle by referrals department at DSC.
- Trained additional staff member to perform Hgb electrophoresis and Bone Marrow.
- Replaced manual entry for Yearly molecular data (spreadsheet) by automatic download.
- Stopped receiving and sending BM cytogenetics addendum to archives.
- Scanning molecular reports from McMaster instead of typing.
- Improved workflow for BM differential.
- Trained fellows/residents on HgbElect bench and Bone Marrows.
- Continuing education through teleconferences, Bone marrow survey CAP and QMP-S survey.
- Annual Special Hematology competency was completed by all staff.
- Revised SOP for Bone Marrow procedures.

# **Microbiology Section**

- From March to May 2013, CLS performed phase II of the Point Prevalence Study with Infection Prevention and Control at all Calgary Acute Care Hospitals to determine if there are increasing numbers of Carbapenemase producing Enterobacteriacae (CRE) in the Calgary Zone. This was in response to an outbreak in the Edmonton Zone in 2012. There was no CRE detected in the Calgary zone during this screen.
- The new CLS Microbiology laboratory was opened at South Health Campus (SHC) in February 2013. Microbiology transferred testing for Group A streptococcus (throats) and Group B streptococcus cultures from DSC to the new lab at SHC. The transfer of testing provides additional Microbiology testing space at the DSC, and redundancy for critical specimen testing if a disaster were to happen at the DSC.
- In conjunction with the Department of Orthopaedic Surgery, CLS Microbiology worked on a new protocol to ensure appropriate specimens for prosthetic joint infections are sent to the laboratory. In May 2013, an OR checklist and new requisition was created, as well as new protocols developed for the processing of these specimens in Microbiology

- A new provincial TAT metric was implemented in which acute care Clostridium difficle results must be reported within 24 hours of collection. In order to meet this metric, CLS Microbiology implemented the Quik Chek Complete in conjunction with our current testing protocol. The Quick Chek Complete assay is used to test specimens that arrive outside of the current GDH EIA/PCR confirmation testing time frame. The new metric has been met since implementation in September 2013.
- A new Malaria real-time PCR was implemented in October, 2013 for specimens where through microscopy either a mixed infection is suspected, a low level parasitemia is undetected, a difficult to speciate organism is due to poor morphology, or there is inadequate circulating antigen detected with the BinaxNow test.
- To standardize the Nucleic Acid Amplification testing (NAAT) platforms for Chlamydia trachomatis (CT) and Neisseria gonorrhoeae (GC) across Southern Alberta, AHS authorized the transfer of these tests from the former Chinook and Palliser regions and from the communities of Drumheller, Hanna and Three Hills to CLS. All testing was centralized to CLS by September 2013.
- Implementation of the Innova system in May, 2013 to automate stool and wound specimen processing to provide more consistent culture plate streaking, resulting in better isolation of pathogens, and to free up time for lab assistants to perform other duties.
- Provincial guidelines for assessing and reporting the quantity of cells and bacteria in gram stains was implemented in July, 2013. This change provides consistent gram stain interpretation across Alberta.
- In May, 2013, an analysis of 2011 data of all fungal cultures and a review of fungal literature was performed to enable the reduction

of incubation times on the following specimens: Dermatophyte cultures reduced to 3 weeks, respiratory sources and tissues/fluids reduced to 4 weeks, all other sources (swabs and superficial sources) to 3 weeks unless a dimorphic fungi requested.

- April, 2013, discontinuation of Salmonella typing for B, C1 and C2 on stool cultures positive for Salmonella species as all isolates are referred to Provincial Laboratory for epidemiology where typing is also performed.
- Due to the increased time to transport specimens from the High River Hospital and South Health Campus, the rapid detection test for malaria, Binax Now, was implemented by April 2013, at these sites.
- In April, 2013, a Millennium QC program was setup for HIV viral load testing, enabling better tracking of QC drift and trends.

- To improve culture identification TATs and reduce costs, MALDI-TOF was implemented on all culture reading benches by September 2013.
- Microbiology trained 42 SAIT MLT students and 9 Residents.
- In collaboration with the Calgary Zone Infection Prevention and Control program the microbiology service now has access to whole genome sequencing using the Illumina MySeq platform when required for epidemiological purposes.

### Microbiology Workload

Specimen numbers continue to increase at a rate of just over 10% per annum. In relation to funding there is a 4.5% per annum cost avoidance (see Table 1) which equates to a reduction in \$0.44 cost per sample processed per annum over the last 7 years. (see Table 2)





Table 2.



24

# 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 students, and summer students, and (8) Continuing Medical Education events. A new Pathologists' Assistant Master of Science degree training program was established, as a specialization within the Medical Sciences graduate program in 2012; this program enrolled its first 2 graduate students in July 2012, 3 more in July 2013, and will be reviewed for National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) accreditation in April 2014.

### Anatomic Pathology Residency Training Program (Program Director: Dr. Lisa DiFrancesco)

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 and Electron Microscopy, Dermatopathology, Hematopathology, Neuropathololgy, 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 selfdirected learning underlies the program.

Three excellent new trainees were accepted into the program beginning July 2013 bringing our total number of trainees for 2013-2014 to 15. Two residents graduated in 2012 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.

### 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, 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

The first Resident will be writing his General Pathology certification exams by the Royal College of Physicians and Surgeons of Canada in Spring 2014.

The first successful Royal College internal review of General Pathology Residency program was held on September 9, 2013 at Diagnostic Scientific Centre by the Faculty Postgraduate Medical Education Committee 18 months after the first resident (Dr. Davinder Sidhu) has commenced the program.

### Neuropathology Residency Training Program (Program Director: Dr. Lothar Resch)

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 2013 there were four residents in the program, although one was on a leave of absence for part5 of the year completing a PhD in Germany. This number of residents made us one of the largest and most active Neuropathology residency training programs in Canada in 2013. One resident, who had already completed a full AP residency before starting NP training, graduated and passed the NP Royal College exam.





### Medical Sciences 515/Biology 515 Course (Course Director: Dr. X. 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 26 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, Uropathology, 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 (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 Faculty of Medicine. Dr. Jim Wright served as acting Chair for a few months in 2013.

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

This year, CLS and DPLM launched a new fellowship training program in Clinical Biochemistry. The program will train PhDs with a background in biological sciences to become Clinical Biochemistrs and to direct clinical biochemistry labs. This program will meet the curriculum requirements for accreditation by the Canadian Academy of Clinical Biochemistry (CACB) and 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 will be eligible to take the Clinical Biochemistry specialist certification examinations in both Canada and the USA. The first trainee started in July 2013. The plan is to accept one fellow per year for a 2 year training cycle, and there will be 2 fellows by the 2014 calendar year in the program. 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. The CACB had a site visit in May 2013 and gave the program provisional accreditation and will be assessed for full accreditation in 2014. The program will seek ComACC accreditation in 2015.

During 2013 the following Clinical Fellows were trained at CLS:

Fellow	Specialty Area	Supervisor	Funding Source	Year
K. Paisooksantivatana	Hematopathology	I. Auer-Grzesiak	External	2011 - 2013
S. Al Bashir	Cytopathology	M. Duggan	External	2012 - 2013
Andrea Vaags	Cytogenetics	J. van den Berghe	CLS	2012 - 2014
Jinguo Wang	Histocompatibility	N. Berka	CLS	2012 - 2014
Salwa Bakhsh	Pulmonary Pathol	M. Kelly	External	2012 - 2013
Nicole Bures	Breast Pathology	H. Yang	CLS	2012 - 2013
Sandra Lee	Gynecological Pathol	M. Koebel	CLS	2012 - 2013
Mona Anand	Hematopathology	I. Auer-Grzesiak	CLS	2012 - 2013
Zohreh Taheri	Renal-Transplantation	H. Benediktsson	CLS	2013 - 2014
Darryl Yu	Urological Pathol	A.Yilmaz	CLS	2013 - 2014
Jessica Boyd	Clinical Biochemistry	I. Seiden Long	CLS	2013 - 2015
Etienne Mahe	Hematopathology	I. Auer-Grzesiak	CLS	2013 - 2014

### **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) A. Al Mami (MSc) (Co-Supervisor)	S. Liu (PhD) M. Alshalalfa (PhD) A. Javanmardi (PhD)
CHAN, JENNIFER	A. Rogers ((MSc) C. Perotti (Postdoctorate)	D. Dennis (PhD) M. Blough (PhD) M. Mobahat (MSc) S. Li (MSc) C. Chesnelong
DEMETRICK, DOUG	M. Al-Mami (MSc) (Co-Supervisor)	S. Gao (PhD) Z. Levacque (MSc) K. Sorenson (MSc)
GREEN, FRANCIS		D. Polley (MSc) H. Payne (MSc) M. Al Saied (MSc)
KELLY, MARGARET	A. Alansaru (MSc) H. Payne (MSc)	C. Downey (PhD) T. George (PhD) M. Amin (MSc) C. Shelfool (MSc) D. Minor (MSc)
KHAN, FAISAL	<ul> <li>A. Liacini (Postdoctorate) (Co-Supervisor</li> <li>R. Faridi (Postdoctorate)</li> <li>S. Ghandorah (PhD) (Co-Supervisor)</li> <li>G. Tripathi (Postdoctorate)</li> <li>A. Akhter (Postodtorate( (Co-Supervisor)</li> </ul>	

FACULTY	GRADUATE STUDENTS	
NAUGLER, CHRISTOPHER	<ul> <li>E. Mohammed (MSc) (Co-Supervisor)</li> <li>A. Crouse (MSc)</li> <li>B. Dupuis (MSc)</li> <li>B. Gorday (MSc)</li> <li>R. Healey (MSc) (Co-Supervisor)</li> <li>E. Mohammed (MSc) (Co-Supervisor)</li> </ul>	

### 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 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 is in its second year and thriving with five students 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, is scheduled to visit our program in early 2014 to assess it for accreditation. Accreditation of our program would be a huge benefit to our students, as it would make them eligible to write their American Society of Clinical Pathology board certification exams, which substantiates their training in a standardized fashion. No major obstacles are expected for accreditation, and we hope to hear about the status of the program by late spring 2014.

As was mentioned in our previous reports, we have been working on a parallel course-based Pathologists' Assistant M.Sc. program. We are pleased to announce that after more than a year of meetings and deliberations with various committees and faculties, this program has been approved by the University of Calgary and has been submitted to the Ministry of Alberta Innovation and Advanced Education for government approval. We hope to offer both options for students in the years to come.

### **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 Gl 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), Pediatric Oncology Tumour Boards (RCPSC accredited), and autopsy (RCPS 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) College 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 2013 was Dr. George Netto, from John Hopkins University.

**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 2013 course was hosted by the University of Alberta, but our Dr. Kiril Trpkov was Scientific Program Chair for the meeting. The topic was Genitourinary Pathology, and was once again a very successful event, with an excellent program and 132 registrants. 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 2013, CLS did partner with the educational institutes of SAIT Polytechnic (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 students annually, 40 MLT students and 2 Cytotechnology students. In 2013 CLS also sponsored 6 additional practicums from SAIT for the programs: Health Information Management (Year 1 and 2), Health Information Office Assistant and Medical Transcription. With the addition of Calgary Rural Labs (CRL) Clinical Student Education coordinated the practicums for 5 NAIT CLXT students. These students divide their practicum time between X-ray and diagnostic laboratory areas.

The CLS simulated labs are utilized to assist with the teaching of MLT students. The sim labs are located at the DSC in Hematology and Microbiology and at the Alberta Children's Hospital (ACH) in Transfusion Medicine, Histology and Clinical Biochemistry (urinalysis). Under the guidance of designated preceptors, students are able to actively practice MLT skills in a controlled learning environment while still being in close proximity to the working activity in 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 teaching. Of additional benefit is that the sim labs can be utilized by other CLS staff for reviewing teleconferences and presenting clinical education sessions.

South Health Campus became a new practicum site for MLA students in 2013 and in 2014 MLT students will have practicum rotations in Hematology and Clinical Biochemistry.

In October 2013 CLS participated with SAIT to achieve accredited status by the Canadian Medical Association (CMA) Conjoint Accreditation Services for the Medical Laboratory Technology program. A six year accreditation status was awarded by CMA until 2019.

CLS recognizes the need for preceptor education throughout the organization. SAIT offers continuous registration to an on-line preceptor course which is available to all preceptors within CLS. In May 2013 SAIT sponsored a free Preceptor Continuing Education Symposium offered to all CLS preceptors. In addition preceptors attended an "Understanding Yourself as a Leader" and "Leading at the Speed of Trust' continuing education series available within CLS.

Clinical Education supports those individuals in the community that aspire to have a career within a medical diagnostic laboratory. CLS preceptors attended High School career days throughout the city and conducted tours of the DSC to prospective students applying to our partnering educational institutes.

### 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, Faculty of Medicine. Much of the research within the Faculty 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 Faculty of Medicine'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 Faculty 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 2013, eight Department members (Drs. Bismar, Chan, Demetrick, Green, Kelly, Khan, Wright, Zhang) have research laboratories within the Faculty of Medicine Health Sciences Centre, Heritage Medical Research Building, HRIC Building, or the Prostate Cancer Centre; these laboratories are associated with Faculty of Medicine Research Institutes or groups, including Hotchkiss Brain Institute; Southern Alberta Cancer Research Institute; Alberta Children's Hospital Institute of Maternal & Child Health; Institute of Infection, Immunity and Inflammation; 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 developed new expertise in Lab Informatics and utilization. In April 2013, AHS funded a two year pilot Utilization Office at CLS under the leadership of Dr. Chris 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, results in the development of new knowledge and therefore enhances patient care.

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

The CLS Medical Director is responsible for the direction and leadership of Research within CLS. The CLS Research Office team also includes the Program Leader for Research and Development, Research and Development Program Coordinator, and Research Supervisor. Three Research Coordinators within the Research Department located at the Special Services Building (SSB) Research Lab, FMC 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 Lab Assistants provide support for clinical trial/research specimen processing, packaging and shipping. A Laboratory Specialist at the Anatomic Pathology Research Lab (APRL) provides Anatomic Pathology research support to researchers at CLS/U of C.

### A summary of the initiatives undertaken by CLS Research in 2013:

- Dr. Demetrick presented recommendations on a Strategy for AHS Laboratory Research and Development at the Laboratory Leaders Meeting.
- Dr. Demetrick submitted an application to the Alberta Cancer Foundation for support of a CLS Novel Developmental Molecular Diagnostics Initiative.
- In consultation with U of C Ethics Board (CHREB) Dr. Demetrick attempted to promote research at CLS and reduce barriers by making the case for the renewal of the Ethics approved Biomarker small-scale pilot research projects within CLS. This was to serve 2 purposes: Enable cost effective research (low cost but high impact/ outcomes); Fast track Novel discoveries relating to rapidly changing Pathology Biomarker studies. This protocol was granted full board renewal until February 2014.
- Dr. Demetrick initiated discussions within Alberta Innovates-Health solutions regarding funding of infrastructure within CLS to support research activities.
- Dr. Demetrick and Mr. Zane Ramdas each met with Dr. Tammy Mah-Fraser to discuss roles for CLS in the new Alberta Clinical Research Consortium.
- Mr. Ramdas was appointed the Research Liaison between CLS and the Tom Baker Cancer Centre.
- Dr. Doha Itani was appointed the Research Pathologist Liaison between CLS and the Tom Baker Cancer Centre
- The CLS Research Committee is responsible for scientific review of internal research projects and members include: Dr. Koebel, Dr. Chin, Dr. Naugler, Dr. Rad, and Dr. Pillai. Dr. Trpkov has completed his term as Chair of the Research Committee and the search for a replacement is in progress.

### The Research Department:

- Facilitated solutions for Research problems/ barriers between TBCC and CLS. TBCC is one of the largest requestors of research support from CLS for Clinical Trials, Anatomic Pathology and Gen-Lab related studies.
- Developed and implemented a new harmonized Research Policy at CLS.
- Provided input for the New Cancer Care Centre for setup of CLS Clinical Trials and Research Outpatient Services, Clinical Trial Support (with the TBCC) & Slide and Block Storage, Cellular Therapy, etc.
- Worked with AHS Provincial Research & Privacy to ensure alignment of Research Agreements & Practices.
- Provided input for the Provincial Price List of Research Tests and Services for 2013/2014 financial year.
- In conjunction with the CLS Research Committee hosted the Chair of University of Calgary Conjoint Health Research Ethics Board (CHREB), Dr. Stacey Page at CLS Grand Round on 30 June 2013. Engaged Dr. Page to address CLS Pathologists and researchers on the new Electronic Ethics Application Process (IRISS) & Issues surrounding review and approval of Pathology and Laboratory Medical Research. Identified the need at the CHREB for expert scientific reviewer volunteers to represent Pathology and Laboratory Medicine.
- Reviewed and assessed requests for provision of research services for biorepositories initiated by AHS and other Researchers in the Calgary Area.
- Designated to process Provincial Research Requests for Laboratory Data. Increased scope of provision of services from Calgary Lab Data systems (Cerner Classic/ Millennium) to Provincial Lab Data systems (Meditech, Sunquest, Copath, etc).
- Appointed a Research Coordinator for Research Data Requests and for Research Services at CLS Special Services Building Laboratory, commencing April 1, 2013.
- Committed to ongoing efforts/ meetings to ensure Researcher access to historical Laboratory Data stored in unsupported Lab Info systems are transferred to current IT systems in a format that is accessible.
- Facilitated an agreement to provide tumour banking services involving CLS Anatomic Pathology sites (FMC, RGH, PLC) and the Alberta Cancer Research Biorepository (ACRB).
- Completed a thorough review of the status of all Anatomic Pathology studies on file.
- Secured the services of Dr. Marvin Fritzler who agreed to Chair the CLS Health Services Research Competition for a 3 year term. Sarah Rose is contracted by CLS to provide statistical analysis review and approval of applications submitted to the Research Competition.
- Continues to work with the CLS data team to develop an accurate process for capturing research workload and test volumes associated with providing Research support at CLS.

The CLS Research Department announced award results for the sixteenth annual CLS Health Services Research Funding Competition. A total of \$95,296.80 was awarded by CLS to researchers in 2013.

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

### 2013 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.
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Supervisor	Student	Project
Dr. Adnan Mansoor	Sarah Osman	Clinical relevance of Micro RNA (miRNA-223) expression with its influence on LM02 protein, as a risk stratification tool among acute myeloid leukemia patients undergoing allogenic bone marrow transplantation.

### Calgary Laboratory Services Undergraduate Competition

Supervisor	Student	Project
Dr. Jennifer Chan	Rick Ngo	Assessing the Nanostring platform for detection of DNA copy number variations in brain tumours
Dr. Lawrence de Koning	Jaeun Yang	Serum 25-OH vitamin D and risk of cancer, cardiovascular disease and death
Dr. Dylan Pillai	Lydia Da-Yeong Lee	Molecular epidemiology and diagnosis of drug-resistant malaria in returning travelers, Calgary
Dr. Sean Gui	Yuchu Yan	Defining the Clinical-Pathological Features Associated with the Transformation of Microscopic Colitis to Inflammatory Bowel Diseases

### Anatomic Pathology Research Lab (APRL):

The Lab Specialist at the Anatomic Pathology Research Laboratory located at the HMRB, FMC continues to provide quality service to accommodate research projects. Services offered include creation of high quality tissue micro arrays, immunohistochemistry (IHC) method development for new or untested antibodies, IHC staining: single and double stain, curls/ scrolls for molecular testing, and core punch construction.

The workload at the APRL has continued to increase. The APRL Lab Specialist provided laboratory support for 23 research projects in support of 11 different principal investigators in 2013, compared to supporting 3 projects for 2 CLS PI's in 2008. There were a total of 101 requests, which included 1718 IHC slides stained, method development for 35 new antibodies, 17 TMA constructions, and 57 antibodies for routine IHC. As a result of research support provided by the APRL, there were 15 related local PI publications. The APRL cost recovered \$36558.14 for work performed in 2013.

# **Publications**

Department members with a primary appointment in the DPLM and whose primary remuneration is derived from either CLS or UofC DPLM (i.e., list excludes cross-appointments) published 160 peer-reviewed papers in 2013 (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 (2005-2013)

Year	Total Papers	Sum of Journal IFs	Mean Jour. IF/Paper	IF >10	I F >30
2005	60	172.38	2.87	0	0
2006	59	236.66	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	118	473.231	4.01	9	1
2013	160	604.908	3.78	9	1

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 was estimated to be 21% in 2010 (for comparison purposes, clinical departments with Academic Alternate Relationship Plans had 34-46% academic protected time in 2010). The following figure shows the trend over a longer period of time and that our increased publication output cannot be simply attributed to increased numbers of GFT faculty members. In 2013, we experiences a 28% increase in total peer-reviewed publications compared to our previous record year (2011); however, this was accomplished with 13% fewer GFT faculty members than in 2011.

DPLM: GFTS & Peer Reviewed Publications (2000-2013)



While peer-reviewed publications, in general, represent the generation of new knowledge, the publication of book chapters, which are almost always by invitation, is usually 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 19 book chapters and one book in 2013 (Appendix 1.3).

Members of the DPLM also presented many scientific papers at prestigious national or international meetings in 2013. 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.

# **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 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.

Year	Total Annual PI Funding	# GFT Faculty	PI Grant Funding / 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

# Total "calendar year-adjusted" P. I. grant funding for faculty members with primary appointments in the DPLM (2005-2013)

### Promotions:

Drs. Martin Koebel, Christopher Naugler, and Travis Ogilvie were promoted to Associate Professor, and Dr. Andrew Kulaga was promoted to Clinical Associate Professor. The Department congratulates Drs. Koebel, Naugler, Ogilvie and Kulaga and thanks them for their academic contributions.

### Faculty of Medicine Faculty-Wide Award Recipients:

### Dr. Christopher Naugler

• Mo Watanabe Distinguished Achievement Award

### Dr. X. Sean Gui

• Basic Science Award for Clinical, Adjunct, Research Faculty from the Faculty of Medicine.

# Medical Leadership and Administration

- Dr. Adnan Mansoor completed his second term as Clinical Section Chief of Hematology & Transfusion Medicine; the department thanks him for his many contributions over the past 10 years. The Section grew clinically and academically under his leadership. Dr. Taher Shabani-Rad will take over this toll in January 2014.
- Dr. Dan Gregson completed his first term as Clinical Section Chief of Medical Microbiology and was reappointed for a second term.
- Dr. Steve Gorombey was appointed Site Leader for both DSC and PLC.
- Dr. Dan Fontaine was appointed Group Leader of Cytopathology, replacing Dr. Ranjit Waghray. Dr. Waghray continues as the Clinical Section Chief/Division Head of AP/Cyto.
- Dr. Marie-Anne Brundler was appointed Site Leader for ACH and Group Leader for Pediatric Pathology, replacing Dr. Cynthia Trevenen.

# Challenges

As a laboratory system that performs >24,000,000 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.
- Expand services at SHC to meet expanding needs as clinical services grow and evolve.
- Planning and eventually actualizing laboratory service at McCaig Tower in the context of planning for laboratory services at the New Cancer Care Centre (NCCC).
- Space constraints including identifying office space for new pathologists.
- Logistics of implementing 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.
- Exploring possibilities to generate new business and hopefully use these funds to subsidize purchase of new capital equipment and development of new technologies.

# 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 Calgarycentric 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, to be determined though 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.

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.

# **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.

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, with the advent of a new Utilization Office funded by AHS in April 2013 as a two year pilot study, we are trying to be more proactive. The new 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. Hopefully, this pilot study will be successful and will curb inappropriate testing.

Fortunately, in the past two years, there has been a very significant influx of funding for 14 new medical and scientific staff FTEs in 2012 and this had already resulted in a massive recruitment effort. 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 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. In 2013, we recruited 7 more pathologists with start dates in 2013 (see below) and 10 more with start dates in 2014 (these will be listed in the 2014 Annual Report).

MEDICAL STAFF - RECRUITMENT							
Medical Staff	Start Date	GFT/Clinical	Primary Division				
Simpson, Roderick	2013 August	Professor	Anatomic Pathology/Cytopathology				
Schinstine, Malcolm	2013 January	Clinical Assoc. Professor	Anatomic Pathology/Cytopathology				
Minoo, Parham	2013 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology				
Cota, Anna	2013 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology				
Xiong, Wei	2013 July	Clinical Assist. Professor	Anatomic Pathology/Cytopathology				
Brundler, Marie-Anne	2013 May	Professor	Anatomic Pathology/Cytopathology				
Itani, Doha	2013 September	Clinical Assist. Professor	Anatomic Pathology/Cytopathology				
MEDICAL STAFF - DEPA	RTURES						
Meier, Lucja	2013 December	Clinical Assist. Professor	Anatomic Pathology/Cytopathology				
Roland, Birgitte	2013 January	Assoc. Professor	Anatomic Pathology/Cytopathology				
Rasmussen, Steve	2013 January	Clinical Assoc. Professor	Anatomic Pathology/Cytopathology				

# Summary of Recruitment

# **Current Needs**

Currently, we have filled all of the newly funded positions and we are trying to fill two clinician-scientist GFT vacancies: one in neuropathology and the other in pediatric pathology. We will also need to fill vacancies created by any departures and retirements.

# **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, we 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 8 years has been to switch GFT positions to Clinical faculty positions or to decrease the percentage of academic protected time for some GFT positions. Eight 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.

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 (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. Over the past year, we have worked with the TBCC and the Oncology Department related to planning for laboratory service provision at the New Cancer Care Centre (NCCC) which will open in about 6-7 years. In addition to planning for standard clinical laboratory services, we also agreed on the design of an innovative Molecular Diagnostic, Therapeutic, and Research Laboratory Complex which creates a partnership between CLS and TBCC clinicians and scientists which should transform cancer research and care in Calgary. CLS also plays an important role in any efforts to optimize patient flow through the acute care facilities, such as in the Emergency Department or discharge planning.

# 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.
  - All CLS-managed sites in the Calgary Zone currently have full College of Physicians and Surgeons of Alberta (CPSA) accreditation; the next CPSA assessment for all facilities is scheduled for 2014.

- The American Society of Histocompatibility and Immunogenetics (ASHI) conducted an on-site inspection in May 2013 for Tissue Typing; full accreditation was granted until 2015.

# 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. Former Department Head Dr. Grant Innes' assessment was "Lab is not a problem".

# Future Directions and Initiatives

The year 2014 will be an exciting one with the arrival of many new Medical & Scientific Staff bringing diverse new expertise to CLS. CLS will remain nimble and try to meet the changing needs of AHS. Through a Provincial "Hub & Spoke" Model, it is anticipated that we may provide some additional laboratory services in the Southern Zone and possibly the Central Zone.

# Appendices

# 1.1 Membership Lists

Clinical Section of Anatom	ic Pathology/Cyt	opathology		
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise
Abi Daoud, Marie	Clinical	Assist. Professor	DSC	Dermatopathology
Anders, Karl	Clinical	Assoc. Professor	SHC	Surgical Pathology
Barber, Duane	Clinical	Assoc. Professor	DSC	Dermatopathology
Benediktsson, Hallgrimur	GFT	Professor	FMC	Renal Pathology, Transplantation
Bismar, Tarek	GFT	Assoc. Professor	RGH	Genitourinary Pathology, Ana- tomic Pathology
Bromley, Amy	Clinical	Assist. Professor	FMC	Autopsy Pathology
Brown, Holly	Clinical	Assist. Professor	DSC	Dermatopathology
Bruecks, Andrea	Clinical	Assoc. Professor	DSC	Dermatopathology
Brundler, Marie-Anne	GFT	Professor	ACH	Pediatric Pathology
Chan, Jennifer	GFT	Assist. Professor	FMC	Neuropathology
Cota, Ana	Clinical	Assist. Professor	DSC	Surgical Pathology, General Path- ology, Hematopathology
Demetrick, Douglas	GFT	Assoc. Professor	HSC	Molecular Pathology
DiFrancesco, Lisa	GFT	Assoc. Professor	FMC	Soft Tissue & Bone Pathology
Duggan, Maire	GFT	Professor	FMC	Cytopathology, Gynecological Pathology
Dvorakova, Marie	Clinical	Assist. Professor	DSC	Cytopathology
Eidus, Leslie	Clinical	Assoc. Professor	RGH	Gastrointestinal Pathology
Falck, Vincent	Clinical	Assoc. Professor	FMC	Gastrointestinal Pathology, Sur- gical Pathology
Fontaine, Daniel	Clinical	Assoc. Professor	DSC	Cytopathology
George, David	Clinical	Assoc. Professor	FMC	Neuropathology, Renal Pathology
Gorecki, Margaret	Clinical	Assist. Professor	DSC	Surgical Pathology, Cytopathology

Clinical Section of Anatomic Pathology/Cytopathology					
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise	
Gough, James	Clinical	Professor	FMC	Renal Pathology, Cytopathology	
Green, Francis	GFT	Professor	FMC	Pulmonary Pathology, Autopsy	
Guggisberg, Kelly	Clinical	Assist. Professor	RGH	ENT Pathology, Dermatopathology	
Gui, Xianyong (Sean)	Clinical	Assist. Professor	FMC	Gastrointestinal Pathology	
Hunter, Charlene	Clinical	Assist. Professor	PLC	Surgical Pathology, Dermatopathology	
Itani, Doha	Clinical	Assist. Professor	FMC	Molecular Genetic Pathology, Hematopathology	
Joseph, Jeffrey	GFT	Professor	FMC	Neuropathology	
Kelly, Margaret	GFT	Assist. Professor	FMC	Surgical Pathology, Pulmonary Pathology	
Khalil, Moosa	Clinical	Assoc. Professor	FMC	Cytopathology, Surgical Pathology, Endocrine Pathology	
Klonowski, Paul	Clinical	Assist. Professor	DSC	Surgical Pathology, Lab Informat- ics	
Koebel, Martin	GFT	Assoc. Professor	FMC	Gynecological Pathology	
Kulaga, Andrew	Clinical	Assoc. Professor	RGH	Genitourinary Pathology, Surgical Pathology	
Luedtke, Chad	Clinical	Assist. Professor	SHC	Breast Pathology	
Medlicott, Shaun	Clinical	Assoc. Professor	RGH	Gastrointestinal Pathology	
Minoo, Parham	Clinical	Assist. Professor	FMC	Surgical Pathology, Hematopathology	
Morava-Protzner, Izabella	Clinical	Assoc. Professor	PLC	Surgical Pathology	
Ogilvie, Travis	GFT	Assoc. Professor	FMC	Breast Pathology, Gynecological Pathology, Molecular Pathology	
Oryschak, Allan	Clinical	Assoc. Professor	RGH	Ophthalmic Pathology, Surgical Pathology	
Paslawski, Doreen	Clinical	Assist. Professor	RGH	Breast Pathology, Surgical Pathol- ogy	
Pinto-Rojas, Alfredo	GFT	Assoc. Professor	ACH	Pediatric Pathology	
Rashid-Kolvear, Fariborz	Clinical	Assist. Professor	DSC	Cytogenetics	
Resch, Lothar	GFT	Assoc. Professor	FMC	Neuropatholgy	
Schell, Andrew	Clinical	Assist. Professor	SHC	Gastrointestinal Pathology	
Schinstine, Malcolm	Clinical	Assoc. Professor	DSC	Cytopathology, Surgical Pathology, Clinical Biochemisty	
Sienko, Anna	Clinical	Professor	PLC	Surgical Pathology, Cytopathology	
Simpson, Roderick	GFT	Professor	FMC	Head & Neck Pathology	
Teman, Carolin	Clinical	Clinical Assist.	FMC	Surgical Pathology, Hematopathology	
Trotter, Martin	GFT	Professor	DSC	Dermatopathology	
Trpkov, Kiril	GFT	Professor	RGH	Genitourinary Pathology, Renal Pathology	

Clinical Section of Anatom	Clinical Section of Anatomic Pathology/Cytopathology						
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise			
Urbanski, Stefan	GFT	Professor		Gastrointestinal Pathology, Liver Pathology, Pulmonary Neoplasia			
van den Berghe, Janette	Clinical	Assist. Professor	DSC	Cytogenetics			
Waghray, Ranjit	Clinical	Assoc. Professor	PLC	Surgical Pathology, Cytopathology			
Wang, Yinong	Clinical	Assist. Professor	DSC	Cytopathology, Cardiac Pathology			
Wright, James	GFT	Professor	DSC	Pediatric and Perinatal Pathology, Experimental Pathology			
Xiong, Wei	Clinical	Assist. Professor	PLC	Surgical Pathology, General Pathology, GI/Liver Pathology			
Yang, Hua	Clinical	Assist. Professor	FMC	Breast Pathology			
Yilmaz, Asli	GFT	Assoc. Professor	RGH	Genitourinary Pathology, Surgical Pathology			
Yu, Weiming	Clinical	Assoc. Professor	ACH	Pediatric Pathology, Cardiac Pathology			
Clinical Section of Clinical	Biochemistry						
Chin, Alex	Clinical	Assist. Professor	DSC	Immunochemisty, Clinical Chem- istry			
de Koning, Lawrence	Clinical	Assist. Professor	ACH	General Pathology, Pediatric Clin- ical Chemistry			
Dias, Valerian	Clinical	Assoc. Professor	DSC	Clinical Toxicology, Special Chem- istry			
Krause, Richard	Clinical	Assist. Professor	DSC	Clinical Biochemistry, QA/QC			
Sadrzadeh, Hossein	Clinical	Professor	DSC	Endocrinology, Nutrition, Pharma- cogenomics, Clinical Biochemistry			
Seiden Long, Isolde	Clinical	Assist. Professor	FMC	Clinical Biochemistry			
Clinical Section of General	l Pathology	_					
Abdullah, Amid	Clinical	Assist. Professor	DSC	General Pathology			
Baskin, Leland	Clinical	Assoc. Professor	DSC	Chemical Pathology, General Pathology			
Flynn, Ethan	Clinical	Assoc. Professor	SHC	General Pathology			
Gorombey, Steve	Clinical	Assist. Professor	DSC	Cytopathology, General Pathology			
Larsen, Erik	Clinical	Assist. Professor	RGH	Surgical Pathology, Clinical Chem- istry			
Mourad, Walid	Clinical	Professor	DSC	General Pathology, Hematopathology, Cytopathology			
Naugler, Christopher	GFT	Assoc. Professor	DSC	Lab Informatics, General Pathology			
Redman, Lyle W.	Clinical		DSC	Point of Care, Clinical Chemistry			
Clinical Section of Hemato	ology/Transfusion	Medicine					
Auer-Grzesiak, Iwona	Clinical	Assoc. Professor	FMC	Flow Cytometry, Lymphoma			
Berka, Noureddine	Clinical	Assist. Professor	DSC	Tissue Typing			
Fourie, Thomas	Clinical	Assist. Professor	FMC	Hematological Pathology, Flow Cyotometry			
Jiang, Xiu Yan (Sue)	Clinical	Assist. Professor	DSC	Hematopathology			

Clinical Section of Anatom	Clinical Section of Anatomic Pathology/Cytopathology					
Medical Staff	GFT/ Clinical	Rank	Site	Special Expertise		
Khan, Faisal	GFT	Assist. Professor	HMR	Tissue Typing		
Mansoor, Adnan	GFT	Assoc. Professor	FMC	Hematopathology		
Ni, Hongyu	Clinical	Assist. Professor	FMC	Hamatopathology		
Patel, Jay	Clinical	Assist. Professor	FMC	Hematopathology		
Prokopishyn, Nicole	Clinical	Assist. Professor	FMC	Stem Cell Lab		
Shabani-Rad, Meer-Taher	Clinical	Assist. Professor	FMC	Hematopathology		
Sinclair, Gary D.	Clinical	Adjunct Assoc. Professor	DSC	Molecular Hematology		
Clinical Section of Microbi	iology	_		-		
Carson, Julie	Clinical	Assist. Professor	DSC	Mycology, Enterics, Wounds		
Chan, Wilson	Clinical	Assist. Professor	DSC	Telediagnostics, Mycology, Parasit- ology		
Church, Deirdre	GFT	Professor	DSC	Medical Microbiology, HIV Diag- nostics, STDs, Anaerobes, Mycol- ogy		
Gregson, Daniel	GFT	Assoc. Professor	DSC	Virology, Sirology, General Micro- biology		
Pillai, Dylan	GFT	Assoc. Professor	DSC	Molecular Diagnostics, Parasitology		
Pitout, Johann	GFT	Professor	DSC	Anitbiotic susceptibility/ARO Bac- teriology, Parasitology		

# 1.2 Current Workforce Plan (see Workforce Planning)

# 1.3 Scholarly Publications

# Publications in Peer-Reviewed Journals

- 1. Abuzinadah AR, **Joseph JT**, Korngut L. Amyloid myoneuropathy mimicking inclusion body myositis. Can J Neurol Sci. 40(2):255-8, 2013
- 2. Afra K, Laupland K, Leal J, Lloyd T, **Gregson D**. Incidence, risk factors, and outcomes of Fusobacterium species bacteremia. BMC Infect Dis. 13(1):264, 2013
- 3. Ahmed-Bentley J, Chandran AU, Joffe AM, French D, Peirano G, **Pitout JD**. Gram-negative bacteria that produce carbapenemases causing death attributed to recent foreign hospitalization. Antimicrob Agents Chemother. 57(7):3085-91, 2013
- 4. Alaghehbandan R, **Fontaine D**, Bentley J, Escott N, Ghatage P, Lear A, Coutlee F, Ratnam S. Performance of ProEx C and PreTect HPV-Proofer E6/E7 mRNA tests in comparison with the hybrid capture 2 HPV DNA test for triaging ASCUS and LSIL cytology. Diagn Cytopathol. 41(9):767-75, 2013
- 5. Alkemade GM, Clemente-Casares X, Yu JZ, Xu BY, Wang J, **Wright JR Jr**, Roep BO, Santamaria P. Local autoantigen expression as an essential gatekeeper of T-cell recruitment to syngeneic islet grafts in diabetic hosts. Diabetes. 62(3):905-911, 2013
- 6. Alshalalfa M, Bader D, **Bismar TA**, Alhajj R. Coordinate MicroRNA-mediated regulation of protein complexes in prostate cancer. PLoS One. 8(12):e84261, 2013

- 7. Altman AD, Nelson GS, Ghatage P, McIntyre JB, Capper D, Chu P, Nation JG, Karnezis AN, Han G, Kalloger SE, **Köbel M**. The diagnostic utility of TP53 and CDKN2A to distinguish ovarian high-grade serous carcinoma from low-grade serous ovarian tumors. Mod Pathol. 26(9):1255-63, 2013
- 8. Armstrong GD, **Pillai DR**, Louie TJ, MacDonald JA, Beck PL. A potential new tool for managing Clostridium difficile infection. J Infect Dis. 207(10):1484-6, 2013
- 9. Baluch A, Humar A, Eurich D, Egli A, Liacini A, Hoschler K, Campbell P, **Berka N**, Urschel S, Wilson L, Kumar D. Randomized controlled trial of high-dose intradermal versus standard-dose intramuscular influenza vaccine in organ transplant recipients. Am J Transplant. 13(4):1026-33, 2013
- 10. Bedard T, Lowry RB, Sibbald B, Harder JR, **Trevenen C**, Horobec V, Dyck JD. Folic acid fortification and the birth prevalence of congenital heart defect cases in Alberta, Canada. Birth Defects Res A Clin Mol Teratol. 97(8):564-70, 2013
- 11. Bellis M, Metias S, **Naugler C**, Pollett A, Jothy S, Yousef GM. Digital pathology: Attitudes and practices in the Canadian pathology community. J Pathol Inform. 4:3, 2013
- 12. Bracey NA, Beck PL, Muruve DA, Hirota SA, Guo J, Jabagi H, Wright JR Jr, MacDonald JA, Lees-Miller JP, Roach D, Semeniuk LM, Duff HJ. The Nlrp3 Inflammasome promotes myocardial dysfunction in structural cardiomyopathy through interleukin-1ß. Exp. Physiol. 98(2):462-472, 2013
- 13. Burak KW, Swain MG, Santodomingo-Garzon T, Lee SS, **Urbanski SJ**, Aspinall AI, Coffin CS, Myers RP. Rituximab for the treatment of patients with autoimmune hepatitis who are refractory or intolerant to standard therapy. Can J Gastroenterol. 27(5):273-80, 2013
- 14. Bures N, Nelson G, Duan Q, Magliocco A, **Demetrick D, Duggan MA**. Primary squamous cell carcinoma of the endometrium: clinicopathologic and molecular characteristics. Int J Gynecol Pathol. 32(6):566-75, 2013
- 15. Cader FZ, Vockerodt M, Bose S, Nagy E, **Brundler MA**, Kearns P, Murray PG. The EBV oncogene LMP1 protects lymphoma cells from cell death through the collagen-mediated activation of DDR1. Blood. 122(26):4237-45, 2013
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- 17. **Chan WW**, Peirano G, Smyth DJ, **Pitout JD**. The characteristics of Klebsiella pneumoniae that produce KPC-2 imported from Greece. Diagn Microbiol Infect Dis. 75(3):317-9, 2013
- 18. **Chan WW**, Virmani D, **Pillai DR**. Artemisinin combination therapy can result in clinical failure if oral therapy is not directly observed. Can J Infect Dis Med Microbiol. 24(4):215-6, 2013
- 19. Chen J, Abi-Daoud M, Wang A, Yang X, Zhang X, Feilotter HE, Tron VA. Stathmin 1 is a potential novel oncogene in melanoma. Oncogene. 32(10):1330-7, 2013
- 20. Chen T, Kurwa HA, **Trotter MJ**, Haber RM. Agminated blue nevi in a patient with dermatomyositis. J Am Acad Dermatol. 68(2):e52-3, 2013
- 21. **Church D**, Lloyd T, Peirano G, **Pitout J**. Antimicrobial susceptibility and combination testing of invasive Stenotrophomonas maltophilia isolates. Scand J Infect Dis. 45(4):265-70, 2013
- 22. Church DL. Principles of capillary-based sequencing for clinical microbiologists. Clin Microbiol Newsletter, 35(2):11-18, 2013
- 23. Dal Pra A, Lalonde E, Sykes J, Warde F, Ishkanian A, Meng A, Maloff C, Srigley J, Joshua AM, Petrovics G, van der Kwast T, Evans A, Milosevic M, Saad F, Collins C, Squire J, Lam W, **Bismar TA**, Boutros

PC, Bristow RG. TMPRSS2-ERG Status Is Not Prognostic Following Prostate Cancer Radiotherapy: Implications for Fusion Status and DSB Repair. Clin Cancer Res. 19(18):5202-5209, 2013

- 24. Darragh TM, Colgan TJ, Thomas Cox J, Heller DS, Henry MR, Luff RD, McCalmont T, Nayar R, Palefsky JM, Stoler MH, Wilkinson EJ, Zaino RJ, Wilbur DC, (Duggan MA, member of the LAST Project Work Groups). The Lower Anogenital Squamous Terminology Standardization project for HPV-associated lesions: background and consensus recommendations from the College of American Pathologists and the American Society for Colposcopy and Cervical Pathology. Int J Gynecol Pathol. 32(1):76-115, 2013
- 25. **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. 24:2061-6, 2013
- 26. Delahunt B, Cheville JC, Martignoni G, Humphrey PA, Magi-Galluzzi C, McKenney J, Egevad L, Algaba F, Moch H, Grignon DJ, Montironi R, Srigley JR, and (Trpkov K, Yilmaz A, members of the ISUP Renal Tumor Panel). The International Society of Urological Pathology (ISUP) grading system for renal cell carcinoma and other prognostic parameters. Am J Surg Pathol. 37(10):1490-504, 2013
- 27. Deng X, Church D, Vanderkooi OG, Low DE, Pillai DR. Streptococcus pneumoniae infection: a Canadian perspective. Expert Rev Anti Infect Ther. 11(8):781-91, 2013
- 28. Denisuik AJ, Lagacé-Wiens PR, Pitout JD, Mulvey MR, Simner PJ, Tailor F, Karlowsky JA, Hoban DJ, Adam HJ, Zhanel GG; Canadian Antimicrobial Resistance Alliance. Molecular epidemiology of extended-spectrum ß-lactamase-, AmpC ß-lactamase- and carbapenemase-producing Escherichia coli and Klebsiella pneumoniae isolated from Canadian hospitals over a 5 year period: CANWARD 2007-11. J Antimicrob Chemother. 68 Suppl 1:i57-65, 2013
- 29. Deutschmann M, **Khalil M**, Bhayana S, Chandarana S. Occult multifocal papillary thyroid microcarcinoma presenting as a supraclavicular mass containing anaplastic thyroid carcinoma. JAMA Otolaryngol Head Neck Surg. 139(4):415-8, 2013
- 30. **Duggan MA**, Goswami R, Magliocco AM, Burnier M, Sidhu D. Canadian Association of Pathologists (Association Canadienne des Pathologistes) Working Group. Guidelines for the review of pathology in the research context. Surgery. 154(1):111-5, 2013
- 31. Erdogdu U, Tan M, Alhajj R, Polat F, Rokne J, **Demetrick D**. Integrating machine learning techniques into robust data enrichment approach and its application to gene expression data. Int J Data Min Bioinform. 8(3):247-81, 2013
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- 34. Franko AD, Wright JR, Trotter MJ. Underestimating underrecognition: the authors' reply. Am J Clin Pathol. 139:694, 2013
- 35. Gage JC, **Duggan MA**, Nation JG, Gao S, Castle PE. Comparative risk of high-grade histopathology diagnosis after a CIN 1 finding in endocervical curettage versus cervical biopsy. J Low Genit Tract Dis. 17(2):137-41, 2013
- 36. Gao S, Chen A, Rahmani A, Jarada T, Alhajj R, **Demetrick D**, Zeng J. MCF: a tool to find multi-scale community profiles in biological networks. Comput Methods Programs Biomed. 112(3):665-72, 2013
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- 40. **Gui X**, Liu S, Meng Z, Gao Z-H. Neurotensin Receptor 1 (NTSR1) Overexpression in Breast Carcinomas is Common and Independent of ER/PR/Her2 Expression. Journal of Cancer Therapy. 4:12-17, 2013
- 41. **Gui X**, Liu S, Yan Y, Gao Z. Neurotensin receptor 1 overexpression in inflammatory bowel diseases and colitis-associated neoplasia. World J Gastroenterol. 19(28):4504-10, 2013
- 42. Hamilton LE, Jones K, Church N, **Medlicott S**. Synchronous appendiceal and intramucosal gastric signet ring cell carcinomas in an individual with CDH1-associated hereditary diffuse gastric carcinoma: a case report of a novel association and review of the literature. BMC Gastroenterol. 13(1):114, 2013
- 43. Hammermeister M, **Baskin L**, Lemaire C, **Naugler C**. Comparison of two full term infant lancet devices on ease of use and post lance bleeding times. J Neonatal Nurs. 19:71-75, 2013
- Han G, Sidhu D, Duggan MA, Arseneau J, Cesari M, Clement PB, Ewanowich CA, Kalloger SE, Köbel M. Reproducibility of histological cell type in high-grade endometrial carcinoma. Mod Pathol. 26(12):1594-604, 2013
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- 47. Iacucci M, Daly A, Chaudhry A, Duggan P, **Gui X**, Love J, Ghosh S. Assessment of the early regenerative therapeutic response in graft versus host disease using high definition technology with virtual i-Scan chromoendoscopy. Endoscopy. 45 Suppl 2 UCTN: E389-90, 2013
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### Book 2013:

Gao Z-H, Naulger C. Clinical Skills Review Scenarios Based on Standardized Patients (3rd Ed), Brush Education, Calgary, AB, 285 pages, 2013

# 1.4 Research Grants

### 2013 CLS HEALTH SERVICES RESEARCH FUNDING COMPETITION PROJECTS AWARDED FUNDING

Competition Year	Principal Investigator/Co-Investi- gators	Торіс	Budget
2013	Adrienne Lee, Gary Sinclair, Natalia Rydz, Dawn Goodyear, Man-Chiu Poon	Potential role of thromboelastography (TEG) in DDAVP response monitor- ing for von Willebrand disease and mild hemophilia A	\$9,520.00
2013	Faisal Khan, Jan Storek, Gaurav Tripathi, Poonam D. Khan	To assess whether allogenic HCT per- formed with donors carrying low IL-10 producing gene variants is a good pre- dictor of graft vs host disease (GVHD)	\$9,825.00
	Noureddine Berka, Jinguo Wang, Abdulnaser Alabadi, Serdar Yilmaz	Development of a novel diagnostic tool to monitor the antibody dependent NK cell mediated cytotoxicity in solid organ transplantation (Phase II).	\$9,972.00
	Johann Pitout Dylan Pillai, Deirdre Church, Dan Gregson	Rapid whole genome sequencing in clinical microbiology- the new frontier for molecular epidemiology.	\$34,979.80
	Faisal Khan Jan Storek, Rehan M. Faridi, Poonam D. Khan	Precise' Genetic Profiling of Killer Immunoglobulin like Receptors (KIRS) of Natural Killer Cells as predict- ors of ATG-conditioned allogeneic Hematopoietic Cell Transplantation (HCT) outcomes.	\$31,000.00

### 2013 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
BERKA, NOUREDDINE				

MEDICAL STAFF	YEAR	FUNDING SOURCE	total Award	*PI/CO-INV
"Biomarkers for Viral Pathogenesis"	2011-14	Emerging Health Research Teams Grant Program/The Canadian Institutes of Health Research	\$300,000	Co-Inv
"Assessment of T-cell receptor exci- sion circle (TREC) quantity after hematopoietic cell transplantation: a biomarker for immune reconstitu- tion and thymic function."	2011-14	The Kids Cancer Care Foundation of Alberta (KCCFA)	\$25,000	Co-Inv
"BMT translation research, non HLA immunogenetics study."	2011-15	Childhood Cancer Collaborative Funding- ACH Foundation	\$500,000	Co-Inv
BENEDIKTSSON, HALLGRIMUR				
"Renal Biobank"	2013-16	Canadian Foundation for Innovation; Alberta Health Services; Calgary Laboratory Services	\$768,771	Co-PI
BISMAR, TAREK			•	•
"Combined role of TMPRSS2- ERG fusion gene and PTEN genomic deletions in prostate can- cer development, progression and metastasis"	2008-14	Prostate Cancer Research Foundation USA	\$238,660	PI
"New insights into the molecular pathology of scleroderma"	2011-14	Canadian Institutes of Health Research	\$157,850	Co-Inv
"The ING3 epigenetic chromatin regulator in prostate cancer"	2011-13	Alberta Cancer Foundation, Edmonton, Alberta	\$306,000	Co-Inv
"A matched case control study to characterize the TMPRSS2-ERG gene rearrangement in patients treated with prostate brachytherapy"	2011-13	ACURA (Abbott Oncology)	\$25,410	Co-Inv
"Interaction of TMPRSS2-ERG fusion gene and PTEN genomic deletions in prostate cancer progression"	2012-15	Prostate Cancer Research Foundation USA	4\$50,000	PI
"Killikrein-PSA signalling, pro- teinase-activated receptors (PARS) and prostate cancer development"	2013-15	Prostate Cancer Canada	\$197,836	Co-PI
"Molecular signatures platform to characterize aggressive and indolent prostate cancer"	2013-18	Canadian Foundation of Innovation	\$17,970	PI
CHAN, JENNIFER				
"MicroRNA functions in cerebellar development and disease"	2010-13	Alberta Heritage Foundation Establishment Grant	\$360,000	PI

MEDICAL STAFF	YEAR	FUNDING SOURCE	total Award	*PI/CO-INV
"MicroRNA functions in cerebellar development and disease"	2010-17	Alberta Heritage Foundation Clinical Investigator Award	\$770,000	PI
"A novel platform for glioma mod- eling to accelerate the therapeutic targeting of GBM"	2011-14	Terry Fox Research Institute, New Investigator Award	\$397,614	PI
"Stratifying and targeting medul- loblastoma through genomics"	2011-14	Genome Canada (with multiple co-funding sources)	\$208,384	PI
"Modeling and therapeutic target- ing of the clinical and genetic di- versity of glioblastoma"	2011-16	Terry Fox Research Institute (with multiple co-funding sources)	\$252,090	PI
CHIN, ALEX				
"Killikrein-PSA signalling, pro- teinase-activated receptors (PARs) and prostate cancer development	2015	Prostate Cancer Canada	\$197,836	Co-Inv (collaborator)
"A prospective biochemical analysis of changes in serum hormone levels (FSH, LH, Estradiol) associated with menopause in women with early breast cancer in the NCIC CTG MA.12 trial of tamoxifen versus placebo, given following ad- juvant chemotherapy"	2015	Breast Cancer Society of Canada	\$14,651	Co-PI
CHURCH, DEIRDRE			^	2
"Infection of the gut by HIV-1"	Renewed 2012-15	Canadian Institutes of Health Research	\$144,100	Co-Inv
DEMETRICK, DOUG				
Molecular auditing: An evaluation of tissue specimen misidentification"	2011-14	Canadian Institutes of Health Research	\$380,000	PI
"MicroRNA gene polymorphism/ mutation association with meta- static breast cancer"	2012-13	Breast Cancer Society of Canada	\$10,000	PI
"Uncovering mechanisms of cell ce- gulation in human chronic disease"	2013	Ruth Barker Foundation	\$20,000	PI
GREEN, FRANCIS				
"High resolution microscopy of human cancer"	2004-15	Anonymous Foundations	\$500,00	PI
"Disseminating a novel rescue therapy for severe asthma to a wider commercialization focused audience"	2011-14 (exten- sion)	CIHR Knowledge translation operating grant	\$77,269	PI
"Development and validation for a novel rescue therapy for severe asthma"	2012-14	Alberta/Pfizer Translational Research Fund Opportunity	\$198,780	PI

MEDICAL STAFF	YEAR	FUNDING SOURCE	total Award	*PI/CO-INV
"Pathological evaluation of slides from lungs of rats exposed to ambi- ent dust from Iraq and comparison to control lungs"	2012-14	U.S. Army	\$7,500 US	PI
"Cholesterol-mediated surfactant dysfunction – mechanisms and treatment"	2013-16	Alberta Innovates – Health Solutions	\$700,000	Co-Inv
GUI, XIANYONG (SEAN)				
"Colonic mucosal lymphocyte sub- sets and cytokine profiles associated with disease phenotypes and thera- peutic responses of IBD"	2012-14	Alberta Innovation and Health Solution (though Alberta IBD Consortium)	\$36,000	PI
KELLY, MARGARET		[		
"The innate immune response in the pathogenesis of hypersensitivity pneumonitis"	2009-16	Alberta Heritage Foundation for Medical Research	\$1,170,000	PI
"Are ani-inflammatory glucocor- ticoid-inducible genes present in humans taking ICS"	2011-13	AstraZeneca: Investigator Initiated	\$178,773	Co-Inv
KHAN, FAISAL				
"Non-HLA immunogenetic bio- markers important for pathogen- esis and therapy of complications of paediatric hematopoietic cell transplantation"	2011-15	Alberta Children Health Foundation. Cancer Care Collaborative	\$500,000	PI
"Biomarkers of viral pathogenesis in transplant recipients"	2011-14	University of Calgary, Emerging Team Grant	\$3,000,000	Co-Inv (collaborator)
"Effect of a physical exercise program on the immune system recovery and quality of life in paedi- atric patients undergoing autologous stem cell transplantation"	2011-14	Alberta Children's Health Foundation, Cancer Care Collaborative	\$62,826	Co-Inv
"Assessment of T-cell receptor exci- sion circle (TREC) quantity after hematopoietic cell transplantation: a biomarker for immune reconstitu- tion and Thymic function"	2011-14	Alberta Children's Hospital Foundation/KCCF Chair in Pediatric Oncology	\$25,000	PI
"Toward improved outcomes of an- tithymocyte globulin-conditioned hematopoietic cell transplantation"	2013-15	Alberta Innovates-Health Solutions.	\$750,000	Co-Inv
"Immunogenetic Biomarkers im- portant for pathogenesis and therapy of complications of Hematopoeitic Cell Transplantation"	2011-15	Alberta Children's Hospital Foundation: Barb Ibbotson ACHF Investigatorship Award in Pediatric Hematology	\$120,000	PI
NOEDEL, WIAKTIN				

MEDICAL STAFF	YEAR	FUND	DING SOURCE	total Award	*PI/CO-INV
"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	Natio	nal 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 Depa		rtment of Defence	\$65,000	Co-Inv (local PI)
"PIK3CA mutation and associated pathway activation status and sur- vival in patients with cervical can- cer: quantifying the risk and testing the solution"			Alberta Innovates- Health Solutions	\$750,000	Co-Inv
MANSOOR, ADNAN					
"Predict benefit and improve out- comes of conventional high dose therapy/stem cell transplantation for lymphoma patients through mo- lecular biomarkers"	2012-14		Stephure Directed Donation, TBCC/ Alberta Cancer Foundation	\$250,000	Co Inv
"Reovirus as a viable therapeutic option to target therapy resistance of multiple myeloma"	2013-15		Cancer Research Society	\$120,000	Co-Inv
"Hematological profile of appro- priate for gestational age infants born to mothers with early onset preeclampsia"	2013-14		Alberta Children's Hospital Research Institute	\$2,985	Co-Inv
"Molecular profile of Follicular lymphoma and relationship to risk stratification"	2013-15		Division of Hematology & Hamatologic Malignancies	\$30,000	PI
NAUGLER, CHRISTOPHER					
"Translating evidence to improve- ments in care and outcomes for people with diabetes"	2012		Canadian Institutes of Health Research, Planning Grants	\$24,995	Co-Inv
"Implementation and evaluation of a clinical pathway for chronic kid- ney disease in primary care"	2013-16		Canadian Institutes of Health Research	\$524,421	Co-Inv
"Psychosocial health of women in Mwanza City: Biomarkers of stress, anxiety, depression and birth outcome.	2013		University Research Grants Committee	\$18,000	Co-Inv
"Pilot Lab Utilization Study"	2013-2015		Alberta Health Services	\$1,000,000	PI
PILLAI, DYLAN					

MEDICAL STAFF	YEAR	FUND	DING SOURCE	total Award	*PI/CO-INV
"Canada-UK team in bacterial re- sistance to Beta-Lactam antibiotics"	2011-14		Canadian Institutes of Health Research	\$3,565,700	Co-Inv
"Novel dapatomycin derived lipo- peptide antibiotics"	2011-14		Canadian Institutes of Health Research / Natural Sciences and Engineering Research Council	\$447,999	Co-Inv
"Toward a rational and novel therapy for Clostridium difficile infection"	2012-15 Cana Resea Engi		dian Institutes of Health arch /Natural Sciences and neering Research Council	558,000	Co-Inv
TRPKOV, KIRIL	•			•	•
"The role of the inflammasome in renal injury"	2009-13		Canadian Institutes of Health Research	\$512,080	Co-Inv (collaborator)
ZHANG, KUNYAN					
"The Alberta Sepsis Network"	2009-14		Alberta Heritage	\$4,998,191	Co-Inv
	2012 increase		Foundation for Medical Research	\$2,257,734	
"Detection and tracking of hos- pital outbreaks of pathogenic mi- crobes using rapid whole genome sequencing"	2013-15		Calgary Health Trust	\$106,050	Co-PI

# 1.5 Banff Pathology Course

2013 Banff Patho	ology Course Program				
WEDNESDAY	WEDNESDAY, AUGUST 28, 2013				
5:00-6:30 pm	Registration - Riverview Lounge				
THURSDAY, A	UGUST 29, 2013				
7:00-7:45 am	Registration - Riverview Lounge				
7:00 - 7:45	Continental Breakfast - New Brunswick Room				
7:45-8:00	Dr Michael Mengel - Welcome & Introduction - Alberta Room				
8:00-8:45	Dr Stephen Bonsib - Handling and reporting of nephrectomies - Alberta Room				
8:45-9:30	Dr David Grignon - Current classification of kidney tumors - Alberta Room				
9:30-10:15	Dr David Grignon - Novel renal tumors you do not want to miss!				
10:15-10:30	Break - Riverview Lounge				
10:30-11:15	Dr Stephen Bonsib - Pathology of the non-neoplastic kidney for the surgical pathologist: Part I - tubulointerstitial and cystic diseases - Alberta Room				
11:15-12:00	Dr Banu Sis - Pathology of the non-neoplastic kidney for the surgical pathologist: Part II - glomerular and vascular diseases				
12:00-1:00 pm	Lunch - New Brunswick Room				
1:00-1:45	Dr Asli Yilmaz - Diagnostic approach and reporting of testicular cancer - Alberta Room				
1:45-2:30	Dr Asli Yilmaz - Germ cell tumors, diagnostic pitfalls - Alberta Room				

2013 Banff Pathology Course Program	
5:00-6:30	Case presentations - New Brunswick Room
	Moderators: Dr Asli Yilmaz and Dr Kiril Trpkov
	Presenters: Drs. Julinor Bacani, Ather Bano, Angela Franko, Arjumand Husain, Mark Lee, and Darryl Yu
6:30-8:00	Wine & cheese - Riverview Lounge
FRIDAY, AUGUST 30, 2013	
7:00-7:45 am	Registration - Riverview Lounge
7:00 - 7:45	Continental Breakfast - New Brunswick Room
7:45-8:00	Dr Michael Mengel - Welcome & Introduction - Alberta Room
8:00-8:45	**Dr Peter W Davey Pathology Lectureship**
	Dr Jonathan Epstein - Contemporary Gleason grading - Alberta Room
8:45-9:30	Dr Kiril Trpkov - Diagnosis of prostate cancer - pearls and pitfalls - Alberta Room
9:30-10:15	Dr Jonathan Epstein - Handling and reporting radical prostatectomies - Alberta Room
10:15-10:30	Break
10:30-11:15	Dr Kiril Trpkov - Benign mimickers of prostate cancer and preneoplastic lesions - Alberta Room
11:15-12:00	Dr George Cembrowski - The use and misuse of PSA testing - are there better alternatives? - Alberta Room
12:00-1:45	Lunch - New Brunswick Room
12:00-1:45	ASLP Annual General Meeting & Luncheon - RSVP required - Ivor Petrak Room
1:45-2:30	Dr Ronald Moore - Reporting GU pathology - the clinician's needs - Alberta Room
2:30-3:15	Dr Tarek Bismar - Molecular insights into prostate cancer - what practicing pathologists should know! - Alberta Room
3:15-4:00	Dr John Lewis - Future biomarkers for risk stratification in prostate cancer - Alberta Room
6:00-10:00	Cocktails & Banquet - Cascade Ballroom / Conservatory
SATURDAY, AUGUST 31, 2013	
7:00-7:45 am	Registration - Riverview Lounge
7:00 - 7:45	Continental Breakfast - New Brunswick Room
7:45-8:00	Dr Michael Mengel - Welcome & Introduction - Alberta Room
8:00-8:45	Dr David Grignon - Urothelial cancer: staging and sampling issues - Alberta Room
8:45-9:30	Dr Jesse McKenney- Diagnosis and grading of urothelial cancer - Alberta Room
9:30-10:15	Dr Jonathan Epstein - Mimickers of bladder neoplasia - Alberta Room
10:15-10:30	Break - Riverview Room
10:30-11:15	Dr Jesse McKenney - Variants of urothelial cancer and non-urothelial neoplasms you do not want to miss! - Alberta Room
11:15-12:00	Dr David Grignon - "Eye candy for pathologists" - Alberta Room
12:00-12:15	Dr Michael Mengel - Closing Remarks - Alberta Room
12:15	Adjournment

### Guest Faculty / Keynote Speakers

JONATHAN I. EPSTEIN, MD \*\* Dr. Peter W. Davey Pathology Lectureship \*\* Professor of Pathology, Professor of Oncology, Professor of Urology Johns Hopkins Hospital Baltimore, MD

STEPHEN M. BONSIB, MD Nephropath Little Rock, AR

DAVID J. GRIGNON, MD, FRCP Centennial Professor of Pathology Vice Chairman, Clinical Programs

Indiana University School of Medicine & Indiana University Health Indianapolis, IN

JESSE K. McKENNEY, MD Associate Head, Surgical Pathology Cleveland Clinic Cleveland, OH



