Submitted by Dr. Paul Yip

In this follow-up article to the introduction of JCTLM from the September 2019 issue of CSCC News, I would like to expand on the practical value of traceability in laboratory medicine. The JCTLM (Joint Committee for Traceability in Laboratory Medicine) was established in 2002, but the coordinated activities of defining higher order reference materials and reference methods was well underway and Canadians were active in this regard. Those who entered our profession after this time would find it hard to retrace some history, but hopefully the examples below highlight the importance of accuracy, realized through proficiency testing to bring about improved patient care.

The classic example comes from the importance of reliable cholesterol measurements in the treatment of coronary heart disease, which had long been the leading cause of death in Canada before currently available treatments. The CSCC and CAP (Canadian Association of Pathologists) published a position statement that recommended a reference laboratory (1). This led to the Canadian Cholesterol Reference Foundation that served as an accuracy base for the standardization of lipid testing in clinical laboratories across Canada at the time. Through this link to the CDC’s reference laboratory network, we have been able to directly benefit from the National Cholesterol Education Program Adult Treatment Panel guidelines. Traceability in Canada was born over 30 years ago!

Within the lab, day-to-day operations probably do not lead to much thinking about traceability. Yet some of our most important assays that uphold international guidelines rely on the continuity of the results that were established in the original clinical trials. While manufacturers claim traceability of their methods, the laboratory needs to verify this in the initial method validation and throughout the life of the assay. Regular inter-laboratory comparisons, especially through Proficiency Testing (PT), is now the mainstay as an external check of analytical performance. Going back to the CSCC/CAP Position Statement, the Task Force was prescient to suggest a “mandatory and tightly controlled” PT program in 1989. Furthermore, an accuracy-based assessment was much needed given that variation in results would leave one to question the effectiveness of treatment (let alone exacerbating patient risk!). Fortunately, laboratories got in line, and accuracy-based PT was essential to assure ongoing performance.

Fast forward to the current global disease burdens that have necessitated accurate patient results. PT would need to be anchored to a valid reference system to ensure standardization of results. Again, Canadians would not be left out and accuracy-based PT schemes for creatinine and HbA1c have substantially decreased overall analytic error by laboratories (2,3), thereby benefiting the efforts to combat kidney disease and diabetes, respectively. In the same manner, higher order reference materials and methods for these analytes are now recognized by JCTLM. Through traceability, clinical laboratories have the assurance that results are comparable regardless of methodology. Although we use field methods that are imperfect (e.g. Jaffe creatinine), the uncertainty in the results can be determined through accuracy-based PT due to the unbroken chain to the reference calibrator. Therefore clinical laboratories and assay manufacturers can be...
accountable for the results that are reported, which should drive our own efforts towards improvement to be fit for purpose (4).

These are just recent examples that we should be able to recognize in global standardization efforts that have reached fruition. Many more are in progress that are relevant to clinical chemistry but also extend into the reaches of hematology, microbiology, and molecular testing. Not only should we be aware of ongoing developments, we have the expertise from the implementation of the aforementioned analytes to help lead others in bringing standardization to their laboratory tests.

Next article: Traceability – Make It, Don’t Break It

References

New CACB Fellows featured in the September 2019 CSCC News:
Drs. Nicole White-Al Habeeb, Ivan Stevic and Michelle Parker
Additional new CACB Fellow (not pictured): Dr. Barry Kyle
Congratulations to all the new CACB Fellows in 2019!

Meet the New 2019 CACB Fellows

Albert Tsui
I grew up and studied in Toronto for most of my life. I completed my BSc (Honors) and PhD in Physiology at the University of Toronto. My PhD work focused on elucidating the oxygen-sensing and hypoxia-inducible factor (HIF) pathways in anemia using animal models. In my postdoctoral study at St. Michael’s Hospital in Toronto, I continued my project theme with the focus of translating my doctoral work to define novel biomarkers for anemic patients. At that time, I was introduced to the profession of clinical biochemistry through collaboration with the clinical laboratory. I was fortunate to be the first clinical biochemistry fellow admitted to the University of Alberta program. During the two years of training, I was mentored by a team of exceptional, enthusiastic, and experienced clinical biochemists in Edmonton who encouraged and supported me along the way.

I am fortunate to join a young and vibrant team of Clinical Biochemists at Alberta Precision Laboratories Ltd. I currently oversee core laboratory testing in academic and suburban rural hospitals in Edmonton, as well as pre-analytical areas for Northern Alberta. Over this past year, I have been involved with the implementation of a new provincial Clinical and Laboratory Information System, along with the development of new standardized order requisitions and test directory. In the future, I look forward to collaboration and integrating translational research into my clinical roles in laboratory medicine. In my spare time, I enjoy playing tennis, skiing and hiking.

Dr. Uvaraj Uddayasankar
I completed my undergraduate and graduate studies at the University of Toronto in the field of analytical chemistry. My graduate research focused on investigating the use of nanomaterials for bioanalytical assays. Looking for ways to apply my knowledge in the clinical realm led me to clinical biochemistry. I joined the Houston Methodist Research Institute as a postdoctoral researcher, working with their clinical biochemist to validate point of care tests for drugs of abuse testing. I was then fortunate to join the clinical biochemistry postdoctoral training program at the University of Manitoba. Under their mentorship and guidance, I completed the training program in October 2018 and joined Shared Health Manitoba as a clinical biochemist. My primary responsibilities were in clinical toxicology and special chemistry tests performed on the LC-MS platform. I then decided to pursue an opportunity with LifeLabs in Ontario where I currently work alongside a great team of biochemists. In addition to our regular sign out duties and consultative services, I have primary responsibilities in high volume chemistry (immunoassays), hepatitis serology and HbA1c testing. Outside of work, I enjoy rowing.

Have you renewed your membership for 2020?

Please ensure that you renew your membership before the end of the year to retain your CSCC member benefits including access to the Members Only files, your PD credit files, and archived roundtables!

Visit the website www.cscc.ca to complete the renewal form.
Host Laboratory for Fellows in Training: The Ottawa Hospital Experience

The Department of Pathology and Laboratory Medicine, University of Ottawa, together with The Ottawa Hospital, CHEO and Eastern Ontario Regional Lab Association (EORLA), offers a unique opportunity for clinical biochemistry fellows to enhance and augment their clinical biochemistry training in a vibrant medical and cultural setting in Canada's Capital city with a group of six experienced Academic Clinical Chemists.

The Ottawa Hospital is one of Canada’s largest hospitals and is comprised of three sites, the General, Civic and Riverside campuses. It is a 1200-bed academic health sciences center affiliated with the University of Ottawa and the University of Ottawa Heart Institute, and offers a range of medical specialties. CHEO is a specialized pediatric acute-care hospital that in addition to serving the Eastern Ontario community also partners with organizations in Nunavut, Northern Ontario and Quebec.

As a regional laboratory, EORLA oversees 19 licensed, acute-care hospital clinical laboratories throughout eastern Ontario. Providing support to regional hospitals, the clinical diagnostic laboratory at the General, Civic and CHEO campuses provide routine and specialized diagnostic testing to both hospital inpatients and registered outpatients, performing approximately 13 million tests annually.

Fellows wishing to enhance their training can choose from a number of our specialty testing areas, such as immunology and autoantibody testing, porphyria analysis, renal stone testing, therapeutic drug monitoring, toxicology, viral serology, and pediatric clinical chemistry, to name a few. With oversight and direction from our Clinical Biochemists, fellows who wish to gain valuable experience as an acting provisional laboratory director have the opportunity to do so at one of our 13 regional diagnostic hospital laboratories. An opportunity to participate in collaborative clinical research is also available. Our structure is flexible so as to provide fellows with individualized training to strengthen current knowledge, as well as to gain new skills and experience.

Situated on the Ottawa River, Ottawa has at its center Parliament Hill, grand Victorian architecture, museums and a vibrant market scene. For those who like the outdoors, the park-lined Rideau Canal is filled with joggers, cyclists and boats in summer, and ice-skaters and carnivals in winter. Downtown’s Byward Market is known for its vibrant restaurant, bar and live-music scene and the Wellington West neighbourhood is home to galleries, boutique shops and food specialists.

For more information, please contact Dr. David Colantonio at dcolantonio@eorla.ca.

Alberta Society of Clinical Chemists 2019 Annual General Meeting

Submitted by Dr. Miranda Brun, UofA Clinical Chemistry Fellow

The annual meeting for the Alberta Society of Clinical Chemists (ASCC) took place in Edmonton, Alberta on September 20, 2019 and was teleconferenced throughout the province. With over 60 participants at the primary site in Edmonton, plus additional attendees at remote sites, the meeting shows continued growth and engagement within the clinical chemistry community in Alberta. The meeting began with a tribute to a very deserving individual whose contributions to the field of clinical chemistry are incalculable.

Mr. Trefor Higgins was recognized with the 2019 ASCC Outstanding Contribution to Clinical Chemistry Award by outgoing ASCC president Dr. Jessica Boyd. Before retiring earlier this year as interim director of Biochemistry, North Sector, Alberta Public Laboratories, Mr. Higgins was Director of Clinical Biochemistry at DynaLifeDx. With over 40 years of experience in laboratory medicine, Higgins has authored over 200 articles and abstracts, and lectured on every continent beside Antarctica (maybe not the most popular conference destination). He has taught generations of students/trainees, implemented testing algorithms to improve patient outcomes, and is a valued resource for students, physicians and colleagues. In 2005, he became the first person to be awarded a Fellowship by Special Distinction by the Canadian Academy of Clinical Biochemistry. He has previously been recognized for his contributions to the field of clinical chemistry when he received the 2008 Canadian Society for Clinical Chemistry (CSCC) Education Excellence Award, and the 2015 CSCC Award for Outstanding Contribution to Clinical Chemistry. We will miss Trefor Higgins immensely, but wish him the very best in his retirement.
The topic of this year’s meeting was “Mass Spectrometry: To Infinity and Beyond?” with three speakers discussing their research and experiences with Mass Spectrometry (MS) in the clinical lab. Dr. Andy Hoofnagle, from the Department of Laboratory Medicine at the University of Washington was the keynote speaker as part of the 2019 CSCC Travelling Lectureship sponsored by Bio-Rad. Dr. Hoofnagle gave a superb talk highlighting the superiority of MS over traditional immunometric-based methods to improve accuracy of results and patient outcomes. He provided a number of examples on the practical use of MS to overcome the issues so prevalent with immunoassays. The first example focused on the use of MS in quantification of vitamin D binding protein. Dr. Hoofnagle and his group validated an LC-MS/MS method to quantify vitamin D binding protein, as vitamin D binding protein genotypes affect immunoassay affinity, leading to misleading results. He also discussed the value of clinical proteomics for measuring proteins, where interferences can render immunoassays subject to false positive and false negative results. He focused on thyroglobulin, which has poor inter-laboratory concordance by immunoassay due to the high prevalence of autoantibodies in the testing population. By including an immunoaffinity enrichment after proteolysis, thyroglobulin, a low abundance protein, can be quantified.

Dr. Andy de Souza, lab scientist with Alberta Public Laboratories in the Newborn Metabolic Screening (NMS) and Biochemical Genetics lab at the University of Alberta (U of A) Hospital, spoke next. She focused on the recent expansion of Alberta’s provincial NMS program, and the positive impact of second tier testing on the program. She revealed how second tier testing can decrease the stress on families by decreasing the false positive rate and increasing the positive predictive value. She gave examples of second tier testing using LC-MS/MS for maple syrup urine disease and methylmalonic academia already built into the NMS program. Although no second tier testing has been developed for congenital adrenal hyperplasia, she showed data on how implementing an LC-MS/MS steroid panel can significantly reduce the false positive rate for 17-hydroxypregesterone screening.

Representing the physician view of MS, Dr. Greg Kline, an endocrinologist at the Cumming School of Medicine at the University of Calgary (U of C), presented an interesting case of factitious Cushing’s that was identified by LC-MS/MS. He used the case to underline the importance of continued communication between clinicians and laboratory staff. Citing the need for collaborative validation studies, he revealed that many endocrinologists interpret results using reference intervals and cutoffs taken directly from medical literature and guidelines. This may not always reflect current methods and lab determined values and can be detrimental in making diagnoses. He shared the positive relationship he has developed with his laboratory colleagues who meet regularly to discuss gaps and ways to improve collaboration.

The final part of the scientific program gave a chance for various trainees across the province to showcase their work. U of C clinical biochemistry fellow Dr. Heather Paul opened the trainee presentations, speaking from Calgary. She discussed how she identified a pre-analytical contamination recently detected in pediatric and newborn urine drug screening samples. Her talk demonstrated how working with patient care units is important to gain a complete understanding of the testing process that can often lead to uncovering previously unidentified sources of error. She was followed by Arshia Mostoufi, also presenting from Calgary. As a summer student at the U of C, Arshia determined that in the Fecal Immunochemical Test (FIT) screening program, samples with concentrations near the cutoff may warrant recollection if they are received after 3 days due to concerns with stability. Kaltrina Doberdani, a newly graduated U of A Medical Laboratory Technology (MLT) student now working in Grande Prairie, presented her work at DynaLIFE medical labs trying to identify a patient-friendly screening test for gestational diabetes. Traditional screening requires ingestion of a glucose drink, a 1 or 2 hour wait at a collection center, and up to three blood draws. Kaltrina evaluated fructosamine and HbA1c tests as potential alternatives. Michelle To, another U of A MLT graduate, spoke about developing standardized reagent lot-to-lot validation procedures to improve consistency across Edmonton hospital labs. Steven Dang, another recent MLT student graduate of U of A, shared his research analyzing the impact of CyanoKit drug (hydroxocobalamin) interference on a wide range of laboratory methods in a hospital where house fire patients are frequently treated. Dr. Miranda Brun, U of A clinical chemistry fellow, discussed the impact of pneumatic tube system transport on ammonia samples, revealing a small but significant increase in ammonia levels at a hospital that uses pneumatic tube system transport compared to sites that do not. The trainee presentations were concluded by Alyssa Marusyn, recent U of A MLT graduate, who compared serum indices on different analyzers with visible grading to elucidate the relationship indices produced from different methodologies.

Following the scientific program, the ASCC mixer, held at The Writer’s Room in Edmonton, was well attended and enjoyed. The successful meeting is thanks to the hard work of the ASCC board, outgoing president Dr. Jessica Boyd, secretary Dr. Josh Raizman, and treasurer Dr. Albert Tsui.
OSCC Annual Scientific Meeting 2019
“Proud Past, Strong Future”

Submitted by Dr. Nicole White-Al Habeeb, OSCC Councillor & Clinical Biochemist, LifeLabs ON

The 2019 Ontario Society of Clinical Chemistry (OSCC) scientific meeting took place October 3-4 at Hart House, University of Toronto, Toronto, Ontario. This meeting marked a momentous milestone as the OSCC celebrated its 50th year! The celebrations for this significant occasion were held throughout the scientific meeting and at the annual dinner at the Cluny Bistro, Toronto. During the dinner, past presidents received a commemorative 50th anniversary pin and all members participated in a chocolate tasting lead by a chocolatier. As part of the 50th anniversary commemoration, several distinguished members of the OSCC shared their reflections on the past and future of clinical chemistry in Ontario in person and by video.

The OSCC annual scientific meeting provides the opportunity to honour the accomplishments of its members. This year’s recipients are Dr. Paul Yip for “Outstanding Contributions to the Profession of Clinical Biochemistry in Ontario” and Dr. Barry Hoffman for “Lifetime Achievement in the Profession of Clinical Chemistry”.

Dr. Paul Yip is a graduate of the University of Toronto (U of T), completing both his B.Sc. and Ph.D. degrees in Biochemistry. After completing the Postdoctoral Training Program in Clinical Chemistry, also at U of T, he joined University Health Network (UHN) in Toronto as a Clinical Biochemist. After 12 years at UHN, he recently joined Sunnybrook Health Sciences Centre as Head of Biochemistry in the Department of Laboratory Medicine and Molecular Diagnostics. Dr. Yip’s professional interests are in the areas of test utilization, laboratory quality management and point-of-care testing. He holds the rank of Associate Professor in the Department of Laboratory Medicine and Pathobiology, where he collaborates on educational and research activities. Dr. Yip has served in leadership positions with the Canadian Academy of Clinical Biochemistry, Institute for Quality Management in Healthcare (IQMH), and community healthcare organizations.

Dr. Barry Hoffman has been a member of Laboratory Medicine and Pathobiology (LMP), and the predicate Department of Clinical Biochemistry, since 1980. He currently holds the rank of Associate Professor at the University of Toronto. He is a member of LMP’s Appointments and Promotions Committee and Quality Assurance Committee. Dr. Hoffman is employed as a Clinical Biochemist by Mount Sinai Hospital with responsibility for special biochemistry and the regional prenatal screening service for Down syndrome. He has been actively involved in training, supervising and mentoring Clinical Biochemistry Postdoctoral trainees in the University of Toronto Clinical Chemistry Training Program for the past thirty years. Since 1990, he has been the site supervisor of training at Mount Sinai Hospital during the first six months of the two year program. Dr. Hoffman served as Academic Director of the Radiation Sciences Baccalaurate Program in the Faculty of Medicine from 2001 to 2005. He has received numerous awards recognizing his contributions to teaching and education including the Teaching Award of the Department of Clinical Biochemistry (1994), LMP’s award for sustained Excellence in Graduate or Postdoctoral Teaching (2004), the OSCC’s award for sustained Achievement in Education (2012), and the Canadian Society of Clinical Chemists’ Award for Education Excellence (2013). In 2012 he received a Leading Practice citation by Accreditation Canada for introducing the intraoperative testing of parathyroid hormone for the surgical service at Mount Sinai Hospital.

Symposium 1: Mass Spectrometry: Where we’ve been and where we’re going
Emerging role of clinical proteomics in laboratory medicine, Dr. Vathany Kulasingam

The scientific program of the conference began when Dr. Kulasingam, from UHN, presented the role of shotgun proteomics in the clinical laboratory. Protein molecules in cells have a vast dynamic range and mass spectrometry may play a role not only in quantification of specific analytes, but also in acquisition of protein profiles. Dr. Kulasingam reviewed the principles of tandem MS/MS techniques and discussed the implementation of LC-MS/MS-based proteomics from a practical and operational standpoint. She noted that the major
The hurdle of implementing this technique in the clinical laboratory is the complexity of sample handling. To conclude, she presented several examples of shotgun proteomics with mass spectrometry, including amyloid subtyping.

**Direct Detection of monoclonal free light chains in serum by MALDI-TOF mass spectrometry, Dr. Lusia Sepiashvili**

Dr. Sepiashvili, from SickKids Hospital, discussed the commonly used quantitative and semi-quantitative methods for measurement of monoclonal antibodies. It was noted that due to the wide spectrum of monoclonal gammopathies, no single method has sufficient sensitivity and specificity to be useful for all clinical scenarios. The disadvantages of gel-based as well as immune-nephelometric quantification of free light chains were discussed. Dr. Sepiashvili highlighted that the use of free light chain concentrations and their ratio lacks adequate specificity. Abnormal free light chain ratios sometimes cannot be confirmed by gel-based electrophoretic methods which then leads to a diagnostic dilemma. As an alternative, Dr. Sepiashvili described novel MALDI-TOF mass spectrometry-based methods for free light chain measurement. By optimizing the immunoenrichment process prior to analysis, this method has been shown to offer better diagnostic performance and has already been adopted for routine use at the Mayo Clinic. She concluded her presentation with several clinical cases.

**Mass spectrometry in pediatrics - case studies from inherited metabolic diseases, Dr. Nathalie Lepage and Dr. Matthew Henderson**

Dr. Lepage and Dr. Henderson presented on various aspects of the newborn screening program at the Children’s Hospital of Eastern Ontario (CHEO). They began with a history of inception and expansion of Newborn Screening Ontario from 1965 to present day. Dr. Lepage mentioned that the general positivity rate of all tests is estimated at ~1%, with 0.15% being true positives. The clinical impact of newborn screens and confirmatory testing was highlighted with several clinical cases. Finally, a new assay to test the enzymatic activity of the alpha-L-iduronidase (IDUA) will allow newborn screening for mucopolysaccharidoses including Hurler’s syndrome.

**50 years of automation, Dr. Edward Dunn**

Dr. Dunn, from Dynacare, presented an enlightening account of the path from manual chemistry towards full automation in clinical laboratories. Starting with a reference to the popular science fiction TV series Star Trek, he explained how the rapid advances in technology have transformed laboratory medicine in the last few decades. He described the invention of spectrometers and their utility in medicine. Dr. Dunn also summarized the evolution of various automated chemistry platforms from their inception to the modern models in today’s clinical labs. Finally, he touched on the advent of artificial intelligence and the concept of machine vision as disruptive technologies that are destined to make significant impact in clinical chemistry.

**Symposium 2: Transgender identity and reporting**

**Endocrinology testing in transgender patients - interpretation disorientation, Dr. Scott Somerville**

In the first talk of the session, Dr. Scott Somerville from CHEO discussed the mainstay treatments in transgender patient care and how these treatments affect the clinical picture and interpretation of laboratory tests. He provided several thought-provoking cases that emphasize the importance of interpreting laboratory tests in the context of the current gender and not the gender assigned at birth. It is interesting to note that from a clinical perspective, monitoring transgender treatments is based mainly on clinical findings (e.g. amenorrhea in transgender male, breast development in transgender female) and less on biochemical tests, due to the complexity of interpretation.

**Transgender healthcare and the medical laboratory, Dr. Miranda Wozniak**

Dr. Miranda Wozniak, from LifeLabs, discussed challenges faced by the transgender population in society and healthcare, and how these may deter them from pursuing medical care. Examples of these obstacles include lack of medical and laboratory professional knowledge, the inability to document the current gender in laboratory information systems (LIS), limited experience in interpreting transgender results, and lack of reference intervals. Dr. Wozniak also presented the IQMH working group recommendations to help minimize these obstacles and create a more inclusive environment for transgender patients.

**Presentation of the 2019 award for “Outstanding Contributions to the Profession of Clinical Biochemistry in Ontario” to Paul Yip by Lianna Kyriakopoulou.**

Presentation of the 2019 OSCC award for “Lifetime Achievement in the Profession of Clinical Chemistry” to Barry Hoffman by Ron Booth.
50 years of hormone testing in the clinical laboratory,
Dr. Barry Hoffman
In the final talk of this symposium Dr. Barry Hoffman from Mount Sinai Hospital took us on a stroll down memory lane for immunoassay testing, starting from radioimmunoassay discovery and use in 1959, to current methodologies. Regardless of the assay used, immunoassay interferences such as hook effect, heterophile antibodies, macro complexes, biotin and hormone-binding proteins continue to confound test results, adding to the complexity of measuring and interpreting hormones. Dr. Hoffman discussed the future of harmonization of hormone testing and the use of clinically relevant cut points.

Symposium 3: POCT Guidelines, standardization, and clinical impact
Integration of IFCC guidelines in critical care patients,
Dr. Paul Yip
The second day of the conference began when Dr. Yip, from Sunnybrook Health Sciences Center, quoted an excerpt from a poem written by Gertrude Stein in 1913. “A rose is a rose is a rose is a rose”, so is “A glucose is a glucose is a glucose is a glucose?” He discussed the integration of International Federation of Clinical Chemistry (IFCC) guidelines in critical care patients. Finally, Dr. Yip explained the importance of tight glycemic control in critical care patients and poetically concluded that a “rose” would be a rose if it was within ±12.5% of a rose.

Easy peasy manual point-of-care test reporting: Is that possible?, Vinh Ly
Mr. Vinh Ly, from William Osler Health System, gave the audience an uncensored view of two very different perspectives regarding changes in point of care (POCT) practices; those that are resistant and those that are compliant with the changes. He shared video interviews of physicians and nurses discussing how they felt about changes implemented to POCT procedures to allow connectivity with the LIS. These videos also served as talking points in the concluding roundtable discussion.

Impact of lack of standardization of POCT results,
Dr. Davor Brinc
Dr. Brinc, from UHN, highlighted the lack of standardization of POCT results. He discussed a clinical case that demonstrated a bias in total hemoglobin between POCT blood gas devices and laboratory hematology analyzers. He also shared a comprehensive analysis showing differences in total hemoglobin measurements between multiple blood gas instruments.

Clinical biochemist perspective / Use of IT in POCT programs for quality assessment, Dr. Julie Shaw
Dr. Shaw, from The Eastern Ontario Regional Laboratory Association, explored POCT quality indicators, such as repeat POCT critically high glucose measurements. She identified that the biggest risk to POCT quality exists when clinical staff do not follow POCT policies and procedures. Moreover, she emphasized strategies to improve POCT user compliance, including changes in education style.

The POCT symposium was capped with a roundtable discussion with all of the panelists. The lively discussion included types of POCT that are under clinical chemists’ oversight. Also discussed, were strategies to overcome challenges associated with POCT including non-compliance to regulatory requirements by healthcare professionals outside the laboratory.

Symposia 4 – OSCC member and OSCC trainee presentations
A 75-year-old man on androgen deprivation therapy, low PSA and unsuppressed testosterone, Dr. Ola Ismail
Dr. Ismail presented a clinical case of a 75-year-old man on androgen therapy with a low prostate specific antigen (PSA) and unsuppressed testosterone levels. The patient was diagnosed with intermediate risk prostate cancer and was started on Lupron and anti-androgen therapy. Following treatment, testosterone levels remained elevated. Laboratory work up revealed highly elevated human chorionic growth hormone (hCG) and provided an explanation for the highly elevated testosterone. hCG shares sequence homology with luteinizing hormone and follicle stimulating hormone and was suspected to be driving androgen production. Magnetic resonance imaging revealed an adenoma that was producing hCG. The patient was successfully treated with cisplatin, which resulted in suppressed androgen levels.

Performance evaluation of the hand-held epoc analyzer for use in hospital surgical and ICU units, Dr. Zahraa Mohammed-Ali
Dr. Mohammed-Ali discussed the clinical utility of the Epoc point of care device. The study was a 3-way comparison between the Epoc, a blood gas analyzer, and a general lab analyzer. The performance of following analytes were investigated: CO₂, O₂, pH, Na, K, Ca, Cl, lactate, glucose, hematocrit, bicarbonate and creatinine. Epoc performance was considered clinically acceptable for all analytes with the exception of creatinine. Creatinine exhibited biases of 7% and 17% relative to Abbott and Roche general lab analyzers, respectively. It was noted that this bias was patient specific, which suggests a possible unknown interference rather than a total method bias.

Evaluation of a quantitative ELISA-based Anti-PLA2R antibody assay for primary membranous glomerulonephritis, Dr. Amir Babalhavaeji
Dr. Babalhavaeji discussed the use of anti-PLA2R antibodies for the diagnostic workup and monitoring of both primary and secondary membrane glomerular nephritis. The antibody performance was evaluated by qualitative immunohistochemistry and quantitative Euroimmun’s enzyme linked immunosorbent assay (ELISA). Overall, there was 83% agreement between methods, with 9% ambiguous ELISA results. Although the ELISA was deemed less sensitive, the quantitative nature of the assay displayed obvious benefits in guiding therapeutic decisions. For example, if antibody levels are declining, the patient should not be switched from first line therapy, cyclosporine, to a more expensive second line therapy, rituximab.

Beyond mass spectrometry: could multiplex proteomics technologists be the future of clinical chemistry?
Annie Ren, PhD Candidate
Ms. Ren discussed the future of proteomics in clinical chemistry. She investigated two platforms that both claim to deliver clinically acceptable analytical performance. Ray Biotech offers simultaneous
determination of over 1000 proteins through a quantitation sandwich-based immunoassay microarray. This was compared against the O-link immune-PCR assay where each antibody contains one complimentary strand of DNA. When both antibodies bind in a sandwich style immunoassay, complimentary DNA strands are amplified by qPCR. The overall concordance of analyte levels between both assays were evaluated for specific analytes.

Symposia 5 – Important changes to IQMH Chemistry Surveys in 2020

External Quality Assessment: Looking back and moving forward, Dr. Paul Yip
Dr. Yip, from Sunnybrook Health Sciences Center, provided a history of IQMH starting with its beginnings as the Laboratory Proficiency Testing Program (LPTP) in 1974. IQMH’s mission is to elevate the integrity of the medical diagnostic testing by providing third-party evaluations according to international standards. Dr. Yip also discussed the challenges posed by assessing spiked, frozen, or lyophilized serum for proficiency testing (PT), including implications in commutability and interpretation of the results in context of IQMH allowable performance limits. Extensive work has been done by IQMH committees to establish accuracy and reference values for tests used in medical guidelines, including lipid, diabetes and kidney guidelines. Future work includes urinary albumin, which is used in chronic kidney disease risk assessment, and the Fecal Immunochemical Test (FIT), which is used in colon cancer screening.

Technical specifications of the updated chemistry proficiency testing program, Julia Stemp
Ms. Stemp delivered the penultimate talk of the session, where she highlighted four major changes in the updated IQMH 2020 PT program.

1. Impact of new proficiency testing material – receipt, handling and storage practices.
Major changes to PT material in 2020 include lyophilized materials for certain panels. Lyophilized material will be shipped in January with a supply for the entire year.

2. Benefits and implications of using lyophilized PT material.
Lyophilized materials offer improved stability and will increase the number of analytes tested per PT specimen. An increased test menu can be performed on fewer samples in comparison to past surveys. This approach will generate larger peer groups for analysis and comparison.

3. Improved result reporting of updated analysis worksheet.
As part of the updated 2020 program, laboratories in Ontario will only see analytes they are testing (i.e., listed in their laboratory license) or any PT programs they have selected to purchase on their worksheet. IQMH is currently working towards development of an interface for automated reporting.

4. Method Maintenance Selection screen changes and benefits of a logical method maintenance that is pre-verified.
Method Maintenance link will be located on the worksheet screen and will allow users to add and delete analytes. Extensive efforts were made to include updated instrument lists and principle names to assign results to the correct assessment group.

Quality in Action: Performance Metrics with New Survey Reports, Berna Aslan
For the final presentation of the meeting, Dr. Aslan informed members that the change in survey material and a collaboration with the Royal College of Physicians of Australia Quality Assurance Program (RCPAQAP) will contribute to (i) increasing material stability, (ii) increasing range of analyte concentrations and (iii) increasing peer group studies. In anticipation of the upcoming changes, the results of a pilot survey have been evaluated and allowable performance limits reviewed and revised. From survey results it was noted that majority of the labs did not have issues working with reconstituted material. However, some labs reported that some material adhered to the stopper, leading to material loss upon opening of the vial.

Over two days and throughout five symposia, the presentations at the 50th Annual Scientific Meeting and Anniversary celebrations were well received by members. The scientific talks reflected on the proud past and reinforced the strong future of clinical chemistry. Great potential lies ahead for the discipline, not only in improvements and advances in technology and automation, but also in the many talented and dedicated clinical chemists of the OSCC.
This year’s IATDMCT Congress was held in Foz do Iguassu, Brazil, September 22-26. Its theme was TDM and Clinical Toxicology in a Globalized World and speakers from 20 countries got together to contribute their knowledge and expertise.

The members of the IATDMCT scientific committees worked the entire year to organize an informative Congress. Moreover, all attendees contributed to the vibrant atmosphere by bighartedly sharing their professional experiences and proficiency in the field.

Many hot topics in TDM and Clinical Toxicology were presented. The congress sessions covered TDM of immunosuppressants and psychoactive drugs, pharmacogenetic testing, clinical and environmental toxicology. There was a strong focus on the TDM of antimicrobial and nephrotoxic agents, which are especially important in the context of emerging antimicrobial resistance and the need for optimal antimicrobial use. Numerous scientific oral and poster presentations covered a diversity of topics, from clinical to experimental research in the field.

As chair of the IATDMCT’s Clinical Toxicology and Drug of Misuse committee I organized a Clinical Toxicology symposium that highlighted the role of immunogenetics in monitoring the safety and efficacy of therapeutics as well as the role of gene association in patients suffering from alcohol and drugs of misuse disorders. Identification of drugs or biologicals with potential to cause serious, life-threatening drug-induced injury requires causality assessment and comprehensive testing for alternative etiologies in each suspected case. My talk was on "Immunotoxicity: drug-induced and herbal-induced hypersensitivity syndrome" and I presented one undertaking of my laboratory that aims at assessing the immunotoxicity produced by therapeutics or herbal medicines using the *in vitro* lymphocyte toxicity assay in patients who manifested the reaction clinically and at correlating the test results with the clinical syndrome.

Dr. Jessica Boyd presented the poster entitled: "LC-MS/MS determination of 3 immuno-suppressants from dried blood spots with automated sample preparation".
Dr. Cristiana Stefan from the Centre for Addiction and Mental Health, Toronto, presented "Specialty toxicology investigation: identification of AMB-FUBINACA following a hospital medical emergency". The merit of clinical laboratories in the surveillance of misused substances and impact on both patient and public safety was strongly communicated.

One important take-home message of this year’s IATDMCT meeting was that clinicians as well as laboratories should jointly monitor the therapeutic interventions. Genetic variations should be studied in the laboratory and tailored in practice by clinicians. Drug monitoring of therapeutics used in several diseases is linked to immuno-pharmaco-genetics. It is important that the laboratory medicine specialists work as a team, learn from each other, to consult each other and educate the new laboratory personnel.

Most importantly the Canadian members of IATDMCT are proud to bring home the flag of IATDMCT from the Brazilian organizers. Drs. David Kinniburgh and Penny Colbourne are the co-chairs of the 18th IATDMCT in Banff, Alberta.

Finally, I would like to extend my invitation to all our members to come and join IATDMCT and to participate at the next IATDMCT, Banff, Alberta, Canada.

Decoding the CSCC News Crossword
Submitted by Dr. Cristiana Stefan

Earlier this year the CAMH Clinical Laboratory celebrated the National Medical Laboratory Week 2019, April 21-27. This time we invested more in preparing for this important event and showcasing to our stakeholders and executive leadership how our laboratory professionals are involved with patient care. Suggestions were plenty and the event was a success. Everybody was on board with new and fun ideas on activities for that week. One proposal was to engage our technologists in decoding one of the crosswords published in the CSCC News, a series initiated by our associate editor Michelle Parker. I am happy to share with you the winner of this mini-contest, Samantha Poon, BSc, MLT, and what she has to tell us:

From the IATDMCT Brazilian Diaries
Attending the IATDMCT conference in Brazil was also an opportunity to visit a couple of special places including the Bird Park (Parques das Aves), a privately owned conservation center for birds of the Atlantic forest, and one of the largest bird parks in Latin America. Above all it was also an opportunity to meet with colleagues from across Canada or other countries.

From left to right: Co-Chairs of this year’s IATDMCT, Drs. Rafael Linden and Marina Venzon Antunes (Brazil); Co-Chairs IATDMCT 2020, Drs. Penny Colbourne and David Kinningburgh (Canada).
Use your Social Media Skills to Advance Science

Are you looking for a way to get involved with our society’s journal and learn how the journal operates? We are looking for a Social Media Specialist to join the Clinical Biochemistry (CLB) Editorial Board.

The role will require knowledge of social media, to generate interest and interaction with existing and upcoming CLB content.

Social media specialist’s responsibilities:

• Create a consistent and cohesive brand image across all platforms.
• Develop and maintain a social media strategy. Coordinate with stakeholders to ensure its effectiveness.
• Manage CLB social media accounts, including consistently posting and sharing content, and responding directly to comments and messages from followers. As a starting point, the social media specialist will devise a strategy to distribute Clinical Biochemistry table of contents to our readership.
• Provide benchmarks and analyze data (ie number of hits and downloads/month).
• Track and monitor the effectiveness of social initiatives (i.e. reach, resonance, influence), and provide reports for Editor in Chief and Editorial Board.

The Social Media Specialist does not have to be a computer programmer, as the society’s website infrastructure is maintained by a web developer with Head office. A willingness to learn and creative problem solving are key requirements. There are several web-based tutorials available from Elsevier to get started.

Interested?

Please send expressions of interest to: Dr. Loralie Langman, Editor in Chief, Clinical Biochemistry
Email: Office@cscc.ca

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Call for Expressions of Interest: CSCC Web Editor

We’re looking for a CSCC member with an interest in web design to oversee the content, production and maintenance of the CSCC website. Web editor duties would include, but are not limited to: Oversight of the general appearance and organization of the website content; review of content on a regular basis to ensure that it is current and accurate; addition or deletion of pages including provincial section pages; structuring of menu links; working with CSCC committees and working groups to support their activities through the website by developing required pages and functionality eg EPOCC, CSCC educational roundtables, POCT. The web editor will also assist in maintaining CSCC blog pages and monitoring content as needed.

CSCC Head office and Head of the CSCC Publications Division will support the web editor with design and maintenance of the CSCC website infrastructure and work together with the web editor and web designer to maintain and develop website content and functionality. Technical knowledge on updating the back end of the website is not required. Head Office staff and the website developers handle the technical side of the changes.

Interested?

Please send expressions of interest to: Isolde Seiden Long, Head, Publications Division CSCC
Email office@cscc.ca
Check Your Knowledge!

Liver Anatomy and Pathology

If you have any questions, need a hint, or want to submit your own Check Your Knowledge activity, send a message to michelle.parker@dynalife.ca

Across
3. Biliprotein aka __-bilirubin
5. Yellowish skin due to increased bilirubin
9. AST has both ___ and cytosolic isoenzymes
11. Venous dilation around the umbilicus resulting from portal hypertension (2 words)
13. Phagocytic cells stationed in the sinusoids
14. Carries blood from the GI tract to the liver (2 words)
15. ___ syndrome: benign unconjugated hyperbilirubinemia
16. Process of making sugar from non-carbohydrate sources
17. Bromocresol ___ albumin method gives falsely low values in patients with jaundice
18. Hepatotoxic metabolite of acetaminophen (abbreviation)
20. Diffuse fibrosis with nodular regeneration

Down
1. ALP and GGT are found on the ___ membrane of hepatocytes
2. Bromocresol ___ albumin method gives falsely high values in patients with low albumin
4. Functional anatomical unit of the liver
6. Stoppage or suppression of the flow of bile
7. Characteristic protein decreased in Wilson’s disease
8. Bilirubin solubility is increase by conjugation to_______
10. Supplies oxygenated blood to the liver (2 words)
12. Cells in the space of Disse that store vitamin A when quiescent
19. Effusion and accumulation of fluid in the abdominal cavity
Our Congratulations to Dr. Khosrow Adeli

The following message was received from the IFCC Office:

“The result of the ballot for the election of the President-elect, to commence the term of office on January 1st, 2020, was concluded yesterday, September 30th, 2019. In summary 66 societies voted (out of 88 having the right to vote), giving preferences as follows:

Dr. Khosrow Adeli
(Canadian Society of Clinical Chemists (CSCC) received votes: 39 (59.1%)

Prof. Päivi Laitinen
(Finnish Society of Clinical Chemistry (SKKY) received votes: 15 (22.7%)

Prof. Tomáš Zima
(Czech Society of Clinical Biochemistry - CSKB) received votes: 12 (18.2%)

Accordingly, IFCC is pleased to announce that the President-elect is Dr. Khosrow Adeli.

IMPORTANT REMINDERS RE: PD PROGRAM REQUIREMENTS

1. Annual Conference Credits Submission – Within 60 Days Following the End of the Conference
2. Annual PD Credit Claim Submission Deadline – December 31st
3. Late Submission Requirements and Associated Fees
   a. Late submissions beyond the new deadline of December 31st are permitted but no later than 60 days after deadline (i.e. after February 28th of the following year).
   b. Late submissions are subject to late fees as follows:
      • CAD $50 for submissions within the first 30 days (submissions between January 1st and January 31st)
      • CAD $100 for submissions 30 days beyond deadline (submissions between February 1st and February 28th)
4. PD Certificate Will be Issued Annually – Effective January 2020 for the 2019 PD credit year
5. Changes to the Annual PD Requirements – Effective January 2020 for the 2019 PD credit year
   • Minimum of 25 Credit Hours/Year of which there must be:
     - 15 credit hours in Category 1
     - 10 credit hours in any two categories from Category 2 to Category 8

Physicians who have a certificate of credits from the Royal College of Physicians and Surgeons of Canada and use it in the CACB PD program will not be affected. A Category 9 submission is equivalent to 50 credits (fixed). Only one submission may be made each year.
The CSCC News is published bimonthly by the Canadian Society of Clinical Chemists and distributed to the members by the Society. Letters to the Editor must be signed and should not exceed 200 words in length. Chairs of Committees and Local Sections are requested to submit announcements and reports of activities.

Deadline for Submissions:
- December 31: January issue
- February 28: March issue
- April 30: May issue
- June 30: July issue
- August 30: September issue
- October 30: November issue

Notices from members seeking employment may be inserted without charge, and box-number replies may be arranged. Notices from institutions will be invoiced at $150 and include a notice on the website on the Job Opportunities page.

Views and reports appearing in CSCC News do not necessarily have the endorsement of the Society. Address general communications to the Editor care of the CSCC Head Office.

Editor in Chief: Dr. Cristiana Stefan
Associate Editors: Dr. Michelle Parker, Dr. Dorothy Truong

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### 2019-2020 Executive & Council of CSCC

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### 2019-09 Crossword Answers

**Across**

1. Alpha  
6. Hypothalamic  
8. Neurohypophysis  
9. Pulsatile  
11. Leydig  
13. BitemporalHemianopsia  
17. Luteinizing  
18. FollicleStimulatingHormone  
19. Oxytocin  
20. IGF1

**Down**

2. Aquaporin  
3. MelanocyteStimulating  
4. Macroprolactin  
5. Vasopressin  
7. Kisspeptin  
10. TRH  
12. Dopamine  
14. Acromegaly  
15. PEG  
16. Growth

Happy Holidays!