2018 – 2019 Year in Review

Pathology And Molecular Medicine

Clinical Services
Table of Contents

1. Message from Department Head
2. Message from Laboratory Directors
3. Top 10 Themes Emerging from this Report
4. Departmental Mission, Vision, Values
5. Strategic Priorities
6. Clinical Laboratories’ Leadership Team
7. Clinical Laboratories’ Technical, Discipline, and Quality Leads
9. Anatomical Pathology
   a. Surgical Pathology
   b. Immunohistochemistry & Special Histology
   c. Cytopathology
   d. Autopsy Service & Regional Forensic Unit
10. Hematopathology
    a. Hematology and Coagulation
    b. Histocompatibility and Immunodiagnostics
    c. Transfusion Medicine
11. Clinical Biochemistry
12. Clinical Microbiology
13. Laboratory Genetics
14. Point of Care Testing
15. Phlebotomy Services
16. Regional Laboratory Outreach Program
17. Research Studies and Clinical Trials Support
18. Looking Forward to Fiscal Year 2020
Message from Department Head

It’s hard to believe but yet another year has come and gone. This annual report documents the incredible amount of hard work that all staff and faculty members have put in over the last 12 months to provide the diverse lab testing that great patient care requires. A clear theme of growth and renewal permeates this report. We are doing more testing than ever before, we have added people to our department, and we have added new equipment and new methodologies. I believe that for our relatively small academic pathology and lab medicine department that growth is not only good but essential for our future. I also recognize that the work that growth brings includes not only the testing itself but also method development, validation, implementation and ongoing quality assurance. I thank you all for going above and beyond this year as do our clinical colleagues and most importantly… our patients.

Dr. Alexander (Sandy) Boag
Head, Pathology and Molecular Medicine

Message from Laboratory Directors

What should be the “big, hairy, audacious goal” for our Clinical Laboratories? Why nothing short of driving transformational change, of course! We should be leading efforts to get to the future, and in the process, be willing to change the tools of our trade! We should define and reshape our value proposition; after all, it is often quoted that
greater than 70% of the data in the electronic medical/health record is from laboratories! We have experience in managing laboratories and platforms and in synthesizing information to guide care. In an era of changing platforms, big data, and healthcare reforms at the provincial level … who is better poised than us to lead the charge?

In last year’s Annual Report, we proudly announced the launch of our clinical strategic plan for the Department which embraces the six dimensions of quality in healthcare. Our Fiscal 2020 Quality Improvement Plan documents many of our successes and also our challenges. Amongst those, a severe shortage of skilled laboratory technologists is at the top of our list. However, in spite of sometimes seemingly insurmountable obstacles and an increasingly stringent regulatory environment, great things are happening in our backyard. Some of these are putting us on the global map. The laboratory industry has noticed, for example, that we are leaders in the application of business intelligence solutions for our laboratories, or that we have acquired state-of-the-art new equipment and information systems (e.g. Alinity h in Core Laboratory, Cerebro in Histology Laboratory), or that we have a world-class Coagulation laboratory!

Our achievements in building relationships and collaborations outside of the laboratories give us great hope that we are on the right track in reaching our lofty goal, and in creating value for our regional healthcare ecosystem. For example, by working with our local hospitals’ community fundraising arm, University Hospitals Foundation Kingston (UHKF), we educated the public at several fundraising events in our community and we helped raise money for KHSC’s Phase 2 redevelopment campaign. Through the enhanced laboratory medicine services that we are providing in our region, we are helping to bring care closer to home for patients in their communities, and in the process creating a “hospital without walls”.

We hope that you will share our sense of excitement, enthusiasm, and pride as you read through this report of the past year!

**Dr. Sandip SenGupta**  
Medical Director

**Joyce deVette-McPhail**  
Administrative Director
Top 10 Themes Emerging from this Report

1. **Staff and faculty turnover and renewal**: Across nearly all of our 11 laboratories and 5 divisions, there were retirements and departures, felt most at the ranks of our long service senior technologists (e.g. Coagulation, Microbiology), yet there was plenty of talent recruitment as well: new MLT’s (including new seniors), MLA’s, pathology assistant, lab manager, clinical biochemist, general pathologist, forensic pathologist, GI pathologists

2. **Excellence of our staff and faculty**: Highlighted by the KHSC Team Award to our Genetics Team, but includes also outstanding technical, managerial, and leadership skills and accomplishments of many individuals in all of our laboratories over the year

3. **Laboratories achieving high quality standards**: Fresh off an accreditation-based self-assessment from the previous year, we excelled in our external quality assurance and proficiency testing surveys (e.g. IQMH, CAP, cIQC, CCO, QMP) and received congratulations from a lab leader in the USA about the excellence of our Special Coagulation laboratory

4. **Complements from our customers**: High praise from our patients about their phlebotomy experiences, from physicians (at KHSC and at BGH) for rapid test results and access to sophisticated laboratory medicine; and letters of complement from funeral directors for the meticulous dissections of complex body tissues

5. **New equipment, new tests and assays**: From Core Laboratory to Genetics Laboratory, and other labs between Douglas 1 and Douglas 4, we purchased and validated for clinical use state-of-the-art instruments, analyzers, platforms to provide faster, more accurate test results that help improve outcomes for patients.

6. **Promoting appropriate test utilization and appropriate blood products utilization**: We recommended revisions to order sets and medical directives to be in compliance with Choosing Wisely Canada guidelines. Through active dialogue with clinicians, we addressed selection of referred-out tests. We promoted best practices in blood products utilization.

7. **Collaborations beyond the laboratory**: So many examples this year! Our microbiology team is working with hospital pharmacists to ensure more effective and efficient patient care. Our phlebotomy team worked with Pediatrics leaders to improve sweat chloride collection in patients suspected of having cystic fibrosis to reduce NSQ samples.

8. **New ways of doing things more efficiently and effectively**: Implementing document control software for policies and procedures, electronic purchasing, changes to front-end workflow in microbiology … all helping us to become more efficient and effective in our laboratory operations.

9. **Supporting our academic mission**: Teaching students from St. Lawrence College, Michener institute and Queen’s … supporting clinical trials and research at our academic health sciences centre

10. **Supporting hospitals in our region**: Providing enhanced on-site support with selection and validation of new instrumentation, optimization of local test menus, ensuring quality control and quality assurance of coagulation testing, guiding infection control and point of care testing practices
Departmental Mission, Vision, Values

Our Mission

We are dedicated to providing exemplary care, knowledge and leadership in pathology and laboratory medicine through innovative and collaborative approaches.

We ensure that the care that we provide is consistently safe, timely, effective, and efficient and that it leads to better outcomes for our patients and their families throughout our regional catchment area.

We work in well-developed partnerships with our colleagues across our academic health sciences centre and advance our role beyond initial diagnostic testing to full participation in the patient care journey.

Our Vision

We aspire to be a collegial and integrated department that is nationally recognized and valued as leaders in the delivery of high quality, comprehensive, integrated pathology and laboratory medicine services to our academic health sciences centre and to the Southeastern Ontario region.

We continue to grow through an entrepreneurial approach to new opportunities based upon our strong foundation of sound fiscal and resource management.

We are leaders in the provision of testing for emerging personalized and precision medical care.

Our Values

In our pursuit of excellence, we value people by practicing mutual respect, professionalism and teamwork, and demonstrating integrity, trust, transparency, equity and accountability. We value integrated clinical and research activities which are coordinated through strategically developed multidisciplinary teams.
Our Strategic Priorities

Avoiding Harm
(e.g. reducing specimen collection errors, avoiding transfusion reactions, ensuring diagnostic accuracy)

Providing Effective Care
(e.g. promoting appropriate test utilization, and blood products usage)

Providing Timely Care
(i.e. test results, whether from central lab or Point-of-Care, available at time of clinical decision making)

Providing Patient & Family-Centred Care
(e.g. a comfortable phlebotomy experience)

Providing Efficient Care
(e.g. reducing unnecessary duplication of services)

Providing Equitable Care
(i.e. ensuring all patients in our region have access to high quality lab services)

Our Fiscal 2020 Quality Improvement Plan and our Fiscal 2019 Quality Management Review serve as companion documents to this Annual Report, providing more details about our accomplishments, including our quality indicators in each of these five domains of quality, and our challenges.
## Clinical Laboratories’ Leadership Team

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>POSITION</th>
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<tbody>
<tr>
<td>Dr. Alexander (Sandy) Boag</td>
<td>Department Head</td>
</tr>
<tr>
<td>Dr. Sandip SenGupta</td>
<td>Laboratory Medical Director (KHSC, BGH, PSFDH); Deputy Department Head</td>
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<tr>
<td>Joyce deVette-McPhail</td>
<td>Laboratory Administrative Director</td>
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<tr>
<td>Dr. Tim Childs</td>
<td>Service Chief, Anatomical Pathology</td>
</tr>
<tr>
<td>Dr. David Good</td>
<td>Service Chief, Hematopathology; Director, Hematology &amp; Hemostasis</td>
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<tr>
<td>Dr. Harriet Feilotter</td>
<td>Service Chief, Laboratory Genetics; Director, Molecular Genetics</td>
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<tr>
<td>Dr. Lewis Tomalty</td>
<td>Service Chief, Microbiology</td>
</tr>
<tr>
<td>Dr. Michael Chan</td>
<td>Service Chief, Clinical Biochemistry; Laboratory Director, Providence Care Hospital</td>
</tr>
<tr>
<td>Dr. Graeme Quest</td>
<td>Director, Transfusion Medicine, Histocompatibility &amp; Immunodiagnostics</td>
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<tr>
<td>Dr. Jeff Tanguay</td>
<td>Director, Regional Forensic Unit &amp; Autopsy Service</td>
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<tr>
<td>Dr. Susan Crocker</td>
<td>Director, Cytogenetics</td>
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<tr>
<td>Dr. Marosh Manduch</td>
<td>Director, Cytology</td>
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<tr>
<td>Dr. Yun Huang</td>
<td>Director, Point of Care Testing</td>
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<tr>
<td>Dr. Patricia Farmer</td>
<td>Director, Immunohistochemistry; Laboratory Director, LACGH</td>
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<tr>
<td>Dr. Prameet Sheth</td>
<td>Molecular Microbiologist; Biological Safety Officer</td>
</tr>
<tr>
<td>Colleen Knapp</td>
<td>Manager, Pathology, Outreach &amp; LIS</td>
</tr>
<tr>
<td>Donnah Pocius</td>
<td>Manager, Core Lab, Transfusion Medicine &amp; POCT</td>
</tr>
<tr>
<td>Tammy Edwards</td>
<td>Manager, Genetics &amp; Immunology</td>
</tr>
<tr>
<td>Tammie Taylor</td>
<td>Manager, Microbiology &amp; Pre-analytical Services</td>
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Clinical Laboratories’ Technical, Discipline & Quality Leads

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>POSITION</th>
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<tbody>
<tr>
<td>Kerry Benford</td>
<td>Charge Technologist, Core Laboratory</td>
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<tr>
<td>Yvonne Dubbelman</td>
<td>Senior Technologist, Chemistry</td>
</tr>
<tr>
<td>Natalie Thebault</td>
<td>Senior Technologist, Chemistry</td>
</tr>
<tr>
<td>Shari Neal</td>
<td>Senior Technologist, Hemostasis</td>
</tr>
<tr>
<td>Suzanne Torgerson</td>
<td>Senior Technologist, Hematology</td>
</tr>
<tr>
<td>Angela Sirosky-Yanyk</td>
<td>Senior Technologist, Transfusion Medicine</td>
</tr>
<tr>
<td>Cathy Skinner</td>
<td>Senior Laboratory Assistant, Customer Service</td>
</tr>
<tr>
<td>Anne Vincent</td>
<td>Senior Technologist, Point of Care Testing</td>
</tr>
<tr>
<td>Elena Sumila</td>
<td>Supervisor, Pathology Assistants</td>
</tr>
<tr>
<td>Elisa Kelly</td>
<td>Senior Technologist, Histology</td>
</tr>
<tr>
<td>Jill Jaynes</td>
<td>Senior Technologist, Histology</td>
</tr>
<tr>
<td>Joanne McAllister</td>
<td>Senior Technologist, Cytology</td>
</tr>
<tr>
<td>Karen Persad</td>
<td>Senior Technologist, Molecular &amp; Cytogenetics</td>
</tr>
<tr>
<td>Laura Semenuk</td>
<td>Senior Technologist, Molecular &amp; Cytogenetics (Acting)</td>
</tr>
<tr>
<td>Julie McClatchey</td>
<td>Senior Technologist, Histocompatibility</td>
</tr>
<tr>
<td>Laura Webber</td>
<td>Senior Technologist, Immunodiagnostics</td>
</tr>
<tr>
<td>Sheri Levesque</td>
<td>Senior Technologist, Microbiology</td>
</tr>
<tr>
<td>Diane Ryan</td>
<td>Senior Technologist, Microbiology</td>
</tr>
<tr>
<td>Donna Meekel</td>
<td>Senior Technologist, Quality Management</td>
</tr>
<tr>
<td>Deb Webster</td>
<td>Phlebotomy Team Lead, KGH site</td>
</tr>
<tr>
<td>Shawna Dowd</td>
<td>Phlebotomy Team Lead, HDH site</td>
</tr>
</tbody>
</table>
Our Clinical Laboratories’ Senior Technologists Team
Clinical Laboratories’ Fiscal 2019 Workload Statistics

Note: Workload for Point of Care Testing is included in Chemistry, Hematology, and Coagulation units.

Anatomical Pathology
The Division of Anatomical Pathology includes Surgical Pathology, Cytopathology and the Autopsy Service, including the Regional Forensic Unit.

Surgical Pathology

Workload and Workforce
The integration of pathology services between KHSC and BGH as well as aging patient demographics and population growth within our region contributed to a steady increase.
in volume and complexity of AP caseload, most notably in GI specimens.

Three new pathologists joined our group and have made significant contributions towards clinical service and education within the Department. Drs. Andrea Grin and Tao Wang are fellowship trained GI Pathologists and Dr. Yanping Gong is a General Pathologist with AP focus in Head & Neck, Soft Tissue & Bone, and Perinatal – Placental Pathology.

The retirement of highly experienced histotechnologists and laboratory assistants (i.e. Eric Gagnon, Mary-Jo Sargeant-Kerr, Terri Bird) and subsequent staffing changes created special challenges for new staff to keep up with the increasing workload.

Celebrating careers of retiring staff: Mary-Jo Sargeant-Kerr and Terri Bird
Quality & Process Improvements

1. We performed at, or above, our peers across the province in adherence to quality standards mandated by the Quality Management Partnership for Pathology, a provincially mandated initiative. Dr. Andrea Grin replaced Dr. Tim Childs as our regional quality management lead over the past year.

2. Our performance in Cancer Care Ontario turnaround time metrics for cancer resection specimens continued to meet or exceed provincial standards.
Additional quality improvement initiatives to meet CCO targets:

a. **Audits of lymph node sampling** in cancer resection specimens (e.g. esophagogastrectomies) and vascular invasion pick-up rates (e.g. colorectal resections)

b. **Mismatch repair (MMR) testing** for endometrial cancer to detect patients who may have HNPCC

c. **Somatic BRCA testing** of high-grade serous carcinomas of the ovary/fallopian tube to identify patients who would benefit from newly funded PARP inhibitor therapies

3. New stain processes and orders in our **Leica Cerebro** middleware system reduce errors through elimination of hand labeling of slides.

Terri Bird  Joanna Gladyz  Tammy Raymond
Immunohistochemistry & Special Histology

Our LEICA BOND III instrument platform continues to provide high quality staining and excellent turnaround times for IHC, thanks in large part to our highly skilled and dedicated team of histotechnologists, led by Jill Jaynes and Elisa Kelly. Some antibody clones (e.g. myosin, S131) were changed to provide superior staining. Other antibodies (e.g. Anaplastic lymphoma kinase, PMS2) were re-optimized to provide a superior stain. Some new antibodies (Arginase-1, Cat Scratch, Glypican 3, IgG4 by FITC, PLA2R1, Steroidogenic Factor 1, T-pit) were validated and added to our menu.

Under Dr. Sonal Varma’s guidance, we completed a multidisciplinary validation process of the BOND platform for HER-2/neu gene amplification in breast cancer by FISH digital image analysis – the first of its kind in Canada, involving staining of > 100 cases by this methodology. The manual vs. automated concordance rate was < 80% in several of the runs and therefore we concluded that this technology is not currently robust enough to be implemented as part of the predictive biomarker testing algorithm for patients with breast cancer.

<table>
<thead>
<tr>
<th>External Quality Assurance Agency</th>
<th>Immunohistochemical &amp; Special Stains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute for Quality Management in Healthcare (IQMH)</td>
<td>ER, PgR, HER2 for breast cancer CD21, CD23, CD45, CD56 ALK, MLH1, PMS2, MSH2, MSH6 CHROM A, p16 PAS, d-PAS, Grocott, Alcian Blue</td>
</tr>
<tr>
<td>Histotechnology Quality Improvement Program (HQIP)</td>
<td>H&amp;E, GMS, Trichrome GATA-3, ER, Pax8, HepPar1</td>
</tr>
<tr>
<td>Sunnybrook Health Sciences Centre</td>
<td>HER2 (IHC and FISH)</td>
</tr>
</tbody>
</table>
Cytopathology

Quality & Process Improvements

1. We joined a national *EQA program* for sputum differential counts. Sputum differential cell counts for asthma patients are now performed in the Cytology lab.
2. *Semen analyses* are now signed out directly by cytotechnologists, thereby improving turnaround times and improving the patient experience.
3. *Infertility reporting* has been updated to meet current WHO guidelines. Collaborative discussions with the Fertility Program identified a solution for semen analysis of male partners of patients.
4. A new process in the wet lab marks specimens with a colour code throughout the cycle to provide a visual queue to *prevent specimen mix-ups*.

“Our cytotechnologists: Kelli Thompson, Marion Rubens, Joanne McAllister

“YOU ARE … AWESOME! THANKS FOR ALL YOUR EFFORTS TO SORT OUT OUR FERTILITY PROGRAM”

Dr. Mary Anne Jamieson

OBGYN
### Autopsy Service and Regional Forensic Unit

#### Quality & Process Improvements

1. Our stakeholders, including coroners, police and other investigators appreciate the benefit of having more medicolegal autopsies performed locally than having them performed in Ottawa.

2. Our continuing education program continues to be strong: We held 8 ML multidisciplinary work rounds (i.e. coroners, pathologists, autopsy staff) during the year and discussed ~ 25 cases. We also provided an educational experience for at least 30 medical students (mostly first and second year) who rotated through the autopsy service over the year.

3. We continuously updated policies and procedures to be aligned with the Ontario Forensic Pathology Service, where applicable, and created new documents (for example, Exhibit Continuity Form, Notice of Identification, Dental Comparison, Fingerprint Comparison).

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**I AM WRITING THIS LETTER TO COMPLIMENT THE PATHOLOGY TECHNICIAN WHO COMPLETED … I WAS PLEASED TO FIND LENGTHY CIRCLE OF WILLIS … THE EXTRA TAKEN DURING DISSECTION MAKES THE TASK OF ADEQUATELY EMBALMING FAR LESS LENGTHY AND FRUSTRATING … HELP CREATE A FAR SUPERIOR APPEARANCE AND ENDURING EMBALMING. I HAVE NOT SEEN SUCH A PRECISE DISSECTION IN MANY YEARS. THOUGH … FAMILY MAY NEVER KNOW HIS FINAL APPEARANCE WAS IMPROVED BY THE EXTRA CARE YOUR PATHOLOGY TECHNICIAN GAVE DURING THIS AUTOPSY, I WOULD LIKE TO SUGGEST THAT IF THEY DID … THEY WOULD BE VERY GRATEFUL AS WELL…”**

Laura Jeffery  
Embalmig Funeral Director, Gordon F. Tompkins Funeral Home,
Our Autopsy Team: Katie Logan, Dr. Jeff Tanguay, Julie Wallis, Lis Andersen, Jill Hamilton, Kathy Migneault, Yolanda Nerkowski, George Thorne, Erin Goodenough (missing)
Hematopathology

The Division of Hematopathology (HP) includes Hematology, Coagulation, Transfusion Medicine, Histocompatibility and Immunodiagnostics.

Hematology and Coagulation

Workforce and Workload

The retirement of several medical laboratory technologists (MLT’s) with decades of collective experience, including the Coagulation Senior Technologist (Louise Dwyre) resulted in profound changes in the staffing of the Core Laboratory. We have a new Senior Technologist, one new full time MLT trained in Special Coagulation, and also two new part time MLTs.

Quality & Process Improvements

1. Our Alinity h hematology analyzers (finally!) arrived and are being validated for clinical use. This instrument is the first to be implemented in North America. Its technological features will lead to improvements in turnaround times for CBC’s. Newer reticulocyte parameters will be introduced that may provide value for hematology/oncology and renal patients.

2. Our Special Coagulation laboratory received accolades as a “world-class lab” from Dr. Bob Montgomery, Blood Centre of Wisconsin, for our “extremely impressive” results, “the closest to the reference values of any lab in the study”. Our results validate our decision to choose the Siemens coagulation platform and
also speak strongly about the quality of our technologists who performed these tests.

3. A chromogenic Factor IX assay was implemented; this will enable accurate monitoring of Hemophilia B patients on extended half-life replacement products.

4. Acute leukemia reporting has improved through incorporation of relevant molecular and cytogenetic information in a synoptic format.

5. DOAC removal reagent was implemented to assist with Lupus Anticoagulant (LA) testing, as we are not always aware what medications that patients may be taking when testing is ordered. DOAC interferes with LA testing and can cause false positive test results.

6. Order set reviews: Uncoupling of PT/PTT, deletion from routine orders, and removal of ESR were introduced to promote more appropriate test utilization.

Histocompatibility & Immunodiagnostics

Workforce and Workload

Due to increasing workload, several staffing changes were required: one MLT was hired, and a temporary “Acting Senior” MLT opportunity was created to facilitate validation and implementation in histocompatibility testing. However, we also saw the departure of 2 MLT’s, and an unexpected increase in sick time leave.

Medical knowledge and technical skills required for histocompatibility and flow cytometry are not included in standard MLT training. This presents a significant challenge in the hiring and training of new technologists. A need for formal training in histocompatibility was highlighted over the year through the need for accreditation status through American Society for Histocompatibility and Immunogenetics (ASHI) to support the hospital’s participation in a more complex renal transplantation program.
Quality & Process Improvements

1. Two new 12-colour FACSLyric flow cytometers were acquired to replace the aging 5-colour FC500 cytometers. A magnet for magnetic cell separation was also acquired to facilitate the flow cytometry lymphocyte crossmatch assay. The new instruments enable better data resolution, more efficient use of samples with minimal wastage, precise cell concentration measurement and assay performance to ensure result reproducibility. The enhancement in technology will improve the care delivered to our patients, especially in the Renal Transplant and Autologous Stem Cell Apheresis programs, malignant hematology program, and Allergy and Immunology programs.

2. A new method was introduced for absolute quantitative enumeration of lymphocytes subsets. The new method issues absolute and relative quantitative results for T cells, B cells, and NK cells in a single assay, effectively streamlining testing for cellular immunodeficiency screening, CD4+ T cell monitoring in HIV, CD3+ T cell monitoring following anti-thymocyte globulin, and CD19+ B cell monitoring after rituximab.

3. Routine HLA serology testing for potential renal transplant recipients was standardized, reducing unnecessary repeat testing and improving efficiency. Testing was also consolidated to Single Antigen Bead assays with discontinuation of PRA screen testing. The transition increases resolution of antibody specificities, obviates the need for follow up testing in sensitized patients, and simplifies reagent inventory management.

4. The acquisition of QuantStudio6 real-time PCR instruments has allowed for implementation of real-time PCR tissue typing, thereby decreasing STAT turnaround times for organ donor typing to approximately 2-3 hours (instead of 5-6 hours for the previous PCR-SSO Luminex methodology). This also significantly expedited the organ allocation process and also reduced technical staff on-call in-lab time.
Our Immunology team: Lise Wagar, Kelly Clark, Marie Guthrie, Julie McClatchey, Stephen Berry

Marie Guthrie prepares a specimen for HLA match for renal transplant patient.

Dr. Jocelyn Garland (Nephrologist) was recognized with the prestigious Human Touch Award from CCO for her work in going above and beyond in delivery of care for one of her patients (pictured here).

“This award is not just me … It is also important to point out that our hospital provided excellent support to clinical care across all spheres, from ensuring essential laboratory testing is carried out in a timely manner, to the approval of very expensive non-formulary drugs. This collaborative effort was key to the patient’s outcome”.

COMPLEMENTS FROM A CLIENT

A member of TAA with Julie McClatchey
Transfusion Medicine

Utilization of Blood Products

We continue to monitor our hospital’s blood utilization strategy to ensure better patient outcomes, appropriate, evidence-based use of blood products and decreased wastage.

Immune Globulin (IG) Provincial Utilization Management Strategy

<table>
<thead>
<tr>
<th>Utilization 2017-18</th>
<th>Grams</th>
<th>$ Value</th>
<th>% Change</th>
</tr>
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<tbody>
<tr>
<td>Provincial Use</td>
<td>2,473,778</td>
<td>$161,252,789</td>
<td>+8%</td>
</tr>
<tr>
<td>South East LHIN Use</td>
<td>129,452</td>
<td>$8,433,719</td>
<td>+13%</td>
</tr>
<tr>
<td>KHSC Use</td>
<td>69,985</td>
<td>$4,563,746</td>
<td>+12.5%</td>
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Platelet Discard Rate

Hospitals have been encouraged by Canadian Blood Services to report platelet utilization so that improvements may be tracked and changes made to reduce the cost of outdated platelet products.

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<thead>
<tr>
<th>Utilization 2017-18</th>
<th>Platelet Discards % (# doses)</th>
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<tbody>
<tr>
<td>All hospitals in the province</td>
<td>9.6% (5,729)</td>
</tr>
<tr>
<td>All hospitals in South East LHIN</td>
<td>14.0% (347)</td>
</tr>
<tr>
<td>KHSC</td>
<td>14.6% (274)</td>
</tr>
</tbody>
</table>
Quality & Process Improvements

1. **ABO typing confirmation** is now required prior to issue of group-specific blood product. Its implementation has led to risk reduction of adverse and potentially fatal transfusion reactions.

2. As the supply of IVIg and SCIg has become very limited across Canada, we have restricted the use of these products to patients with a clearly documented history of recurrent Ig-related transfusion reactions.

3. We updated the test panel for monitoring hemostatic capacity during massive transfusion protocol (MTP) activation. This now includes fibrinogen testing.

4. In order to reduce wastage, platelets ordered as part of a MTP are now issued in a separate transport bag.

5. Due to national shortages of cryoprecipitate, **fibrinogen concentrates** are now preferentially issued instead of cryoprecipitate (except for neonates and pediatric patients).

6. Since **Rh immune globulin** (RhIg) can no longer be issued as stock supply (Health Canada regulation), orders for RhIg are now placed on an individual patient basis and processed by the laboratory similar to other blood products. This prevents the transfusion of this product to a patient who is already auto-immunized with Anti-D antibody.

7. **Dr. Lois Shepherd**’s exemplary service as Chairperson of the Northern and Eastern Regional Advisory Committee for the past 12 years was acknowledged; she was thanked by ORBCoN for her support and leadership over this time.

"OBRCON AND CBS WOULD … LIKE TO THANK [KHSC] FOR CONTRIBUTING TO IMPROVEMENTS IN BLOOD RELATED PATIENT SAFETY AND BLOOD AND BLOOD PRODUCT MANAGEMENT."

Wendy Owens
Regional Manager, Ontario Blood Coordinating Network

Amanda Nowry
Hospital Liaison Specialist, Canadian Blood Services
Clinical Biochemistry

The Division of Clinical Biochemistry includes Routine (largely automated) testing, Special Chemistry (including Volatiles testing by GC) and Point of Care Testing.

Workforce

Dr. Yun Huang, Clinical Biochemist, was a welcome addition to the Department after a lengthy search for a second biochemist. Dr. Huang brings a strong passion for quality improvement in laboratory medicine and special expertise in Point of Care Testing.

There were several changes in technologist staffing over the year including the hiring of a new senior MLT. In addition, there were several technologists trained or re-trained in Chemistry.

Quality & Process Improvements

1. **Blood gas analyzers**: We validated and implemented 2 new instruments for the Core Laboratory. Our laboratory also coordinated implication of the same new instruments, purchased at the same time as us, for hospital laboratories in Perth, Smiths Falls, Napanee and Brockville. This fulfilled our goal of method standardization and harmonization of blood gas results across the region.

2. **Osmometers**: Two new instruments were validated and replaced obsolete units to measure serum and urine osmolality.

3. **Gas chromatograph** for toxic alcohols (e.g. methanol testing): Validation was completed, implementation is pending, as additional staff training is required.

4. **BNP testing**: This test was validated for clinical use on our Abbott Architect analyzers. Following implementation, we began a joint study with the Departments of Anesthesiology & Peri-operative Care, and Internal Medicine, to better define specific threshold levels of BNP for peri-operative cardiac risk assessment of patients. The decision values recommended by the Canadian Cardiovascular Society Guidelines on Perioperative Cardiac Risk Assessment are based on a different instrument platform.

5. **Urine cortisol testing**: This is a new test being validated for clinical use in our Core Laboratory.

6. **Protein investigations and light free chains**: A consensus was reached with clinical hematologists on a minimum retesting interval (30 days). Prior to this, many patients were being too frequently (even as short as every 2 days).

7. **Pre-analytical processes**: Pre- and post-centrifugation specimen stability charts were reviewed and updated. The handling of specimens with hemolysis, lipemia, and icterus was also updated.
8. **Reference (and therapeutic) ranges** were reviewed and updated: e.g. serum and urine osmolality (for neonates, children and adults), DHEAS, Sweat Chlorides, Volatile substances, Tacrolimus, Cholesterol, Ferritin, ALP, urinalysis

Test Utilization

Continual conversations and communications with physicians regarding appropriate use of tests, especially send-out tests, is an important daily activity on the Chemistry service by the senior/charge technologists and clinical biochemists.

<table>
<thead>
<tr>
<th>Chemistry team member</th>
<th># of enquiries by clinicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior technologist</td>
<td>~ 1.5 correspondences/day with physicians regarding send-out testing</td>
</tr>
<tr>
<td>Charge technologist</td>
<td>~ 2 phone calls/day for phlebotomy collections relating to send-out testing ordered from clinics, plus</td>
</tr>
<tr>
<td></td>
<td>~ 2 patients/day for F/U of collected specimens requiring clarification with ordering physician, plus</td>
</tr>
<tr>
<td></td>
<td>~ 1 test every other week, for:</td>
</tr>
<tr>
<td></td>
<td>- comparison of external reference labs</td>
</tr>
<tr>
<td></td>
<td>- validating that account exists with ref lab (or creating new account)</td>
</tr>
<tr>
<td></td>
<td>- seeking pre-approval from MOHLTC for out-of-province testing</td>
</tr>
<tr>
<td>Clinical biochemist</td>
<td>~ 8.4 enquiries/week by email (~60% for send-outs, 40% in-house tests)</td>
</tr>
</tbody>
</table>
Examples of utilization initiatives:

1. **Creatinine Kinase**: Troponin-associated testing for CK was discontinued as a utilization best practice. Current data shows a reduction of CK testing of ~59%.
2. **RBC folate**: Testing discontinued in line with Choosing Wisely Canada initiatives.
3. **CA19-9**: Presentation to physicians in the Cancer Centre helped them understand the new reference range of this recently repatriated cancer biomarker.
4. **Heterophilic antibodies**: Investigation and troubleshooting test results of patients, helping physicians to better understand the impact of these antibodies on laboratory testing.

### Top 7 Chemistry Send-Out Tests for Fiscal 2019

<table>
<thead>
<tr>
<th>Test</th>
<th>Number of Specimens</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-OH Vitamin D</td>
<td>5,300</td>
<td>$148,400</td>
</tr>
<tr>
<td>NT-proBNP</td>
<td>1,819</td>
<td>$71,851</td>
</tr>
<tr>
<td>ENA antibodies</td>
<td>1,346</td>
<td>$40,380</td>
</tr>
<tr>
<td>Tissue transglutaminase-IgA</td>
<td>1,208</td>
<td>$46,810</td>
</tr>
<tr>
<td>T3 Free</td>
<td>1,107</td>
<td>$21,310</td>
</tr>
<tr>
<td>Zinc, plasma</td>
<td>911</td>
<td>$31,885</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>834</td>
<td>$12,097</td>
</tr>
</tbody>
</table>
Review of Order Sets and Medical Directives

We provided feedback and recommendations into a total of 31 clinical order sets and 22 medical directives for appropriate laboratory testing (chemistry, hematology, hemostasis, microbiology) in Fiscal 2019. Some of these were new order sets whereas many others were ones coming up for two-year or three-year cycle review.

Examples of order sets:

1. **Medicine**: peritoneal dialysis, Vancomycin infusion, catheter-directed Alteplase, inpatient red cell transfusion, epilepsy monitoring, ulcerative colitis admission, peritoneal fluids, pre-renal transplant donor work-up
2. **Surgery**: gastric & intestinal feeding, carotid endarterectomy post-op, pituitary surgery – endocrine management
3. **Orthopedics**: total shoulder replacement admission, elective hip & knee replacement post-op, spine surgery post-op
4. **Urology**: nephrectomy, TURP/TURBT admission, transitional cell bladder carcinoma
5. **Oncology**: transfusions, osteosarcoma chemotherapy
6. **OBGYN**: Women’s Clinic admission, vaginal delivery
7. **Pediatrics**: diabetic ketoacidosis, NICU (TPN monitoring, endotracheal intubation, short stay admission), hypoglycemia in newborns, parenteral nutrition monitoring, neonatal therapeutic hypothermai
8. **Critical Care**: High frequency oscillator ventilation for ARDS
9. **Diagnostic Imaging**: Interventional Radiology Procedural

Susan Mercer monitors the Automated Chemistry Track, which streamlines how patient specimens are tested and stored.
Clinical Microbiology

The Division of Microbiology includes Bacteriology, Molecular Virology, and Mycology services.

Workforce and Workload

A new Manager (Tammie Taylor) was successfully recruited. Tammie brings more than 15 years of experience and a strong background and passion for quality and staff engagement.

Personnel changes presented the greatest challenge over the past year: 3 MLT’s moved to Infection Prevention and Control; a senior MLT retired, 2 MLT’s were on long-term medical leave, 1 MLT on maternity leave, and 1 MLT on paternity leave. As a consequence, 4 new MLT’s and 1 new MLA were hired, which required > 3,000 hours of training.

With the increase in junior staff, a more robust and standardized process for reading a bench was developed, as workflow is designed primarily around specimen type (e.g. urine, respiratory, blood). Process mapping of the front room and media room, where pre-analytic processing occurs, resulted in more space for reporting functions as well as blood culture sorting.

The volume of molecular tests continued to grow, in part due to a prolonged and severe influenza season. However, rapid turnaround times remained a priority and the laboratory offered twice daily testing, 7 days per week.
Quality Improvements and Collaborative Care Initiatives

1. **Carbapenemase Producing Organisms (CPO):** The increasing incidence of CPO poses an important problem for infected patients. Patients who are either colonized or infected must be placed in strict isolation to minimize the risk of spread. All patients who were in a health care facility over the year were required to have enhanced screening to detect these bacteria. In order to decrease the turnaround time (to 24 hours) for detection, an in-house PCR test was developed. Given the complexity of PCR testing, smaller laboratories are
usually unable to perform such testing; our laboratory therefore is offering this service on a regional basis.

2. **Meningitis PCR test**: Culture-negative bacterial meningitis is not a rare occurrence but the clinical implications can be significant. A PCR test has been available through the Public Health Laboratory, however, the turnaround time of 2-3 days (due to specimen transportation) was too long for appropriate patient care. An in-house PCR test was developed and is now offered at KHSC 7 days per week. This test is also available for hospitals in the region.

3. MYLA middleware that integrates data from three major semi-automated instruments (Vitek for antibiotic susceptibility testing, BacT/Alert for blood cultures, MALDI-TOF for bacterial identification) is now being fully utilized to produce numerous reports (e.g. antibiograms, blood culture contamination rates) for KHSC and our community hospital partners in the region. Previously, the production of these reports required days to weeks of manual effort. Working with the Phlebotomy team, an educational program on blood culture technique for nursing staff resulted in a dramatic reduction in the ICU to consistently < 3% contamination rate (best practice). Although the overall contamination rate is too high, only certain areas (i.e. Emergency Department) are experiencing problems. The laboratory continues to work with the manager of the ED to find solutions to the contamination problem.

4. **Sterility testing** for Pharmacy Services: Vials of expensive medications can be used for more than one patient, if it can be proven that these vials remain sterile between usages. The laboratory, working with Pharmacy Services, implemented a process to assess sterility and sterile technique.

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**Biological Safety Officer (BSO)**

For laboratories conducting activities with pathogens, it is a IQMH requirement that a BSO be designated to oversee biosafety and biosecurity practices. The BSO has safety training in the area of infectious material and toxins and relevant working knowledge of the operational practices and procedures within the laboratory.

The BSO for KHSC is Dr. Prameet Sheth, Microbiologist.
Laboratory Genetics

We provide cytogenetic and molecular genetic testing to patients throughout our region and the province. Testing assays are available for a wide range of conditions, including prenatal findings, developmental delay, hereditary cancer, cardiac rhythm disorders, solid tumour oncology and malignant hematology.

Workforce and Workload

Many changes in staffing occurred during the year due in part to maternity leave, sick leave and reintegration into the workplace. New MLT and MLA positions were created; 3 new MLT’s and 1 new MLA were trained. We also had 1 Michener Institute student placed with us who had a terrific experience and looks forward to beginning her work at KHSC. Assessors for a Michener Institute Clinical Site Visit remarked that the “KHSC learning environment is optimal for student learning”. The Assessment of Readiness to Practice student assessments exceeded expectations and stood out above ones created for other clinical sites. Observations showed a “high functioning, happy team”.

A very proud moment for our Genetics team was the honour bestowed upon it as the recipient of the 2018 KHSC Team Award recognizing team excellence in care, knowledge and leadership.
Quality & Process Improvements

Measuring mutations in DNA to diagnose and guide treatment of patients has been a part of our service for many years, but recently, laboratory genetics has undergone a revolution, as more and more DNA-based markers have become relevant as standard of care. To deal with increasing demand for testing, new high throughput technologies have been introduced into the laboratory. The new platforms allow measurement of hundreds of mutations in a single assay. Some of these assays provide a rapid confirmation of a diagnosis for a patient. Some dictate the specific treatment that a patient is likely to respond to. Others predict the likelihood of a patient developing disease in the future, allowing individuals the opportunity for early detection. The change in platforms and the increasing complexity of genetic mutation measurements needed to guide the patient journey means that the critical impact of the genetics service has grown exponentially.

1. **S5 Next Generation Sequencer**: This has provided us with a high capacity platform for efficient, massively parallel sequencing of oncology specimens.

2. **Ion Chef and Ion Reporter server**: These serve as critical adjuncts to the S5-XL massively parallel sequencing platform. The Chef supports automated workflow for preparing the complex libraries for massively parallel sequencing, ensuring consistency and standardization, and allowing the molecular genetics laboratory to maximize efficient use of human resources. The Ion Reporter server supports...
rapid local analysis and short-term storage for the large raw sequencing data files that are generated, ensuring consistency and stability for the analytic pipeline, as well as a secure method for holding data prior to long term archiving.

3. **MiSeq Next Generation Sequencer**: This new technology improves testing for our arrhythmia patients (e.g. *Long QT syndrome*). Its purchase followed our discovery that our previous platform in use was not optimal for this testing. The new platform is designed to interrogate entire genes in a uniform and accurate manner.

4. Through a partnership with Queen's **Centre for Advanced Computing (CAC)**, a bioinformatics pipeline was built for seamless analysis of complex massively parallel sequencing data for our hereditary cancer and arrhythmia testing programs.

5. **New assays**: Development is underway for new tests, which in some cases is a response to opportunities (e.g. CCO Complex Malignant Hematology, OCTANE (provincial), CAPTUR (national) clinical trials) to develop resources that support the expansion of our solid tumour targeted testing: from ~50 genes to ~180 genes in a panel that also includes the ability to identify copy number changes and translocations, in addition to more standard DNA mutational changes:

   Examples of validated assays:
   - FLT3/NPM1
   - Oncomine Myeloid NGS Panel
   - Hereditary Comprehensive panel (on MiSeq)
   - Hereditary Colon Cancer Panel (on MiSeq)
   - CMV RT-PCR

   Assays in development:
   - PML/RARA,
   - CLL,
   - BCR/ABL,
   - MPN,
   - Plasma cell enrichment,
   - IDH1/2
Point of Care Testing

Workforce & Workload

We added a 0.5 FTE staff position due to the increasing demands of the POCT service. Two laboratory technologists began their training, giving a total of 4 MLT’s (including 1.0 FTE Senior Technologist, Anne Vincent). One of our new MLT’s, Robert Dean, came to KHSC with experience from Mount Sinai Hospital in Toronto.

Dr. Yun Huang, Clinical Biochemist, also joined the team as the Clinical Director of POCT. She brings considerable expertise and enthusiasm to POCT from her previous position at Eastern Health Authority in Newfoundland and Labrador. Dr. Yanping Gong, General Pathologist, joined the POCT Advisory Committee in his regional laboratory outreach role with responsibilities for POCT (at Providence Care Hospital, PSFDH, LACGH, and BGH). Additionally, Christine Mainse, Clinical Educator for HDH nursing,
joined our POCT Advisory Committee as a core member. Her knowledge of nursing, POCT and HDH clinical activities are an asset for the Committee.

Anne Vincent – instructing a nurse on use of a POCT device

![POCT Total Tests](chart.png)
Quality & Process Improvements

1. Eight new blood gas analyzers were validated and implemented at the KGH site for POCT (includes one mobile device for use around the hospital when one instrument is down). Respiratory therapists, perfusionists, and a few anesthesiologists were certified to operate them. In addition to blood gases, oximetry, and electrolytes, the new analyzers also give us the ability to measure lactate and provide an expanded test menu for most areas, including glucose and ionized calcium, in the ICU. The availability of lactate on the blood gas analyzers reduced the number of samples analyzed in the Core laboratory and is beneficial for patients – saving them an extra draw of blood. The ability to add
comments on blood gas results that will cross over to PCS was an important IT project accomplished over the year. POCT lactate results trending in the PCS, with the laboratory lactate results, was accomplished during the year.

1. **New iSTAT device for measuring Activated Clotting Times (ACT):** A reference range change was required due to a change in methodology. The Operating Rooms adapted well to the new method, however, physicians in the Cardiovascular (CV) Lab experienced difficulty reaching the new target despite additional doses of heparin. They expressed concern for patient safety as they had to ensure effective anticoagulation of patients during procedures. **Dr. David Good** worked closely with the CV Lab staff to ensure that these patients were safely anticoagulated. Our work comparing the ACT results with the anti-Xa laboratory results have shown promising correlation, and we continue to gather data on this quality assurance project with Dr. Damian Redfearn. Dr. Good presented a poster on this topic at the 2019 ISLH Meeting.

2. **Glucose meters:** 158 new instruments were purchased for implementation in next fiscal year. These meters are an upgraded version of our current Nova Statstrips with an improved physical design which will decrease pre-analytical errors. Another enhancement to Point of Care glucose monitoring was the upgrade of the Novanet and Telcor systems for connectivity of test results with the patient’s electronic medical record.

### Phlebotomy Services

**Quality & Process Improvements**

1. A joint project with Pediatrics accomplished reduced repeat collections and insufficient samples for *sweat chloride testing* for suspected Cystic Fibrosis patients seen at the Children’s Outpatient Clinic at HDH site. These collections now take place in Jeanne Mance 5 which allows greater privacy and dignity to the mother, in a less hurried environment. Ongoing efforts are underway to further reduce NSQ rates in infant population under 3 months of age.

2. **Patient privacy** was improved at the cramped Brock 1 specimen collection centre at HDH site: Since a scoping project with Facilities Planning staff at HDH site demonstrated that renovations would be cost prohibitive, a new CQI initiative is underway to centralize phlebotomy services to the Jeanne Mance 5 collection centre.

3. **Bariatric procedure chairs**, one for the Burr 0 Cancer Centre at KGH site, and the other in the Brock 1 specimen collection centre at the HDH site, were purchased; these chairs are wide and deep with opposable and adjustable arm rests that allow for the patient to lean forward safely if feeling faint. They also allow for a parent and child to sit together during collection. Increased chair capacity at Burr 0 in turn helps to reduce wait times in the busy oncology clinic.
4. All part time staff were trained on *Entry Point* and *lab order entry* at KGH site thereby improving their competency. This has led to increased flexibility in scheduling and a more engaged part time team who now enjoy more varied shifts and a consistent balance of distributed hours throughout the team without additional hours being added to the budget. *Role reclassification* of phlebotomy staff of four part time members from part time to full time status with minimal budgetary impact helped to significantly improve staff morale and engagement.

"I AM A PATIENT UNDER DR. C.B.. I WISH TO TAKE TIME TO LET YOU KNOW WHAT A GREAT COMPASSIONATE TEAM YOU HAVE. THEY ALWAYS HAVE A SMILE FOR YOU AT THE DOOR. THEY KNOW WHEN YOU ARE NOT WELL AND THE KIND WORDS ALWAYS HELP. I CALL THEM ‘THE MOSQUITOS’. IN THE 3 YEARS I HAVE BEEN COMING FOR BLOOD WORK, THERE HAS NEVER BEEN A MISS. PLEASE ACKNOWLEDGE THEM IN SOME MANNER."

D.S., A former Physician at KGH
Regional Laboratory Outreach Program

The philosophy of our outreach program remains unwavering: i.e. KHSC as a knowledge hub in laboratory medicine can diffuse its specialty and subspecialty expertise to community hospitals in southeastern (and central eastern) Ontario, thereby ensuring safer and more equitable, effective, efficient, timely and patient-centred care for patients in our region.

Workforce

The arrival of Dr. Yanping Gong marked a significant milestone in the evolution of our regional laboratory outreach program. Dr. Gong’s formal education and work experience as both a Clinical Biochemist and as a General Pathologist have proven invaluable to us in our quest to improve the quality and operational aspects of the services which we provide to the hospitals which we serve in southeastern Ontario. Dr. Gong began providing on-site clinical pathology consultation and advice to hospitals in Napanee, Smiths Falls, Perth, and Brockville – mainly in validation of new chemistry instrumentation, standardization of test menus and SOP’s, appropriate test utilization, POCT, and infection prevention and control. He also worked closely with Dr. Michael Chan in the transition of directorship of the laboratory at Providence Care Hospital.
Quality & Process Improvements

1. Validation of new automated chemistry and immunoassay analyzers in Napanee, Perth and Smiths Falls with standardization of test menus, standard operating procedures, etc.

2. Initiating the process to add tests to local menus to improve results turnaround time, e.g. Vancomycin (Smiths Falls), lipase (Brockville), hs Troponin (Napanee, Perth, Smiths Falls)

3. Evaluation of the quality control range for coagulation for hospital laboratories (Belleville, Perth Smiths Falls, Brockville, Napanee) and organization of the reagent validation process with proficiency testing samples. We continue to be able to do this because the same instrumentation and lot numbers are in use across the region.

4. Implementation of best practices in test utilization: e.g. serum folate instead of red cell folate, replace ESR with CRP, removing CK from cardiac order sets, removing AST from liver test profiles, proper use of hs-troponin, Fecal immunochemical test (FIT) to replace guaiac-based FOBT

5. Standardization of policy for pre-analytical procedures (e.g. collection of intra-osseous specimens)

6. Initiation of centralization of microbiology services (i.e. transfer of Micro from Smiths Falls to KGH site)

“WE TRULY MADE THE BEST CHOICE IN THE WORLD WORKING WITH YOU AND YOUR TEAM TO SUPPORT THE GROUP HERE AND HELP THEM EXCEL. ALL GREAT PEOPLE! … EXCELLENT TURNAROUND TIME … GREAT TO HAVE ACCESS TO SUBSPECIALTY AP, HP, MICRO, ETC. I WILL CONTINUE TO CELEBRATE OUR SUCCESSES EVERY TIME I SPEAK AT OUR MAC, KHSC MAC, AND ONTARIO HEALTH TEAM MEETINGS!”

Dr. Rob Malone
Chief of Staff, Brockville General Hospital
Research Studies and Clinical Trials Support

Scope of Services

Our Clinical Laboratories play a very important role in supporting the academic mission of KHSC through our active support and participation in clinical trials performed by clinicians. The volume and complexity of studies that are monitored, by our Charge Technologist Kerry Benford, has been increasing steadily over the past few years. We work closely with study coordinators, for example to determine whether industry-sponsored studies are on a national or international level, whether some (or all) of the testing can be performed in one of our laboratories. The Transfusion Medicine laboratory has recently experienced an increase in the number of studies requesting their services for DAT, blood grouping and Rh testing. The Microbiology laboratory also experienced an increase related to Queen’s Animal Care monitoring and maintenance (310% revenue increase over previous fiscal year, not attributed to increases in test pricing). The precise pre-analytical requirements must be determined so that valuable specimens are not rejected for analysis and patients’ access to care delayed.

<table>
<thead>
<tr>
<th>Time Period</th>
<th>New Studies Added</th>
</tr>
</thead>
<tbody>
<tr>
<td>April – December 2018</td>
<td>56</td>
</tr>
<tr>
<td>January – March 2019</td>
<td>34</td>
</tr>
</tbody>
</table>

Examples of Study Titles Reviewed by the Clinical Laboratories in Fiscal 2019

<table>
<thead>
<tr>
<th>Study Investigator/Department</th>
<th>Name of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Anne Ellis</td>
<td>Allergy studies, drug trials, typically having high volume of participants</td>
</tr>
<tr>
<td>Dr. Paula James, Hemostasis</td>
<td>Bone Health in Symptomatic Carriers of Hemophilia A; Hemostasis Stress Response; Phenotypic Variability in Type 1 vWD; Does the Self-administered Bleeding Assessment Tool score accurately predict perioperative bleeding? CHiC Study: The Canadian Hemophilia Carriers-Postpartum</td>
</tr>
<tr>
<td>Emergency Medicine Department</td>
<td>Clinical Component of the Canadian Lyme Disease (CLYM)</td>
</tr>
<tr>
<td></td>
<td>Precision Medicine for Improving the Diagnosis of Pediatric Appendicitis in the Emergency Department (PRIMED)</td>
</tr>
<tr>
<td>Obstetrics Department</td>
<td>THC &amp; Other Illicit Drug Use in KGH Obstetric Population</td>
</tr>
<tr>
<td>Various Queen's PI's</td>
<td>Late Third Trimester Cannabis and Other Substance Use in the Adolescent Obstetrical Population at KHSC</td>
</tr>
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<td>----------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Late Third Trimester Cannabis and Other Substance Use in the Adolescent Obstetrical Population at KHSC</td>
<td></td>
</tr>
<tr>
<td>Various Queen's PI's</td>
<td>A Blood Test for Breast Cancer</td>
</tr>
<tr>
<td>A Methylation-Based Blood Test as a Replacement for PSA</td>
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<tr>
<td>Quantification of Structural and Functional Brain Changes in Varsity Football Players</td>
<td></td>
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<tr>
<td>Investigating the Extracellular Communication Mechanisms Required by Cancer Stem Cells</td>
<td></td>
</tr>
<tr>
<td>Shift Work Circadian-related Gene Methylation and Cardiometabolic risk</td>
<td></td>
</tr>
<tr>
<td>Development of a rapid diagnostic system for identification of the top 10 most common infectious bacterial strains</td>
<td></td>
</tr>
<tr>
<td>The Epidemiology of Gram-negative Blood Stream Infections Across Canadian Pediatric Centres in the Era of Emerging Multidrug Resistance</td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>Cerashield Adult Coated Endotracheal Tube Study</td>
</tr>
<tr>
<td>Lessening Organ Dysfunction with VI TAMIN C (LOVIT Trial)</td>
<td></td>
</tr>
<tr>
<td>Genetics</td>
<td>Clone of Biomarkers of Response to Immunotherapy in Non-small Cell Lung Cancers</td>
</tr>
<tr>
<td>Care4Rare Canada: Harnessing Multi-omics to Deliver Innovative Diagnostic Care for Rare Genetic Diseases in Canada (C4R-SOLVE)</td>
<td></td>
</tr>
<tr>
<td>OCTANE: A Provincial OICR-led trial that supports profiling of solid tumours using NGS Panels</td>
<td></td>
</tr>
<tr>
<td>CAPTUR: A CCTG clinical trial for solid tumour profiling</td>
<td></td>
</tr>
<tr>
<td>Renal</td>
<td>Multi-center, Randomized, Parallel, Adaptive, Controlled Trial in Adult and Pediatric Patients with Type 1 Diabetes using Hybrid Closed Loop System and Control at Home</td>
</tr>
<tr>
<td>Canadian Multicentre Pilot Open Label Study to Evaluate the Efficacy and Safety of the Bacterial Vaccine Uromune in Treating Recurrent Urinary Tract Infections in Women</td>
<td></td>
</tr>
<tr>
<td>Insulin and Phosphate Excretion in People with Metabolic Syndrome or Type 2 Diabetes: Examination of a Novel Cardiovascular Risk Factor</td>
<td></td>
</tr>
<tr>
<td>Surgical</td>
<td>A Single-arm Phase II Trial of Intra-operative Application of HEMOPATCH ot the Pancreatic Stump to Prevent Post-operative Pancreatic Fistula Following Distal Pancreatectomy</td>
</tr>
<tr>
<td>Intraarticular versus Intravenous Antibiotic for Treating Prosthetic Joint Infection: A Pilot Study</td>
<td></td>
</tr>
</tbody>
</table>
Looking Forward to Fiscal Year 2020

During Fiscal 2019, we laid several important building blocks towards our desired future state through the addition of new skilled faculty and staff, new equipment, new tests, new collaborations and partnerships, improved service and operations. However, we know that we continue to face major challenges ahead of us.

There are at least three major initiatives, some of which we participated in during Fiscal 2019, that we will monitor developments closely in the upcoming year, as they are crucial to our success. They include:

1. **Regional Healthcare Information System** (HIS): Selection of an appropriate laboratory information system (LIS) is crucial towards improving all five domains of quality, e.g. more effective care through computerized order entry, greater efficiency by reducing unnecessary duplication of laboratory services across the region, safer care through positive patient identification and bar code labeling of specimens.

2. **Phase II Redevelopment**: Approval by the Ministry of Health of KHSC’s plans for construction of a new wing at the KGH site which would include clinical laboratories is crucial for our growth and development as a regional academic health science centre and the services that we provide as a reference laboratory. It is also important for wellbeing of our staff and faculty and our academic mission as a centre of learning, teaching, and research.

3. **Ontario Health Networks** (OHN): The impact of new provincial legislation abolishing the LHIN’s and encouraging the formation of OHN’s will begin to be felt over the next year, including in our region. The formation of such a network which includes hospitals as well as primary care practices offers the clinical laboratories an opportunity for growth and further development through laboratory testing of community patients thereby better integrating care for patients and their healthcare providers.

We look forward to reporting about these and other initiatives underway in next year’s report!