HAMILTON REGIONAL LABORATORY MEDICINE PROGRAM

LAB CONNECTIONS

OCTOBER 2014 /
Issue #133

SPECIAL EDITION

HRLMP Quality Initiatives

Editorial Office:
Dr Cheryl Main, Editor
Email: mainc@hhsc.ca
Michelina Bozzo,
Editorial Assistant
Email: bozzom@hhsc.ca

SPECIAL EDITION

Welcome to the "**Focus on Quality**" edition of Connections. This special edition will showcase a few of the quality improvement initiatives underway within the HRLMP. Providing high quality patient care is the top priority for all departments within our program and this demands strong teamwork and collaboration.

Before we start on this journey, I would like to take a moment to recognize the hard work and skill of the Connections Editorial Board. I am very fortunate to have their input and assistance with every edition that is shared with you. I would like to specifically recognize the contributions of **Dr. Jan Jansen** who has acted as the Pathology representative on the board for many years. He will be leaving us now as he plans his retirement.

Thank you Dr. Jansen for your hard work and commitment to Connections. You will be missed. We wish you all the best in your retirement. -Cheryl Main, *Editor of Connections*

"Quality improvement at a revolutionary pace is now becoming simply *good* management."
~ Godfrey

Quality Improvement is the mainstay of our **Quality Management System at the HRLMP**. We are never short of improvement projects and are often amazed when we stop to reflect on how much we accomplish. All of this takes great ideas, leadership, and team work.

We are dedicated to providing:

The right test, for the right patient, with the right result, at the right time!

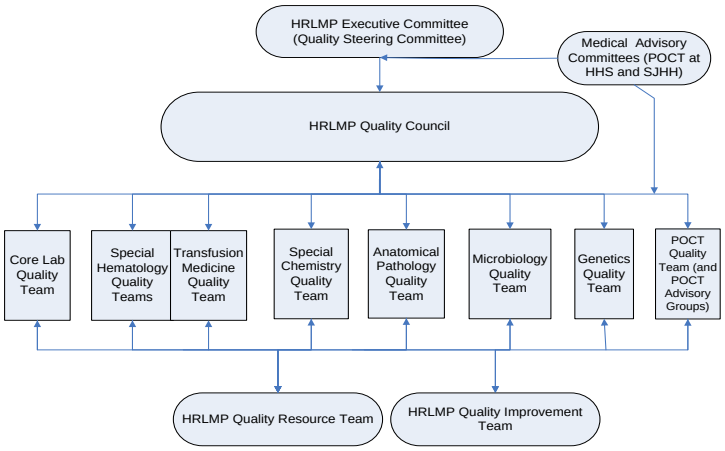
In this issue of Connections, we would like to share with you a few of the improvement initiatives that are taking place across the Hamilton Regional Laboratory Medicine Program.

Your feedback, suggestions and new ideas are welcomed. Submit to the Editorial Office:
Dr. Cheryl Main, Editor, Email: mainc@hhsc.ca; Michelina Bozzo, Editorial Assistant, Email: bozzom@hhsc.ca

Improving our Team Work

Quality product and service can only result from the efforts of everyone in the organization doing the best for our patients and clients.

HRLMP Quality Structure



This structure in the diagram above has served us well but it has been recently reviewed and membership to these teams has been revitalized. This results in new energy and new perspectives and ideas. Our Quality Resource Team's representation is multi-disciplinary consisting of frontline members who also sit on their Discipline Quality Teams. This team has a focus on auditing and maintaining conformance to the Quality Management System and accreditation requirements.

Direction flows from the Quality Council to the discipline teams with feedback on quality issues feeding back to the Council. This bi-directional communication helps to keep alignment on a quality focus across our program and sharing of best practices.

Each year the Quality Council establishes the HRLMP quality goals. This year we are focused on:

- Finalizing the use of the HRLMP Balanced Scorecards (Executive and Operations)
- Developing strategies to enhance the patient experience by adopting a bringing the patient back to the laboratory mind set
- Reducing the number of patient identification errors on ward-collected laboratory samples and evaluating the use of a positive patient identification system for phlebotomy.
- Developing strategies to improve use of STAT, URGENT and ROUTINE priorities across the clinical areas

A new addition to our structure is the formation of a team of *Improvement* leaders consisting of representatives from each of our laboratories. This team will be provided with training on improvement methodology and tools, leadership of teams, and change concepts and will be charged with leading improvement initiatives across our program.

- Cathie McCallum, Quality Manager HRLMP

The following are a few of the improvements from our Laboratories that we would like to share with you.

Auto-verification of Results in Core Laboratories

Auto-verification is a process which uses computer-based rules and algorithms to verify clinical laboratory test results without any manual intervention from our Medical Laboratory Technologists (MLTs). This process allows the computer to perform the initial review of every test, holding back only those results that require MLT intervention. Auto-verification has been part of the Core Laboratory workflow at HRLMP since November 2011, when we began auto-verifying coagulation testing results. Initially, about 40% of the coagulation results were being auto-verified. With some further improvements to our process and algorithm, 78% of INRs and PTTs are now being auto-verified.

Today, greater than 85% of blood gas results and 60% of CBC results are also being auto-verified, resulting in efficiencies that only a few years ago were not realized. As we continually improve, every test that is performed in the Core Laboratory has been assessed and all test results that can be auto-verified will be auto-verified. Our goal is to continue to refine our processes to achieve an auto-verification rate of greater than 90% for all tests in the Core Laboratories.

This initiative provides **improved turnaround** of test results to enhance patient care while being built on algorithms that are safety focused for our acute care patients. - Spencer Brown, Quality Specialist, HRLMP

EUREKA – I have a solution to that challenge!!!

Now what do I do???

Our frontline staff expressed concerns regarding why operational challenges were not being addressed, why their improvement ideas were not being acted upon, and on the inability to keep track of why processes discussed were not implemented.

To address this, the HRLMP has implemented "**Eureka Boards**" as a mechanism to capture ideas related to the identification and solution of departmental issues or improvements. This concept has been adopted from Intermountain Healthcare in Utah, a similar multi-site, multi-disciplinary laboratory program.

The Collins English Dictionary defines Eureka as, *"an exclamation of triumph on discovering or solving something."* It is also derived from the ancient Greek word *heúrēka, meaning, "*I have found (it)!"

How are Eureka moments being captured?

When a challenge is identified and an improvement solution is proposed, staff members initiate a **Suggested Solution Form** which will document:

- ***The Challenge:*** A description of the process/ procedure/practice that is causing a concern.
- ***Why is this a Challenge?:*** A description of why this is a concern and who/what is affected.
- ***A Suggested Solution:*** A description of the improvements that could be made to address the submitted challenge.

The completed form is posted on the departmental Eureka Board.

What is a Eureka Board?

An idea submission location that contains three sections: *Challenge, In-Progress, and Complete*

Challenge: Initial Suggested Solution Forms are posted in this section of the Eureka Board.

In-Progress: Managers/supervisors/delegates have two weeks to review and develop an action plan for each submission. Once the action plan is recorded and assigned, the form is moved to "In-Progress" on the Eureka Board.

Complete: Once the action plans are implemented, the manager/supervisor/delegate documents the final resolution on the form and it is moved to "Complete" on the Eureka Board. Any supporting documentation/records/reports should also be posted to summarize the improvement completed.

All submitted Eureka forms serve as evidence of our commitment to continuous quality improvement, as well as document what actions were or were not taken in a transparent and readily-available format that is accessible by all departmental staff.

- Tom Dorland, Quality Specialist, HRLMP

HRLMP Dashboard – *A tool to monitor quality indicators:*

The HRLMP has implemented the use of a dashboard – an electronic tool to visualize and monitor our performance based on defined quality indicators.

Our dashboard is sectioned into five parameters based on organizational goals for which specific quality indicators are defined. This also provides a balanced view to ensure that our efforts do not get focused on any one dimension more than another.

- Provide an excellent patient experience:
  - *Monitors patient safety occurrences, EQA performance, accreditation*

performance and key turnaround times for each discipline

- Achieve a seamless healthcare system:
  - *Monitors progress made on consolidation of services within our program*
- Attract and steward resources:
  - *Monitors budget variance, overtime*
- Organization of choice:
  - *Monitors staff satisfaction, absenteeism, the frequency of staff related-safety occurrences*
- Move evidence into practice:
  - *Monitors the number of new tests, external publications and student placements*

The HRLMP dashboard provides our executive team with a high-level snapshot of our performance based on current goals and key performance indicators with a balanced scorecard view.

- Tom Dorland, Quality Specialist, HRLMP

Beyond the Borders of the Lab: A multi-disciplinary Approach to External Ventricular Drain Infections

External Ventricular Drains (EVDs) are inserted to help relieve elevated intracranial pressure resulting from trauma, intracerebral hemorrhage or other pathologies. These drains may be in place for several weeks and are a potential portal of entry for bacteria. Ventricular drain infections are serious nosocomial infections, and are associated with morbidity and mortality for patients. They require a prolonged course of intravenous antibiotic therapy and increase the length of hospitalization.

Late in 2011, the Infectious Disease Service at the Hamilton General Hospital informed the Microbiology Laboratory that they were seeing an increase in external ventricular drain infections. A working group was created to determine if the infection rates were a concern and to assess current procedures for inserting and managing ventricular drains. This multidisciplinary group has representation from nurses, educators and physicians from Neurosurgery and ICU, as well as a Microbiologist, Infectious Disease Physician and members of the Infection Prevention and Control (IPAC) group. The team began by reviewing the literature[1] and inquiring about best practices for EVD insertion being used at other neurosurgical centers. Using this information they established a best practice "checklist" to be used when inserting EVDs. The checklist was reviewed by physicians, nurses and educators in both departments. Additionally, the team found published rates of EVD infections at other centers which range from 5-15%[2] and established laboratory and clinical criteria to define an EVD infection.

The best practice checklist was implemented in May 2012 and infection rates were tracked with the aim of keeping them below 10% (Figure 1). The initial data post-implementation was reassuring and the assumption was made that the checklist would continue to be used. The working group stopped meeting and in May 2014, infection rates were noted to increase again. After reviving the working group and implementing practice audits, we are now seeing rates decrease and this time we will keep watching!

- Cheryl Main, Medical Microbiologist, HRLMP

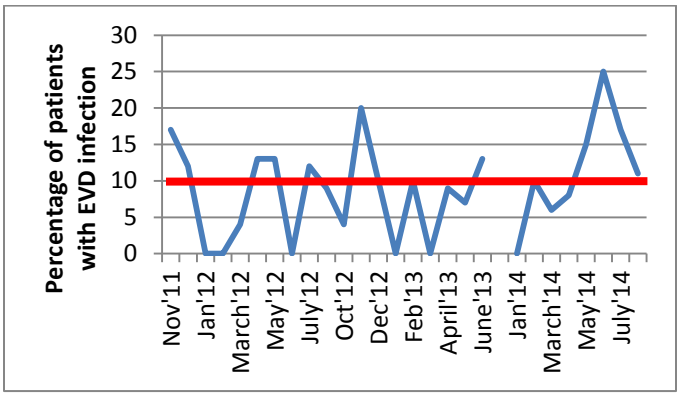


Figure 1: EVD Infection rates

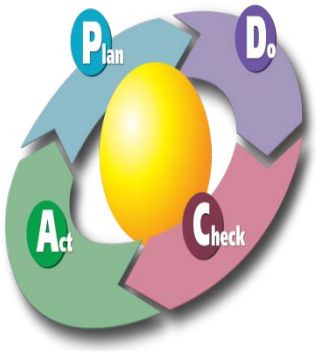
1. Kestle et al. A Standardized protocol to reduce cerebrospinal fluid shunt infection: The Hydrocephalus Clinical Research network Quality Improvement Initiative. J Neurosurg Pediatr. 2011.8: 22-9.
2. Flint et al. A simple protocol to present external ventricular drain infections. 2013. 72:993-9.

Cross Contamination in Anatomical Pathology – An Opportunity for Improvement

One of the most serious and persistent problems we face in Anatomical Pathology is the cross contamination of patient tissues. The literature tells us that on average 3% of cases will show extraneous tissue (not belonging

to the patient specimen being examined)[1]. There are many checks and balances along the way to help reduce the number of cases affected by this. Many times the contaminants can be resolved at the histologic level but some require DNA molecular analysis to determine "what belongs to whom". The Pathologist must be confident that the diagnostic material on the H&E slide truly represents the patient's diagnostic material.

Cross contamination can happen at any step along the specimen pathway: at the time of specimen procurement, gross dissection, tissue processing (automated chemical preparation of tissue for further steps), embedding (tissue is embedded in paraffin wax in preparation for cutting), at microtomy (slicing of the paraffin embedded block and placement of a thin tissue section on a glass slide), and staining the tissue sections in an automated stainer.



PLAN - Cross contamination was identified as an opportunity for Quality Improvement in Pathology at the HRLMP. Utilizing the PDCA cycle we started this process with a planning phase which included the formation of a committee with representation from all of the different roles within our department. A literature search was done and relevant information was discussed at meetings to best determine which areas along the specimen pathway needed action and what improvements needed to be made. It was also determined that metrics were needed to measure the impact of the changes made. A new category "Cross Contamination" was added to our Radical Logic Incident Reporting System to be able to track our progress. The group determined what changes needed to be made at all steps along the pathway to reduce our cross contamination. A new SOP was written which incorporated all of those changes.

DO - Next came the education for all staff to ensure the new procedures were followed. This included sessions at every site to outline the importance of the changes and to help ensure staff buy-in. Reminder posters were hung throughout the Laboratory to keep the message "front and center". Audits were done to help ensure the procedures were followed.

CHECK - Monitoring the number of incidents of cross contamination helps us to determine compliance to the implemented procedures. It has shown a reduction in the number of incidents since the implementation in 2012 and then a rise again in 2013. Further audits were done.

ACT – The new audits indicated that an emphasis on the more stringent filtering of solutions at the staining step and re-education around the embedding step were needed. This resulted in a significant reduction in 2014.

The problem of tissue cross contamination is on-going and constant vigilance is the key to success in reducing the number of incidents. The utilization of the Quality Improvement PDCA cycle helps to ensure our continued success, but it is the professionalism of our dedicated staff and particularly of our Technical Specialist, Pat Ludlow, that really makes this a dynamic and successful improvement project.
- Linda Turner-Smith, Manager, Anatomical Pathology, HRLMP

1. Gephardt,G.N. and R.J. Zarbo. Extraneous tissue in surgical pathology: a College of American Pathologists Q-probes study of 275 laboratories. Arch Pathol Lab Med 1996. 120:1009-1014.

Improving TAT for Prenatal Genetics

Continuing Quality Improvement (CQI) within the laboratory may be driven by a variety of influences including scientific, technical or operational concerns that may exist at any stage of testing. The last decade has borne witness to substantive technological advancements in Genetics allowing for unprecedented growth in our understanding of normal genomic

variation and its contribution to the pathophysiology of disease. The challenge to clinical genetic laboratories has been incorporating these advances into routine laboratory practice in a manner that enhances patient care while being mindful of fiscal restraints.

In prenatal genetic diagnostics, the previous gold standard for prenatal cytogenetic investigations was chromosome karyotype analysis. This technique has a turnaround time of 10-21 days and is limited to detection of chromosome abnormalities greater than 5-10 megabases in size. More recently, methodologies have been developed that allow for significant improvements to both the turnaround time and sensitivity of prenatal cytogenetic testing.

Rapid aneuploidy testing protocols (eg. QF-PCR) allow for assessment of aneuploidies (too few or too many chromosomes) involving chromosomes 13, 18, 21, X or Y; the routine reporting times for these assays are only 24 to 48 hours. In 2011, a joint practice guideline was issued by the Society of Obstetricians and Gynecologists of Canada (SOGC) and the Canadian College of Medical Geneticists (CCMG) recommending that QF-PCR should replace conventional cytogenetic techniques for certain clinical indications[1].

Chromosomal microarrays (array CGH) are another technologic advancement that has greatly improved test options in prenatal care. Microarrays have sufficient resolution to detect chromosome abnormalities as small as 50 to 100 kilobases in size; abnormal results interpreted to be causal and clinically significant are reported in ~6% of pregnancies with fetal ultrasound anomalies and an otherwise normal karyotype[2,3]. This led to a committee opinion through the American College of Obstetricians and Gynecologists (ACOG) that recommended chromosome microarrays should be requested instead of routine G-banded karyotypes when invasive prenatal diagnostic testing is being performed because there are one or more major structural abnormalities identified by fetal ultrasound[4].

In 2012-2013 the HRLMP Cytogenetics Laboratory participated in an extensive CQI project to redevelop prenatal diagnostic testing being performed within the laboratory. The primary goals of this CQI project were to address the CCMG-SOGC guidelines regarding QF-PCR, to incorporate prenatal chromosome microarrays for specific clinical indications, to incorporate additional QA measurements by assessing for maternal cell contamination (MCC) of all prenatal specimens, and to introduce efficiencies within the laboratory by minimizing labour intensive karyotype analysis. Consultation with health care practitioners was critical to establish a testing algorithm that allowed triaging of testing performed to include QF-PCR only, karyotype and/or microarray analysis depending on the clinical indication. In the laboratory, extensive validation of the testing procedures was performed and the testing algorithms were further refined to ensure that testing meets quality standards, is appropriate, and minimizes redundancy. The outcomes of this CQI project have led to the launch of enhanced prenatal cytogenetic testing as of May 2013 and have placed the HRLMP among the leaders in this field within Canada.

- Elizabeth McCready, Head of Molecular Cytogenetics, HRLMP
- Robyn White and Amanda Cocca, Medical Laboratory Technologists, HRLMP

1. Langlois *et al*. 2011. *JOGC*, 265:955-960
2. Wapner *et al*. 2012. *N Engl J Med*, 367(23):2175-84.
3. Shaffer *et al*. 2012. *Prenat Diagn*, 32(10):976-85.
4. American College of Obstetricians and Gynecologists. 2013.*Obstet Gynecol*, 122:1374-7.

Managing Performance by Exception – *What does this mean and how are we looking to do it?*

It is well recognized that a good **Quality Management System** is built on the foundation of a strong quality control program for all of its processes. HRLMP has invested considerable efforts over the past year to improve our quality control program for our analytical methods and processes.

Managing performance by exception is a new theme for our quality program. It is a practice where only significant deviations from defined goals are escalated for further review. The idea behind this is that attention/efforts will be focused only on those areas in need of action.

The most important step to this practice is setting goals that make sense. To facilitate this, time is required to consider and define goals that are meaningful, sensible, and achievable. To do this, we utilize the S.M.A.R.T. approach for defining our quality goals and indicators to monitor our system performance:

Specific	Defined, clear, and consistent
Measurable	Performance criteria e.g., error rate, sigma value
Attainable	Achievable by assay capability
Relevant	Aligned to an objective i.e., clinical care, EQA
Time-bound	Reviewed on a regular schedule

All laboratories continuously monitor performance using a variety of indicators:

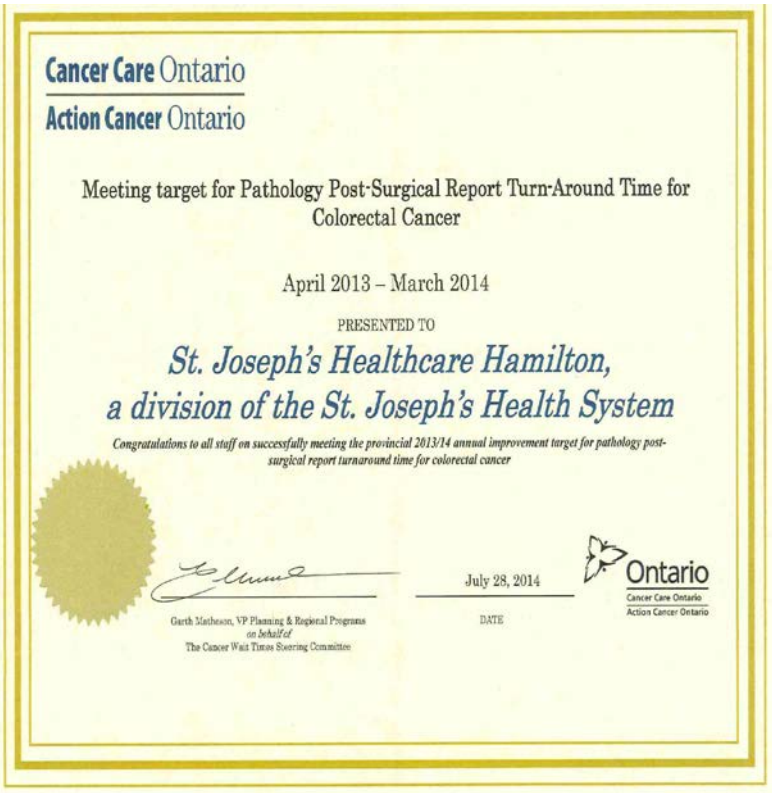
- Customer complaints to ensure practices are improved to meet their expectations.
- Quality Control to ensure our results are accurate and precise
- Budget tools to ensure spending is in line with available resources
- Workload volumes to ensure capacity to meet our clients' needs is available
- Safety Occurrence Reports to ensure practices are in place to minimize risk

One improvement we have initiated is the use of **test specific quality control rules** for each of our chemistry instruments throughout our Core Laboratories. What this means is that after defining our quality goal for each analyte (Total Allowable Error), we have assessed our performance and determined specific rule sets to ensure that we are able to meet our goals. This has allowed us to implement a 1-5s rejection rule for some of our excellent performing assays, but a more stringent rule set for those assays that do not perform as well (1-3s, 2-2s, R-4s). Functionally, this minimizes the financial and operational time spent investigating results that do not represent an unexpected difference.

As we continue to improve this program we are establishing a monitoring tool that allows us to monitor the Sigma level of all quantitative methods on each instrument across our program. We will share more on this once it is complete.

We continue to learn from our past experiences and continue to drive to new levels in our commitment to Quality product and services. We use our occurrence reports as an opportunity for improvement and being open and honest when they occur so that we provide a safe service for our patients.
- Tom Dorland, Quality Specialist, HRLMP

Congratulations to Pathology at SJH!



Cancer Care Ontario
Action Cancer Ontario

Meeting target for Pathology Post-Surgical Report Turn-Around Time for Colorectal Cancer

April 2013 – March 2014

PRESENTED TO

St. Joseph's Healthcare Hamilton, a division of the St. Joseph's Health System

Congratulations to all staff on successfully meeting the provincial 2013/14 annual improvement target for pathology post-surgical report turnaround time for colorectal cancer

July 28, 2014

DATE

Garth Matheson, VP Planning & Regional Programs
on behalf of
The Cancer Wait Times Steering Committee

Ontario
Cancer Care Ontario
Action Cancer Ontario

Continuing Education

HRLMP Rapid Fire Showcase

"Best one yet!" – The comments from our attendees say it all!

Since it began in 2008, the HRLMP Rapid Fire Showcase has been one of the best attended educational events

sponsored by the HLRMP. This year marks our 7th Annual HRLMP Rapid Fire Showcase, and over the years we have welcomed nearly 600 attendees from the HRLMP and our neighbouring community hospitals.

The Rapid Fire Showcase is a half-day session held on a Saturday each fall, consisting of twelve, 15-minute presentations. The presentations are a perfect length - long enough to provide enough information for an audience of laboratory professionals, and short enough to keep the audience completely engaged. Topics range from new and innovative methodologies and technologies in the laboratory, to case studies, and even to a few back-to-the-basics refreshers.

Presenters span the entire gamut of HRLMP technical staff: managers, supervisors, technical specialists, senior MLTs, bench MLTs and MLAs. We are proud to say that many of our presenters are first-timers who have approached the experience cautiously and sometimes quite nervously, but have always done a fantastic job and have embraced and enjoyed the experience. This year we will pass the milestone of having had over 80 presenters at the Rapid Fire Showcase.

Rather than printing handouts, each attendee is provided with a CD with all of the presentations for their review and for sharing with colleagues. It's good to go green!

We are in the midst of planning another great session, and look forward to hosting our 7th Annual Rapid Fire Showcase on Saturday November 22nd, 2014. Click here to register http://tinyurl.com/HRLMP-Education

Man in Motion

Dr. Mark Crowther has stepped down from his position as Chief of the Hamilton Laboratory Medicine Program to become **Chair of the Department of Pathology and Molecular Medicine**, Faculty of Health Sciences, McMaster University. Dr. Crowther was Chief of Laboratory Medicine at Hamilton Health Sciences and St. Joseph's Healthcare for 5 years and led in his own words, "One of the most cohesive, high quality and enthusiastic teams that operate(s) within health care in the Hamilton region." Under Dr. Crowther's leadership, the HRLMP has established itself in the forefront of academic laboratory medicine programs, is recognized internationally for its educational and research achievements, as well as for delivering high-quality care to patients. Dr. Crowther has been a tireless advocate for laboratory medicine as a clinical specialty and is a passionate believer in a culture of total quality management.

Dr. Crowther is a clinical hematologist with a busy clinical practice in the care of patients with clotting disorders as well as being an internationally recognized researcher in thromboembolic disease. He brings energy and enthusiasm to everything he does and always manages to find time to fit anything important and extra into his busy days. Mark has recently completed a cross-Canada bicycle ride to raise money in support of childhood cancer research and is often seen in his bike shorts coming or going.

What is the HRLMP's loss is, however, the academic department's gain. Dr. Crowther leaves a strong legacy and a strong leadership team. We thank him for his service to the laboratory program and know he will bring the same passion and commitment to the academic department during an exciting time in medical research and education.

- Fiona Smaill, Past Chair of Pathology and Molecular Medicine, McMaster University