DEPARTMENT OF PATHOLOGY AND MOLECULAR MEDICINE

ANNUAL REPORT

APRIL 1, 2005 – MARCH 31, 2006

Pathology and Molecular Medicine
KINGSTON GENERAL HOSPITAL
CLINICAL LABORATORY SERVICES

Mission:
"Together, we proudly serve our regional community through the provision of expert laboratory and clinical services, education and research."

Vision:
"We strive to be national leaders in advanced diagnostic services, employee success, student achievement and knowledge discovery."

Values:
"In our pursuit of excellence, we value people by practicing mutual respect, professionalism, teamwork, integrity, trust and accountability."

For more detailed information about our Department and its activities, please visit our website at: ***http://www.path.queensu.ca***

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1. EXECUTIVE SUMMARY

1.1 PREAMBLE

The Department of Pathology and Molecular Medicine at Kingston General Hospital and at Hotel Dieu Hospital is closely integrated with KGH Clinical Laboratory Services. The Department is organized into five divisions: Anatomical Pathology, Clinical Chemistry, Clinical Microbiology, Hematopathology, and Genetics. Management and medical direction for the hospitals' Infection Prevention and Control Service and the Transfusion Medicine Service are the responsibility of our Department. However, those two annual reports are presented separately to the MAC and are not included as part of this departmental report.

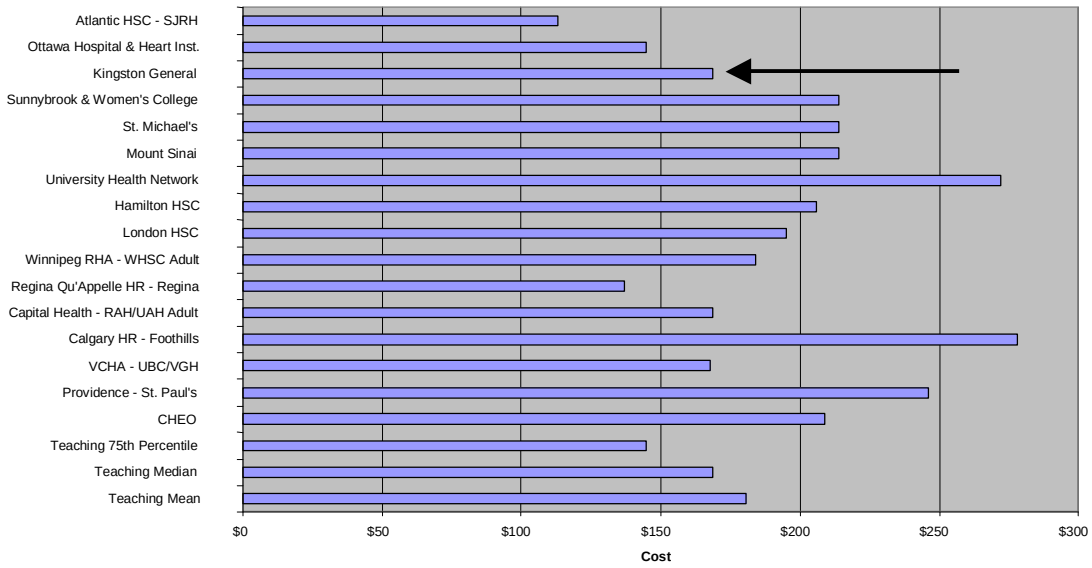
In addition to providing clinical service, education and research, several departmental faculty members have significant administrative responsibilities for co-supervision of technical staff and co-management of clinical laboratory operations. On the academic side, a number of faculty members have received prestigious national and international awards and other recognitions for their achievements. These are highlighted in this report.

1.2 WORKLOAD AND UTILIZATION TRENDS

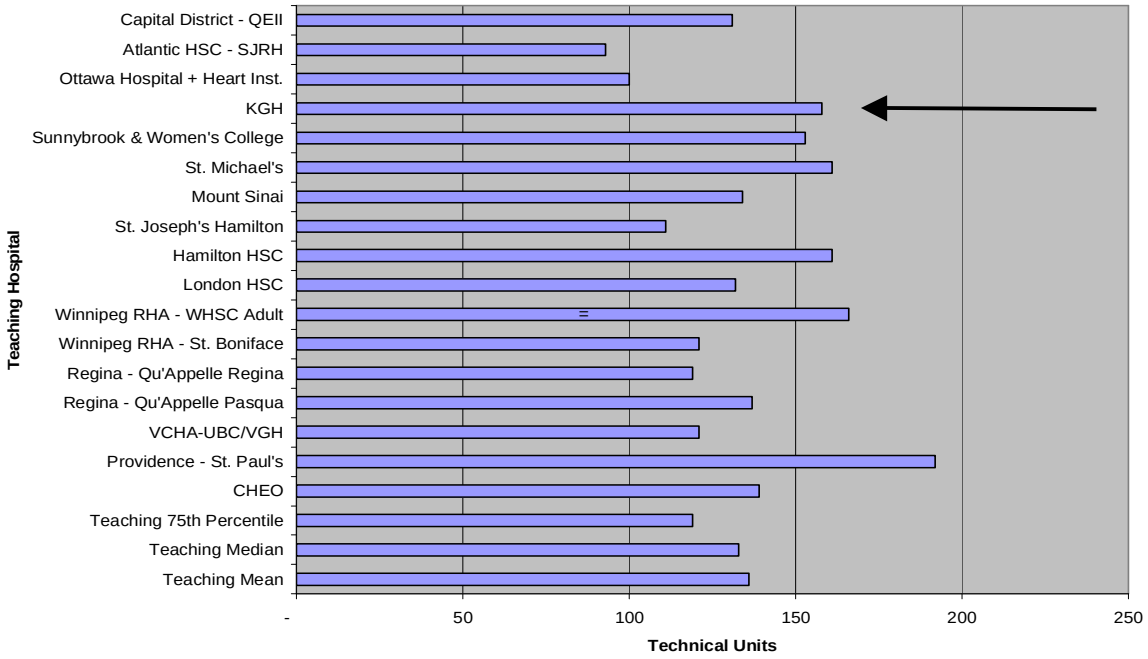
Surgical Pathology, which comprises the bulk of day-to-day service work for most Anatomic Pathologists, continued to show a shift towards more complex and work intensive cases. Similar workload trends have been observed by the Hematopathologists and Laboratory Geneticists.

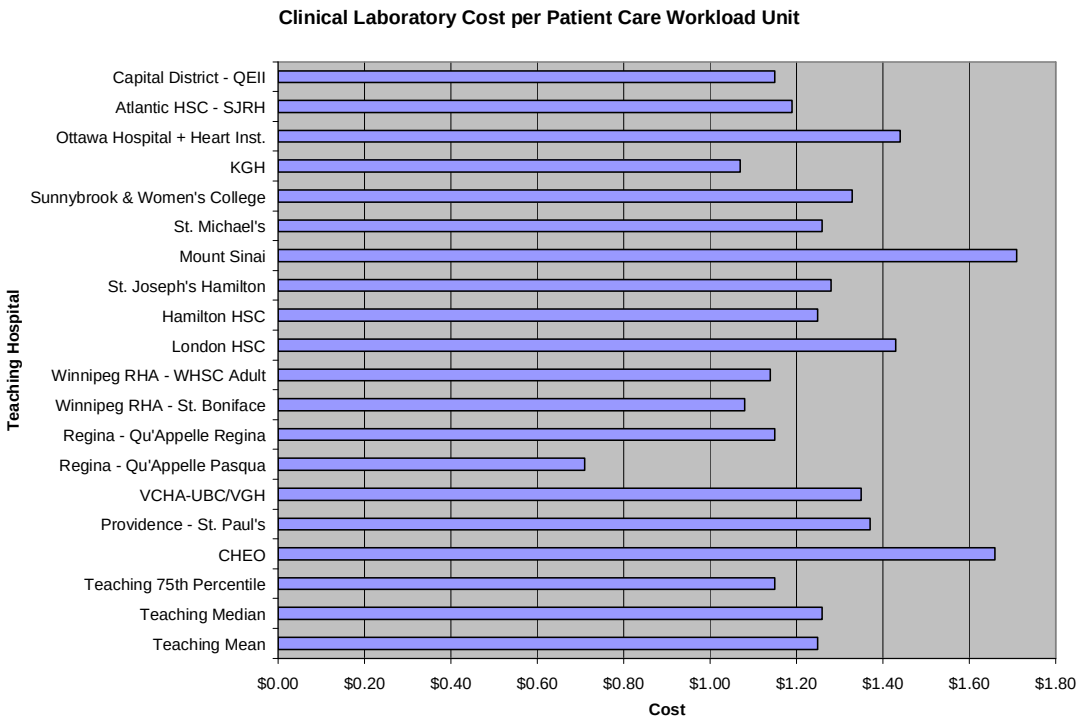
Laboratory Physicians and Scientists have very little control over utilization of laboratory services; this is determined primarily by Attending Staff and House Staff on the wards. The 2005 CIHI/HayGroup Benchmarking Comparison of Canadian Hospitals revealed once again that while KGH has one of the most cost efficient clinical laboratories, it also has one of the highest rates of laboratory test utilization (workload per weighted cases is high - see bar graphs). The reasons for this are not entirely clear. Implementation of tools such as computer-based physician order entry (CPOE) would greatly assist in identifying root causes and implementing possible solutions.

Laboratory Services: Acute Inpatient Cost per Weighted Cases (2005)



Laboratory Services: Acute Inpatient Workload per Weighted Case (2005)





1.3 QUALITY IMPROVEMENT ACTIVITIES

Several new state of the art instruments were purchased for KGH and HDH over the past year, thanks in large part to one-time MOHLTC funding to hospitals for Diagnostic Medical Equipment (DME). This will improve the diagnostic and testing capabilities required for a tertiary care academic centre. The Department's Quality & Utilization Improvement Committee continues to examine a wide range of issues pertaining to quality including external benchmarking, continuous improvement initiatives, comprehensive occurrence management, and development of a balanced scorecard. The Committee's 2005-2006 Annual Report is available within the Department.

1.4 MULTIDISCIPLINARY COLLABORATION

We continue to support well-established regional initiatives (e.g. Lab Outreach Program, Forensic Unit, Genetics Program in Peterborough) and multidisciplinary activities (e.g. Regional Cancer Centre Disease Site Groups, Regional Infection Control Program, Transfusion Medicine Service, and Stem Cell Transplant Program).

1.5 TEACHING AND RESEARCH

The departmental educational mission crosses multiple programs at KGH and Queen's as well as St. Lawrence College and the Michener Institute in Toronto. Departmental members teach extensively in the undergraduate medical curriculum, particularly in Phase I.

The Department has a substantial graduate program which includes 38 students. Departmental laboratories also support 14 postdoctoral research fellows. Faculty offer

approximately 10 courses in Pathology, Genetics and Molecular Medicine within undergraduate Life Sciences and graduate programs and also participate in courses within the Nursing and Rehabilitation Medicine programs at Queen's. Departmental members play a significant role in supervising and training general medical laboratory technology students from St. Lawrence College and also cytology and laboratory genetics students from the Michener Institute. The Department also coordinates an annual, very highly regarded course in the Queen's Enrichment Program for high school students.

Enrolment in our residency training programs has enjoyed resurgence during the last several years. Current enrolment exceeds 85% of capacity (13 of 15 resident positions in Anatomic Pathology, Hematopathology and General Pathology are filled). Our departmental members also have significant teaching and training responsibilities for residents in other programs, most notably Hematology, General Surgery, Radiation Oncology and Obstetrics/Gynecology. The department also administers a postdoctoral training program in Clinical and Laboratory Genetics and one fellow is currently enrolled in the Laboratory Genetics program.

The Department's biomedical research programs continue to grow progressively. In 2005-2006, total research funding in the department exceeded $5.7M with $3.6M originating from major national agencies. Lists of departmental research grants, publication records and scholarly presentations are available within the department upon request.

1.6 STAFFING ISSUES

The Division of Anatomic Pathology began the Spring of 2006 with a nominal staffing level of 14.0 FTE pathologists but an effective strength of only 11.25 FTE's. The Department successfully recruited an Anatomic Pathologist/Hematopathologist (Dr. P. Farmer) but will have to renew its search in Fall 2006 to fill a vacancy created by the resignation of Dr. T. Hiruki (AP), effective March 31, 2006. Staffing in the other Divisions was stable.

A new provincial Alternate Funding Arrangement for nearly all Ontario Laboratory Physicians (LMFFA) was implemented over the past year. This has helped us to stay competitive with other academic centres in terms of base remuneration.

2. AWARDS, HONOURS & ACHIEVEMENTS

Highlights are listed under our four departmental strategic priorities:

People

- Recruitment of a new faculty member, Dr. P. Farmer, to a vacant Anatomic Pathologist position.
- Three of our faculty members served on the Executive of the KGH-HDH Medical Staff: Dr. D. Zoutman – President; Dr. S. SenGupta – Vice-President; Dr. D. Dexter – Past-President.
- Dr. D. Lillicrap: Canada Research Chair, Tier 1, Molecular Hemostasis; also received a Career Investigator Award, Ontario Heart and Stroke Foundation. Dr. Lillicrap is the Chair of the Gene Therapy and Novel Technology Committee, World Federation of Hemophilia and the Co-Chair of the Scientific Standardization Committee on Von Willebrand Factor, International Society for Thrombosis and Hemostasis. He presented the Inaugural Sir John Dacie Lecture at the Imperial College School of Medicine, London, UK.
- Dr. S. Ludwin: Chair, Medical Advisory Committee, Canadian Multiple Sclerosis Society. Dr. Ludwin delivered the lectures "Oligodendrocytes and Tissue Repair in MS" at the 2005 MS Update Meeting, Philadelphia, PA and "Understanding MS through Pathology" at the 19th Annual Meeting of the Consortium of MS Centres, Orlando, FL.
- Dr. D. Zoutman: Co-Chair, Provincial Infectious Diseases Advisory Committee
- Dr. L. Shepherd: Vice-President, Canadian Society of Transfusion Medicine; Physician Coordinator of Multicentered Phase III Clinical Trials, National Cancer Institute of Canada – Clinical Trials Group.
- Dr. J. Rossiter: Vice-Chair, Neuropathology Fellowship Examination Board, RCPSC
- Dr. D. Rapson: Vice-Chair, Examination Board for Hematological Pathology, RCPSC
- Dr. C. Collier: Program Chair (President-Elect), Upstate NY-American Association of Clinical Chemists; Councillor, International Association of Therapeutic Drug Monitoring and Clinical Toxicology; received 2005 Canadian Association of Medical Education (CAME) Certificate of Merit.
- Dr. S. Taylor: Chair, Laboratory Genetics Fellowship Review Committee, MOHLTC
- Dr. L. Tomalty: Assistant Dean, Continuing Professional Development; Acting Associate Dean, Medical Education. Received Reddick Award for excellence in Nursing education from the School of Nursing.

Quality

- Implementation of Real Time Polymerase Chain Reaction (RT-PCR) for MRSA rapid detection at KGH

- Implementation of genetic typing procedures for selected pathogens (e.g. MRSA, VRE) to allow more precise determination of origins of clusters and outbreak strains.
- Autopsy suite renovations completed and new instruments purchased (e.g. two trace evidence detection UV lights, a dissecting microscope to study cardiac stents)
- Acquisition of two automated immunostainers to support enhanced cancer specimen testing, including breast HER-2/neu, and to provide in situ hybridization testing capability
- Six new blood gas analyzers were implemented to replace outdated instruments.
- A new scanning spectrophotometer allows the laboratory to implement an improved procedure for determination of amniotic fluid bilirubin. Also, new computer software improves both the speed and accuracy of the analysis.
- A gas chromatograph/mass spectrometer purchase has improved the analysis of methanol and ethylene glycol. A new mass spectrometer purchase is the cornerstone of the development of a comprehensive drug detection system.
- A sweat chloride analyzer purchase is particularly well suited for the analysis of small quantities of sweat and will facilitate the investigations of Cystic Fibrosis in neonates.
- Enhancement of applied imaging karyotyping system to improve cytogenetics workflow allowing continuous analysis of specimens.
- Purchase of RT-PCR instrument for Molecular Genetics laboratory allowed transfer of two high volume tests (hemochromatosis and familial thrombosis) to this new platform.

Integration and Partnerships

- Ontario Cancer Registry Network (OCRN) tumour banking program implemented, including a tumour banking gross room station to allow banking of fresh cancer tissue for research).
- Common instrument platforms for the community hospital laboratories were purchased and implemented under the leadership of the KGH Clinical Laboratory Service: blood gas analysers, Hematology and Chemistry analysers, Coagulation analysers, etc.

Business Process Management

- LIS replacement process moved forward to contract stage.
- Automated histology equipment purchased (slide stainers, block labeller, slide labeller) to improve lab efficiency

3. CURRENT STAFFING ISSUES

3.1 DIVISION OF ANATOMIC PATHOLOGY

Faculty	Main Administrative Responsibilities	FTE in Department		Main Clinical Service Responsibilities
		Nominal	Effective	
Boag, A.	Division Chief	1.0	1.0	GU, lung, cytology
Childs, T.	Director, Post-graduate Education	1.0	1.0	Gyne, cytology, perinatal pathology
Dexter, D.	Director, Autopsy Service	1.0	1.0	GI, lymphoma, soft tissue/bone, head/neck, forensic pathology
Hurlbut, D.		1.0	1.0	GI, head/neck, forensic pathology
Isotalo, P.	Coordinator, Tumour Bank	1.0	1.0	GU, breast, lung, head/neck
Lebrun, D.	Director, Immunohistochemistry Service	1.0	1.0	Lymphoma
Ludwin, S.	Associate Dean & V.P. Research	1.0	0.25	Neuropathology
Manley, P.		1.0	1.0	GI, head/neck, dermatopathology
Rossiter, J.	Director, Neuropathology	1.0	1.0	Neuropathology
Rowlands, C.	Director, Cytology Services	1.0	1.0	Dermatopathology, gyne, breast, cytology
SenGupta, S.	Medical Director, Clinical Laboratories, KGH & HDH	1.0	1.0	Breast, gyne, soft tissue/bone
Young, I.	Dept. Head & Pathologist in Chief	1.0	1.0	Dermatopath, GU, renal biopsies, forensic pathology
Vacant positions (2)		*1.0*	*0.0*	
Total FTE		14.0	11.25	

Staffing Notes:

1. Dr. S. Ludwin remains as 0.25 FTE Neuropathologist as a result of his administrative activities as Vice-President (Research). It is anticipated that he will return to the department on a full time basis in 2007.

2. Dr. T. Hiruki took parental leave from July 1 – September 30, 2005. He resigned his position effective March 31, 2006.
3. Dr. P. Farmer was successfully recruited as a new faculty member with starting date July 1, 2006. Her service responsibilities will include both Anatomic Pathology and Hematopathology.
4. Dr. S. SenGupta is also the Laboratory Director at the Perth & Smiths Falls District Hospital and at Ongwanada. Dr. D. Dexter also provides occasional on-site laboratory services at P&SF Hospital.

3.2 DIVISION OF HAEMATOPATHOLOGY

Faculty	Main Administrative Responsibilities	Main Clinical Service Responsibilities
Rapson, D.	Division Chief	General & Special Hematology, Hemostasis
Shepherd, L.	Director, Blood Bank Director, Hematopathology Post-graduate Program	General Hematology, Transfusion Medicine
Dexter, D.		General Hematology, Lymph Node Pathology
Lillicrap, D.	Director, Regional Hemophilia Clinic	Hemostasis, Hemophilia Clinic
Lee, D.		Clinical Hematology
Mathews, J.		Clinical Hematology
James, P.		Clinical Hematology

Staffing Notes:

1. Drs. Lee, Matthews, and James are cross-appointees from the Department of Medicine.
2. The time commitment to Laboratory Haematology varies amongst the members: Dr. Rapson 1.0 FTE; Dr. L. Shepherd 0.5 FTE; Dr. D. Dexter 0.2 FTE; Dr. D. Lillicrap 0.25 FTE.
3. Workload complexity, many teaching commitments, and very limited technical manpower for developmental work curtail the rate of progress and new initiatives in the Division, including some research productivity.
4. Dr. D. Rapson is also the Laboratory Director at the L&A County General Hospital (Napanee).

3.3 DIVISION OF CLINICAL CHEMISTRY

Dr. L. Seargeant	-	Division Chief
Dr. C. Collier	-	Clinical Chemist

Staffing Notes:

1. Dr. M. Raymond continues to provide Clinical Chemistry consultation for laboratory outreach clients (L&A County General Hospital, Perth & S.F Hospital., Weeneebayko General Hospital) – post retirement (approximately 3-4 days per month).
2. Dr. C. Collier provides outreach consultation to QHC – Belleville General Hospital (approximately 2 days per month).

3.4 DIVISION OF CLINICAL MICROBIOLOGY

Dr. D. Zoutman	-	Division Chief
	-	Director, Infection Control Service, KGH & PCCC
	-	Chair, Division of Infectious Diseases, Department of Medicine
Dr. L. Tomalty	-	Clinical Microbiologist
Dr. R. Liao	-	Clinical Microbiologist

Staffing Notes:

1. Dr. R. Liao is the lead faculty member in the molecular microbiology program.
2. Dr. L. Tomalty's appointment is part-time. He has senior administrative responsibilities in the Faculty of Health Sciences (Associate Dean, Continuing Education)
3. Dr. D. Zoutman was appointed as the Director of the newly created Regional Infection Control Network, Southeastern Ontario (1 day per week). He also provides Infection Control consultation for several community hospitals within the region.
4. Dr. D. Zoutman is also the Laboratory Director for PCCC, St. Mary's of the Lake campus.

3.5 DIVISION OF GENETICS

Dr. D. Lillicrap	-	Division Chief
Dr. K. Harrison	-	Director, Cytogenetics
Dr. S. Taylor	-	Director, Molecular Genetics
Dr. H. Feilotter	-	Molecular geneticist
Dr. M. Khalifa	-	Pediatric, Adult & Metabolic Genetics
Dr. J. Mackenzie	-	Pediatric and Metabolic Genetics
Dr. C. Forster-Gibson	-	Adult and cancer-related Genetics

Staffing Notes:

1. Drs. J. Mackenzie and C. Forster-Gibson are part-time cross-appointees in the Department of Pathology & Molecular Medicine.

2. There have been no changes in faculty over the past year. However, two genetic counsellors left Kingston for personal reasons during the year. These positions were filled by two new MSc genetic counsellor graduates.
3. There have been major technical staffing challenges in the Molecular Genetics laboratory over the past year. A provincial shortage of qualified molecular genetics technologists combined with the impending retirement of most of our technologists within the next five years and the explosion of molecular tests for clinical diagnostics serve to flag a major human resources issue unless resources are made available to aid in succession planning.
4. In the Cytogenetics laboratory, the recruitment of a very experienced and highly competent charge technologist has been a tremendous asset in improving the efficiency of that laboratory.

4. PROFILE OF ACTIVITIES

4.1 DIVISION OF ANATOMIC PATHOLOGY

4.1.1 Surgical Pathology

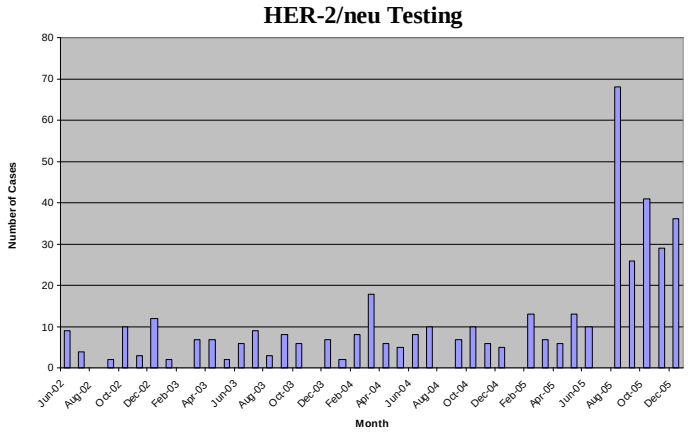
Activity Indicator	Calendar 2005	Change in Activity	
		One Year	5 Years
Total Cases	22,597	- 4.2%	- 4.9%
Indicator cases, complex			
Cases requiring IHC*	2,112	2.0%	37%
Breast, requiring IHC	728	19%	31%
External Consults	1,625	11%	4.9%
Lymphoma	223	3.7%	34%
Prostate	788	- 0.4%	13%
Indicator cases, simple			
Bone	885	12%	21%
Gallbladder	570	- 15%	- 10%
Skin	5,485	- 16%	- 15%
Products of Conception	867	- 7.9%	- 2.8%

*IHC = Immunohistochemistry

Comments:

Total surgical pathology case count has shown a minor decrease but the main trend continues to be the shift to more complex and work-intensive case mix. New "targeted therapies" for certain types of cancer continues to significantly impact upon the workload of the pathologists, as these therapies require pathologic assessment of tumours for specific oncoproteins or oncogenes. Over the past year, for example, new directives from the Ministry of

Health & Long-Term Care with respect to funding of the drug Herceptin for early breast cancer have resulted in dramatic growth of testing for HER-2/neu status by immunohistochemistry and fluorescence in situ hybridization.



4.1.2 Cytopathology

Activity Indicator	Calendar 2005	Change in Activity	
		One Year	5 Years
Total Cases	16,993	- 0.5%	- 29%
Non-gynecological cases			
Total	7,455	2.8%	8.2%
Fine needle aspirations	1,159	1.8%	13%
Cervical ("pap") smears	9,538	- 3.0%	- 44.3%

Comment:

The shift away from community-based pap smears to more complex non-gyne cytology continued this year.

4.1.3 Autopsy Service

Activity Indicator	Calendar 2005	Change in Activity	
		One Year	5 Years
Hospital Cases	83	- 16%	- 27%
Coroners' Cases (includes referred in cases)	222	6.7%	16%
Total Cases	305	- 0.7%	- 3.0%

Comments:

In general, over the last four decades, hospital autopsy rates have been falling, and whereas the distribution of hospital versus medicolegal autopsies was approximately ⅔ to ⅓,, it is now almost reversed. The Royal College of Physicians and Surgeons of Canada at one time expected an autopsy rate of 40 percent, but no longer has a required level for the support of their training programs. The following data is derived through KGH medical records.

Year	Deaths in Hospital	Hospital Consents	% Autopsy Rate	Hospital MLs	Consented + ML	% Autopsy Rate Combined
2003	832	87	10.4	67	154	18.5
2004	859	84	9.7	56	140	16.2
2005	835	76	9.1	64	140	16.7

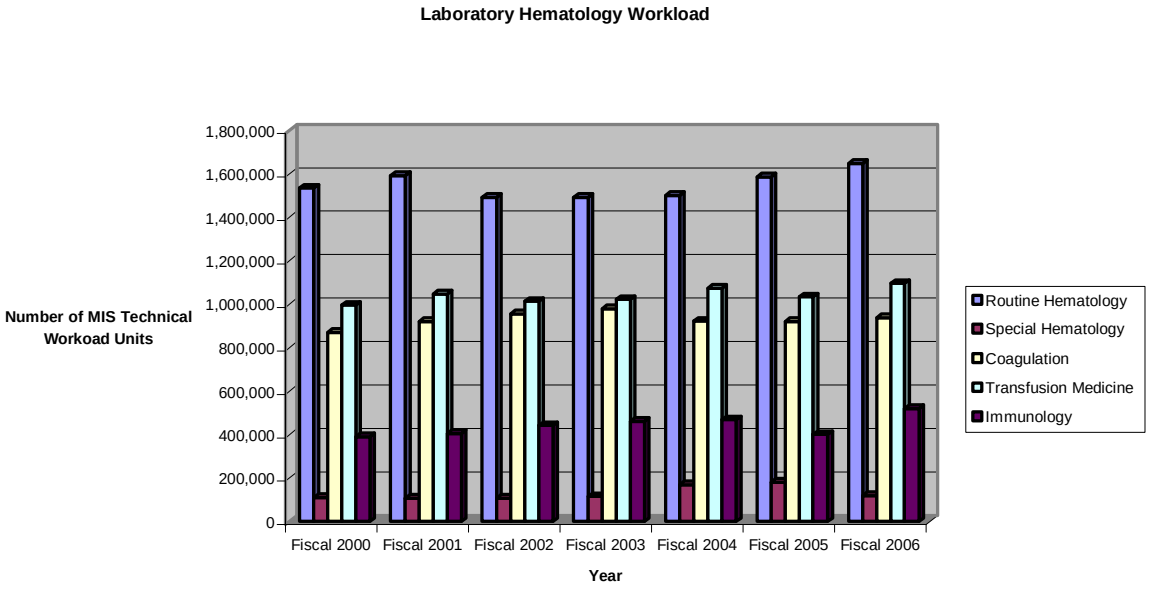
Hospital Consents - Family consented to an autopsy
Hospital ML - Coroner ordered an autopsy on a patient death in hospital
Consented + ML - Combined coroner's cases + family consented autopsies

Autopsy rates in both Canada and the USA have been falling and a 10 percent rate would not be unusual. Factors include a belief that current investigations and, particularly, CAT scans and MRIs have detected all-important pathologies. Busy staff and residents or doctors covering services, but not primary patient physicians, fail to ask and promote the value of an autopsy to the deceased relatives. In some cases, there is a misunderstanding the family will be billed. In some cases, there is a fear that there will be unexpected but important findings at autopsy that may provide a foundation for the family to sue.

The literature continues to support the value of the autopsy with documentation of significant findings at autopsy that would impact, if known, on patient care or diagnosis at a rate of around 20 percent of cases.

A presentation of the Role and Value of the Autopsy is made annually to the house staff at Hotel Dieu Hospital and Kingston General Hospital with emphasis on encouraging autopsy permissions.

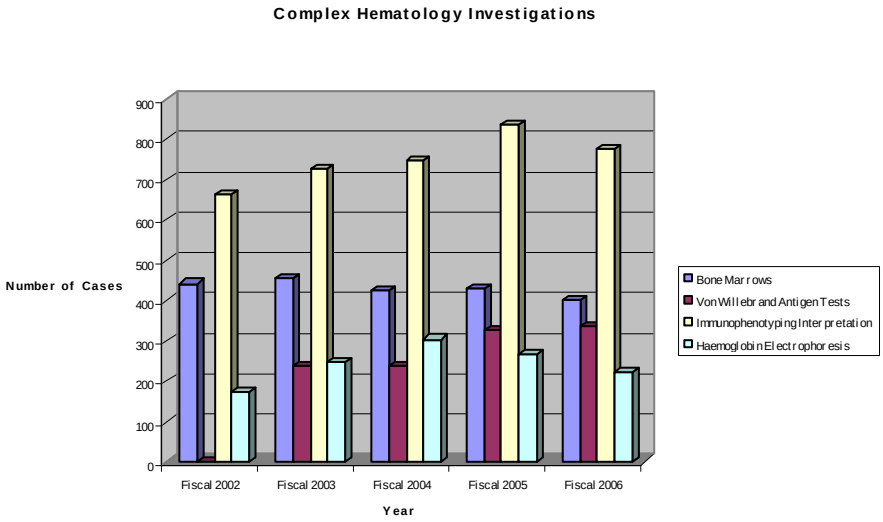
4.2 DIVISION OF HEMATOPATHOLOGY



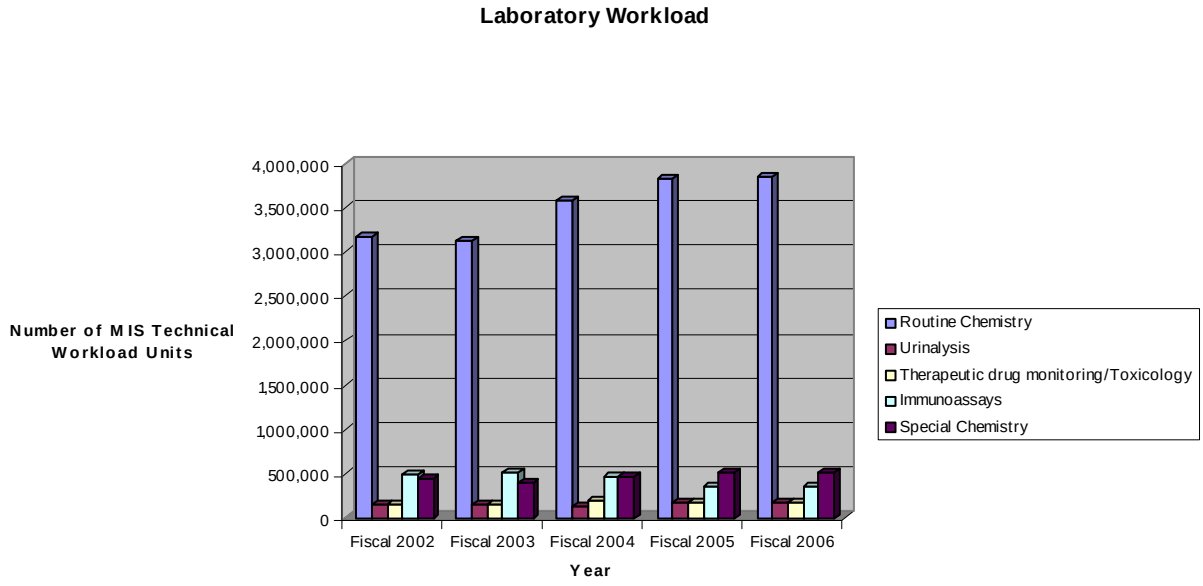
Comments:

Overall laboratory workload continues to trend slightly upwards, especially in Immunology and Transfusion Medicine. Part of this can be attributed to the fully established and optimally functioning Stem Cell Transplant Program which was extremely successful in its first year of operation. The Laboratory provided CD34 (stem cell) counting and stem cell re-infusion as well as logistical support in arranging stem cell processing and storage with the Canadian Blood Service (CBS) in Ottawa. The program represents an example of outstanding collaboration between the KGH Blood Bank, CBS, Division of Hematology, KGH Pharmacy, and the Renal Unit. Thirteen transplants were performed in the first year of the program.

There was a decrease in Special Hematology workload due to fewer hemoglobin electrophoresis cases. This reflects a change in Laboratory Outreach contractual work (Central East 1 [Durham] region chose to re-direct its work for financial reasons).



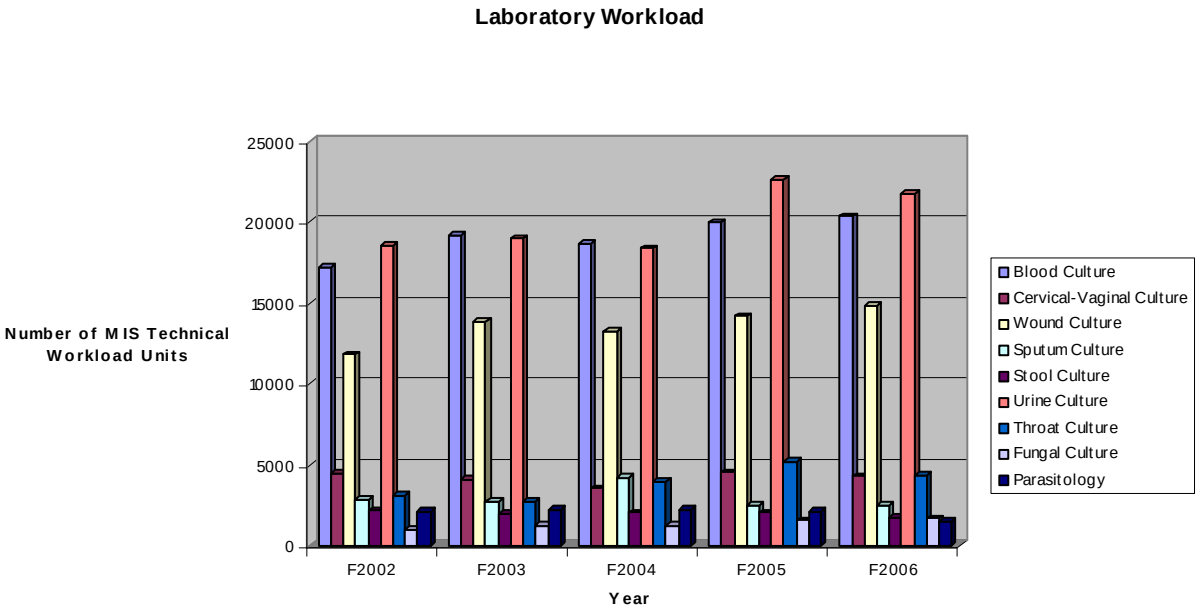
4.3 DIVISION OF CLINICAL CHEMISTRY

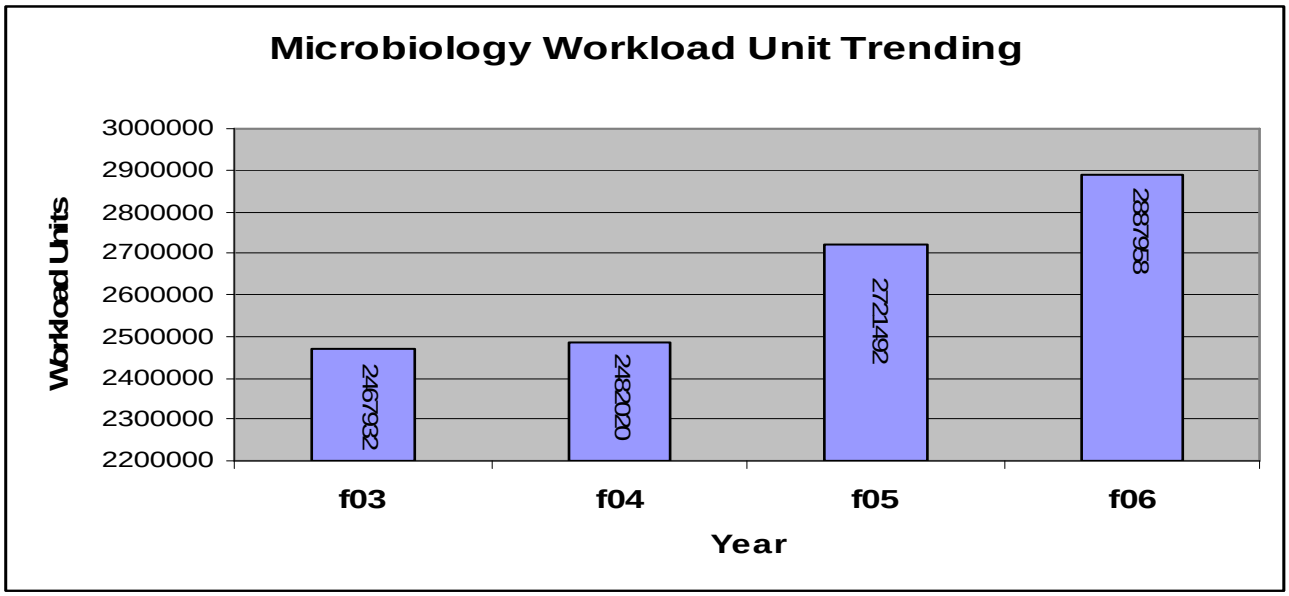


Comment:

Most of the increased workload is attributable to routine testing. Test volumes are unchanged from the previous year.

4.4 DIVISION OF CLINICAL MICROBIOLOGY

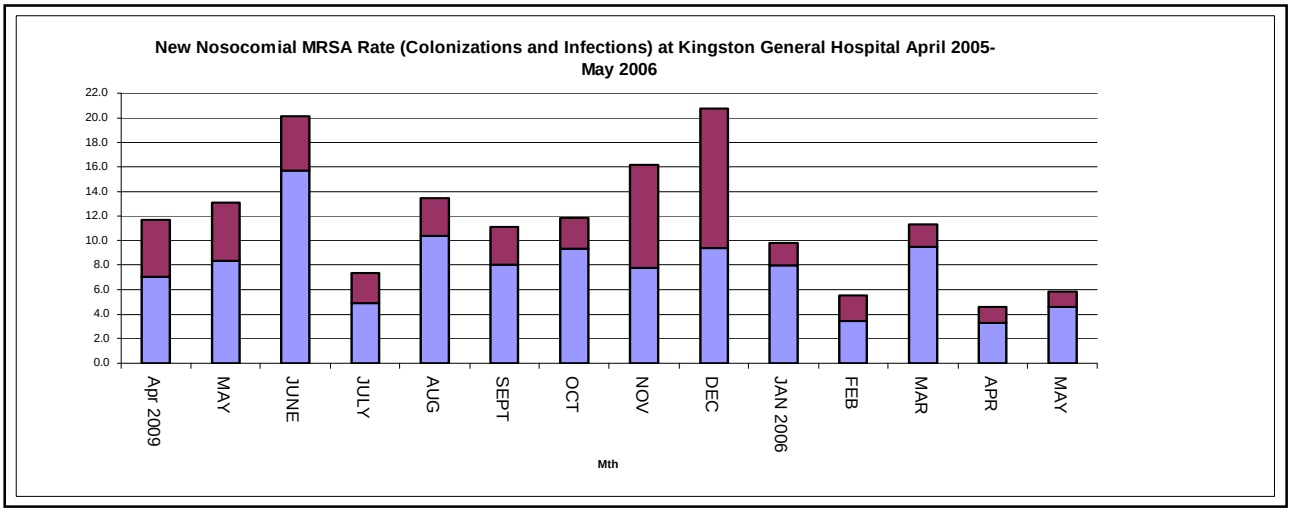




Comment:

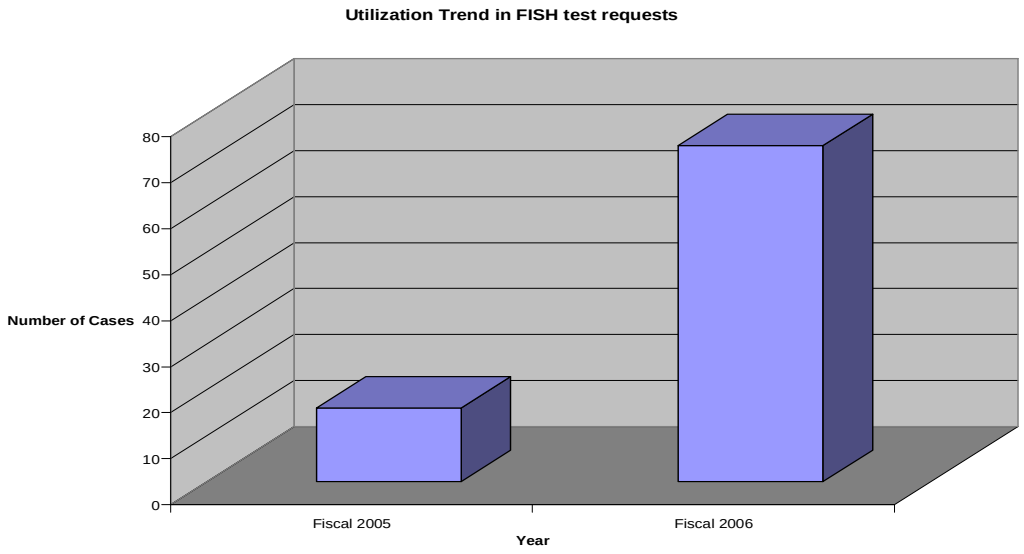
MRSA testing by PCR technology became a clinical service in March 2006. This new, rapid and more sensitive testing method required extensive quality control and quality assurance testing, staff training, and step-wise rollout across the hospital. This testing, together with detailed contact tracing and isolation of new MRSA cases, has resulted in a measurable reduction in MRSA cases, in particular, MRSA clinical infections.

The Infection Control Service is in need of a dedicated infection control information management system to improve its ability to track and control the spread of infections throughout the hospitals.

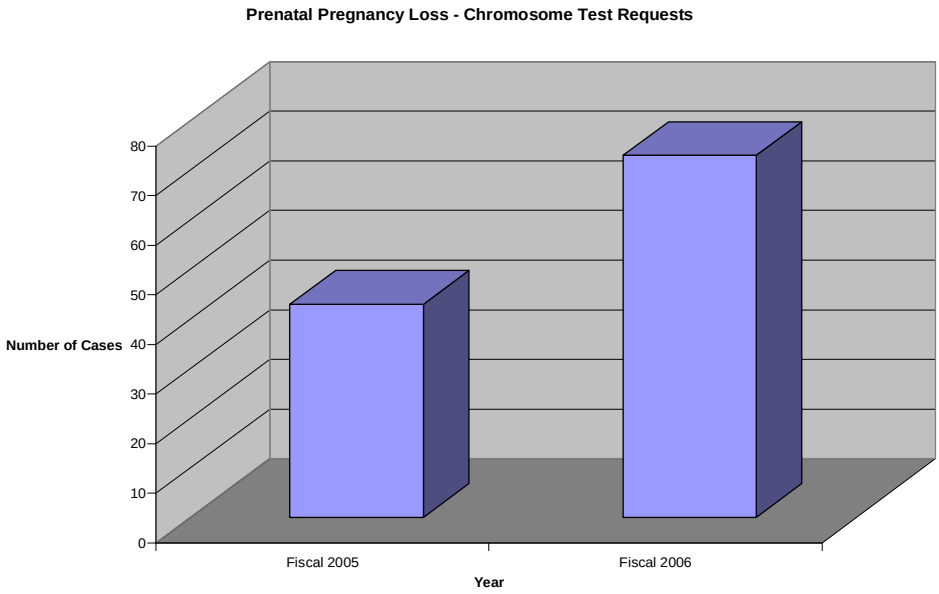


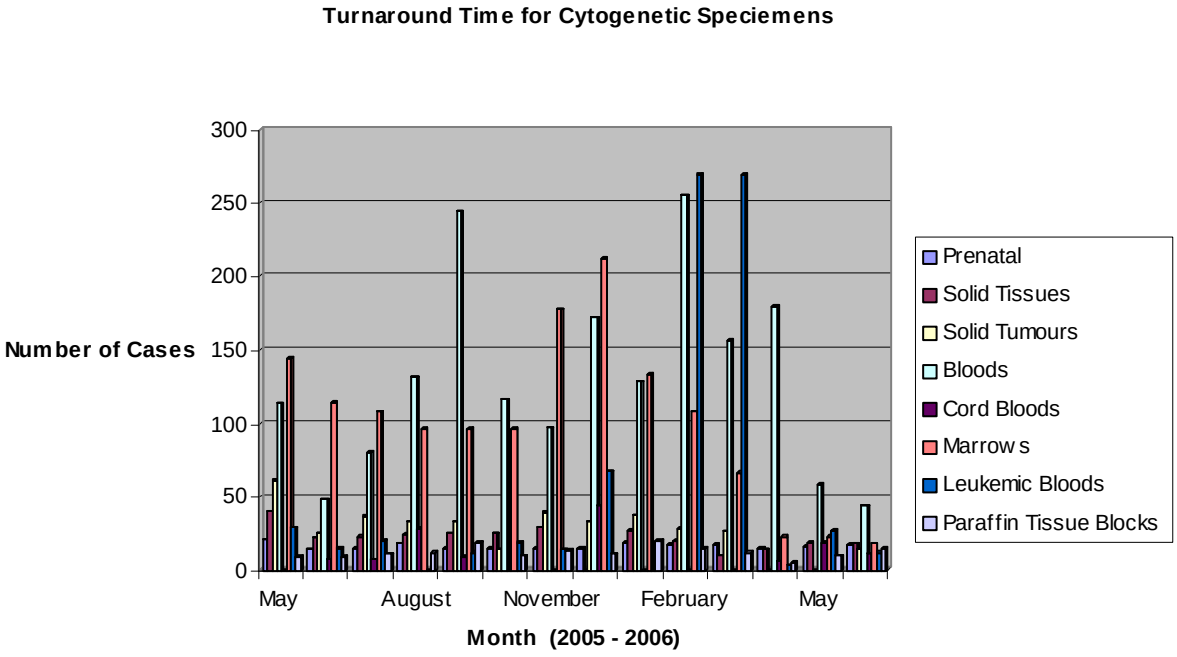
4.5 DIVISION OF GENETICS

4.5.1 Cytogenetics



Increase in Fluorescence In Situ Hybridization (FISH) testing Fiscal '06 was largely due to requests for HER-2/neu gene amplification testing in breast cancer biopsies (65 cases).





Comments:

For the past 6 years, the Cytogenetics laboratory has been faced with a perpetual backlog of specimens requiring analysis. This developed due to a lack of technologists available to meet the demands of the increased numbers of specimens as well as the increasing complexity of the testing. An action plan was successfully implemented in January 2006 to control and eliminate the backlog. This included hiring of a charge technologist, implementation of a continuous workflow plan in the laboratory and replacement of malfunctioning light and fluorescence microscopes (FISH and G-banding analysis). Also, 56 backlogged blood cases were sent out to the Cytogenetic laboratory at Detroit Medical Centre/Wayne State University for G-banding. (The number in brackets in the above table reflects the external benchmark turnaround time based on CCMG guidelines).

4.5.2 Molecular Genetics

There were no significant changes in workload this year. However, turnaround times (TAT) for some tests increased significantly due to technical staffing issues. For example, TAT for familial breast/ovarian cancer specimens did not meet that expected by the MOHLTC.

4.5.3 Clinical Genetics

The total number of patients managed through the 20 Barrie Street Clinical Genetics Program was 856 for Fiscal 2006.

Prenatal counseling cases:	194
Genetic counseling consultations:	369
Ward consultations:	100
Telephone/postal consultations:	91
Special clinics:	11
Outreach consultations:	54
Biochemical genetics consults:	37

Genetics clinics take place at several sites:

- FAPC (pediatric and adult genetics)
- Hotel Dieu Hospital (pediatric genetics)
- Family Medicine Centre (adult and developmental genetics)
- 20 Barrie Street offices (prenatal counseling)
- Peterborough Public Health Unit
- North Bay outreach clinic
- Timmins outreach clinic

As of April 2005, both clinical and laboratory genetics services are no longer funded through “Priority Programs” of the MOHLTC. The oversight of the funding has been transferred to the LHINs with budgets that are expected to be protected, but static, for the next three years. Members of the genetics program at KGH continue to participate in the activities of the Ontario Advisory Committee on Genetics, which provides guidance to the Deputy Minister of Health on matters related to genetics services in the Province.

5. QUALITY & UTILIZATION IMPROVEMENT ACTIVITIES

Some highlights of the quality assurance activities of the Department are provided. The full range of activities is documented in the annual report of the Department's Quality & Utilization Improvement Committee - which is included as an Appendix to this report.

5.1 ANATOMIC PATHOLOGY

- Audit of turnaround time (TAT) of all surgical pathology cases: Standard is 80% completion in 3 working days. Standard not met between October '05 – February '06 largely due to significant shortage of medical transcriptionists.
- Audit of frozen section diagnosis agreement with final diagnosis: Within expected range.
- Pap smear diagnostic rate monitoring: Within standards.
- Cytologic-histologic correlation: Within standards.
- Hospital autopsy TAT: Remains outside 30 day standard to complete 80% of cases. QA activities continue. Transcription staff shortage is a limiting factor at present.

5.2 HEMATOPATHOLOGY

- Stem Cell Audit: KGH estimated CD34 count was compared with the actual CD34 count in the final stem cell collection performed at Canadian Blood Services. Correlation co-efficient 0.9.
- Audit of Regional Cancer Centre STAT CBC automated differential count TAT: average = 22 minutes.
- TAT for PTT: average <60 minutes, 70% of the time
- Adverse reactions to blood product transfusion: 95 reactions were reported, 4 of which were considered severe and attributable to the blood/fractionated product transfused, and were reported to Health Canada. The 95 reactions represents a 135% increase over previous years and reflects a heightened awareness of transfusion safety.

5.3 MICROBIOLOGY

- Blood culture positivity and contamination rates: 9.8% (significant positives) and 1.4% respectively; meets targets
- CSF cell count turnaround time: 90% within 1 hour
- Notification of positive blood cultures: 74% within 1 hour

5.4 GENETICS

- Implementation of Real Time PCR based assays for hemochromatosis and familial thrombosis: reduces sample manipulation and thus risk of lab error while increasing efficiency

- Implementation of Shire information system for Clinical Genetics data management and patient records – to track patient encounters
- Genetics clinic coverage redistributed between the clinicians and counsellors to decrease patient waiting times. (The genetic counsellors are now spending time in all clinics to maintain expertise and competency in all clinical genetics disciplines and to provide satisfactory cross-coverage.)

5.5 CLINICAL CHEMISTRY

- Focus on reduction of pre-analytical errors to improve the quality of specimens and to reduce labeling errors.
- Utilization of reagents and calibrators has been significantly reduced by test consolidation on modular analysers. Less redundancy of testing has not only decreased supply costs but also the time and effort to ensure that all assays are correlated and interchangeable.
- Fewer test results were flagged by external quality assurance programs this year. No errors that would have be associated with serious clinical consequences. This improvement is likely due to several technical initiatives in the lab.

6. REGIONAL AND MULTIDISCIPLINARY ACTIVITIES

6.1 ONGOING ACTIVITIES

We continue to provide a wide range of regional and trans-regional diagnostic and clinical services, largely through our regional laboratory and clinical genetics outreach programs. Some of these are listed below.

- Laboratory director and consultation service to community hospitals in Perth, Smiths Falls, Napanee, Belleville and Moose Factory. The KGH Clinical Laboratories receives reference testing specimens from these sites and several others, including commercial labs and some community physicians' offices in the region.
- The Peterborough genetics outreach program is coordinated out of the Peterborough Health Unit. It is supervised by Dr. Forster-Gibson.
- A regional immunohistochemistry service (e.g. advanced diagnostic workup for solid tumours)
- Regional Cancer Centre secondary pathology review (for cases arriving from community hospitals)
- Regional Forensic Pathology Unit
- Regional Hematopathology service (for blood smear and bone marrow interpretation, including second opinions; consultation for hemostasis problems, blood transfusion issues, etc.)

- Multidisciplinary Point of Care Testing Committee – addressing need for new bedside glucose meters and blood gas analyzers outside the main laboratory (eg. O.R.)
- National Program for Hemophilia Mutation Testing – Association of Hemophilia Clinical Directors of Canada

6.2 NEW ACTIVITIES

- BRAF mutation analysis for Phase I study of VEGF receptor AZD2171 – with Queen's NCIC Clinical Trials Group
- Implementation of DHPLC and MLPA laboratory technologies for familial breast and ovarian cancer testing – an Ontario initiative through the Women's Health Council
- Assessment of a novel PCR-based assay for B and T cell clonality identification – with Toronto Medical Laboratories/UHN Molecular Diagnostics/Credit Valley Hospital
- Testing at KGH for Belleville dialysis monitoring was implemented. This improvement reduces transcription of results and the risk for errors.

7. GOALS & OBJECTIVES FOR 2006-2007

The following is a list of some of our objectives as they relate to our four departmental strategic priorities and associated goals:

1. To recruit and retain a diverse group of highly skilled staff, faculty and students and provide an environment, which will enable them to achieve their highest potentials.
    - Fill the faculty vacancy in Anatomic Pathology.

2. To provide clinical and diagnostic services and programs in education and research, which are recognized, nationally for their excellence.
    - Implement a revised DNA-based protocol for BRCA testing.
    - Develop a quantitative assay for the detection of the BCR/ABL translocation assay using the RT-PCR platform.
    - Develop a successful business case for on-site performance of influenza PCR testing.
    - Roll out CMV PCR testing to clinical services
    - Implement regional fetal fibronectin testing to reduce unnecessary obstetric admissions and travel from outside centres.
    - Implement drugs-of-abuse testing on new laboratory instruments to reduce false-positive and false-negative results obtained with the Triage Drug Screen system.

3. To lead in the development and optimization of regional laboratory services in Southeastern Ontario.

- Develop a strategic plan for regional laboratory services under the auspices of the East 2 Region Laboratory Alliance and the Health Care Network of Southeastern Ontario
- Explore closer working relationship with Kingston Public Health Lab branch.
- Complete the electronic lab interface between KGH and Hospitals-in-Common Laboratory (Napanee) to permit more efficient transfer of laboratory results.

4. To employ sound business practices, to practice responsible stewardship of our resources, to embrace accountability for high standards of care and resource utilization.
    - Implement a new LIS (Mysis).
    - Implement Lean Process Excellence into the Core Laboratory to improve Hematology & Chemistry STAT test turnaround time and introduce operational efficiencies.

8. KEY CHALLENGES

- ***Implementation of a new Laboratory Information System*:** Replacement of the current (obsolete) LIS is one of the top strategic priorities of KGH Information Management and Clinical Laboratory Services. This is slated to begin over the next year. Its implementation will have a large impact upon the Clinical Laboratories affecting staffing and delivery of services. Extra resources will be required.

- ***Monitoring Laboratory Utilization:*** The implementation of new or enhanced clinical programs and services in the hospitals frequently has direct effects upon the Clinical Laboratories through an increase in lab testing. Two examples over the past year are the expansion of cancer care (e.g. Herceptin for breast cancer) and the regional dialysis program. The introduction of the revised newborn screening program in Ontario this year is expected to result in additional laboratory testing to investigate abnormal screen test results. This increased utilization places a significant strain on laboratory resources. It is hoped that with the implementation of the new Program Management structure in the hospitals, there will be clearer lines of communication and accountability for laboratory utilization.

- ***Meeting clinical demand for new or enhanced testing:*** As a tertiary level academic health sciences centre, we need investment in Research and Development in our Clinical Laboratories so that new tests can be made available to clinicians in a timely fashion. Currently, we are falling behind other academic centres in the provision of sophisticated testing, particularly in Chemistry and Molecular Genetics. One of the consequences of this is that more and more testing is referred out to another centre for testing. This has repercussions with respect to turnaround time and quality of care. The clinical demand for Point of Care Testing also continues to increase. To meet laboratory accreditation requirements, additional resources are required, particularly for education of staff and quality assurance.
- ***Meeting increasingly stringent quality standards and regulatory requirements:*** Adherence to Ontario Laboratory Accreditation (OLA) standards is mandatory and

consumes considerable resources to ensure compliance with >500 requirements for each laboratory discipline. There is also a greater focus on patient safety. In the Clinical Laboratories, the attention is being focused upon correct patient identification and reducing the large number of specimen labeling errors. This is a resource-intense, multi-disciplinary exercise but is essential for risk management. A laboratory-based clinical educator would greatly facilitate this effort on wards to improve specimen quality and reduce errors.

- ***Human resource issues:*** The Clinical Laboratories have an aging technical workforce. For example, most of the technologists in Molecular Genetics, an area with rapid growth in testing, are eligible for retirement within the next five years. This situation is exacerbated by the insufficient numbers of graduates from colleges and intense competition for these graduates. Succession planning and increased training of junior staff is required.