KINGSTON GENERAL HOSPITAL

DEPARTMENT OF PATHOLOGY

ANNUAL REPORT

APRIL 1, 2001 - MARCH 31, 2002

1. EXECUTIVE SUMMARY

1.1 Preamble

The Department of Pathology at Kingston General Hospital is a medical department reporting through the Medical Advisory Committee but it is also closely integrated with a hospital division of Clinical Laboratory Services which reports through the Vice President, Program Support. The Department is organized into five divisions: Anatomical Pathology, Clinical Chemistry, Clinical Microbiology, Hematopathology, and Genetics and Molecular Medicine. The Clinical Laboratory Services are organized into four departments: Core Laboratory Services, Pathology Services, Microbiology Services and Genetics Services.

Our major function is to provide useful answers to clinical inquiries by performing laboratory testing for patients in a reliable and timely fashion, and when appropriate, providing interpretation of test results as well as diagnostic and clinical consultations. We have also recently assumed responsibility for the provision of Clinical Genetics services to the Academic Health Sciences Centre (AHSC).

In addition to providing clinical service, education and research, laboratory physicians and scientists have significant responsibilities for clinical supervision of a large number of technical staff and management of operational and capital budgets.

1.2 Utilization Trends

In Fiscal 2002, the total laboratory test workload increased by approximately 7%. Referred-in testing increased 33% over the past two years, largely in clinical biochemistry but also in pathology. Most of this increase comes from the 11 hospitals in the Central East region (Peterborough, Oshawa, Whitby and others), with which the Department of Pathology has a contract for reference testing.

KGH Clinical Laboratories:

WORKLOAD UNITS	**Fiscal 2002**	**Budget**	**Previous Year**
Inpatients	5,339,385	0%	0%
Outpatients & Routine Staff Health	3,226,537	+13%	+10%
Referred-In	4,564,614	0%	0%
Quality Control & Calibration	2,542,533	+31%	+22%
TOTAL UNITS	15,673,069	+7%	+5%

TESTS

Inpatients	1,806,913	0%	-1%
Outpatients & Routine Staff Health	1,050,637	+8%	+12%
Referred-In	999,517	+3%	+3%
Quality Control & Calibration	1,060,271	+28%	+9%
TOTAL TESTS	4,917,338	+7%	+4%
REFERRED OUT LAB TESTS	35,011		-6%

There continues to be an increase in the complexity of laboratory testing. Examples include special handling requirements for sentinel node biopsies for breast cancer and malignant melanoma, cytogenetic and molecular diagnostic work-up of bone marrow aspirates containing malignant hematologic neoplasms and complex microbiological work-ups of multi-drug resistant pathogenic organisms. These tests reflect the increase in information that the laboratory provides to improve care, predict and prevent disease, and to determine therapy.

1.3 Quality Improvement Activities

We have a comprehensive quality assurance program in the clinical laboratories which includes analysis of pre-analytical, analytical, and post-analytical variables of laboratory testing. We monitor a number of key indicators in each of the laboratory disciplines, particularly turnaround time for test results and medical diagnoses (e.g. biopsies), which are well within, or better than, accepted benchmarks amongst the academic health science centres. Nevertheless, we continue to strive for improvement to assist our clinical colleagues in the timely triage and management of their patients (e.g. 24 hour turnaround time for breast stereotactic core biopsies; STAT testing for RSV and influenza virus during flu season).

One of the areas of focus of our departmental quality assurance committee this year was determining our state of preparedness for a recently introduced MOHLTC mandated laboratory accreditation process which significantly raises the bar for quality standards in the province. We have expressed our concern to the KGH administration that without additional staffing (i.e. primarily laboratory technologists), we may not be able to fully comply with all of the >600 requirements that we are expected to meet in order to obtain a full 5 year accreditation.

1.4 Initiatives in Multidisciplinary Collaboration

The breadth of our tertiary level laboratory services and the far reaching extent of our regional laboratory outreach program offer numerous opportunities for multidisciplinary collaboration. For example, we provide a diagnostic consultation service for the KRCC and participate in a number of Tumour Board rounds on a weekly basis. Our Medical Microbiologist provides Infection Control services for the KRCC as well as PCCC. Our technical and managerial staff work closely with the hospital's IT service to address ongoing LIS/PCS issues. Our

hematopathologists have worked closely with cardiovascular surgeons and anesthetists to evaluate a point-of-care testing program for coagulation.

At the regional level, our outreach program provides three separate courier systems to cover a geographic region stretching from Oshawa-Whitby to Brockville-Prescott and north to Smiths Falls-Perth. The program not only provides reference testing for community hospital partners and commercial laboratories but integrates this with a broad based technical/managerial/medical and scientific professional team that is available to consult medically and problem solve. For example, our clinical biochemists provide regular on-site consultation and scientific direction to the laboratory at QHC in Belleville. This year, our regional outreach extended further into community cytology practice (i.e. gynecologic Pap smear supervision and interpretation) as MDS Laboratories established one of its three regional Cytology screening centres in the province in Kingston.

External funding from the Ministry of the Solicitor General permitted the expansion of our regional forensic pathology program at KGH. Not only do we have closer working relationships with local and regional coroners, police forces and crown attorneys, we conduct monthly multi-disciplinary medico-legal rounds which meet both service and educational objectives.

Our Genetics service also bridges many medical disciplines and several different constituencies, not only regionally but provincially, as we are the preferred testing centre for diseases such as hemochromatosis and the hemophilias.

1.5 Teaching and Research

We are extraordinarily broad based in our educational mission with teaching throughout the undergraduate medical curriculum and also in Life Sciences, Nursing, Rehabilitation Medicine, Biology, graduate programs, St. Lawrence College, and high school students (enrichment program).

Our major challenge relates to our residency program in Pathology. In common with all pathology programs in Canada, we have seen a dramatic decrease in residency numbers. We currently have two PGY5 residents in Anatomical Pathology and one PGY4 resident (through the Ministry's re-entry program). We continue to hope that applications will increase in the near future as there is a documented shortage of laboratory physicians across the country and multiple vacant positions. Internally, we continue to try to attract local students through a variety of initatives.

We continue to be one of the most successful research departments at Queen's. Several faculty members have been recognized for their achievements through a number of prestigious awards. This year, the total value of our grants and awards was $5,574,369, increased from the previous year's total of $3,406,000. A list of the research grants administered by the Department

of Pathology and its primary appointees is appended to this annual report. Further details, including publication records, scholarly presentations, etc. is available upon request.

1.6 Staffing Issues

We were successful in recruiting two new pathologists to join our Department in 2002 to replace vacated positions due to resignation and retirement. Due to a variety of factors, we were short staffed for a significant time period during 2001-2002 and this stretched to the limit our resources to fulfill our mission. A national shortage of laboratory physicians and scientists will complicate our recruitment efforts for 2002-2003. We are also concerned about our technical staffing in the clinical laboratories, as we face increasing laboratory workload yet we lack the financial resources to recruit new medical laboratory technologists. Shortages of MLT's across Canada also exist and threaten to affect our ability to provide laboratory services in a timely fashion.

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

2. REVIEW OF GOALS & OBJECTIVES FOR THE PAST YEAR

2.1 Staffing

1. Recruit a Laboratory Physician/Scientist to replace Dr. Alan Giles - Unsuccessful. Nationally, there is a severe shortage of physician-scientists and while we made offers to two credible candidates, the intense competition for recruiting these individuals allowed them the choose more attractive options elsewhere.

2. Recruit up to two Anatomic/General Pathologists to fill anticipated vacancies - Successful. We are delighted to have recruited Dr. Philip Isotalo, an Anatomic Pathologist who spent the year as a Fellow in Surgical Pathology at the Mayo Clinic. Dr. Isotalo will begin practice in August 2002, taking the position vacated by Dr. Monique Arquint who resigned in October 2001. We also recruited Dr. Tim Childs, an Anatomic Pathologist from our own residency program, to fill Dr. Allen Fletcher's position (vacated due to early retirement) effective July 1, 2002.

3. Free up medical technologist time in the laboratories to participate in quality improvement initiatives, point of care testing programs, and new test development and validation - Unsuccessful. Our workload continued to increase over the year and we did not receive any additional resources in our operating budget to allow this to happen. This remains a high priority for us however and its urgency is now highlighted by one of the Ministry's new accreditation requirements for a laboratory quality manager.

2.2 Equipment and Test Mix

1. Implement molecular diagnostic testing in microbiology - Unsuccessful. This Academic Health Sciences Centre is the only one in Ontario that does not offer such a service for the rapid detection of infectious diseases, such as tuberculosis. While we have received considerable written support from clinician stakeholders for this initiative, it has not received funding for capital equipment or staffing and reagents. We will continue to lobby for the funds necessary to initiate this program.

2. Purchase essential equipment, such as a new flow cytometer for immunology tests, a cytocentrifuge for examination of sputum for mycobacteria - Unsuccessful. Not funded.

3. Improve our capability for accurate and timely laboratory information transfer through the institution of an appropriate order/entry system in the hospital's PCS and through electronic interfacing with our regional community hospital partners - Ongoing. The purchase of a new LIS within two years has been approved.

Each of our Department's five divisions also set goals and objectives (see Section 4 - Activity Profile).

3. CURRENT STAFFING & STAFFING CHANGES

3.1 KGH Department of Pathology Faculty

Division of Anatomic Pathology

Dr. Paul Manley	-	Department Head and Director of Laboratories
	-	Diagnostic GI pathology
Dr. Iain Young	-	Service Chief, Anatomic Pathology
	-	Diagnostic dermatopathology, nephropathology and urologic pathology
	-	Forensic pathology
Dr. Sandip SenGupta	-	Deputy Head and Medical Director of Regional Laboratory Outreach Program
	-	Chair, Department of Pathology Quality & Utilization Improvement Committee
	-	Diagnostic breast, gynecologic, soft tissue pathology
Dr. David Dexter	-	Director, Autopsy Service and Regional Forensic Pathology Unit
	-	Diagnostic Head & Neck, GI, soft tissue, breast and hematopathology
	-	Forensic pathology
Dr. Caroline Rowlands	-	Director, Cytology Service
	-	Director, Pathology Residency Program
	-	Diagnostic breast, gynecologic and dermatopathology
	-	Diagnostic cytology
Dr. John Rossiter	-	Director, Neuropathology
	-	Diagnostic neuropathology
	-	Neuroscientist
Dr. David Lebrun	-	Director, Immunohistochemistry
	-	Diagnostic hematopathology
	-	Research scientist
Dr. Allen Fletcher	-	Diagnostic gynecologic pathology and perinatal pathology
	-	Diagnostic cytology
	-	Laboratory Director, L&A County Hospital
Dr. Robert Kisilevsky*	-	Research scientist
	-	Autopsy pathology
Dr. Sandy Boag	-	Diagnostic pulmonary and urologic pathology
	-	Diagnostic cytology
	-	Departmental Information Technology support
Dr. David Hurlbut	-	Diagnostic GI and Head & Neck pathology
	-	Forensic pathology
Dr. Sam Ludwin*	-	Diagnostic neuropathology and ophthalmic pathology

	-	Research scientist
Dr. Sally Ford*	-	Diagnostic cardiac pathology
	-	Forensic and autopsy pathology
Dr. Monique Arquint*	-	Diagnostic breast, gynecologic and dermatopathology
	-	Diagnostic cytology
	-	Laboratory Director, Perth & Smiths Falls District Hospital

*Notes:
1. Dr. Arquint resigned her position in October 2001 to take a position in a community hospital.
2. Dr. Kisilevsky was on sabbatical during most of this period.
3. Dr. Ford was on long term disability leave during this period.
4. Dr. Ludwin became Associate Dean of Research for the Queen's AHSC on February 1, 2002 and his availability in the Department of Pathology was reduced to 0.25 FTE.

Division of Haematopathology

Dr. Dilys Rapson	-	Service Chief, Haematopathology
	-	General Hematology, Hemostasis
Dr. Lois Shepherd	-	Director, Blood Bank
	-	General Haematology, Transfusion Medicine
Dr. David Dexter	-	General Haematology, Lymph Node Pathology
Dr. David Lillicrap	-	Regional Haemophilia clinic, Haemostasis
	-	Molecular Genetics of Haemostatic Disorders
Dr. David Lee*	-	Clinical Haematology
	-	Haemostasis research

*Notes:
1. Dr. Lee is a cross-appointee from the Department of Medicine.
2. The time commitment to Laboratory Haematology varies amongst the members: Dr. Rapson 0.7 FTE; Dr. Shepherd 0.5 FTE; Dr. Dexter 0.2 FTE; Dr. Lillicrap 0.25 FTE.

Division of Clinical Chemistry

Dr. Michael Raymond	-	Service Chief, Clinical Chemistry
Dr. Christine Collier	-	Clinical Chemist

Division of Clinical Microbiology

Dr. Lewis Tomalty	-	Service Chief, Clinical Microbiology
Dr. Dick Zoutman	-	Medical Microbiologist

	-	Director, Infection Control Service
	-	Chair, Regional Infection Control Committee
	-	Laboratory Director, PCCC
Dr. Tim Karnauchow	-	Clinical Microbiologist

Division of Genetics and Molecular Medicine

Dr. David Lillicrap	-	Chief of Division
Dr. Karen Harrison	-	Cytogeneticist
Dr. Sherry Taylor	-	Molecular geneticist
Dr. Jenny Raymond	-	Biochemical geneticist
Dr. Harriet Feilotter*	-	Molecular geneticist
Dr. Mohamed Khalifa*	-	Clinical genetics
Dr. Jennifer Mackenzie*	-	Clinical genetics
Dr. Cynthia Forster-Gibson*	-	Clinical genetics

*Notes:

1. Dr. Khalifa continued his sabbatical leave at Johns Hopkins Hospital until August 2001. He returned to his clinical practice and academic responsibilities in September 2001.
2. Dr. Mackenzie served as the acting Head of the Division of Medical Genetics during Dr. Khalifa's leave. In February 2001, she began a new appointment in developmental disabilities in the Department of Pediatrics but maintains ~75% time commitment to service and academic aspects of medical genetics.
3. Dr. Forster-Gibson is a cross-appointee from the Department of Family Medicine.
4. Dr. Feilotter is a primary faculty member outside of SEAMO.

Clinical Laboratory Services Staffing

Laboratory Administrator - 1
Departmental managers - 4
Senior technologists - 8
Medical laboratory technologists, full-time - 79
Medical laboratory technologists, part-time - 18
Other technicians - 5
Laboratory assistants, full-time - 16
Laboratory assistants, part-time - 8
Clerical and Secretarial - 27

3.2 Staffing Issues

Professional Staff

Our workload continues to increase both in volume and complexity. However, we have not had an increase in Pathologist positions since 1977. Our request during the last SEAMO negotiations for an additional 1.5 FTE positions was not approved. During 2001 - 2002, we were short staffed due to one pathologist who resigned to re-locate to community practice (Dr.

Arquint), another on a year's sabbatical leave (Dr. Kisilevsky), the extended medical leave of a third pathologist (Dr. Ford), and the change in professional practice of a fourth (Dr. Ludwin). Our ability to provide continuous coverage in all areas of our mission (service, teaching, research) was stretched to the limit with remaining faculty experiencing stress from the significant number of added responsibilities and workload. We also provide a number of regional outreach services, including medical directorship and on-site pathologist's services to community hospitals (Perth/Smiths Falls, Napanee, Ongwanada) and clinical chemistry consultation at QHC - Belleville. The gradual decrease in the number of general pathologists on faculty has impacted upon our traditional method of delivering these services and forced us to examine alternatives which will be implemented in 2002-2003.

We feel very fortunate that we were able to successfully recruit two excellent pathologists to fill expected vacancies later in 2002. However, the serious national shortage of pathologists and laboratory scientists remains a major concern for us as we plan for further recruitment in 2003 and 2004 (expected retirements).

In the new Division of Genetic and Molecular Medicine, a search began for a second full time clinical geneticist and an appointment was offered to a candidate from Calgary.

Technical Staff

We have reached the limits of our capability to accommodate an ever increasing workload without additional medical laboratory technologists and technicians. The price that we have paid for being one of the most efficient large hospital laboratories in the province is understaffing in critical high intensity areas such as our Core Laboratory. New equipment in the Core Laboratory has provided some efficiencies, however, to date these have been largely offset by our steadily increasing workload, both volume and complexity of cases. This is compounded by a shortage of medical laboratory technologists – a shortage that is likely to become much worse in the next few years. Staffing shortages is a serious concern, particularly as we can anticipate significant challenges over the next year as we prepare for laboratory accreditation and regionalization.

Another major defect is the lack of funding for technologist time for developmental work which is mandatory for maintenance of a high quality tertiary centre laboratory. This creates a vicious circle, since the introduction of new tests, as well as cost efficiencies, require preparatory work. Without adequate staffing, advances are often delayed, or are postponed indefinitely.

3.3 Extramural Professional Activities

In addition to meeting the objectives of the departmental and institutional mission, many of the faculty actively participate in regional, provincial, national and international committees, task forces and medical societies. For example, Drs. D. Rapson and S. SenGupta were members of specialty Examination Boards of the Royal College of Physicians & Surgeons of Canada (Haematopathology and Anatomic Pathology respectively). Dr. L. Shepherd completed her term

as Chief Examiner in Haematopathology for the Royal College. Dr. SenGupta is the President of the Canadian Association of Pathologists. Drs. Collier, Zoutman and SenGupta serve on the OMA-MOHLTC's QMP-LS laboratory discipline-specific committees. Dr. S. Ludwin is the immediate past President of the International Society of Neuropathology.

4. DEPARTMENTAL ACTIVITIES

4.1 Division of Anatomic Pathology

Functions

- Diagnostic surgical pathology, cytology and neuropathology for the AHSC
- Autopsy service for the AHSC
- Regional forensic pathology service
- Regional diagnostic consultation service (for community hospital pathologists and for the KRCC)
- Regional gynecologic cytology screening program (in partnership with commercial sector laboratory)
- Professional support for the regional laboratory outreach program (medical directorship, medical and scientific consultation)
- Continuing quality improvement program
- Independent and collaborative research programs
- Participation in undergraduate, graduate and postgraduate teaching programs

Workload Units (DBS)

	Fiscal 2000	**Fiscal 2001**	**Fiscal 2002**
Surgical Pathology	1,840,182	1,917,219	2,002,883
Autopsy	733,764	649,033	684,552
Cytology	508,223	475,263	434,721

Analysis

- There has been a progressive increase in surgical pathology workload which is due to several factors including an increase in case volume (particularly referral oncology cases) and an increase in complexity in the diagnostic work-up in certain areas (e.g. HER-2/neu testing, general immunohistochemistry, sentinel node biopsies). Workload increase over the last three years approximates 25%.
- Autopsy workload increased 5%. The establishment of a regional forensic pathology unit contributed to an increase in medicolegal workload.

- Total laboratory workload in Anatomic Pathology has increased 17% in the last 3 years. It is expected that increases in the complexity of surgical pathology diagnosis and forensic

pathology workload will continue and result in a progressive growth in overall workload in Anatomic Pathology, for at least the short term and probably into the intermediate term.

Key Achievements

- Plan developed for upgrades to the physical plant of the Autopsy service (source of funding: Ontario Solicitor General's office)
- Implementation of digital photography in the surgical pathology grossing service and consolidation of digital case records.
- In collaboration with the Cytogenetics laboratory, the fluorescence in-situ hybridization (FISH) technique for detection of amplification of HER-2/neu gene copy in breast cancer.
- A quality audit to evaluate the adequacy of cytology FNA specimens was conducted and results disseminated.
- An effective user-friendly database of anatomic pathology reports was established. This has greatly facilitated information retrieval and quality management activities.

Quality Improvement Activities

Surgical Pathology

- Quarterly monitoring of surgical pathology report turnaround times
- Annual auditing of frozen section diagnosis accuracy
- Audit of case cross-contamination rate

Cytology

- Monthly directed and targeted re-screens of Pap smears for diagnostic accuracy and discrepancy rates
- Monthly evaluation of ASCUS-SIL rates and unsatisfactory/limited specimen rates
- Ongoing audits of professional diagnostic discrepancy rates

Autopsy

- Bi-annual audit of final report turnaround time
- Monthly medical-legal work rounds with coroners and pathologists
- Annual audit of provisional report turnaround time

Education

In addition to the activities referred to in the Executive Summary, Anatomic Pathologists participate in numerous inter-departmental rounds, conferences and tumour boards that are held in the AHSC on a weekly and monthly basis. Also, Divisional members are involved in the postgraduate training of Residents from several other Departments who do a rotation in Pathology.

Objectives for 2002

1. Complete implementation of renovations to physical plant of regional forensic unit.
2. Establish procedures and mechanisms to optimize turnaround time of autopsy reporting.
3. Streamline and optimize efficiency in surgical grossing function.
4. Refine surgical pathology reporting function to optimize efficiency.
5. Develop molecular diagnostics in surgical pathology and cytology.

6. Pursue external funding for tumour bank.
7. Establish automated mechanism for follow-up communication after abnormal cervical cytyology.

4.2 Division of HaematoPathology

Functions

The Division of Haematopathology provides high quality laboratory haematology services to the AHSC, regional community hospitals, some out of region (e.g. Central East) hospitals and to private laboratories. The division is unique in that its members have varied expertise and responsibilities in many other areas of the faculty outside of the Department of Pathology. This provides a blend of laboratory haematology expertise with value added experience and knowledge from anatomical pathology, molecular diagnostics, pediatrics, clinical trials, oncology, basic research initiatives, and general internal medicine.

The divisional activities cover a broad base of laboratory haematology including the following areas:

- general morphology
- special haematology
- haemostasis
- special haemostasis
- immunology/regional histocompatibility laboratory
- transfusion medicine service

In addition to clinical service, education and research continue to play vital roles within the division (see below).

Workload Units

	Fiscal 2000	**Fiscal 2001**	**Fiscal 2002**
Routine Haematology	1,536,050	1,593,045	1,495,010
Special Haematology	111,003	108,555	108,617

Coagulation	873,360	921,666	957,214
Transfusion Medicine	997,836	1,048,555	1,015,438
Immunology	391,826	405,528	442,861

Immunology has seen a particular increase in workload. This is being addressed by providing more technologists, when feasible, and improving some reagent formulations to cut down on technologist work time. A state of the art flow cytometer is on the capital equipment list. This would provide improved quality of specimen analysis, an extra work site for technologists and the foundation for future clinical developments in immunology for patient care.

Key Achievements

- In general and special haematology, the introduction of the Roche XE2100 cell counters has provided a track system for specimens with an automated slide making facility. In addition, its on line photography system, known as the Lafia, has been used to capture digital images for teaching purposes. A smaller instrument, the Roche SF3000, is currently being introduced into service at the Hotel Dieu Hospital. This will complete the upgrade of instrumentation for complete blood counting at the Kingston hospitals.

- The Patient Transfusion Information Pamphlet has been revised and updated by Dr. Lois Shepherd.

- Under the auspices of the MOHLTC, the Kingston hospitals have been chosen as one of 23 hospitals in the province to receive funding for a Blood Transfusion Nurse Coordinator for 1-2 years. This post has been filled by Ms. Doris Flynn, who will be working in conjunction with Dr. Lois Shepherd and the Department of Nursing.

- The clinical aspects of the Autologous Transfusion Service were transferred from the Blood Bank to Nursing. This clinical service is now being provided by nurses in FAPC, where there are better facilities for patients. However, the Autologous Transfusion Service remains a joint responsibility of the Heamatopathology Division, Blood Bank, and Nursing.

Quality Improvement Activities

- Standardization of blood film reporting has begun. This is an ongoing process, the benefits of which will hopefully be apparent to physicians in the coming year.

- An audit showed that thrombophilia investigation was suboptimal and required improvement. To that end, a guide to thrombophilia testing was developed jointly by the Divisions of Haematopathology ahd Haematology/Oncology, and has been distributed.

- An audit of the small numbers of PT/PTT tests performed at HDH showed that many of these are requested for pre-admission work-up. The necessity for maintaining a coagulation analyzer at HDH is therefore being reviewed.

- Developmental work on point-of-care-instrumentation for coagulation is being spear-headed by Dr. David Dexter. This has been a particular interest of the Division of Cardiovascular Surgery, which is participating in the process. Hopefully, as a result of this, a suitable point-of-care instrument which will link up to the hospital PCS will soon be in place for use by the cardiovascular service.

- Over the year, developmental work on a quantitative D-dimer assay as a tool in venous thromboembolism diagnosis was completed and introduced in the Emergency department. This test, based on published evidence, can function as a stand-alone test in some patient categories and should reduce the number of ultrasound exams and ventilation perfusion scans requested.

- In blood transfusion, a gel system for routine blood banking has finally been introduced. This provides clearer reaction end points for interpretation by technologists.

- Tissue typing using molecular techniques have been developed and introduced by the Immunology laboratory.

Education

Teaching continues to be a vital role of this division. All divisional members participate in Phase I and Phase II Haematology sections and integrated rounds with the Clinical Haematology/Oncology Division. In addition, the division provides clinical clerk selectives. In postgraduate education, our division provides the six months formal laboratory training component for the Clinical Haematology Fellows to satisfy Royal College requirements. This is in addition to the division's training in anatomic pathology and general pathology when required.

Research

The division continues an active research role and Dr. David Lillicrap was awarded a Canada Research Chair in the last year. Divisional members take part in grant and journal reviews and are PhD and MSc research supervisors and examiners. Other activities include: Clinical Trials, further development of a tumour bank, a research contract laboratory and the HERL Laboratory directorship. Members have received grant awards from MRCC, CIRL, Heart & Stroke Foundation and others. They have presented abstracts and posters at ISTH and ASH as well as for other meetings.

Objectives for 2002-2003

1. Complete standardization of blood film reporting.
2. Introduce a pilot project for collection of bone marrows wihtout technical support in KRCC to remove time restraints for oncologists and technologists.
3. Evaluate the necessity for DNA studies on all bone marrows.

4. Implement point-of-care instruments, where required, under laboratory accreditation guidelines.
5. Examine fresh frozen plasma usage in cardiovascular surgery.

4.3 Division of Clinical Chemistry

Functions

The two clinical chemists provide scientific direction for the clinical chemistry components of the Core Laboratory Service at KGH, including quality assurance, appropriate laboratory test utilization, evaluation of new tests, equipment and procedures, and clinical consultation for medical staff. They perform diagnostic interpretation of certain tests, such as protein and immunoelectrophoresis. They also provide significant regional outreach support to community hospitals, especially QHC- Belleville. Education and research are important activities and we continue to be heavily involved in a variety of research projects.

Workload Units

	Fiscal 2000	**Fiscal 2001**	**Fiscal 2002**
Routine Chemistry	2,391,729	2,440,937	3,168,462
Urinalysis	151,251	151,965	145,209
Therapeutic drug monitoring/Toxi-cology	72,078	92,618	144,372
Immunoassays	471,781	471,216	495,548
Special Chemistry	453,010	523,926	445,402

Key Achievements and Quality Improvement Initiatives

Acquisition and implementation of new instrumentation in the core laboratory. This was a major undertaking requiring the validation of over 120 new methods using more than 4000 stored patient samples. Between training and validation, >5000 technical and professional hours were invested in this project. After some initial minor problems, the new systems have operated flawlessly. Since going “live”, we have had visits by delegations from 15 hospitals and private laboratories, showcasing Roche products and our process design.

The new equipment has enabled us to offer some new tests and improved methodologies in others, which should provide tangible benefits to patient care. One example is the introduction of free PSA determinations, which should reduce the prostate biopsy rate in our patient population. We also automated Haemoglobin A1c determinations with a resultant improvement in turnaround time and accuracy.

Objectives for 2002-2003

1. Complete the re-instrumentation project with the installation of the E170 module. This will integrate immunoassay into the regular chemistry analyzer, which was our ultimate goal at the beginning of the project.
2. Install a Remedi, which is a chromatographic drug analyzer capable of identifying >2000 drugs and their metabolites. This ability is crucial for a laboratory serving an AHSC as well as an extended region.
3. A major initiative will be the preparation for new Ontario Laboratory Accreditation. While we are in substantive compliance with many of the requirements, an extensive review of our quality assurance and documentation procedures will be necessary.

4.4 Division of Clinical Microbiology

Functions

The Clinical Microbiology Services continue to include bacteriology, parasitology and mycology. STAT serologic testing for infectious diseases in potential transplant patients, rapid testing for influenza and Respiratory syncytial virus, and support for infection control outbreaks are some of the specialized services offered by the laboratory. Routine Virology, Mycobacteriology and Molecular Diagnostics continue to be referred to the Public Health Laboratory operated by the MoHLTC.

Workload Units

	Fiscal 2000	**Fiscal 2001**	**Fiscal 2002**
Bacteriology	2,062,351	2,125,070	2,064,104
Serology	53,042	65,173	76,646
Mycology	59,665	57,759	65,214
Parasitology	103,376	106,194	115,034
Virology	126,736	123,608	122,021
Environmental testing	9,900	15,276	17,484

Analysis

Utilization continues to increase, as does consequent workload productivity. The average productivity workload increased again in 2001. The unpredictability of infectious disease and infection control outbreaks accompanied by already high productivity of the unit places significant stress on the technical staff. For example, there was a significant increase in RSV and influenza in the community this past year as compared to the previous year. This necessitated an increased need for STAT testing. Outbreaks and infection control screening for agents such as *Clostridium difficile*, MRSA and VRE continue to increase.

Quality Improvement Initiatives

The laboratory continues to have a strong program in quality improvement. The involvement of many individuals within the laboratory enhances the program substantially. Key indicators examined in 2001 included:

- blood culture positivity rate
- turnaround time and notification of critical reports
- rapid identification of *Staphylococcus aureus* from blood cultures
- correlation between intravascular line tip and peripheral blood culture practices
- examination of the sensitivity and specificity of two RSV methods

One of the most rewarding quality improvement endeavours attempted this past year was the development of a comprehensive educational program on appropriate specimen selection and transport. Because of the complexities associated with microbiology testing, a large array of specimen transport systems must be utilized. Improper specimen selection and transport result in inadequate microbiology results. Coloured posters were therefore developed and posted on all wards and clinics. An educational in-service session was offered to accompany the posters and a total of 19 sessions were presented. Extremely positive feedback was received and the profile of the laboratory was increased in the process. Follow-up activities to determine the effectiveness of this educational intervention will be initiated in the coming year.

Objectives for 2002-2003

1. Continue to advocate for the development of a molecular diagnostics facility. (This objective remained unfulfilled from last year due in part to a lack of new funding to implement this sorely needed program. The necessity to refer all molecular diagnostic testing to external reference laboratories results in long turnaround times which adversely affects patient care.)
2. Continue to advocate for capital equipment purchases. (This is another unfulfilled objective from the previous year. The recognized need for new and replacement equipment (e.g. cytocentrifuge, microscopes) jeopardizes optimal patient care.)
3. As a result of the anticipated regional laboratory restructuring plan in Fall 2002, develop a functional plan that will allow the microbiology laboratory to fulfill its mandate within a regional system.
4. Implement the remaining policies and procedures required to achieve full accreditation through Ontario Laboratory Accreditation.
5. Enhance utilization through the development of the PCS order-entry system.

4.5 Division of Genetics and Molecular Medicine

Genetics Review Process

In the Spring 2001, a center-wide review of Genetics was requested by the Dean of the Faculty of Health Sciences and the CEO of KGH. The review committee included: David Lillicrap (chair), Kim Dow, Graeme Smith, Karen Harrison and Peter O'Brien. The terms of reference for the review included consultation and evaluation of the service and academic profile of medical genetics in the AHSC and involved widespread input from the Kingston academic community as well as an external opinion obtained from Dr. Brian Lowry, Professor Emeritus of

Genetics at the University of Calgary. In addition to providing a review of the current status of medical genetics at this centre, the Committee was charged with making recommendations regarding a vision and strategy for all aspects of genetics within the context of this AHSC.

The final Genetics Review document was submitted in May 2001 and its recommendations were formally accepted and approved by the School of Medicine Council in June 2001.

A number of substantive changes to the organization of medical genetics services were implemented as of January 2002. These include:

- a new Division of Genetics and Molecular Medicine established within the Department of Pathology to replace the previous Division of Medical Genetics in the Department of Pediatrics. This reorganization consolidated all clinical, laboratory and academic aspects of genetics. The first Chair of this Division is Dr. Lillicrap.
- disbanding the Medical Genetics Unit at KGH
- plans to relocate the Section of Clinical Genetics from 20 Barrie Street to office space on Connell 4 in KGH

Workload Statistics

DNA Diagnostic Laboratory

Banked samples	26
Breast cancer	78
Familial thrombosis	987
Fragile X syndrome	1278
Hemochromatosis	1658
Hemophilia A	98
Hemophilia B	45
Huntington's disease	10
Miscellaneous	49
B and T cell clonality	452
REFERRED TO OTHER CENTRES	131

Note:
The total number of samples tested, banked and shipped 10 years ago (1992) was 835!

Cytogenetics Laboratory

Prenatal samples	162
Blood samples	385
Somatic cancers	342
Solid tissues	43
Miscellaneous	15

Biochemical Genetics Laboratory

Plasma amino acids	58
Urine amino acids	256
Urine metabolic screen	130
Reducing substances	134
Mucopolysaccharide chromatography	8
Organic acid HPLC	102
Oligosaccharide screen	26
Cholinesterase analysis	88
ACHE gel	802
ACHE activities	66
WBC or RBC preparation	40

Clinical Genetics

Genetic counselling	228
Prenatal assessments	199
Ward consults	76
Telephone/Post consultations	161
Special clinics	8
Biochemical clinics	49

Cancer clinic	41

Regional Initiatives

The growing impact of genetic medicine was apparent through several activities undertaken by members of the Division during the past year. Drs. Mackenzie and Forster-Gibson have now established clinical genetics services at the Ongwanada Resource Centre and Dr. Forster-Gibson also provides a genetics consultation service at the Rideau Regional facility. The Peterborough Outreach Program has continued during the past year and has incorporated visits from the familial oncology group in addition to the general genetics consultation service. Finally, and most recently, approaches have been made by the Administration of Lakeridge Health Corporation for the Queen's genetics group to establish outreach activities encompassing, initially, supervision of the Lakeridge cytogenetics laboratory and a regular clinical genetics outreach service. There is strong optimism that this program will form a growing and mutually beneficial genetics activity.

Education

Three significant advances have been made in the teaching of genetics at Queen's during the past year. Firstly, the Phase I medical undergraduate genetics curriculum has been substantially revised with the incorporation of a WebCT-based program and an emphasis on clinical case material to initiate the presentation of genetics concepts. Dr. Sherry Taylor's role in this initiative was critical.

The second important genetics teaching achievement during the past year has been the successful Canadian College of Medical Genetics (CCMG) accreditation review in Summer 2001. This will ensure the potential for attracting postgraduate trainees in both clinical and laboratory genetics over the next five years. This review was expertly coordinated by Drs. Karen Harrison and Jennifer Mackenzie.

Finally, a new fourth year undergraduate Life Sciences course was developed this year. This will be offered for the first time in Winter 2003. Dr. Lois Mulligan will be the course coordinator.

Research

Drs. Mackenzie and Forster-Gibson are among the co-investigators with Dr. Jeanette Holden on a CIHR-funded multidisciplinary project aimed at improved understanding of autism. This project has been awarded $4.3 million over four years.

Dr. Lillicrap's research program on the genetics of inherited bleeding disorders has been recognized through two awards during the past year. Dr. Lillicrap was one of two Queen's recipients of a Senior Canada Research Chair (in Molecular Haemostasis). In addition, he was awarded one of the two 2001 Queen's University Prizes for Research Excellence.

5. QUALITY & UTILIZATION IMPROVEMENT ACTIVITIES

5.1 Overview of Activities

The Department's Quality & Utilization Improvement Committee for 2001-2002 was chaired by Dr. S. SenGupta and includes representation from each of the five divisions and from the Laboratory Outreach Program. This year, additional technologist representation on the committee was obtained for the Point-of-Care Testing program and Laboratory Information Systems, reflecting the growing importance of these areas in quality improvement processes.

The committee met on a monthly basis from September 2001 - June 2002. Recorded minutes of the meetings are available on file. The Director of the KGH Information Technology Service, Ms. Catherine Claiter, as well as Ms. Christine Gallernault, were invited to one of the meetings to discuss quality issues pertaining to the LIS/PCS. The Chair of the Committee was also a member of the KGH Joint Quality Improvement & Utilization Committee over the past year.

The focus of the committee's work was on the following areas:

- Preparation for laboratory accreditation
- Review of quality indicators
- Review of incident reports
- Review of performance in external quality assurance programs (i.e. laboratory proficiency testing)

5.2 Quality Issues

Human Resources

Attrition of the laboratory workforce, primarily due to senior level technologists and managers approaching early retirement age, is a major concern in a tight labour market, provincially and nationally.

Workload

Routine and specialized laboratory test volumes continue to increase. Protocols are already in place to streamline testing and reduce unnecessary testing. Further utilization management will require an integrated regional patient care system with sophistication to address test ordering practices.

Regional Laboratory Service

If recommendations from the East 2 Regional Steering Committee Report to the MOHLTC are accepted, there may be a significant shift in work (e.g. histology, microbiology) from outlying community hospitals into KGH laboratories. The impact of this additional workload on quality has yet to be determined. Administratively, the implementation of a regional

laboratory service will impose additional workload on the KGH laboratories as new region-wide quality systems would need to be implemented.

Krever inquiry and other bureaucratic recommendations

The logistics of meeting proposed new Canadian Blood Service guidelines for transfusion medicine are overwhelming, particularly from a staffing perspective. Administration of other laboratory services, such as point of care testing, also is increasing in time requirement and complexity.

LIS issues

The current KGH laboratory information system is slated for replacement in the next 1-2 years. This is a most welcome development from a quality and management perspective, however, with it will come the need for staff re-training and other issues related to implementation.

New Technology and Tests

While the Department of Pathology is fully committed to introducing new, clinically proven and beneficial tests for optimal patient care (e.g. HER-2/*neu* testing for breast tumours, molecular microbiology for mycobacteria testing), resource issues threaten to delay implementation or lengthen turnaround times for results.

6. REGIONAL ACTIVITIES

6.1 Overview

For more than 25 years, the KGH Department of Pathology has provided a wide range of laboratory services, both professional and technical, for institutions and individual health care providers throughout Southeastern Ontario. These include routine and esoteric reference testing and pathology services as well as the provision of scientific and medical direction of primary and secondary community hospital and commercial laboratories. While there have been some changes in workflow and workload due to hospital restructuring in the region (e.g. QHC), in general, both the volume and complexity of referred in work continues to increase steadily, largely from Central East region (to the west).

6.2 Utilization Trends

There has been a 33% increase in referred in tests to the KGH Department of Pathology over the past two years, largely in clinical chemistry but also in pathology. Most of this comes from the 11 hospitals in the Central East region (Peterborough - Oshawa - Uxbridge - Whitby - Cobourg - Port Perry). The complexity of these tests performed in the KGH laboratories continues to increase and some of these tests require professional interpretation prior to completion. There has been some increase in referred in testing from hospitals within the region

(e.g. Perth and Smiths Falls), reflecting increased clinical activity at those centres (e.g. a new colposcopy clinic in Smiths Falls resulting in more Pap smears and cervical biopsies).

6.3 Quality Improvement

There have been several new and ongoing initiatives undertaken by the KGH Department of Pathology over the past year to improve the quality of laboratory services provided within the region (and beyond). Some of these include:

Microbiology

On-site visits in Napanee and Smiths Falls by the KGH Clinical and Medical Microbiologists to review existing laboratory and infection control practices and recommend improvements.

Haematology

Interpretation by the KGH Hematopathologists of greater numbers of abnormal blood smears and bone marrows from community hospitals throughout the region.

Clinical Chemistry

Increased scientific direction and consultation provided to community hospital laboratories, especially in selection of capital equipment.

Surgical Pathology

An increase in the number of diagnostic consultations performed by Pathologists at KGH for community colleagues on difficult or complex biopsies.

Administration

Improved turnaround time for bone marrow reporting in Perth and Smiths Falls due to direct upload of results from KGH lab information system into Meditech.

6.4 Ontario Regional Laboratory Services Plan

Across the province, the MOHLTC has mandated regionalization of laboratory services through a comprehensive planning process including regional steering committees (RSC) and external facilitators and consultants. Southeastern Ontario, designated as E2 region, began its planning process in the Fall of 2001 and a final report was submitted by Thiinc-Health consultants to the Ministry in June 2002. There were 3 representatives on the E2 RSC from KGH, including Drs. P. Manley and S. SenGupta and Mr. P. O'Brien. The Thiinc report will be reviewed by a second external consultant group before approval by the Ministry.

7. OPPORTUNITIES AND CHALLENGES

The upcoming year, 2002-2003, will see some major changes within the Department of Pathology. For example, there will be a Headship change in July 2002 and some other personnel changes in key positions in the Clinical Laboratory Services. The goals and objectives may be revised, as necessary. However, the key goals remain similar to last year:

- successful recruitment of qualified professional, technical and managerial staff for expected vacancies
- major capital equipment purchases in the clinical laboratories to meet quality, utilization and efficiency objectives

Many of the division specific objectives have been listed in Section 4.

The challenges that the Department faces over the next year have been either discussed above or alluded to and in sum, include:

- annual significant increases in clinical laboratory workload (both volume and complexity) without commensurate increases in technical or professional staffing
- obsolete instrumentation in some of the laboratories which will have a direct effect on patient care
- new government mandated regulatory, quality management, and regional planning initiatives – all of which require additional resources to meet (i.e. human, financial, equipment)
- a national shortage of skilled and properly qualified laboratorians in all disciplines, which will impact upon our recruiting abilities, especially if salary and working conditions are not competitive with the marketplace.