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### **Festschrift for Roger Keith**

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1. Yale University
2. University of Western Ontario
3. University of Alberta
4. The Ohio State University
5. McGill University
6. University of Saskatchewan
7. McMaster University
8. University of Manitoba
9. Memorial University Newfoundland
10. University of Chicago
11. Harvard Medical School

## FOREWORD

I am honored to introduce my long-time friend, young Roger Keith (I am a year older) at his festschrift. As couples Roger, Nancy, Brenda and I have traveled, partied and fished together for over three decades.

He has had an illustrious career centered on the most important organ of the body: the pancreas. After considerable time learning about it from masters in Seattle, Los Angeles, London and Toulouse, he finally took a job. Thereafter, he accumulated a great deal of academic accomplishments, recognition and some detritus.

Roger and I have shared many interests; the pancreas, leading a surgical department, editing a journal (he, the *Canadian Journal of Surgery*; I, *Surgery*). For now, I will call attention to just one of our common efforts. Thirty years ago we both tilted at the windmill of pancreas divisum as the cause of pancreatitis and accessory papillary sphincteroplasty for its treatment. As brilliant as was that observation, we may be the only surgeons in the room to have done that operation in its time. I mention it here so the subject may not be completely forgotten.

One of my idols is a Massachusetts General Hospital surgeon named Ernest Emory Codman. He became a Canadian hero as well by responding to the great Halifax Harbor explosion, exactly 100 years ago, closing his hospital in Boston and coming to care for the wounded. Codman was a forefather of studying surgical outcomes and quality with a goal of raising standards. I think Dr. Codman would approve of the contributions Roger Keith has made to raise the standard of surgical teaching and practice in Saskatchewan and beyond.

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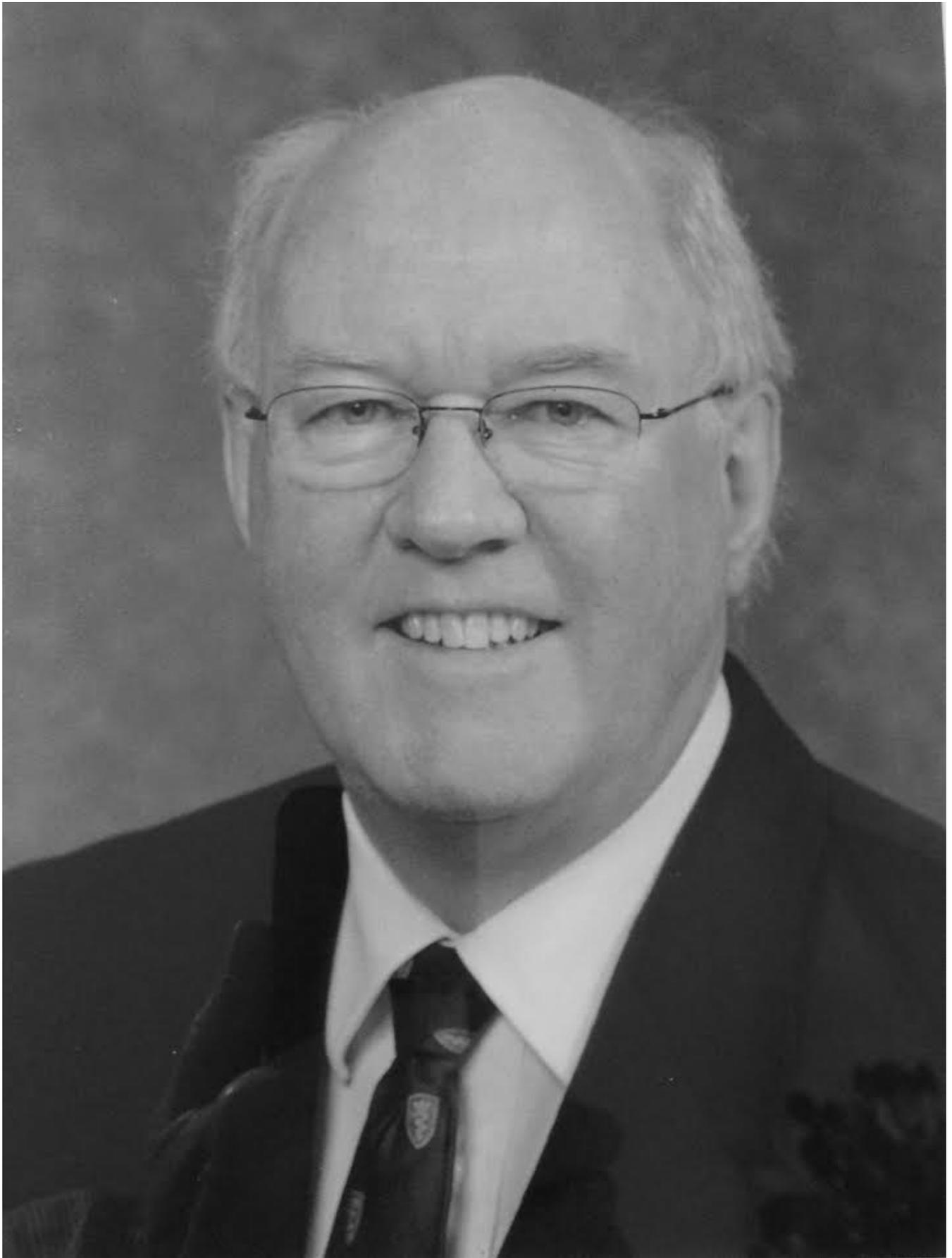
## INTRODUCTION

For the past 26 years, Dr. Keith has been a member of the Department of Surgery at the University of Saskatchewan and was Head of the Department for 13 years. Roger has had a long and illustrious career. He has been active in organized surgery at the National level and has held a number of leadership positions including being the president of the Canadian Association of General Surgeons, Co-Editor of the Canadian Journal of Surgery, and Chairman of the Examinations Committee in General Surgery for the Royal College of Physicians and Surgeons of Canada.

It is in Saskatoon however, where Roger has spent most of his professional career where the impact of his dedicated years of service as a HPB surgeon and his academic contributions to the Department of Surgery will have the greatest impact. It is fitting that his friends and colleagues from Saskatoon and across North America are coming together to discuss the art and science of surgery, new developments in education and research and the challenges and opportunities that surgery will face in the future.

### **Ivar Mendez**

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## **ROGER G. KEITH MD, FRCSC, FRCS, FACS**

Born in Calgary, Dr. Keith graduated in Medicine from the University of Alberta in 1964. After two years of Family Medicine in Calgary, he entered General Surgery residency training at the University of Toronto. Thereafter, he completed pancreatic and biliary surgery fellowships at the University of Washington, UCLA and London, England. He joined the faculty of the Department of Surgery at the University of Toronto in 1973. He established his academic practice in non-transplant HPB surgery at Sunnybrook Medical Centre from 1973 to 1986, following which he moved to St. Michael's Hospital as Head of General Surgery. In 1990 he accepted an appointment as Professor and Chairman of the Department of Surgery at the University of Saskatchewan. Dr. Keith was the first Fred Wigmore Professor of Surgery in the College of Medicine. He also served as Head of the Department of Surgery at the College of Graduate Studies and Research at the U. of S. Dr. Keith held both of these offices until 2005. He was the Director of Clinical Affairs for the College of Medicine and served on the Deanery of the College from 1997 to 2002. From 2014 to 2016, Dr. Keith was Chair of Faculty Council for the College of Medicine. While in Saskatoon, Dr. Keith served as Co-Editor of the Canadian Journal of Surgery from 1992 to 1996.

Dr. Keith has been involved with the Canadian Association of General Surgeons for over three decades. He served as a member of the Board of Directors from 1981 to 2010. He has chaired numerous CAGS Committees, was the third Secretary from 1989 to 1995 and President from 1997 – 98. During his administrative career with CAGS he played a role in defining specialty qualifications in gastrointestinal endoscopy for general surgeons; sustaining CAGS affiliation with the Canadian Journal of Surgery; initiating the independent CAGS annual meetings from the Royal College; formatting the CAGS Corporate Council; formulating CAGS association membership with International Federation of Surgical Endoscopic Societies; and, coordinating national surgery resident in training examinations for twenty six years, ending in 2016.

In parallel, Dr. Keith served the Royal College on various Committees from 1976 to 2007. He was involved for over ten years with Royal College maintenance of competence programs. He was a member of the Board of Examiners in General Surgery from 1976 to 1986, and Chairman from 1987 – 89. He was reappointed as Chairman of Examination Committee in General Surgery from 2001 – 2004, when the Royal College introduced the condensed final examination. From 1996 to 2002 Dr. Keith served as the Royal College Chairman of the Specialty Committee in General Surgery.

Dr. Keith served as Councillor, Program Committee Chair and President of the Central Surgical Association; was a Governor of the American College of Surgeons; an Executive Committee member of the International Federation of Societies for Endoscopic Surgery; an International Director of the James IV Association of Surgery; and served as a Committee member of numerous academic surgical societies including the Society for Surgery of the Alimentary Tract, American Surgical Association, American HPB Association and SAGES.

Currently, Roger Keith is a Professor of Surgery at the University of Saskatchewan, still participating in his career long devotion to undergraduate and postgraduate teaching in surgery. This year ended his forty-four years of academic surgical care of patients in Ontario and Saskatchewan.

## FESTSCHRIFT IN HONOUR OF DR. ROGER KEITH

A festschrift is a collection of essays written to honour the contributions of a colleague during his or her career. These essays are not about the colleague but about the science. A theme is often chosen to align with the interests of the honoree. In June 2017, colleagues of Dr. Roger Keith gathered in Saskatoon to discuss topics regarding the past and future of surgery and its subspecialties, particularly surgical education and hepatobiliary - pancreatic surgery. The Canadian Journal of Surgery is pleased to collaborate in the production of this festschrift for its former editor, Dr. Keith.

Roger Keith was born in Calgary in August 1940. After completing his M.D. at the University of Alberta and general surgery residency at University of Toronto, Dr. Keith went to Toulouse (Professor Jean Escat), London (Sir Rodney Smith), Los Angeles (Dr. William Longmire) and Seattle (Dr. Thomas T. White) to gain the best training in liver and pancreatic surgery (known today by the acronym HPB surgery). HPB surgery including endoscopic retrograde cholangiopancreatography became Dr. Keith's specialty, leading its development in Canada over the next 40 years. In 1990 he moved back west becoming the professor and head of surgery at the University of Saskatchewan. He contributed to the rapid development of surgical education through leadership roles, many of which continue today, at the Royal College of Physicians and Surgeons of Canada, the American College of Surgeons, the Canadian Association of General Surgeons, the American Surgical Association and the James IV Association of Surgeons. Dr. Keith was editor-in-chief of the Canadian Journal of Surgery from 1992 to 1998.<sup>1</sup>

This festschrift is opened by a description of challenges facing medical schools in the 21<sup>st</sup> century (Dr Grant Miller, University of Saskatchewan) and continues with essays on: the development surgery in Canada: neurosurgery in Saskatchewan (Drs. Michael Kelly and Lissa Peeling, University of Saskatchewan); hepatopancreaticobiliary (HPB) surgery including transplantation (Dr. William Wall, University of Western Ontario); head and neck surgery (Dr. Richard Nason, University of Manitoba) and endoscopy (Dr. Michael Marcaccio, McMaster University) as well as personal account of participation in Canada's military hospital in Kandahar as a civilian surgeon (Dr. Stewart Hamilton, University of Alberta). Essays on surgical education include: undergraduate education (Dr. Christopher de Gara, University of Alberta); postgraduate education (Dr. E. Christopher Ellison, The Ohio State University); academic surgery (Dr. Richard Prinz, University of Chicago) and continuing education (Dr. William Pollett, Memorial University, Newfoundland). Chief examiner, Dr. Ward Davies (University of Western Ontario) provides reflections on the evolution of the certification examinations of the Royal College. Dr. Gerry Fried (McGill University) describes the development of Canada's latest megahospital in Montreal. These essays are written from a personal perspective by surgical colleagues of Dr. Keith who also have a lifetime of contributions to the science. As Dr. Andrew Warshaw (Harvard Medical School) remarked referring to his idol of outcome research in surgery, Dr. Ernest Codman (1869 – 1940), that Dr. Keith's career would have met with praise and approval from Dr. Codman, a sentiment echoed in the essays of this festschrift.

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### **Vivian McAlister**

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## MEDICAL SCHOOL CHALLENGES IN THE NEW CENTURY

Just like health care, medical education today is complex and faces enormous challenges. This essay will focus primarily on reviewing the significant events within the University of Saskatchewan College of Medicine over the past 2 decades, how they have affected the undergraduate program, the positives that have come about, the challenges for the future, and what the way forward will look like.

Prior to the early 1990's the University of Saskatchewan (U of S) Medical School was a 5 year program with an enrollment of 60 students/year. The majority of clinical exposure was at the Saskatoon Royal University Hospital with the exception of approximately 10-20 students who spent their final year, referred locally as the Junior Undergraduate Rotating Student Internship (JURSI) year, in Regina at the Plains Health Center. During this time the U of S graduating medical students were generally considered to be very competent with excellent clinical skills and ahead of many of their peers from other Canadian medical schools. This was in part due to the early exposure to patients in 2<sup>nd</sup> year along with the fifth year rotating internship. In their second year these students spent 20 hours per week learning clinical skills through direct in hospital patient contact when most traditional medical school programs didn't have much patient oriented clinical exposure until 3<sup>rd</sup> and 4<sup>th</sup> year. Also the 5<sup>th</sup> year was a type of rotating internship (Jr. undergraduate rotating internship) while most medical schools were only 4 years duration.

The enrollment was small and curriculum could be primarily delivered at the Saskatoon Royal University Hospital. There was a limited distributed education component with the Plains Health Center in Regina training final year students. This state of the art health care center was opened in 1974 at a cost of \$9 million and was the tertiary referral and university training hospital for southeastern Saskatchewan. It hosted University of Saskatchewan fulltime clinician teachers, 10 - 20 medical student clerks, a handful of surgery and internal medicine residents, and its own Family Medicine Residency program. However, while the training in Regina was valued by those involved it's time was short lived. In 1986 University budget cuts saw the full time university faculty at the Plains Health Center laid off. The number of Royal College trainees rotating to Regina dropped off significantly as did the number of medical student clerks. Saskatchewan health care reform in 1998 saw this beautiful state of the art facility decommissioned as a hospital at a cost of \$21 million.

Shortly thereafter, in 2002, the medical school program was put on probation primarily related to resource issues especially the library and the faculty complement. That year the medical school also welcomed Dr. William Albritton, a country boy from Alabama, as the new Dean. The relatively minor accreditation issues were quickly resolved and full accreditation was achieved within a couple of years.

Shortly after the closing of the Plains Health Center and on the heels of coming off of probation the College of Medicine began to expand the undergraduate enrollment. Related to a national concern of a physician shortage the expansion of medical school enrollment in Canada began in the early 2000s. This resulted in doubling enrollments at all medical schools by 2012. The University of Saskatchewan Medical School under the pressure of a political agenda and against the medical school's own recommendations expanded to an enrollment of 100 students/year today. This also required a significant increase in the number of resident physician training spots. The rapid expansion of the number of trainees significantly taxed the resources, particularly the requirement for clinical teaching.

In the midst of this expanding enrollment the College of Medicine began to focus on the poor performance of its graduates on the Medical Council of Canada Qualifying Examination (MCCQE). Since 2001 U of S student MCCQE mean scores have consistently been below the national mean and ranked last or 2<sup>nd</sup> lowest in 7 out of the last 12 years. The highest ranking achieved during this time was 9 out of 16. It was evident that changes were needed.

“The Future of Medical Education in Canada” published by the Association of Medical Faculties of Canada in 2007 would form the background for many of the changes in medical education in Saskatchewan that would be implemented over the next few years. From this report Saskatchewan keyed on 4 priorities:

1. Expansion of Distributed Medical Education
2. Development and implementation of the undergraduate medical education 2+2 curriculum
3. Focus on inter-professional education (IPE)
4. Adapting admissions procedures

Embarking on expanding a distributive education model as well as implementing a new curriculum would significantly challenge the college particularly in light of other developments affecting it. Concern over the recent probation in 2002, poor research productivity, an ongoing rhetoric around the “town and gown” myth, the expanding enrollment challenges, the 2010 warning of probation and the University administration belief that all the problems were related to the University of Saskatchewan Faculty Association Collective Agreement the U of S embarked on a plan to restructure the administration of the College of Medicine. This project ignored the historical collegial processes of the university and was a top down driven agenda led by a Law Professor turned university administrator. The University administration denied the widely held belief that the intent of the reform was to eliminate all of the full time academic clinicians.

A plan was put forward that featured a new academic governance model with the creation of 3 new divisions: Clinical Research, Medical Education, and Biomedical and Population Sciences. It also intended to address accreditation issues around the assignment of faculty duties and accountability for teaching responsibilities, lagging research performance and complex lines of authority in delivery of clinical services. The University intended to get out of business of clinical service delivery. Full time university faculty would do research while the responsibility for clinical teaching would be shifted to the community physicians.

This administrative driven plan for change was without faculty support. It did not benefit from the accusatory rhetoric of some highly placed U of S senior leaders who publicly placed the blame for the accreditation issues squarely on the faculty. They stated that the faculty had plenty of opportunities to fix the problems and did nothing. This did not sit well with faculty and did not aid the process of change. It caused a great deal of anxiety for students and faculty and resulted in a lot of turmoil but was eventually pushed through.

In the midst of this turmoil over the restructuring of the College of Medicine there loomed the warning of probation that had been received by the College in 2010. In 2013 this threat was realized by the assignment of probation for the second time. In response to this and to support the proposed restructuring of the College the University invested \$400 million. The expansion of the Health Sciences Building with new research and education wings was embarked upon at a cost of \$278 million.

The University administration felt the main reason why the school was struggling to meet accreditation standards was because teachers were also working as doctors. To deal with this the plan was to shift all

clinical teaching to community physicians. As part of this plan 125 full time university faculty were offered voluntary severance packages at an estimated cost of \$25 million. It was hoped these faculty would stay on as community physicians and continue to teach medical students and residents. The idea was to create a single faculty. To encourage this a new funding model for clinical faculty was created with better-defined deliverables.

While dealing with the turmoil of administrative restructuring and addressing the accreditation issues the College needed to move forward with curriculum renewal. A new curriculum was being developed in the midst of this and was not unnoticed by the accreditation team. The plan was to move from a 2 ½ year pre-clerkship and 1 ½ clerkship program to a more common curriculum with 2 pre-clerkship years and 2 clerkship years. The new curriculum would incorporate the expanded enrollment and embrace a distributive education model. Once again Regina was to become an important health sciences learning center. The medical school curriculum in Regina has expanded to now include years 2 through 4 with 40 students per year. Four students are earmarked for enrolment in a longitudinal curriculum delivered in Prince Albert. At the same time family medicine residency programs have expanded to include: La Ronge, Swift Current, North Battleford, Moose Jaw as well as Prince Albert, Regina and Saskatoon.

Full accreditation of the medical school was reinstated in 2015. Moving forward with the new governance model, new faculty engagement, and new curriculum will be challenging. Medical education in Canada is shifting the emphasis away from subspecialization and focusing on generalism (a philosophy of care distinguished by a commitment to the breadth of practice within each discipline and collaboration with the larger health care team in order to respond to patient and community needs). Curriculum renewal in the undergraduate program focuses on developing self directed learners who are excited about their profession, re-establishing the faculty-student preceptor relationship, re-emphasizing the clinical skills basic to competence in medicine, implementing evaluation methods relevant to those basic clinical skills, shifting the emphasis to the outpatient clinical experience and lastly adopting competency based education.

Traditionally the clinical curriculum has been delivered with a Clinical Teaching Unit model. There is now a shift toward preceptor based teaching. In addition, there is more pressure on specialists to teach basic clinical skills rather than speciality related topics and skills. Clinicians often teach the way they were taught, however the new curriculum continues the movement away from Socratic teaching and embraces more problem based learning. It embraces the principles of adult learning theory where the adult learner is: self directed, experienced, has a need to know, is attracted to problems and is internally motivated.

As a program and an institution we are moving forward and we have reason to be optimistic about the future. We have a new Dean with a strong focus on education. The new administrative structure includes new senior administrative positions of Vice Dean Research and Vice Dean Education. The new recruits to these positions will have the direction, budget and focus to advance the vision and mission of the college within their portfolios. Finally we are embarking on curriculum renewal that emphasizes what students need to learn rather than what faculty would like to teach. We are going to make lots of mistakes with this new curriculum. There will be lots of failures but we will learn from those failure and improve. The curriculum will become a living curriculum continuously adapting and changing. There remains lots of work to do and we are hopeful that we are moving in the right direction. We are anxiously looking forward to future MCCQE results as a marker of our success.

	Year of Graduation												
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
CMG* Mean	540	545	556	545	521	530	526	522	515	534	543	545	
UofS** Mean	515	532	554	547	500	504	486	489	503	525	503	498	
Rank***	15/16	13/16	9/16	9/16	15/16	15/16	16/16 (last)	15/16	14/17	13/17	17/17 (last)	17/17 (last)	

\* Mean score on the spring MCCQE of Canadian Medical Graduates taking the exam for the first time

\*\* Mean score on the spring MCCQE of UofS Medical Graduates taking the exam for the first time

\*\*\* Overall rank of the UofS Graduates on the spring MCCQE exam, a higher value in the numerator indicates a lower finish.

Table 1. Ranking – placing out of all medical schools

**Grant G. Miller**

*The College of Medicine, University of Saskatchewan*

## **THE JOURNEY TO IMPROVE STROKE CARE AND RESEARCH IN SASKATCHEWAN.**

### **Abstract**

Prior to 2014, there was no comprehensive acute stroke program in the province of Saskatchewan. This changed with the development of the Saskatchewan Acute Stroke Pathway. The pathway is a Saskatchewan Ministry of Health led initiative to get acute stroke patients to either regional or tertiary centres. Endovascular stroke services were also implemented in Saskatchewan during the last 8 years. Stroke research has been limited in the province. There are pockets of excellent research in basic science but limited stroke clinical trials were available to patients. The Saskatchewan Cerebrovascular Centre was developed to improve stroke research in Saskatchewan. These improvements in patient care, clinical research and basic science research will create a solid foundation for further growth of our program in the future.

### **Introduction**

Saskatchewan traditionally has lagged behind many other provinces in stroke care and research. Dr. Kelly was awarded the Heart and Stroke Foundation and Saskatchewan Health Research Foundation Clinical Stroke Research Chair position in 2012. This 1 million dollar chair allowed marked improvements in clinical and research opportunities at the University of Saskatchewan and in the province as a whole. The focus of the chair, Dr. Michael Kelly, was to improve clinical stroke care in Saskatchewan, further develop endovascular and cerebrovascular services, enhance basic science research and perform clinical stroke trials. This process will be reviewed in this manuscript.

### **The Saskatchewan Acute Stroke Pathway**

Saskatchewan lacked a coordinated strategy to manage patients presenting with acute stroke. Over the last 3 years, the Saskatchewan Acute Stroke Pathway has been developed and implemented. The pathway, which is a Saskatchewan Ministry of Health initiative, follows the Heart and Stroke Foundation of Canada's best practice guidelines for acute stroke care.<sup>1</sup> Regina General Hospital and Royal University Hospital (in Saskatoon) were designated as comprehensive stroke centres and 7 regional centres with computerized tomography imaging were designated as primary stroke centres. The acute stroke process was mapped out and then implemented in a staged fashion. System improvements included 1. emergency medicine bypass protocols, 2. Pre-hospital notification, 3. Emergency department stroke protocols, 4. Standard order sets and 5. Robust data collection to track metrics of stroke care.<sup>2</sup>

### **Endovascular and Cerebrovascular Neurosurgery in Saskatchewan**

Prior to 2008, there were no endovascular services for patients with complex cerebrovascular disorders in Saskatchewan. The program was started by Dr. Kelly and two radiologists, Drs. Rob Otani and Peter Szkup. In 2013, a second endovascular neurosurgeon, Dr. Lissa Peeling was added. The service provides 24/7 coverage for acute ischemic stroke from large vessel occlusions, endovascular management of aneurysms, arteriovenous malformations and other complex cerebrovascular disorders. The program has experience significant growth and is well supported with appropriate infrastructure and support staff. In September of 2016 the program opened a new biplane angiography suite with a second new biplane suite being opened in early 2017. This state of the art facility will ensure the continued success of the

program. There are multiple recent studies, including the ESCAPE trial that show that endovascular therapy for patients with severe stroke from a large cerebral vessel occlusion have markedly improved outcomes.<sup>3</sup>

### **Clinical Stroke Research Program**

It was felt that a robust clinical program will be dramatically enhanced by a clinical trials research program. This program currently employs a research manager and 4 study coordinators. The program performs both industry sponsored studies but also designs and implements independent research trials at the University of Saskatchewan. This program allows patients in the province to access cutting edge therapies and participate in clinical trials. Over the last 8 years the program has participated in 26 clinical trials. The program has also had several post-doctoral fellows and is funded by multiple research grants.

### **Stroke Basic Science Research Program**

In Saskatchewan there is excellent stroke research. However, it was felt that the cerebrovascular program should have a dedicated basic science research program. The Canadian Light Source is a third generation synchrotron and is on the University of Saskatchewan campus. This facility allows for unprecedented imaging. A basic science research program was designed with this in mind. The program uses synchrotron imaging to perform a complete biochemical characterization of a rodent stroke model.<sup>4</sup> Future direction includes the implementation of new drug and nanoparticle therapies. The program has a full time lab manager, laboratory assistant and research scientist.

### **Conclusions**

Over the last 8 years, there has been significant gains in stroke care and research in Saskatchewan. Future plans include continued recruitment of clinical personnel such as stroke neurologists, research scientists, research coordinators and statisticians.

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### **Michael E. Kelly and Lissa Peeling**

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## MASTERS OF SURGERY AND BEYOND

The concept of dedicated research training in general surgery residency programs is not particularly novel. However, the outcomes resultant from such programs, often leading to an advanced degree, have not been well-elucidated. We discuss the ramifications of such programs through a critical evaluation of the existing literature.

When one thinks about “Masters of Surgery”, one often thinks about people like Roger Keith, who celebrated his Festschrift last June. A giant in surgery, Dr. Keith had been Chair of the Department of Surgery at the University of Saskatchewan for many years. He has penned hundreds of papers, held leadership positions in key surgical societies, and trained innumerable residents. Critical to the legacy of such masters of surgery is the training of the future generation of surgeons and scholars, and while the training paradigm of surgery has focused primarily on surgical technique and development of surgical judgement, provision of skills related to research and scientific rigor is also required. Over the years, dedicated research time has been instituted into many surgical residency programs, and more recently, formal training programs leading to a degree (either a Masters or a PhD) have also emerged. Hence, the other “Masters of Surgery” refers to a formal degree; and I would argue that both forms are beneficial to the propagation of the mission of academic surgery.

To begin with, one would hypothesize that programs that offer advanced degrees during residency training are more likely to attract residents who are geared towards an academic career. Indeed, several studies have found that dedicated research time during residency predicted an academic surgical career. Bhattacharya et al, in an analysis of graduates of Duke University’s General Surgery residency training program, found that those who completed two or more years of protected research time were more likely to end up having an academic surgical career than those who did not (96% vs. 80%,  $p < 0.05$ ).<sup>1</sup>

Beyond simply the research experience of being in a laboratory, a formal degree program gives trainees the opportunity to participate in didactic classes that may provide them the tools and language they need in science, statistics and scientific design to excel in a research career. To evaluate whether the formal degree had any further impact on trainees’ future careers, Smith et al compared residents at Vanderbilt who completed dedicated research time with or without concomitantly completing a formal degree. Those who completed a degree were significantly more likely to pursue an academic surgical career than those who did research time but did not complete a formal degree (93% vs. 58%,  $p = 0.046$ ).<sup>2</sup>

That a formal degree leads to a higher rate of pursuit of an academic career leads one to ask the question of whether it is the actual training provided by the degree that is beneficial (versus what one would obtain through less formal research experience), or whether the credential itself is meritorious in the eyes of future employers seeking academic surgeons. To evaluate this, one could evaluate the objective research productivity between trainees with formal degrees and those who underwent dedicated research training in terms of number of publications. Accounting for the time period of seven years prior to the start of residency until a year after the completion of chief residency, Smith et al found that those who completed a degree had more publications and first-author manuscripts than those whose formal research training did not lead to a degree (10.3 vs. 5.30,  $p < 0.001$  and 4.06 vs. 2.30,  $p = 0.017$ , respectively).<sup>2</sup> In addition, those completing a degree had a higher cumulative impact factor of the journals in which they had published compared to those whose research training did not lead to a degree (32.3 vs. 17.8,  $p = 0.001$ ).<sup>2</sup>

It could be hypothesized that degree programs, simply by their requirements, would yield more publications during training, but whether this translates into greater academic productivity after residency is not self-evident. In their study of graduates of McGill's general surgery residency program, Hsieh et al found that surgeons who had participated in formal degree programs during their training produced twice as many publications per year after graduation than those had not (2.8 vs. 1.1,  $p < 0.01$ ).<sup>3</sup> Further, they were also more likely to have greater funding success as faculty (81% vs. 55%,  $p = 0.03$ ).<sup>3</sup>

Interestingly, Merani et al., in their study of graduates from the University of Alberta and the University of Toronto, found that while having either a Masters degree or a PhD was associated with higher publication volumes in several time periods (0-5 years, 6-10 years, and  $> 10$  years post-training) than having done research without a degree ( $p < 0.05$  for all time periods), and a higher h-index ( $p < 0.05$ ), only PhD level training was associated with more first or senior author publications.<sup>4</sup> Hsieh et al., found that the proportion of trainees who obtained funding during residency for their research was similar between those who were in PhD vs. MSc programs (33% vs. 31%), although they too found that the number of papers was greater for those in PhD programs (8.4 vs. 4.7).

Given these findings, what is the value of a Masters degree? Clearly, it seems to fuel more academic productivity than simply having a dedicated research experience, but may not be as impactful as a PhD. For residents who are interested in pursuing an academic career, who may want to explore research but who may not be wedded to a particular area of scientific endeavor, the Masters experience may certainly provide the skills to further one's academic career and provide the credential to substantiate their expertise. For me, both the mentorship of Dr. Keith, as well as his support of my MSc in Surgery, proved to be invaluable in launching my academic career. For both, I am eternally grateful.

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## SURGICAL ENDOSCOPY AND THE GENERAL SURGEON

### Summary

The first flexible endoscope was used in 1958. Technological development and innovative physicians have led to several endoscopic eras, beginning with purely diagnostic procedures and progressing to the current era, which is perhaps best characterized as traditional surgical procedures now being done via an endoluminal approach. It is rare to review an endoscopy focused journal or attend an endoscopy meeting and not see one or more new procedures being reported as now having been accomplished through an endoluminal approach in humans.

Innovators in General Surgery have always contributed to the progress of gastrointestinal endoscopy. Often their colleagues have been slow on the uptake and there remain pockets where General Surgeons are not centrally involved in the practice of endoscopy. All major surgical organizations now have endoscopy as a very important part of their agenda. They have become engaged in the quality movement which will serve patients and endoscopists well.

As procedures become more complex, it is appropriate that we stop and ask the same questions that we have throughout the history of surgical innovation and development:

1. Who should do these procedures?
2. What core skills do they need?
3. How do we insure that providers remain as comprehensive physicians rather than become purely technicians?
4. How will practicing physicians acquire the new skills that innovation brings?
5. How do we measure quality?

As our future unfolds, General Surgeons must be involved in leading development and innovation in GI endoscopy in order to maintain their appropriate place in this critical area of practice. The responsibility to continue the momentum generated by General Surgeon Pioneers in gastrointestinal endoscopy is transferred to the new generation of surgeons, who are well-equipped to take on this very important task.

### Essay

The first flexible endoscope was used in 1958, and in the 1960s the development of glass fiber with its incorporation into endoscopes in 1975, led to the emergence of flexible endoscopy as a mainstay of gastrointestinal investigation. This eventually relegated barium-based radiologic diagnosis to the historical archive. Subsequent development of the charge coupled device, the development of ERCP and the development of endoscopic ultrasound have each ushered in new eras in flexible endoscopy. Initially gastrointestinal endoscopy was principally a diagnostic technique, but as these developments occurred it became a therapeutic platform. Therapies initially directed at the treatment of benign mucosal pathology have continued to evolve, and in the current era, there are continuing developments in the use of flexible endoscopes as the platform from which procedures which were once considered solely within the domain of operative surgery, are now performed via an endoluminal approach.

General surgeons were generally slow to adopt gastrointestinal endoscopy into their practice. However, early endoscopic pioneers in general surgery saw the future and the importance that endoscopy would assume, understanding how it allowed general surgeons to provide more complete and efficient care to their patients. These pioneers, who included the Honoree of this Festschrift, were able to establish surgical endoscopy within their institutions, advocating that the hospitals resources were for the best care of patients and that "ownership" of resources did not belong to any one physician group.

In the 1990s, there was widespread adaptation of gastrointestinal endoscopy by general surgeons. They became a vital resource in small and remote hospitals where general surgeons provide the vast majority of endoscopic care. However, given the uneven uptake, there is much more variability in academic centers where gastroenterology presence is robust, and thus participation of general surgeons in gastrointestinal endoscopy is highly variable. In the 1990s the Royal College of Physicians and Surgeons of Canada added gastrointestinal endoscopy to the objectives of training for general surgery, and the CAGS Endoscopy Committee was formed. This has helped establish the legitimacy of general surgeons incorporating gastrointestinal endoscopy into their practices, and the importance of imparting these skills to all graduating general surgery residents. However, there has been criticism that we have provided less than ideal teaching, and that our determination of competence is not evidence based. General surgeons are commonly acknowledged to be technically proficient but lacking in other dimensions of quality. It is frequently pointed out that while gastrointestinal endoscopy can represent 40% of our practice, it represents 1% of our training and continuing medical education.

The new millennium can be considered as the "quality era" in gastrointestinal endoscopy. The volume of procedures has experienced massive growth, and the economic importance of gastrointestinal endoscopy in medical practice has similarly experienced major growth as well. As discussions of quality have increased, the quality questions surrounding general surgery have become more common place. General surgeons have responded appropriately. Program Directors and Canadian general surgery residents have acknowledged the concerns themselves, and have instituted changes in training to try to address these quality issues. Simultaneously, the Canadian Association of General Surgeons and other Professional Specialty Associations have taken up the challenge, advocating for appropriate quality measures, urging general surgeons to embrace the quality agenda, and increasing the options for continuing medical education in the field of gastrointestinal endoscopy. Importantly, they are advocating for a single quality standard regardless of the base medical specialty of an endoscopist, and that the standards be supported by appropriate evidence. This work is ongoing and will serve patients and the medical profession well if these important goals can be achieved.

Gastrointestinal endoscopy can be considered to have two important domains. The first is diagnostic capability. Advances in diagnostic capability have been mostly technology based. These have included the ability to image the entire gastrointestinal tract, the ability to understand involvement of deeper layers of GI organs, and the ability to have macroscopic and microscopic views of the pathologic lesions that are encountered. As the understanding of colon cancer biology and genetics has increased, screening colonoscopy has been responsible for a major part of the growth in the volume of gastrointestinal endoscopy. However, research into less invasive alternatives for the diagnosis of gastrointestinal pathology, and colorectal neoplasia in particular, is robust and some have theorized that it is possible (and highly likely) that the diagnostic role will diminish significantly in the future. Thus, it is important that general surgeons understand and embrace the therapeutic domain.

The early therapeutic range in gastrointestinal endoscopy involved polypectomy, followed by development of ERCP with removal of common bile duct stones and stenting of biliary obstruction. This was followed by treatments to control gastrointestinal bleeding, and placement of tubes into the gastrointestinal tract. Michael Sivak, at the end of his term as editor of the Journal of Gastrointestinal Endoscopy, published an article in Gut in 2006 in which he speculated on the future of gastrointestinal endoscopy. He expressed concern that innovation in gastrointestinal endoscopy was slowing, and quoted Yogi Berra "the future ain't what it used to be". He stated that for the future, the only certainty is that endoscopic innovation

is no longer assured. However, driven by the economics of technology, the enthusiasm for innovation, and the initially slow but subsequent rapid understanding of how endoscopic ultrasound could see beyond the lumen of the gastrointestinal tract, we have entered in to a new era of rapid expansion of the range of therapeutic procedures in gastrointestinal endoscopy. New procedures are being described with great regularity, and endoscopists have entered into the domains of treating calculus disease in the gallbladder and malignant diseases in the gastrointestinal tract, to name two of the areas which were previously solely within the domain of general surgeons. One could describe the current pace of development as "if you can do it with open or laparoscopic surgery, it can be done with an endoluminal approach". In many ways, this "endoscopic revolution" mirrors the laparoscopic revolution. This has raised some interesting questions that will need to be addressed as we progress into the future.

If we reflect on the history of procedural medicine, we understand that surgeons have evolved from purely technicians to comprehensive physicians with knowledge and skills centered around patient cohorts and disease processes, in order to provide proper care to patients. The whole development of formalized training has focused on the development of these comprehensive skills, indicating that we should have a thorough understanding of our patients and disease processes, not just the ability to use a technology. We have repeatedly reaffirmed the importance of foundational skills such as understanding of wound healing and the physiology of tissue injury. However, current directions might be interpreted as a return to the previous concept of proceduralists rather than comprehensive physicians. During the evolution of minimally invasive surgery, there was discussion as to whether those who had mastered the technology should be allowed to carry out procedures on patients even though they lacked comprehensive understanding of the disease processes they were treating. This notion was rejected by the surgical community at large and current practices reaffirmed the notion that we should provide comprehensive patient care. This concept is now being explored in flexible endoscopy. So-called therapeutic endoscopy fellowships focus on teaching of procedural skills, and many practitioners are again providing technical procedures across a very broad range of disease processes and patient cohorts. They are relying on others to provide the comprehensive patient care. As surgeons have become very involved in activities promoting multidisciplinary care, such as multidisciplinary case conferences (often willingly but sometimes because of external forces), we have once again reaffirmed our belief that we need to be more than technicians. This applies particularly in the domain of care of oncology patient's although clearly extends to most other patient cohorts as well. It therefore seems appropriate that, as the range of therapeutic endoscopy increases, we consider whether we should demand that practitioners have the same foundational skills, comprehensive understanding of disease, and participation in multidisciplinary care that we have repeatedly affirmed as the standard to which we aspire.

Another issue that will need to be addressed is whether there will be regionalization of complex procedures. As techniques evolve, the issue of volumes and outcomes will undoubtedly arise, and the same examination that has been applied to traditional surgical procedures will undoubtedly occur.

In summary, gastrointestinal endoscopy will continue to evolve. While the role in the diagnostic domain may contract, the variety of procedures to treat disease processes through endoluminal techniques will continue to expand. General surgeons are very well positioned to be both leaders in the development of these techniques as well as providers, because of our foundational skills and commitment to comprehensive patient care. As in all other domains, we must also embrace the quality agenda. This process will not be without challenges. The current fiscal environment for healthcare will certainly present resource challenges. Access to training in these advanced procedures is currently quite limited, and we must look to our surgical innovators to assist in creating opportunities. Another caution is a

somewhat disturbing trend of surgeons, especially in larger centers, indicating a desire to be involved in scheduled endoscopy procedures but not in emergency procedures. This could potentially limit our access to hospital resources, and is certainly not embracing our commitment to comprehensive patient care.

We should embrace diversity in providers but advocate that a single quality standard for both training and the provision of patient care exist. We should continue to advocate that foundational skills and comprehensive knowledge of patient cohorts and disease processes are required in addition to technical competency to provide the highest quality of care for patients. General surgery should embrace these challenges, as we have embraced all others in our long and proud history.

**Michael Marcaccio**

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## HEAD AND NECK SURGICAL ONCOLOGY

### Abstract

The management of head and neck cancer is complex as a consequence of the functional and cosmetic demands of treatment in this area and the rarity and heterogeneity of the disease. Significant changes in the practice of head and neck surgical oncology have been driven by technical advances, progress in the understanding of the disease, and a change in the epidemiology of head and neck cancer. The most significant paradigm shift in head and neck oncology practice has occurred in the management of advanced squamous cell carcinoma of the upper aerodigestive tract where concurrent radiation and chemotherapy has limited the role for surgery. The consequence of these changes is a procedural shift in head and neck surgery practice. Total laryngectomy is now an uncommon procedure and composite resections have decreased. Thyroidectomy and procedures for cutaneous malignancy have increased. The major factors shaping future change in practice will include a rapid escalation of our understanding of the biology of cancer and quality issues driven by economic considerations. The future head and neck surgical oncologist will continue to function as part of a multidisciplinary team where he/she should embrace a leadership role. Surgery will have an evolving role within the context of multidisciplinary treatment plans.

### Head and Neck Surgical Oncology

The discipline of head and neck surgical oncology (HNSO) encompasses a broad spectrum of pathology including tumours of the upper aerodigestive tract, benign and malignant thyroid and parathyroid pathology, salivary gland tumours, cutaneous malignancy and primary and secondary tumours of lymph nodes. There were 5450 tumours of the upper aerodigestive tract diagnosed in Canada last year representing 2.8% of new cancers in males and 1.7% in females. Approximately 50% of these patients presented with advanced disease. Sixty-three hundred new cases of thyroid cancer were responsible for 1.4% and 5% of new cases in males and females respectively.<sup>1</sup> The management of head and neck cancer is challenging as a consequence the rarity and heterogeneity of the disease, and the functional and cosmetic demands of treatment in this area.

The speciality of HNSO is relatively young. The Society of Head and Neck Surgery was established under the leadership of Hayes Martin in 1954 and was dominated by General Surgeons, most with additional training in surgical oncology. In 1958 Dr J Conley organized otolaryngologists interested in cancer surgery. A common mission to improve the care of head and neck cancer patients led to the amalgamation of the two societies with birth of the American Head and Neck Society (AHNS) in 1958.<sup>2</sup> Prior to this amalgamation the education committees of both societies, in 1977, established the Joint Council for Approval of Advanced Training in Head and Neck Oncologic Surgery and defined structured training programs in HNSO. The AHNS currently sponsors 35 head and neck surgery and oncology fellowship programs offering 50 training positions to otolaryngology, general and plastic surgery residents. There are 3 programs in Canada: Toronto, Edmonton and Winnipeg. The programs are site visited, approved, and reviewed by the Executive Council of the AHNS. Interest in the speciality has varied. The North American pool of candidates for 25 fellowship positions exceeded 80 in 1995. The pool declined to less than 10 candidates by 2004 with positions left unfilled.<sup>2</sup> The reasons cited for the declining interest included decreased interest from general surgery residents, otolaryngology residents pursuing more lucrative careers in facial plastic surgery, poor remuneration in general, and

insufficient patient volume.<sup>2,3</sup> The crisis seems to be over with the candidate pool and fellowship programs positioned to meet current needs.<sup>3</sup>

There have been significant changes in the practice of head and neck oncology over the last 20 years driven by technical advances in all aspects of care, improved understanding of the biology of cancer, and changes in the epidemiology of the practice. Notable technical advances in surgical management include the evolution of function preserving neck dissections selectively targeting areas of the neck likely to harbour metastases. An understanding of the mechanisms of tumour spread has expanded the use of mandible sparing procedures in the management of oral cancer. Options have evolved for resecting tumours that facilitate minimally invasive approaches. Transoral laser microsurgery (TLM) for early stage laryngeal cancer, robotic surgery (TORS) for selected oropharyngeal cancers, and image guided approaches to parathyroidectomy are examples. There have been dramatic advances in the delivery of radiation to head and neck tumours reflecting the use of computer planning with advanced data processing capabilities. These advances include conformal radiation, intensity modulated radiation and image guided radiotherapy.

The most significant paradigm shift in the management of head and neck cancer has been the integration of chemotherapy into multimodality treatment plans. The Veteran Affairs Laryngeal Cancer Study Group Trial published in 1991 compared induction chemotherapy followed by radiation therapy in responders to primary treatment with laryngectomy. The results showed that a functional larynx could be preserved in almost two thirds of patients without a decrease in survival.<sup>4</sup> The integration of chemotherapy with radiation, usually in a concurrent fashion, has become widely accepted as the primary treatment for advanced tumours of the larynx, oropharynx, hypopharynx and nasopharynx.

The epidemiology of head and neck cancer has changed. There has been a rapid increase in HPV-associated oropharyngeal cancer and a decline in the incidence of tobacco and alcohol related cancers. This patient population tends to be younger and healthier. HPV related tumours respond well to radiation and are associated with a better prognosis than tobacco and alcohol related tumours.<sup>5</sup> There has been a decrease in laryngeal cancer and increases in thyroid cancer and cutaneous malignancies over the last two decades.<sup>1</sup>

The consequence of these technical, biologic and epidemiologic shifts is a procedural change in head and neck surgery practice. Total laryngectomy is now an uncommon procedure. Composite resections have decreased. Thyroid surgery and procedures for cutaneous malignancy have increased significantly. The number of neck dissections has actually increased as a result of the increase in thyroid cancer and cutaneous malignancy

In my opinion the changes we will see in the next 5 years will meet or exceed those observed over the last 20 years. The speciality will continue to grow and present new challenges. Major factors driving change will be economic considerations and a rapid escalation of our understanding of the biology of cancer. Spending on health care consumes the largest, and an increasing part of provincial budgets. Most health care economists question the viability of the current system. The surgical community will need to actively address the longstanding and well documented quality issues such as practice variation and process inefficiency that exist and increase cost. The future of cancer prevention and treatment is at the genomic/molecular level. The feasibility of large-scale genomic analysis of patient tumors is approaching attainability.<sup>6</sup> Optimal treatment strategies will involve a multi-faceted approach tailored to the genomic make-up of the tumour combining immune checkpoint therapies, cancer vaccines, cytotoxic

agents, and molecularly targeted treatment. These regimes will be combined with surgery and/or radiation therapy in the context of multimodality treatment plans.

The head and neck surgical oncologist will continue to work as part of a multidisciplinary team including radiation and medical oncologists, oncology nursing, physician assistants, speech language pathologists, maxillofacial prosthodontists and others. The head and neck surgeon of the future will likely have further subspecialty training as appropriate to the need of the centre. Recognized subspecialties currently include thyroid and endocrine surgery, reconstruction/microvascular surgery and skull base surgery. The head and neck surgical oncologist will continue to be the first specialist the patient will see, establish the diagnosis in most, and initiate the staging investigations. He/she will participate in treatment planning with the multidisciplinary team. A role for surgery will be defined within the context of a multidisciplinary treatment plan.

How do we optimize care for the head and cancer patient in Canada? I would envision a tiered model coordinated by the multidisciplinary team working from a designated comprehensive cancer care centre. The head and neck surgical oncologist would play a pivotal role in leadership, education, research and quality issues in this model. Primary care providers should be able to recognize head and neck pathology and initiate an appropriate diagnostic approach which will often involve referral to a specialist. Regional centers/ community hospitals with general surgery and otolaryngology services, using standards set by the cancer centers, should be able to manage diagnostic procedures including a thorough evaluation of the head and neck and appropriate biopsies, lymph node biopsies as necessary for lymphoma diagnosis and treatment, surgical management of benign head and neck lesions, and depending on interest and volume, thyroid and endocrine surgery. Complex cases, including most patients with suspected or proven malignant processes of the upper aerodigestive tract, are best managed through the multidisciplinary clinics at regional cancer centres. In my opinion a complement of 4 Head and Neck Surgical Oncologists per one million population would be a reasonable estimate for resource planning in Canada.

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## **REFLECTIONS FROM THE CANADIAN ROYAL COLLEGE OF SURGEONS GENERAL SURGERY EXAMINATION BOARD**

I have been a member of the examination board for general surgery for the past thirteen years, and have participated in the transformation of the exam board into its current format. In Canada, residents must pass the Royal College examination to enter surgical practice. The examination typically occurs in the last month of residency training, and is offered in English and French. The examination consists of a two day written multiple choice examination followed by a standardized oral OSCE exam one month later. The examinations are high stakes summative exams that are offered once per year. Without certification from passing these examinations residents cannot enter surgical practice and typically would perform additional training before retaking examinations the following year. The examinations are a compensatory exam, meaning the written and oral exam marks are added together to arrive at the final mark. In the past residents were required to pass the written exam before being allowed to take the oral examination.

A unique feature of the Royal college examination boards is that residents who take the exams are determined to have passed the exams, failed the exams or are placed in borderline category. Borderline candidates have failed the examination, but are very close to the pass cut off mark. The borderline category is determined before the exam by a grid created by the statisticians that provide psychometric support for the exam board. Typically the borderline candidates are within 0.5-1% of the pass mark. The borderline candidates are then discussed by the entire 40 surgeon examination board. The written exam, oral exam and the resident's final in service training evaluation (FITER) by their program director are considered. The board then votes to pass or fail the candidate. The Royal College of Physicians and Surgeons of Canada also have a severe failure category. If a candidate fails so badly that they are placed in this category, the candidate would be mandated to obtain additional residency training before being allowed to retake the examination.

The Examination Board has two subcommittees, the written and oral examination test committees who have the task of creating the examination questions. The test committees are supported by the education unit of the Royal College, which we rely on heavily to provide psychometric analysis of past examinations and question performance. They play a key role in ensuring reliability and validity of the examination. Once the MCQ questions are developed and edited, they are reviewed in an answerless fashion by an external member of the board who did not participate in question development. The purpose of this review eliminate as much ambiguity as possible from the questions. A major challenge facing our exam board, as well as examination boarder around the world, is the presence of a very robust resident created ghost banks of questions on prior examinations. The Canadian general surgical ghost bank is updated within hours of every exam and accurately reproduces the questions. The bank is maintained on a password protected web site.

**Ward Davies**

*Chairman of the examination board*

## **THE ROYAL COLLEGE MAINTENANCE OF CERTIFICATION (MOC) PROGRAM: FACILITATING A CULTURE OF LIFELONG LEARNING AND CONTINUOUS IMPROVEMENT FROM 1975 UNTIL THE PRESENT**

The Royal College of Physicians and Surgeons of Canada was founded in 1929 with a mandate to oversee postgraduate medical education in Canada. Since 1975, the Royal College's mandate has expanded to include promoting and supporting the lifelong learning of specialist physicians in active practice.

The following presentation:

- Describes the evolution of the Royal College Maintenance of Certification Program (MOC);
- Discusses the educational principles underpinning the Program;
- Describes the current function of the Program;
- Describes the future direction of the Program.

In the mid-1970s, the Royal College voted against a proposal for mandatory recertification in favour of a system of support for continuing medical education of specialists in affiliation with the National Specialty Societies (NSSs). From 1975–1985, the Royal College focused on promoting programs which ensured a system of continuous professional development in daily practice.

In 1986, the Communications, Publications and Continuing Medical Education Committee (CPCME) expressed the need for a more formal system of promoting continued learning in a changing practice environment. This resulted in a resolution passed by the Royal College Council in 1988 directing the Royal College to establish a system to facilitate the maintenance of competence of specialists. In 1991 a voluntary Maintenance of Competence (MOCOMP) program started as a pilot project.

In 1994 MOCOMP became a formal program of the Royal College. The initial goal of this program was to set standards in the use of effective and innovative methods in CME while supporting the concept of lifelong learning. The focus evolved from teacher-driven CME primarily promoting the medical expert role towards the concept of continuing professional development (CPD). In CPD, activities became individualized and related to defined competencies relevant to not only the medical expert role but also the non-medical expert CanMEDS roles, which had recently been defined. The focus shifted to behaviour change and practice improvement related to defined competencies.

The system encouraged practice-based learning projects, self-assessment programs, as well as performance and outcome assessment. The Royal College engaged in educational research related to these new education formats. The MOCOMP program provided an innovative framework and credit system, set standards for self-directed professional development, and provided a means of recording learning activities in either paper or electronic format.

However, uptake by the membership only approached 30%. The public and provincial licensing bodies were demanding accountability and transparency in the promotion of competence of specialists. Following multiple reviews, in 1999 the Royal College changed its bylaws to require participation in a mandatory "Maintenance of Certification (MOC) Program". Participation would be required to maintain

membership and use the Fellowship designation. Over the next three years, the mandatory MOC system was developed.

The MOC Program evolved in phases of approximately five years each. The Implementation phase extended from 2001–2005. Components included a six-section CPD framework and credit system, an accreditation system for CPD events, an ePortfolio, and a MOC Program evaluation strategy, as well as related research and scholarship.

Phase 2, the Program Enhancement Phase, extended from 2006–2010. During this time, the Program was further developed and refined with feedback from participants. The initial MOC Program evaluation strategy was launched.

During Phase 3, the Program Revision Phase from 2011–present, multiple refinements were made. The CPD framework was revised from six to three sections. Activities were divided into group learning, self-learning, and assessment activities. Self-learning and assessment activities were encouraged by providing two credits per hour for self-learning activities and three credits per hour for assessment activities. A support program was provided through the Royal College Services Centre and regional CPD Educators. An improved electronic portfolio, the MAINPORT ePortfolio, was launched to provide an enhanced electronic framework for reporting, recording, and documenting the various learning activities. The MAINPORT ePortfolio was also designed to improve reflection and documentation of outcomes. A MOC Program evaluation strategy was launched focusing on how well the changes implemented addressed initial concerns of Fellows.

The Royal College MOC Program has been guided by a number of educational principles as enumerated in Table 1.<sup>1</sup>

Currently, requirements for participation follow a set of rules. There is a 5-year cycle during which a minimum of 40 credits per year must be claimed. A minimum of 400 credits are necessary to complete a 5-year cycle and a minimum of 25 credits must be obtained in each section for cycles starting on or after January 1, 2014. Activities can be easily documented using the enhanced MAINPORT ePortfolio.

CPD credits are divided into 3 sections as outlined in Table 2.<sup>2</sup>

Section 1 includes group learning activities which may be accredited or non-accredited. Non-accredited activities can be claimed for 0.5 credits per hour, whereas accredited group learning activities are eligible for 1 credit per hour.

The self-learning activities in Section 2 are divided into 3 categories: planned learning, scanning, and systems learning. Planned learning activities, such as personal learning projects, can be claimed for 2 credits per hour. Scanning and systems learning are eligible for credit as noted in Table 2.<sup>2</sup>

Section 3 assessment activities can be claimed for 3 credits per hour. They include accredited self-assessment programs and accredited simulation activities. Performance review and outcomes assessment are valued and encouraged.

The MAINPORT ePortfolio is designed to be user friendly and to facilitate the recording of these various learning activities.

## The Future

The Royal College of Physicians and Surgeons is currently developing a system of competency-based education entitled Competence by Design (CBD). This represents a transformational change in medical education for specialist physicians in Canada.

Competence by Design will focus on the competencies required across the continuum of medical practice from entry into specialty training through residency, entry into practice and retirement from practice. Competency-based education asks “How do specialists progress in competence to obtain expertise?” The competency-based model for CPD will focus less on the participation in learning activities ‘for credit’ and more on outcomes achieved for practice. There will be a focus on continuous learning, assessment and improvement of individuals and teams.

There is a need for culture change to focus on enhancing competence, performance and patient outcomes. The context will remain one’s scope of practice rather than a broader specialty as is assessed in recertification programs. Content of the continuous learning program should be based on best evidence. The learning will continue to focus on and integrate formal learning, self-planned learning, and assessment activities. The ultimate goal and belief is that a system of competency-based CPD will result in improvement in quality of care, patient outcomes and safety.

TABLE 1. The Royal College MOC Program Educational Principles (revised May 2011)

Principle	Description
Personal	Each specialist is responsible to develop a personal continuing professional development plan that is relevant to their professional scope of practice.
Needs-based	Each specialist’s CPD plan should be based on their perceived and unperceived needs.
Choice	Specialists have the ability to choose learning activities that will address their identified professional practice needs.
Reflection	Specialists should critically think about and learn from their practice experiences.
Continuous improvement	Specialists are expected to continuously engage in learning activities that result in improvements to knowledge, competence, performance and health of patients.
Competency-based	Engagement in CPD activities and the outcomes achieved for practice should reflect and sustain the competencies required for practice.
Interprofessional	Learning with and from participation in interprofessional health teams, groups or communities of practice.
Evidence-informed	Specialist must base their decisions or conclusions on the best available evidence.
Systems-based	Participate in learning activities that enhance the quality and safety of the health systems within which physicians work.

## Framework of Continuing Professional Development Activities

SECTIONS	CATEGORY	EXAMPLES	CREDIT RATING
Section 1: Group learning	<b>Accredited group learning activities</b> Conferences, rounds, journal clubs or small-group activities that adhere to Royal College standards. Accredited group learning activities can occur face-to-face or online.	<ul style="list-style-type: none"> <li>Accredited rounds, journal clubs, small groups</li> <li>Accredited conferences</li> </ul>	1 credit per hour
	<b>Unaccredited group learning activities</b> Rounds, journal clubs, small-group activities or conferences that have not been submitted for accreditation and have no industry sponsorship.	<ul style="list-style-type: none"> <li>Unaccredited rounds, journal clubs, small groups or conferences</li> </ul>	0.5 credits per hour (maximum of 50 credits per cycle)
Section 2: Self-learning	<b>Planned learning</b> Learning activities initiated by a physician (independently or in collaboration with peers or mentors) to address a need, problem, issue or goal relevant to their professional practice.	<ul style="list-style-type: none"> <li>Fellowships</li> <li>Formal courses</li> <li>Personal learning projects</li> <li>Traineeships</li> </ul>	100 credits per year 25 credits per course 2 credits per hour 2 credits per hour
	<b>Scanning</b> Learning activities used by a physician to enhance their awareness of new evidence, perspectives or discoveries that are potentially relevant to their professional practice.	<ul style="list-style-type: none"> <li>Reading a book</li> <li>Reading a book chapter</li> <li>Reading a journal volume</li> <li>Reading a journal article</li> <li>Bulk journal reading with transcript</li> <li>Bulk online reading/scanning with transcript</li> <li>Podcasts, audio, video</li> <li>Internet searching (Medscape, UpToDate, DynaMed)</li> <li>POEMs</li> </ul>	10 credits per book 2 credits per chapter 2 credits per volume 1 credit per article 1 credit per article 1 credit per hour 0.5 credits per activity 0.5 credits per activity 0.25 credits per activity
	<b>Systems learning</b> Learning stimulated by participation in activities such as setting practice standards, patient safety, continuous quality improvement; curriculum development; assessment tools and strategy development; examination board membership; or peer review.	<ul style="list-style-type: none"> <li>Clinical practice guideline development</li> <li>Quality care/patient safety committee</li> <li>Curriculum development</li> <li>Examination development</li> <li>Peer review</li> </ul>	20 credits per year 15 credits per year 15 credits per year 15 credits per year 15 credits per year
Section 3: Assessment	<b>Knowledge assessment</b> Programs approved by Royal College accredited CPD provider organizations that provide data with feedback to individual physicians regarding their current knowledge base, enabling the identification of needs and development of future learning opportunities relevant to their practice.	<ul style="list-style-type: none"> <li>Accredited self-assessment programs</li> </ul>	All assessment activities are 3 credits per hour
	<b>Performance assessment</b> Activities that provide data with feedback to individual physicians, groups or interprofessional health teams related to their personal or collective performance across a broad range of professional practice domains. Performance assessment activities can occur in a simulated or actual practice environment.	<ul style="list-style-type: none"> <li>Accredited simulation activities</li> <li>Chart audit and feedback</li> <li>Multi-source feedback</li> <li>Direct observation</li> <li>Feedback on teaching</li> <li>Annual performance review</li> <li>Practice assessments</li> </ul>	

This table summarizes the learning sections under the MOC Program framework. Activities submitted via MAINPORT ePortfolio are automatically converted into credits.

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## THOUGHTS ON THE ORIGINS OF HPB SURGERY

### Summary

The innovations and contributions that were essential to establishing HPB surgery as a discipline can be traced to the decade of the 1970s. Fibre endoscopy and imaging provided by ERCP and computerized axial tomography dramatically impacted the surgical approaches to biliary and pancreatic disease. Surgery on the pancreas in particular benefitted from the introduction of parenteral nutrition and advances in the understanding and management of shock and sepsis. Jaundiced patients gravitated to surgeons and institutions with the expertise to accurately diagnose and effectively treat their problems. Liver surgery came of age during the 1970s on two fronts: hepatic transplantation was transformed from a risky, experimental procedure into a common and highly successful operation by the discovery of the immunosuppressive effect of cyclosporine; and liver resection became a common, worthwhile and safe operation for many indications after convincing evidence of its curative potential for hepatic colorectal metastases was demonstrated. Numerous societies eventually formed, dedicated to addressing the needs of patients with hepatic, pancreatic and biliary disease.

It is a special pleasure to contribute to the festschrift for Roger Keith, whose outstanding career is cause for celebration. He excelled in academics, leadership, and education. Through his roles as co-editor of the Canadian Journal of Surgery and chair of the examination committee of the Royal College of Physicians and Surgeons of Canada, he elevated the practice of surgery in this country. His appointment to the highest offices in learned societies, most notably the Presidencies of the Central Surgical Association and the Canadian Association of General Surgeons, attests to the breadth and depth of his contributions and to how highly regarded he is by his colleagues.

It was during the decade of the 1970s that Roger completed his residency, undertook additional fellowship training (biliary, pancreatic and hepatic) at centres in the United States and overseas and then embarked on his career in right upper quadrant surgery. It would be another twenty years however – the 1990s – before HPB surgery became officially recognized as a specialty, with the formation of societies, journals and training dedicated to this discipline. The evolution was long, but I believe that the fundamental contributions that would establish HPB surgery as a specialty can be traced to the 1970s, when Roger was completing his training and starting his practice. I wish to reflect on some of those developments, which occurred during a particularly noteworthy decade in general surgery.

Cholecystectomy had been around for almost one hundred years of course and it was the staple of general surgery. But when common duct injuries occurred or rare and difficult biliary pathologies were encountered such as choledochal cysts and Klatskin tumors, patients with those problems found their way to surgeons who were not only developing a primary interest in biliary surgery but also establishing reputations for themselves and their institutions for dealing with biliary tract disease. Two examples were Rodney Smith at St. George's Hospital and William Longmire at UCLA, both of whom Roger trained with in 1972-73. The introduction fibre endoscopy a few years earlier in 1970 was revolutionary to upper gastrointestinal disease and it was as beneficial to biliary and pancreatic disease as it was to any other condition (1). The ability to cannulate and visualize radiographically the pancreatic and common ducts via the scope (ERCP) would ultimately transform the management of patients with jaundice. "Exploratory laparotomy for jaundice", booked with the understanding that what the surgeon would find

and do was not known preoperatively, disappeared from operating room lists. These developments and the common interests of furthering the understanding and treatment of biliary disease stimulated a small international group of surgeons to form the International Biliary Association (IBA) in 1978 (2). Ron Tompkins was the society's first president. Although dominated by surgeons, the society included gastroenterologists, radiologists and endoscopists. Roger Keith chaired the local arrangements committee at the IBA's annual meeting in Toronto in 1989.

Although the pancreas was not featured in the IBA's name or logo, it was in reality included for study by the society. Operations on the pancreas were not new but they were not common. The high operative mortality of pancreaticoduodenectomy combined with its poor curative potential for pancreatic head cancers made this challenging operation of questionable value in the minds of many. Fibreduodenoscopy allowed early identification of ampullary tumors that had a far more favourable cure rate by a Whipple's procedure. They justified the risk of such a radical operation and kept surgeons searching for the more ideal tumors. Pancreatic leaks were the main source of morbidity and mortality. They were not solved by technical modifications, but they were made manageable and their mortality was reduced by three developments that were rapidly and widely applied clinically in the 1970s – parenteral nutrition, elucidation of the pathophysiology of shock and its treatment, and cross-sectional imaging (3,4,5,6). Ill patients with pancreatic leaks after surgery could be rescued by intravenous feeding, management of sepsis and timely intervention as indicated by findings demonstrated on abdominal imaging. CT scans provided accurate preoperative and postoperative diagnoses and were of enormous benefit to the management of sick patients with pancreatitis and its complications. Roger Keith's numerous publications on the spectrum of pancreatic disorders and their surgical approaches reflected this progress and the fact that operations on the pancreas were safest in experienced hands.

The liver was the last of the HPB trio to join the ranks of frequently performed and worthwhile surgery. The 1970s were the halcyon years of shunts for portal hypertension. Proponents of portocaval, splenorenal, and mesocaval shunts and the distal splenorenal (Warren) shunt participated in vigorous debates on the merits of each at national and international meetings. But no shunt could overcome the fate dictated by end-stage cirrhosis. Liver replacement was the only definitive solution. In 1976, Tom Starzl published the results of liver transplantation in 93 patients (7). He dutifully recorded in great detail the technical challenges of this formidable operation, its complications and mortality. The results led John Najarian to state in his review of the experience "...whether the technique has application in other hands than those of the pioneer is debatable" (8). In 1977, Sir Roy Calne, (under whom it was my good fortune to train) reported the Cambridge results in 64 patients (9). He also detailed the surgical obstacles and the excessively high rate of complications, but both experiences proved that success was possible although only for a minority of patients. The pioneers were rewarded by the discovery of the immunosuppressive effects of cyclosporine in 1976 (10). Its clinical introduction by Calne in 1978 was the quantum leap that transformed all of organ transplantation, including the liver (11). Rejection was controlled, and surgeons could concentrate on the technical challenges of an operation that had no margin for error. Dedicated anaesthesiologists were aided by the development of pulmonary artery pressure monitoring, a major advance in managing the hemodynamic changes during this difficult surgery (12). Surgical techniques were refined and mastered by hundreds of surgeons who sought training and established liver transplant programs throughout the world. The surgical approaches described by Starzl and Calne in the 1970s were the foundation upon which all subsequent methods were based.

Hepatic resection developed separately from but at the same time as liver grafting in the 1970s. Liver resections were well-described in the literature but they were uncommon, the indications were very few,

and the risks of troublesome or life-threatening bleeding were high. The basic anatomy of the liver was known, but that knowledge did not lessen the challenge of dividing a blood-filled organ with essentially no preoperative images as guides. The best images of the liver were radio-labeled scans and angiograms, which were very poor at defining focal lesions. That all changed in the 1970s for two reasons. Martin Adson at the Mayo Clinic reported his experience with resection of hepatic colorectal metastases in 1976 (13). He documented a 5-year survival rate of 28%. For patients with solitary metastases, the 5-year survival rate was 42%. This experience provided convincing and conclusive evidence for the curative role of surgery for these otherwise incurable cancers. Large numbers of patients became candidates for liver resection. The need for accurate identification of favourable liver deposits was provided by the simultaneous development of cross-sectional imaging (5,6). Prophetically, Adson stated in the final paragraph in his seminal publication: “Recent experience with computerized tomography gives us hope that the selection of truly solitary metastases may increase the relevance of this study”. CT scans rapidly became the standard for characterizing liver lesions and providing anatomically precise images. In response, surgeons developed the methods to make hepatic resection safe and widely applicable for many benign and malignant lesions.

Following the 1970s, the avalanche of activity in both liver transplantation and resection firmly established the “H” in HPB surgery. Maturation of the field of liver transplantation and the proliferation of transplant centres led to the formation of the International Liver Transplantation Society (ILTS) in 1990. Its core mandate was to raise liver transplantation worldwide to as high a level as possible (14). True to its origins, it was composed of surgeons, anaesthesiologists/intensivists and hepatologists in almost equal numbers, attesting to the essential roles of each in patient management. Its multidisciplinary membership also included pathologists, paediatricians and infectious disease experts. When its official journal was first published in 1995, it was called *Liver Transplantation and Surgery*. It was an attempt to include the burgeoning activity in non-transplant hepatic surgery. But practically it was not a good fit, and the journal was renamed *Liver Transplantation* in 2000. The Canadian Liver Transplant Study Group was formed in 1993, mainly to address the practical aspects of organ sharing and common listing criteria. Its composition includes hepatologists, surgeons and representatives from organ procurement agencies.

At the same time that the ILTS was becoming established, the IBA was changing to the International Hepato-Pancreato-Biliary Association (IHPBA), widening its scope to formally include the pancreas and liver. Roger served on the Council of the expanded society. The World Association of HPB Surgeons (formed about 1986) merged with the new organization under the IHPBA name in 1994. Its official journal, *HPB*, was established in 1999 (15). There are European and Asian HPB societies, and many regional and national “chapters” of the IHPBA. In Canada, the CHPBA was established in 2008. The Presidents are listed in Table 1. Elijah Dixon, the third president, also served as president of the American HPBA. The membership of different HPB societies varies. Hepatic malignancy is perhaps the most obvious subject that is a central interest of both transplant and non-transplant HPB surgeons, and why liver transplantation is a standard section on the program at the annual meetings of the IHPBA.

Progress in HPB surgery since the 1970s has been remarkable. Some operations that were common then are now infrequently performed or of historical significance. Examples include common duct exploration, transduodenal sphincteroplasty, portasystemic shunts and palliative bilioenteric bypass. They have largely been replaced by endoscopic procedures, often performed by non-surgeons. Conversely, operations that were uncommon then and seemed to have limited application or questionable future are now frequent and routine. Hundreds of thousands of patients have benefitted from them. They include pancreatic resection for a wide variety of benign and malignant conditions;

liver transplantation, which has expanded to include segmental transplants and living donors; and many types of hepatic resection – anatomic, non-anatomic, single, multiple, staged, combined with ablation, etc. Minimally invasive HPB surgery is the most recent and entirely new chapter, a modern way of doing old operations. But the essential elements that would establish HPB surgery as a discipline can largely be traced to the 1970s, when Roger Keith and like-minded surgeons were motivated to solve the problems of patients with diseases of the liver, pancreas and biliary tract.

TABLE 1. Presidents of the CHPBA

2008-2010	Mike Maraccio
2010-2012	Francis Sutherland
2012-2014	Elijah Dixon
2014-2016	Sean Cleary
2016-2018	Shiva Jayaraman

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## **A CIVILIAN SURGEON'S EXPERIENCE IN THE ROLE 3 MULTINATIONAL MEDICAL UNIT AT KANDAHAR AIRFIELD AUGUST-SEPTEMBER 2008**

### **Getting there**

At ten and a half time zones away, Kandahar Airfield is literally half a world away. Departing on a Friday evening from Calgary, overnight through Frankfurt, the first blast of Middle Eastern heat hit as the door to the plane was opened at Dubai International Airport. It was a few minutes into Sunday morning, the temperature was 41 C, and the humidity was 100 percent. Getting through immigration with the 'secret phrase' that none of the immigration officers knew was an adventure, matched only by navigating the mass of humanity on the arrivals level to find the café rendezvous, and the Canadian with a clipboard that had a Canadian Flag on it. Ultimately a 30-minute van ride got us to Camp Mirage and a bed. After a few hours of sleep and a good military breakfast, orders were issued indicating our departure at 0500 the next day for Kandahar Airfield (KAF).

The flight from Camp Mirage to Kandahar Airfield was three and a half hours on board a Canadian Armed Forces Hercules C-130; the last 20 minutes involved wearing personal protective equipment (PPE) – helmet, vest with heavy ceramic plates front and back, and anti-frag glasses. Departing the plane at KAF one was immediately struck by the noise, the heat and the low humidity. Met by Andy Kirkpatrick MD FRCSC (who I was replacing) and Marc Thibert MD FRCSC, we went immediately to the base hospital – the plywood palace - which consisted of 16 beds (5 ICU); 2 operating theatres; a fully functioning lab complete with a blood bank and a “walking blood bank”; a 16-slice CT scanner; and, angiographic capability.

### **The Role 3 Multinational Medical Unit**

The hospital – officially The Role 3 Multinational Medical Unit (Role 3 MMU) - was capable of tertiary care. Its mandate was to care for ISAF Coalition personnel as its first priority. Secondly, it was charged with caring for Afghan National Army and Afghan National Police Force personnel. Finally, where resources permitted, the hospital was allowed to care for Afghan civilians who were victims of the conflict.

The Canadian Forces Medical Service (CFMS) assumed command of the Role 3 MMU in 2006. What made the experience at the Role 3 so unique were the people. It was staffed with a variable component of Canadian “reg force” personnel, which were complemented by civilian professionals from all over the world. Despite the environment and the limited resources, what I observed and continue to hold in such high regard these many years later is the professionalism and commitment of everyone who was part of the mission. I never knew what accent would be spoken when doing rounds – Aussie-English, French-English, Danish-English, German-English or just plain Canadian-English. The esprit de corps and commitment to the patient was truly outstanding.

During my month on the service, the team established new records for the number of admissions and surgical procedures (131 procedures in 30 days). About 80 percent of the patients were Afghans, of which half were civilians. The last 20 percent were ISAF Coalition Forces. Patients came in singles and in groups. The largest mass casualty during the month was 14; it was not unusual to have 5 or 6 patients arrive at once. Coalition Forces generally arrived by US Marine helicopters from the combat zone in the Panjwai, about 35-40 minutes flying time away. Afghans arrived either via their own military/police

transport, or by car at the gate to the airfield. In the case of Afghan civilians, if there was space the patient was taken in. If the patient was suspected of being Taliban, they were blindfolded to protect the Afghan civilians who were working on the base and in the hospital.

The surgical side of the Role 3 ran as two teams, one Canadian and the other Danish. Each team consisted of a general surgeon, an orthopedic surgeon and an anesthesiologist. The general surgeon assisted the orthopedic surgeon and vice versa. In addition there was an intensivist, a neurosurgeon, a radiologist and a plastic surgeon on the team. While the call was ostensibly one in two, in fact when Canadian personnel were involved, the Canadian team was always on call. Because the trauma experience varied amongst the surgical teams, often the Danes would scrub with the Canadian team.

In addition to the hospital, there was an active primary care unit, staffed by medical personnel from all of the ISAF coalition countries who were there in support of the 12,500 people in KAF. Most of these were family physicians or emergency physicians, although the Americans also used physician assistants. In addition to staffing daily clinics, they took call to cover the emergency department of the Role 3. There was the occasional patient with acute appendicitis or other surgical needs that required surgery. Towards the end of my time in KAF, a British contractor had a serious cardiac event that created a real problem for the intensivist – ultimately the patient was transferred by civilian air ambulance back to Britain.

The incoming wounded were triaged by the officer in charge of the hospital and then as appropriate, taken to a resuscitation bay, of which there were eight. The general duty medical officers each managed a patient; the general surgery, orthopedic and anesthesiology consultants assessed them as required and prioritized the investigations and the need for surgery. For the ISAF troops arriving by US Marine helicopter, there was accurate field triage and lead-time to assemble. Afghan National Army and Police personnel arrived in a variety of ways; occasionally accompanied by American military personnel. As the Taliban became more aggressive with ambushes, suicide vests and roadside bombs, the Role 3 took in more and more civilian casualties – often in multiples. On one Sunday in early September, the Taliban sent suicide bombers into a polio clinic run by the World Health Organization (WHO), successfully murdering the two physicians and resulting in six badly injured patients being transferred to the Role 3.

There was a wide range of injuries across the spectrum of patients that were dealt with, including low and high velocity gunshot wounds; penetrating injuries from rocket propelled grenades and shrapnel; blast injuries from improvised explosive devices deployed either as a roadside bomb or by suicide vest – the latter loaded with ball bearings and small screws to magnify the anti-personnel effect. The roadside bombs were very powerful; large enough to flip a LAV III personnel carrier that when loaded for combat weighs about 17,000 kgs. The energy transmission to the human body of such blasts caused extensive damage at the cellular and micro-circulatory level, as well as traumatic amputations and a host of other injuries. All wounds were considered dirty so aggressive debridement and wound lavage was routine, often on multiple occasions to permit traumatic scrubbing, as well as a re-look for evidence of tissue necrosis.

The Afghan as a patient was generally smaller and much thinner than the North American average. Obesity was not an issue in Afghanistan. They did not have the personal protective equipment of the coalition troops and were much more vulnerable. The general population was malnourished, so they tended to have a mild coagulopathy due to a vitamin K deficiency. The PT INR was generally in the range of 1.5. Packed cells that were shipped from Europe were available, as were all the other blood products in component form. However, a ‘walking blood bank’ was available for mass casualty and

massive transfusion situations. All military personnel were available to donate blood on request. The walking blood bank was mobilized four times during my deployment to KAF. There is no fluid that comes close to warm fresh whole blood as a resuscitation fluid.

### **Life in Kandahar Airfield**

The daily routine consisted of getting up before 0700, then going to one of three mess halls for a wholesome breakfast. As a general rule our team chose to go to the American mess hall for breakfasts and lunches; dinners were usually at the British mess hall. Armed guards secured the mess halls and one could not get in without the appropriate pass. Because of fears of Norwalk virus, everyone was observed as they washed on entry and all meals were eaten with plastic cutlery and disposable dishes. Once inside, the cafeteria style set up was quick and efficient. All of the food was prepared off-site. One of the unique features of dining in KAF was the ever-present automatic combat rifle and/or side arm that all military personnel were required to have with them. It took some getting used to as these rifles were often placed on the floor on their tripod, pointing at you. After breakfast the first stop was Green Beans Cafe, an American franchise on bases around the world. They served superb espresso coffees and were located adjacent to the hospital. While there was a Tim Horton's on the base, the line-ups were long, it was a distance away and the coffee was not nearly as good.

After making rounds on my own patients in the ICU and on the ward, daily at 0930 there was an all staff meeting where the treatment and disposition plans for every patient were quickly reviewed. This briefing also included confidential information on troop activities and whatever intelligence had been gathered about Taliban activity. Upon completion of the briefing, an almost everyday occurrence was urgent secondary surgery of some type for debridement, second look laparotomies, removal of packs etc. With two operating rooms and two teams of surgeons, this work was done efficiently and generally before lunch. The afternoons consisted of documentation, attending clinics for surgery consultation (morning or afternoon), and there were regular trauma case rounds – done via a telephone link to the American Hospital in Baghdad, Brooke Army Hospital in San Antonio, Bagram Air Base near Kabul and Landstuhl Air Base in Germany.

Free afternoons and evenings were spent in a variety of ways. The level of dust in the air limited outdoor activities; and some dust storms were severe enough to ground all aircraft. Getting around KAF was done by bicycle, notorious for chains and pedals falling off. On good days, exploring the base by bicycle was possible; jogging was also a common form of exercise, although one had to carefully stay on the jogging paths for fear of wandering into Soviet era minefields that were generally well marked. Canada House had giant TV screens available for viewing. There was lots of sporting news from the Beijing Olympics, which was a refreshing change from the meltdown of the financial markets during the sub-prime mortgage crisis. Canada also had a fantastic gym adjacent to Canada House. It was a great place for a strenuous workout and was very well used. Movie nights were a common occurrence, choosing from a moderately good selection.

Kandahar Airfield is at 1015 meters elevation. The climate is harsh with daytime temperatures into the 40's in late August and early September. It did cool off at night due to the low humidity. Because of the low humidity one had to consume endless amounts of bottled water. Fridges were placed everywhere around camp, with pallets of bottled water always nearby to refill an empty fridge. Unfortunately the water did not taste all that good, especially the Oasis brand. Having sat out in the heat for some time before being consumed, the water assumed the taste of plastic. Even chilled, the plastic flavor came

through. There was no alcohol permitted in KAF, except on very special occasions when beer rations would be provided; a perk I got to enjoy on one occasion.

## **The War**

Canada had 159 combat fatalities, both men and women, during the Afghan Mission. Seven of those deaths occurred while I was on the base – I attended three ramp ceremonies, as on two occasions multiple fatalities were involved. The ramp ceremonies were very moving - more so because on one occasion I knew one of the victims. The ceremony began with the coalition forces parading onto the tarmac at the airfield. The coffins were then driven out on a LAV, one for each soldier. A few words were said about each before calling the parade to attention. At this point the coffin was slow marched to the bagpipes onto the waiting Hercules C-130; a scene all too familiar on our national nightly news.

The mechanism of death during the Afghan War was predominantly a blast injury, accounting for 81% of Canadian troop mortality 2006-2008. The average age was 29 years. The commonest cause of death was hemorrhage, followed by neurologic injury (Pannell D et al., 2011; Eastridge BJ et al., 2012). The in-hospital survival rate at the Role 3 MMU over the four years under Canadian Forces Medical Services (CFMS) command was 98 percent. In light of the outstanding services provided by CFMS to Task Force Afghanistan, NATO awarded the CFMS the Dominique-Jean Larrey Award for ‘..in recognition of a significant and lasting contribution to NATO multi-nationality ...interoperability, ...to improvements in the provision of health care in NATO missions’. This was only the second time in history that the Larrey Award had been given.

## **Lessons learned**

Reflecting on my time in KAF at the Role 3 MMU there were a number of lessons learned. Firstly, it is good to be lucky in all aspects of what you are doing and with the ‘cards that one is dealt’. I consider myself very lucky to have had such an in depth professional experience during my month on duty. Secondly, it is about the team. I had the privilege to work with a truly outstanding group of individuals who were committed to their country, to the mission and to the team. As a group we bonded very well, considering the short period we were together. I do not recall even one episode of unprofessional behavior during my time in theatre. Thirdly, consultants were to stay behind the red line. While this refers to the trauma resuscitation bay, what it really means is do not try to micro manage and control everything. Have trust in your colleagues to get their job done. It makes for a highly functional team. Fourthly, keep the decision process moving. Sometimes it is not about knowing every last detail and investigating forever. Rather, make the decision to do something about the situation and be prepared for the unexpected. Finally, there were the Baghdad Rules. In the years from 2003 to 2008, trauma resuscitation was undergoing rapid evolution as the wartime experience in the Middle East was studied and new techniques were developed. While I was in theatre these new techniques were being introduced, particularly with regards to fluid resuscitation.

## Why go?

My interest and involvement came about because of the close working relationship between the Canadian Forces Medical Services and the health care system in Edmonton. I knew and worked with regular force members who had done tours in Afghanistan. The connection to the military went beyond that however, in that my youngest son was a sapper with 1 Combat Engineering Regiment (1 CER), based in Edmonton. Initially I was to deploy in the winter of 2009. Because of the resignation of a regular force surgeon from the CFMS, the schedule was disrupted and I was asked if I could deploy to help fill in the gap in August-September 2008. Going at that time would mean that I would be in KAF at the same time that my son was in a combat role with 1 CER in Kandahar province. His tour began in March 2008, and was to finish in mid-September. After a consideration of the risks, my wife and I decided that I would deploy in August. While I volunteered to go with the Canadian Armed Forces, it was in the capacity as a contractor who was being paid. My insurance policies were paid for as well.

At a professional level with training in trauma surgery, the opportunity was second to none in terms of the environment and the surgical experience. On a personal level, with a son in the military there was perhaps a sub-conscious drive to help out and to understand more of what was being faced in the field – “outside the wire”. The reality of the decision to be there at the same time as my son struck during the first week of my deployment. Mid-week we were informed of incoming Canadian soldiers. An IED explosion had flipped a LAV III, killing three Canadian soldiers and injuring three more. The three men killed were all members of my son’s regiment; men he knew well; one being a very good friend and with who he had travelled in Europe while on leave. Because he was out on “ops”, my son was unable to attend the ramp ceremony with his unit so I did not see him at that time. However, I did learn from those members who were there that their unit would be heading back to Canada about September 10<sup>th</sup>. Needless to say, the date was then circled on my calendar.

As it happened, on September 7<sup>th</sup> our surgical team was called to attend to Canadian soldiers who had been wounded in another IED explosion, again flipping a LAV III and killing one Canadian who was pronounced dead at the scene. Fortunately the others had sustained relatively minor injuries and in a matter of a couple of hours had been dealt with. Later that afternoon as I was walking towards my room I heard my name called – turning around I saw four Canadian soldiers in the full combat gear, one of which was my son. It is hard to put into words the sea of emotions that hit me at that moment, but relief was certainly one of them. We chatted for a while and then I raised the fact that another Canadian had been killed that morning. After a moment of silence and some quiet muttering as only my son can do, he informed me that he had been in the LAV III in front of the one that was bombed. As he subsequently explained, there had been many close calls over the 7 months of his tour. He stayed in KAF for 3 days before heading home. We had a great three days together and then we were reunited as a family 2 weeks later when I returned from my deployment.

Hippocrates is quoted as saying... *“he who wants to be a surgeon should go to war”*. Having been a surgeon for more than 25 years at the time of my deployment, I can only say that I remain extremely grateful to have had the privilege to work with the outstanding people of the Canadian Forces Medical Service, and those from around the world who were part of the team. Finally, it was also a privilege to practice trauma surgery at the Role 3 in KAF and to make a small contribution to the ISAF Coalition, but as importantly, to provide surgical care to the Afghan victims of this vicious bloody war.

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## POSTGRADUATE SURGICAL EDUCATION: THE US PERSPECTIVE

Postgraduate surgical education in the US has been influenced by multiple factors in the past 15 years including: advances in medical treatment, technological enhancements, and duty hour restrictions. The latter was followed by a small decrease in case number but larger decreases in reported experience as a first assistant or teaching assistant and emergency surgery. In addition duty hour restrictions led to a loss of continuity in patient care and lost opportunities for independent decision making. Furthermore the work of a general surgeon has gradually changed over this time. While remaining broad based there has been an increase in average case volume of about 20% and an increase in laparoscopy, thoracoscopy and endoscopy. In 2012 the Vital Signs of postgraduate surgical education showed: 1) the American Board of Surgery Certifying Examination (CE) failure rate for all test takers in 2000 was 16%; in 2010 was 23%; in 2012 was 28%, 2) 34% of common operations were performed on average less than 5 times by residents in general surgery, 3) residents were concerned about their readiness for practice , and 4) practicing surgeons and faculty were concerned about the new surgeons technical competence and decision making .

The residency debate which continues today began with the ASA Blue Ribbon Committee reporting its findings in 2004. This group involved all stake holders in postgraduate surgical education. The results of these discussions led to curriculum standardization and development of a general surgery “Core”, early specialization and 0-5 and 0-6 programs, flexible customization in 12 of the last 36 months of training, expansion of APPs in clinical care, Core procedures, SCORE, CE revision, QE in year 4 and ACS Transition to Practice Program. Reassessment of the Vital Signs in 2016 shows some improvement in the CE failure rate dropping to 20% for all test takers (personal communication Mark Malangoni) but no other changes.

Additional efforts on the horizon to enhance surgical education include : 1.) Increased use of simulation, 2) the milestone project ,3) competency based training , 4) FIRST Trial completion to facilitate flexibility in work hours, and 5) an emphasis on surgical independence. The latter could be accomplished by an accelerated training approach that could accommodate six months of independence prior to obtaining credentials for the certifying examination.

Finally additional challenges in medical education in general indicate that enhancements of surgical education will require focus on the efficiency of both undergraduate and graduate medical education.

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## CHANGING ACADEMIC SURGICAL ROLES

Change is a certainty in life and in the life of an academic surgeon. One often views change as a loss but change can just as likely lead to gain. Surgeons look forward to our next challenge and do not dwell on past accomplishments. Our academic careers begin because we are attracted to the challenges of teaching, research and patient care. The path is laid out and we advance from assistant to associate and full professor. Some even become a Chair. Being in a leadership period for an extended period can lead to complacency and burnout. Self evaluation is necessary at all the stages in an academic career to make sure you are in the right job at the right time. It is important to control your own destiny or else someone else will.

To address the topic of changing academic surgical roles, I am going to put forth a personal view based mostly on my experience and opinions. In addition to death and taxes, we all know that change is a certainty in this life. Like death and taxes, change is viewed negatively by most people. The first reaction when people are told they have to make a change is that they will be losing something. There is a team building exercise that psychologists use where two people look directly at and observe each other for 20 seconds. They are then told to turn back to back and to change two things about their appearance. Most people will take away something such as their tie, glasses, jewelry, etc. It is the exception that the participants will add something. Nevertheless, addition or gain are equally important aspects of change.

Loss and gain are inextricably connected. One person's loss is typically another person's gain but a person's loss can also turn into their own gain. Going from something implies going to something. When we leave one place we must by necessity go to another place. Our education is a prime example of this process. We go from grade to grade and level to level as we advance through school and training. As residents we finish one service and start the next so our lives are a series of steps or stages as pointed out by William Shakespeare in "As You Like It". I think surgeons are basically optimistic and positive by nature. We look forward rather than backward. We focus on our next challenge and do not dwell on our past accomplishments or failures. We want to grow and develop rather than just stay put.

Change can be external or internal. It can be physically or mentally within us or it can be in our local or broader environment. I plan on focusing on the personal or internal changes that occur within an academic surgeon over the course of one's career. Each of us is inherently different and has his or her own individual story. The story I know best is my own and it will form the basis for much of the remaining talk. Before doing so I will spend some time on external factors that have and are affecting the practice of medicine and surgery, surgical education, academic health centers and academic surgeons.

Obviously there have been a myriad of external developments that have had profound effects on our profession. Among these are cost of care, declining reimbursement, development of health care systems, competition among medical centers and systems, government involvement and regulation, insurance companies and other third party payers limiting access to care, public reporting and scrutiny of outcomes, internet and social media information and misinformation, personalized medicine, impersonal medicine, shift from individual to group practices, increasing specialization, evidence based medicine, 80 hour work week and lifestyle issues. Many hours have and are still being spent discussing each item on the list and I would be the first to acknowledge that the list is far from complete. One thing is certain,

the list will continue to grow and the complexities and demands that tomorrow's academic surgeons face will be as great or greater than those of today.

I started my career in academic surgery over 35 years ago. My chairman at Loyola University Stritch School of Medicine, Dr. Robert J. Freeark, took me aside and asked me to join his faculty. I shook his hand and it was done. This beginning of my career in academics was based on mutual trust. I never had any regret because Dr. Freeark was unwavering in his support. This start to a surgical career is as dated as every other night call. In today's world, I tell all my trainees to consult a lawyer specializing in medical contracts before signing theirs and accepting any position. This illustrates the progressive transformation of the health care profession into the health care business.

At Loyola I learned the three As of being available, affable and acceptable for starting a clinical practice. The expectation was I would develop the clinical, educational and research skills of the so called triple threat. A path was laid out for me and fortunately I was able to progress from assistant to associate and then full professor. Eventually I was appointed Chief of the Section of Endocrine Surgery. Each of these steps brought new challenges, greater recognition and increasing responsibility. I had the ambition, drive, energy and enthusiasm to take on the demands of each new rank. Dr. Freeark built the department at Loyola that was both competitive and supportive for the clinical and academic growth of the faculty. His encouragement and support were evident throughout the entire institution and enabled me to be considered a potential leader both in and outside the department.

In 1993, I left Loyola to become the Helen Shedd Keith Professor and Chairman of the General Surgery Department at Rush University Medical Center. Although there is no such thing as a perfect job, being Chairman at Rush seemed to be the ideal one for me. I could develop and lead my own department, head my own training program and have a major impact on the clinical, educational and research programs of a major medical center. I could do this without disrupting my personal or family life since I did not have to move. After leaving home I turned my car left instead of right to get to work. It was the right time and the right place for me to take on a new challenge. The fit seemed about as good as it could be. I put all my effort and energy into building an academic surgery department. It was a pleasure to recruit new faculty, help them develop and strengthen clinical programs and support their acquisition of education and research skills. Likewise overseeing the growth and maturation of medical students and residents was extremely gratifying. Putting together a loyal and reliable administrative team was a new and rewarding endeavor. Having an influential voice and being recognized as a leader in the administration of a major educational institution was quite fulfilling.

I spent nearly 16 years at Rush which is a relatively long time in a leadership position. The President of the United States spends four or at most eight years addressing a staggering array of economic, political and social problems. Although I am not equating the complexity and gravity of the problems a surgical chair faces with those that are dealt with by the president, being a chair not easy. The president has the background and experience and more importantly the financial resources and unlimited staff to deal with the issues of his office. A surgical chair could use a lot more of all of these to deal with the economic, political and administrative issues of a surgical department.

When I was young my father who was an accountant at a large corporation advised me to be my own boss and pick a job or profession where I would not have one. Although I did not choose a career in surgery for that reason, it seemed to fit the bill. Somehow, it did not turn out that way. I now know that surgeons and surgical chairs do have many bosses and I am not referring to the one at home. During my tenure as surgical chair at Rush, I worked for two different chief executive officers, three separate

hospital presidents, three different medical school deans and three successive chiefs of surgical services. Just as I got used to the style, manner and methods of each one of these individuals I had to readjust to their successor. This gets to be tedious after a while.

It is easy to get stale when you are in a leadership position for an extended period. Enthusiasm and energy are finite quantities and when they burn out they are hard to reignite. Very often you can continue on autopilot. Typically surgeons derive satisfaction and sense of purpose from what they do. It is hard to get that when you are just showing up and going through the motions. Will Rogers said, "Even if you are on the right track, you'll get run over if you just sit there".

It was obvious to me that I needed a change. There is always a push and a pull when you are considering changing jobs. The push was the sum of many small things that accumulate over the years. I was tired of having to convince the Dean and the Hospital Administration of my vision for the Department, of faculty telling me how indispensable and underpaid they were, of residents complaining about their service rotations and their call schedules and of students distraught over what they considered were unfair grades and practices on their rotation. These were the everyday issues and do not take into account the surprise problems that always turn up in a department. To paraphrase the Beatles, "Will I still need this when I'm 64?"

We all should periodically step back and take a break for self assessment and self awareness. We need to define what is most important in our careers at various points. Goals can and do change. What once motivated us to enjoy our work may no longer provide the satisfaction that makes us look forward to going to the office each day. Being an academic surgeon and then a surgical chair were deeply satisfying personally because they were meaningful and significant occupations. They allowed me to make a positive difference in the lives of many others. But mentally and physically the demands of being a chair can erode the satisfaction that one gets from their work activities. In the words of Joe Maddon, manager of the Chicago Cubs, "Never permit the pressure exceed the pleasure." When it does, it is time to move on to the next phase in our life and career.

Stepping down from a Chairmanship is a major change in one's life. At first, I felt a sense of loss but then there was also a sense of relief. I went back to the ancient Chinese concept of change is not just a door closing but also a door opening. I now had an opportunity to do something new and energizing. I began to evaluate all my opportunities and more importantly to evaluate myself. I had found growth and recognition, sense of accomplishment and personal reward in taking care of patients, teaching endocrine surgery to residents and fellows and being involved in clinical research. The administrative responsibilities that were once rewarding had become onerous. I found myself more and more watching the clock during the never ending meetings I had to lead or attend. Clearly there were things I wanted to continue to do and others that I would not miss.

My prime concerns at this stage of my life were my family and my finances. First and foremost, I wanted a position that would allow sufficient time to enjoy my family and the financial security to pursue my outside interests. It can be awkward remaining as a surgeon and faculty member at the same institution where you were once the Chair. Your presence can pose an unintended tension for the new Chair and can be seen as a threat that undermines their leadership and authority. Other faculty both within and outside the department may continue to come to you for help and see you as someone who can still be a positive influence in putting forth their agenda at the institution. I certainly did not want to be put in that position. So in addition to leaving the Chair, I thought it would be best to leave Rush and

to move on to a new challenge. Will Rogers encapsulated my situation: “The worst thing that happens to you may be the best thing if you don’t let it get the best of you.”

When asked for advice about changing jobs and evaluating new positions, I used to always respond, “Make sure you are going to a better place and are trading up.” I now also add, “Make sure you are going to a better situation.” I had worked hard to become a Chair and I had to work just as hard to find another appropriate position. I wanted to reroute my energy into an occupation that would allow me to stay physically and mentally productive and to continue to make a difference. I still wanted to work but needed a better work/life balance. Jack Welch, a former CEO of General Electric Corporation, said, “There is no such thing as work/life balance. There are work/life choices and you make them and they have consequences.” I had put a lot of time and effort into developing my career and now I wanted more time for myself and my family.

Once I decided to leave Rush, I wanted to be sure I was going to an environment with coworkers who shared similar academic based values that focus on excellent patient care, teaching and clinical research. I wanted to remain in Chicago and to practice, teach and perform research in Endocrine Surgery. I no longer wanted to perform the more physically demanding procedures that are part of General Surgery.

The three A’s when I began my surgical career were to be available, affable and acceptable. I now use three new A’s, appealing, adaptable and affordable as I began to seek my new position.

I wanted a job that would appeal to my desire to stay connected, be physically and mentally productive, and to make a positive difference. I wanted to be where my skills and experience would be appreciated and my advice as a former Chair valued. I no longer wanted to work from dawn to dusk so I was looking for a customized work situation that would be adaptable to my goal of having more free time. I wanted to be able to pursue outside personal interests. Affordable meant that the position would not be detrimental to my financial well being. I expected it would provide health and retirement benefits and enhance my economic well being. I did not want to worry about being able to afford the things I had put off doing in my life until now. I reviewed all my options and it was clear that NorthShore University HealthSystem was an ideal choice. Fortunately, Dr. Mark Talamonti was the Chair and was seeking to recruit an endocrine surgeon to join his staff. Dr. Talamonti was building a vibrant, energetic surgical department. He was recruiting a well trained highly specialized mostly young staff. He was emphasizing not only clinical excellence but also academic productivity. I joined his department almost 7 years ago and became a Clinical Professor of Surgery at the University of Chicago Pritzker School of Medicine and a Vice Chairman of the Department of Surgery at NorthShore. Fortunately like many vice president positions the administrative demands are somewhat light. During my time at NorthShore, I have had quite a number of professional and personal rewards. I have had 7 endocrine surgical fellows and have continued to be active in clinical research. I have been able to attend the medical meetings that have stimulated my intellectual curiosity. Not only do I have a work environment with thoughtful coworkers who motivate me but I also have the time and energy to explore new things with my family and friends. The lesson I have learned is summarized in the words of Jack Welch, “Control your own destiny or someone else will.”

**Richard A. Prinz**

*Vice Chairman of Surgery, NorthShore University Health System*

*Clinical Professor of Surgery, The University of Chicago Pritzker School of Medicine*

## UNDERGRADUATE SURGICAL EDUCATION: PAST, PRESENT AND FUTURE

Ladies and Gentlemen,

What a singular pleasure it is to have been invited to speak at this Roger Keith's Festschrift. I have personally known Roger almost from when I first moved to Canada in 1988. Through our common experiences (although separated by some several years) of training in London, working at University of Alberta and the Royal Alexandra Hospital and our roles in the Canadian Association of General Surgeons (CAGS) and Canadian Association of University Surgeons (CAUS) – we have formed a bond of mentorship and, if I may humbly suggest, friendship developed over the years. This was firmly cemented by his lovely wife Nancy's hospitality and her famous Saskatoon berry jam!

So on to my Topic – Undergraduate Surgical Education: Past, Present and Future.

The Past: At Guys Hospital in London in the 18<sup>th</sup> century, students served a 5-7 year apprenticeship and then became a surgeon's dresser (this term was first coined in 1747 at St Thomas Hospital in London, UK). They worked in this role as surgical dresser for 6-12 months and students paid for the privilege! Courses were attended in anatomy, surgery, midwifery, medicine and chemistry - there were separate fees for each course attended and of course, there were no student loans offered at the time!. In 1879, the Director of the Surgical Academy in Graz, Austria, petitioned the then Government to shorten the 2-year course because, and I quote "few surgical students are in a position to pay for their board, lodging, laundry and necessary books!" History doesn't record whether the government agreed to shorten the course.

In 1893, Pye's surgical handcraft – a practical guide for the house surgeon and surgical dresser was published. There were chapters on the arrest of hemorrhage, apparatuses for restraint and support, fractures, preparation for operation, after care and making poultices (there will be a test later on the type of poultices and conditions they are used for!) a soft, moist mass of material, typically of plant material or flour, applied to the body to relieve soreness and inflammation.

Moving to the 20<sup>th</sup> century, a paper out of my own medical school, the now defunct Middlesex Hospital, was published in 1977 the year I graduated. It surveyed 325 first year clinical students who had been allocated, typically in 2's or 3's, to a "firm" (Roger will remember the term) of 1 to 2 consultants and their junior staff. Responding to the survey, they indicated that they spent 5.3 hours per week in the operating room, were scrubbed into the case half the time with a range of 0% to 70% getting teaching in the operating room. I dare say that if this study were to be repeated today, 40 years later, results wouldn't be that much different!

And so to the present: I joined the University of Alberta in 1997, recruited by the then Chair of the Department of Surgery, Dr Stu Hamilton, who you will be hearing from later, as its Division Director with major education responsibilities. As part of one of my very first tasks, I met with Dr George Goldsand, the then Godfather of Postgraduate of Education in Canada. Even before I sat down in his office he asked "so why do surgeons teach by intimidation?" of course I made some lame excuses but it did prompt me to do a research study. We found that 1/3 to half of our 3<sup>rd</sup> year surgical students that we surveyed perceived intimidation to exist. It was noteworthy that the larger, the hospital the bigger the problem. Further, both female learners and female staff experienced intimidation more. However, the more senior the trainee, ie Chief residents, the less intimidation was perceived.

It was around this time that increasing dissatisfaction with the multiple guess, minutiae testing MCQ's was coming under fire having less to do with the practice of medicine. But never let it be forgotten that evaluation drives learning! And so it was that the OSCE (Objective, Structured, Clinical Evaluation) was born. This method of testing was felt to be far more relevant to the actual the practice of medicine. This exam style continues to be rather unpopular in surgical spheres – general surgery remains one of the last remaining hold outs, continuing to use structured questions rather than formal OSCE at the Fellowship exam. Rick Nason, who will be speaking later was the Chair of the exam board and suffered many bruises at the hands of the Royal College.

At a practical level getting surgeons to sit through 10 or 15 checklists for undergraduate OSCE's was a considerable challenge for me as the Director of Undergraduate Surgical Education! So in another study - we showed that non expert and even the OSCE standardized patient could be accurate and effective examiners. This finding was also not particularly popular and so the patient as an examiner was never adopted at the University of Alberta!

So how do we actually learn? Using KOLB's Learning Style Inventory, first introduced in 1984. This inventory to characterize an individual's learning style of which there are four. The Convergent style using the practical application of ideas and accommodative (prefers doing things). Not surprisingly surgical residents and surgical staff were these types. The diverging style (ie imaginative) and the assimilating style (favouring the theoretical abstract concept) were far more common in medical students who weren't particularly interested in surgery. Using this simple tool to guide in the CARMS selection process was similarly not adopted at the University of Alberta, feeling that it would be too threatening (dare I use the word intimidating again) for interviewees hoping for a general surgery residency position!

And so to the Future of Undergraduate Surgical Education - I am grateful to my friend and colleague Dr Jonathan White, our late Dr Tom Williams, Chair of Surgical Education at the University of Alberta. Tom is, I am sure looking down on us with considerable approval of today's events. Jon, with a clear understanding of millennials, ie our learners, developed Surgery 101, a series of over 250 Podcasts on all manner of surgical topics including using Muppets and Lego to teach basic surgical skills. His Podcasts have had over 2 million listeners' worldwide. Clearly he identified a major thirst and need for this novel style of surgical education.

Of late there are a number of themes that have become the universal language of surgical educators. Some of these are self reflection, creative writing, self evaluation, needs-based learning and competency by design to name but a few. However, probably the most important for the future of Undergraduate Surgical Education is the AAMC 13 Entrustable Professional Activities or EPA's that medical graduates must be able to demonstrate on the first day of residency. They are history and physical examination, differential diagnosis, test recommendations, orders and prescriptions, documentation of the encounter, presentation of findings, ability to find evidence for the recommended care, effective hand-over, team collaboration, recognition of urgency, obtaining of consent, performing basic procedures and finally contributing to the safety culture.

Most of these were already implicit in surgical education for time immemorial but I believe the AAMC has clearly articulated them. Ultimately, I believe consideration these EPA's will provide surgeons an opportunity for necessary introspection to improve curricula. This was so well illustrated when our own 4<sup>th</sup> year surgery rotation committee were asked "do students really need 6 hours of vascular surgery

lectures at the start of their 4<sup>th</sup> year specialty rotation?” You can imagine how passionately many of the committee held on to topics that they felt medical students must know!

At the end of the day and I know Roger will whole heartedly agree, truly effective Undergraduate (and Postgraduate) surgical education demands being at as many patient bedsides as at all possible.

So in closing my gentle romp through Undergraduate Surgical Education: Past, Present and Future to honour Roger as he moves into the next phase of his life, Canada will certainly miss a consummate teacher and educator. Thank you.

**Chris de Gara**

*University of Alberta*

## **THE NEW MCGILL HEALTH CENTRE NETWORK TRANSFORMATION: AN OPPORTUNITY TO ESTABLISH A CULTURE OF SURGICAL INNOVATION**

The teaching hospitals of McGill University have recently completed a major physical improvement. The Royal Victoria Hospital was established in 1887 on 10 acres of beautiful land on the shoulder of Mount Royal in downtown Montreal. Although, when it opened in 1893, it was called the "finest and most perfectly equipped (hospital) on the great American continent", by the late 20<sup>th</sup> century, it was clearly no longer suited for modern surgical care (fig 1).

The other principal teaching McGill hospitals, The Montreal General Hospital, The Montreal Children's Hospital and The Jewish General Hospital were housed in buildings opened in 1955, 1924, and 1934 respectively. Although they were renovated over the years, each was in need of modernization to meet the demands of modern healthcare.

In 1997, the boards of the Montreal General Hospital (MGH), the Royal Victoria Hospital (RVH), the Montreal Children's Hospital (MCH), the Montreal Neurological Hospital (MNH), and the Montreal Chest Institute (MCI) merged to form the McGill University Health Centre (MUHC) with the vision of building a single "superhospital" on a single campus that would bring together adult and pediatric care in a modern academic health centre. However, the concern about closing too many hospitals in the downtown core of Montreal, and possibly the scare of the SARS outbreak in Toronto, led to the decision by the Quebec government to maintain the Montreal General Hospital in its current location, while approving the construction of a new medical campus west of downtown at the site of the Glen Yard, where the RVH, MCH, MCI, and a new Cedars Cancer Centre would move. During this planning phase, the MUHC also inherited the Lachine Hospital, a community hospital, west of the Glen site, with a government mandate to develop a large volume bariatric surgery program.

The Research Institute of the MUHC earned a \$100 million grant from the Canadian Foundation for Innovation (CFI) to construct a new Research Institute and Centre for Innovative Medicine at the Glen Site, matched by \$100 million from the Quebec government and \$50 million from the private sector.

Eventually, the Shriners Hospital would join the project, and ultimately it is expected that the MNH will move to the Glen site at some time in the near future. Using a public-private-partnership (PPP) model, the new medical campus was opened in April 2015 (Fig 2). The Shriners moved in October 2015, adjacent to the MCH and, although separate, provided complementary resources to surgical care for the pediatric population.

A final plan to modernize the Montreal General Hospital (fig 3) is awaiting government approval. However, recent renovations to the MGH have included the building of a new 26-bed Intensive Care Unit, four modern integrated minimally invasive and advanced endoscopy operating suites (Fig 4), a new coronary care unit, and a redeveloped GI and respiratory endoscopy suite.

The adult surgical programs of the MUHC are now divided between three physical locations: Lachine (bariatric surgery and community surgery), the Montreal General Hospital (trauma, orthopaedics, plastics-trauma, thoracic surgery, ophthalmology, oral & maxillofacial surgery, and general surgery-colorectal surgery, upper GI surgery, acute care surgery) and the Royal Victoria Hospital (cardiac, vascular, urology, ENT, plastics-cancer reconstruction, women's health, and general surgery-transplant,

HPB, endocrine, breast and melanoma). The Cedars Cancer Centre at the Glen Site is a \$155 million integrated Cancer Centre, measuring > 12,630 m<sup>2</sup> that will provide 150,000 treatments and clinic visits each year in multidisciplinary clinics. It offers advances in cancer diagnosis and treatment using DNA/gene sequencing, risk assessment and prenatal genetic treatments, and targeted and specialized chemo and radiation therapy.

The Glen site was designed based on a “front and back of house model” with separate corridors and elevators for visitors, patients, and clean and soiled materials, and a dedicated ‘trauma’ elevator that goes straight from the ER to the interventional platform. One of the more innovative aspects of the plans for the Glen site was the creation of a technical or interventional platform that was designed to break down traditional barriers. This houses the operating rooms (including hybrid OR, MR-equipped pediatric surgery suite, an experimental OR of the future), as well as endoscopy and cystoscopy suites, interventional radiology, cardiac catheterization and interventional cardiology (fig 5). They share a 70-bed common PACU, and have immediate access to the adjacent 35-bed ICU. By locating these interventional suites together the design fosters the collaboration of surgeons, endoscopists, catheter based interventionists, and imaging experts. This promises to improve our versatility and our ability to optimally use expensive resources.

The result of the redevelopment plan has been to support our mission by aligning patient care over the lifespan on a single site. It allows us to offer tertiary healthcare from conception through a renowned assisted reproduction program, though neonatal and pediatric care, to adult care and finally geriatric and palliative care. Single patient rooms with private bathrooms improve patient privacy and dignity, while reducing the incidence of nosocomial infections.

One of the great opportunities created at the new Research institute is the McConnell Centre for Innovative Medicine (CIM) (Fig 6). This centre offers us an advanced Physiology platform, Cardiopulmonary physiology exercise lab (CPET), Non-invasive vascular suite, Medical Imaging platform with Xray, U/S, PET-CT, CT and MRI, Dual-energy X-ray absorptiometry (DEXA), Bronchoscopy and GI suites, the Experimental operating room, a Simulation suite, minor Procedure rooms, 3D Printers, Metabolic kitchen, and biobanking. All these facilities are exclusively for research.

Of particular interest to our Surgery Mission is the Experimental Operating Suite with a control room and adjacent simulation centre. It is constructed to be flexible to develop and assess novel technology in OR design, device development and both bench and in-human testing.

At the MGH site, the 4 integrated MIS and advanced therapeutic endoscopy suites have allowed us to explore various considerations in OR design and options in technology to better prepare us to plan the Glen site. These advanced OR platforms provide us with the capability to use multiple endoscopes simultaneously and have experience with surgery using multiple simultaneous imaging modalities, aided by various optical systems (HD, 3D, adjustable scope prisms, variable wavelength illumination), telestration, intraoperative videoconferencing and telementoring, etc.

Concurrently, the Jewish General Hospital, another important component of the McGill adult surgical program, has also redeveloped its physical infrastructure expanding adjacent to the current site with the opening of Pavilion K in January 2016. This additional structure contains a state-of-the-art emergency department, surgical suites, intensive, coronary, and neonatal intensive care units.

From the perspective of the McGill Department of Surgery, we have planned to leverage these investments in hospital infrastructure to further our mission of providing outstanding and innovative

care, in an optimal teaching environment, and the generation of new knowledge that promises to improve patient outcomes.

In this context we have established a Master's Program in Surgical Innovation. Our goals are to develop surgical innovators by educating clinicians with business skills, knowledge of biomaterials, the regulatory framework for devices, an opportunity for prototyping (well-equipped machine shop and 3D printers) and legal knowledge regarding intellectual property and liability. This is further enabled by strong collaborations with industry and opportunities for internships within successful biomedical companies. The students are encouraged to create intellectual property that will impact patient care and they are provided an opportunity to spin off companies and commercialize their inventions.

The structure of the Surgical Innovation Program is to team surgical trainees after a minimum of 2 years of residency with MBA students and engineering graduate students at the Masters and PhD level. They are supervised and mentored by faculty in the department of surgery, by software and hardware engineering professors, and by faculty in the Business School. We also have an advisory committee that includes academics, industry partners and successful entrepreneurs. The ideas for projects are generated by the student team after observation in the hospital, then vetted and prioritized by their faculty advisors.

Each team is encouraged to take advantage of the Centre for Innovative Medicine with its experimental OR and simulation satellite suite, the Steinberg Centre for Simulation & Interactive Learning at McGill, the Steinberg-Bernstein Centre for MIS & Innovation at the MGH site, and the DeKuyper Centre for Social Media in Surgical Education @MGH. They are also assisted to access the strong innovation culture in Montreal with expertise in aerospace, the computer gaming field, simulation, biopharmaceuticals, logistics, information technology and multimedia, etc. Our plan is to next build an incubator environment in the MGH with facilities to support the innovation program such as a robotics lab, a sensors lab, a biomaterials research centre, etc. Bringing specialists in these technologies into the clinical environment fosters our goal of bedside to bench to bedside research that will impact patient care.

To help provide the infrastructure for this new program we applied for and were awarded an NSERC Create grant with partners that include 3 Universities, 11 main applicants, 40 collaborators, and 15 companies agreeing to host interns.

In conclusion, we have built on the opportunity provided by the physical redevelopment of our teaching hospitals to launch a new program built around surgical innovation at McGill.



**McGill University Health Centre, Glen Yards Campus 2016**



**McGill University Health Centre Research Institute at Glen Site.**

**Gerald M. Fried**

*Edward W. Archibald Professor and Chair, Department of Surgery, McGill University  
Surgeon-in-Chief, McGill University Health Centre*

**CURRICULUM VITAE  
FOR  
DR. ROGER GRAHAM KEITH**

**Department of Surgery  
University of Saskatchewan**

**1. PERSONAL:**

Date of Birth: 1940  
Place of Birth: Calgary, Alberta  
Citizenship: Canadian  
Marital status: Married - Nancy  
Children: Janet, Donna, Brian

Undergraduate Education:

1958 - 1964 MD - University of Alberta, Edmonton  
1964 - 1965 Rotating Internship, Royal Alexandra Hospital; Edmonton, AB

Postgraduate Education:

1967 - 1971 University of Toronto  
General Surgery Resident Training  
1972 - 1973 Fellowship; Hepatic, Pancreatic and Biliary Surgery:  
1973 Hospital Purpan  
Toulouse, France  
Pancreatic Surgery  
Professor Jean Escat  
1972-1973 St. George's Hospital  
London, England  
Pancreatic and Biliary Surgery  
Sir Rodney Smith  
1972 U.C.L.A.  
Los Angeles, California  
Hepatic and Biliary Surgery  
Professor William Longmire  
1972 University of Washington  
Seattle, Washington  
Pancreatic Surgery  
Professor Thomas T. White

**2. ACADEMIC CREDENTIALS:**

1975 Fellow of the American College of Surgeons (FACS)  
1973 Fellow of the Royal College of Surgeons of England (FRCS)  
1972 Diplomat of the American Board of Surgery (D.A.B.S.)  
1971 Fellow of Royal College of Physicians and Surgeons of Canada (FRCSC) - General Surgery  
1965 Licence of the Medical Council of Canada (L.M.C.C.)  
1964 M.D. University of Alberta

**3. OTHER CREDENTIALS:**

1993-2000 License, College of Physicians and Surgeons of Manitoba  
1990 - \* License, College of Physicians and Surgeons of Saskatchewan  
1967-1990 License, College of Physicians and Surgeons of Ontario  
1965-1969 License, College of Physicians and Surgeons of Alberta

**4. APPOINTMENT(S) AND PROMOTIONS (University of Saskatchewan):**

2005 Acting Head, Department of Surgery  
2001-2005 University Head, Division of General Surgery  
  
1997-2002 Member, Executive of Deanery, College of Medicine  
1997-2002 Director of Clinical Affairs and Health Services, College of Medicine  
  
1995-2003 Fred H. Wigmore Professor and Chairman, Department of Surgery  
1993-2007 Graduate Chair, Surgery; College of Graduate Studies & Research  
1993-2005 Head, Department of Surgery, College of Graduate Studies and Research  
1990-2003 Professor and Head, Department of Surgery  
1990 - \* Tenured Professor (Surgery), University of Saskatchewan

**5. LEAVES:**

2004 Administrative Leave, University of Saskatchewan (Canada, USA, Scotland, Sweden)

**6. HONOURS (MEDALS, FELLOWSHIPS, PRIZES)**

2014-2015 Excellence in Teaching Award, U. of S. Senior Residents in Surgery  
2013 Honorary Member, Canadian Association of General Surgeons  
2007-2016 Best Doctors in Canada listing  
2001-2005 International Director, James IV Association of Surgeons  
1999 Honorary Member, Newfoundland Surgical Society  
1998 The Best Doctors in Canada listing  
1998 - \* Director, James IV Association of Surgeons

1998            Honorary Member, British Columbia Surgical Society  
1995 - \*        Fellow, American Surgical Association

**Undergraduate:      University of Alberta**

1964 - \*        Alpha Omega Alpha Honours Medical Society  
1963            Alberta Hospitals Association Prize in Medicine  
1962            Rankin Prize in Bacteriology

**7.      PREVIOUS POSITIONS RELEVANT TO U of S EMPLOYMENT**

**University:      University of Toronto**

1982.1990      Associate Professor; Surgery  
1976.1982      Assistant Professor; Surgery  
1973.1976      Lecturer; Surgery  
1971.1972      Clinical Teacher; University of Toronto

**Hospitals:      St. Michael's Hospital, Toronto**

1987.1990      Head, Division of General Surgery  
1986.1990      Active Staff, Division of General Surgery

**Sunnybrook Medical Centre, Toronto**

1974.1977      Acting Head, Division of General Surgery  
1973.1985      Active Staff, Division of General Surgery

**St. George's Hospital, London, England**

1972.1973      Honorary Clinical Assistant, Surgery

**Holy Cross Hospital, Calgary, Alberta**

1965.1967      Active Staff, Department of Family Medicine

**8.      UNIVERSITY COMMITTEES:**

2002.2008      Member, University Council  
1993.2005      Member, Animal Care Committee  
1993.1997      Member, Renewal Tenure and Promotions Appeal Committee

**9.      DEPARTMENT AND COLLEGE COMMITTEES:**

**University of Saskatchewan:**

**College of Medicine:**

2014-2016      Chairman, Faculty Council  
2010-2017      Member, Faculty Council  
2008 -2016      Member, Advisory Postgraduate Education Committees

2009 -2013	Member, Electronic Curriculum Vitae Committee
2007-2009	Member, College Review Committee
2001	Member, Admissions Committee
1999-2002	Chairman, Investigative Committee
1997-2002	Director, Clinical Affairs and Health Services
1997-2002	Member, Executive of Deanery
1997-1998	Member, Executive Council of Faculty
1997	Member, Health Services Advisory Council
1996	Chairman, College of Medicine Retreat
1990-2005	Member, Search Committees: Heads for: Surgery, Pediatrics, Medicine, Anaesthesia, Ophthalmology, Medical Imaging.
1990.2003	Member, Department Heads Committee
1992.2002	Member, Clinical Teaching and Research Fund Committee
1992.2000	Member, Deans' Advisory Committee on College Resources
1992.2005	Member, College Review Committee

**College of Graduate Studies and Research:**

2005	Chair, SPR Study for Surgery
1993.2005	Graduate Chair, Department of Surgery
1990.2004	Head, Department of Surgery

**Department of Surgery:**

2005	Acting Head, Department of Surgery
2004.2005	Manager, Clinical Practice Plan
2000.2005	Head, Division of General Surgery
1990.2003	Head, Department of Surgery
1990.2003	Chairman, Executive Committee
1990.2003	Chairman, Clinical Practice Plan
1990.2003	Chairman, Finance Committee
1990.2003	Chairman, Postgraduate Education Committee
1990.2003	Chairman, Research Committee
1990.2003	Chairman, Faculty Tenure, Promotion and Review Committee
1992.2003	Chairman, University Operating Room Committee
1990.2003	Member, Residency Training Program Committee
1990.2003	Member, Undergraduate Education Committee
1990.2000	Member, Trauma Committee
1995.2000	Member, Core Surgery Program Committee
1992.1993	Chairman, Postgraduate Course in Surgery

**Royal University Hospital:**

1990.1997	Chief of Surgery
1990.1994	Chairman, OR Committee

1990.1994 Member, Medical Advisory Committee Executive  
1990.1994 Chairman, Utilization and Audit Committee

**Saskatoon District Health / Saskatoon Health Region:**

1998.2010 Member, Credentials Committee  
1999 Member, President's Committee on System Capacity  
1998-2004 Physician Site Manager, Royal University Hospital  
1998-2003 Member, Medical Human Resource Committee  
1997-2000 Member, Executive of Surgical Operations Committee  
1997-2002 Member, Liaison and Planning Committee  
1995-2002 Chairman, Ambulatory Care and Emergency Committee  
1995-2002 Member, Medical Capital Equipment Committee

**University of Toronto:**

**Department of Surgery:**

1987.1990 Member, Interhospital Committee for General Surgery  
1986 Member, Ad Hoc Planning Committee for General Surgery  
1974.1977 Member, Interhospital Committee for General Surgery  
1973.1981 Member, Postgraduate Education for General Surgery

**St. Michael's Hospital:**

1989.1990 Member, New OR Planning Committee  
1989.1990 Member, OR Policy Task Force  
1987.1990 Member, Phase B Planning Committee  
1987.1990 Member, Clinical Trials Committee  
1987.1990 Member, Critical Care Committee  
1987.1989 Member, Clinical Records Committee  
1987.1988 Member, Oncology Task Force  
1987.1988 Member, Trauma Task Force  
1986.1990 Director, Surgical Acute Care Unit  
1986.1990 Member, Nutrition and TPN Committee  
1986.1987 Member, Task Force on OR Utilization

**Sunnybrook Medical Centre:**

1982-1984 Member, NMR Planning Committee  
1977.1979 Chairman, Medical Records Committee  
1975.1979 Member, Medical Records Committee  
1975.1977 Member, Tissue and Audit Committee  
1974.1976 Member, Pharmacy and Therapeutics Committee  
1977.1979 Member, Tissue and Audit Committee  
1976.1978 Member, Board of Directors Sunnybrook Hospital  
University of Toronto Clinic  
1976.1978 Member, Finance Committee Sunnybrook Hospital  
University of Toronto Clinic

## 10. PROFESSIONAL AND ASSOCIATION OFFICES AND COMMITTEE ACTIVITY OUTSIDE UNIVERSITY

### Canada:

#### Canadian Association of General Surgeons

1981.2010	Member, Board of Directors
1988.2002	Member, Executive of Board of Directors
1999.2001	Chairman, Corporate Council Committee
1998.1999	Past President
1997.1998	President
1996.1997	President Elect
1989.1995	Secretary
1988.1989	Secretary Elect
1987-2016	Chairman, CAGS Test Committee
1981.1989	Chairman, Committee on Endoscopy
1982.1983	Chairman, National Survey of Gastrointestinal Endoscopy By General Surgeons
1998.2002	Representative to Royal College Maintenance of Competence Program
1994.2000	Representative to Advisory Council for Surgery, A.C.S.
2000.2002	Member, Annual Meeting Planning Committee
1999.2002	Member, Education Committee
1991.1993	Member, Publications Committee
1989.2000	Member, Endoscopy and Laparoscopy Committee
1982.1983	Member, Biliary Lithotripsy Subcommittee
1980.1981	Member, Local Arrangements Committee
1977	Member, Program Committee

#### Canadian Association of Surgical Chairman

1994.2003	Secretary/Treasurer
1994.2000	Member, Research Development Committee

#### Royal College of Physicians and Surgeons of Canada

2001.2004	Chairman, Examination Committee in General Surgery
1996.2002	Chairman, Specialty Committee for General Surgery
1987.1989	Chairman, Board of Examiners for General Surgery
1984.1986	Vice Chairman, Board of Examiners for General Surgery
2001-2004	Member, Final Examination Board in General Surgery
1976-1986	Member, Board of Examiners for General Surgery
2000.2002	Member, Specialty Committee in General Surgery Oncology
1999-2003	Member, Core Program in Surgery Committee

1998-2002 Member, Professional Development Committee  
 1990-1996 Member, Credentials Committee  
 1990-1995 Member, Nucleus Committee for Maintenance of  
 Competence Pilot Project  
 1990-1996 Member, Nucleus Committee of Specialty Committee  
 for General Surgery  
 2005-2010 Corresponding Member, Examination Committee in  
 General Surgery  
 2001 Invited Guest, Evaluation Committee  
 1995-1997 CoChair, CanMEDS 2000 Collaborator Pilot Project  
 1991 Invited Observer, Examinations in Cardiovascular and Thoracic  
 Surgery

**R.S. McLaughlin Examination and Research Centre**

1987-1989 Chairman, Test Committee in General Surgery  
 1984-1986 Vice Chairman, Test Committee in General Surgery  
 2004-2007 Corresponding Member, Test Committee in General Surgery  
 1982-1992 Corresponding Member, Test Committee in General Surgery

**Canadian Association of Clinical Surgeons (Eastern Division)**

1987-1990 Secretary/Treasurer  
 1986-1987 Secretary/Treasurer Elect  
 1986-1988 Councillor  
 1981-1983 Member, Audit Committee

**Canadian Association of Gastroenterology**

1990-1994 Councillor  
 1978-1984 Member, Endoscopy Committee

**Academy of Medicine (Toronto)**

1979-1982 Chairman, Section of GI Diseases  
 1975-1978 Chairman, Section of Surgery

**UNITED STATES OF AMERICA:**

**American College of Surgeons**

1994-2000 Member, Advisory Council for Surgery  
 1992-1995 Governor

**American Surgical Association**

1998-2003 Member, Advisory Membership Committee

**American Hepato Pancreatic Biliary Association**

1994-1996 Canadian Chairman, AHPBA  
1999-2003 Member, Membership Committee

**Central Surgical Association**

1994-1995 President  
1993-1994 President Elect  
1995-1996 Councillor  
1989-1992 Councillor  
1997 Chairman, Nominating Committee  
1985-1986 Chairman, Program Committee  
2007-2008 Member, Nominating Committee  
1991-1992 Member, Nominating Committee  
1990-1992 Member, Enrichment Fund Task Force  
1987-1988 Member, Nominating Committee  
1983-1986 Member, Program Committee

**Central Surgical Association Foundation**

1999-2001 Member, Senior Advisory Committee  
1998-1999 President  
1997-1998 1<sup>st</sup> Vice President; Chairman Awards Committee  
1996-1997 2<sup>nd</sup> Vice President; Chairman Finance Committee  
1995-1996 Treasurer  
1993-1995 Member at Large

**Society for American Gastrointestinal Endoscopic Surgeons**

2000-2004 International Member, Program Committee  
1996-1998 Co-Chairman, Poster Program Committee  
1995-2004 Member, Scientific Program Committee

**Society for Surgery of the Alimentary Tract**

2002-2006 Member, Membership Committee  
1997-1998 Member, Nominating Committee  
1990-1993 Member, Membership Committee

**INTERNATIONAL:**

**International Federation of Societies of Endoscopic Surgeons**

1993-2002 Member of Executive Council  
1997-1999 Member, Executive Committee

**International Hepato Biliary Pancreatic Association**

1992-1994 Frank Glenn Scholarship Committee Member  
1990-1994 Councillor

1986 Founding Membership Committee

**James IV Association of Surgeons**

2001-2005 International Director

1998-2010 Director (Canada)

**11. ASSOCIATION MEMBERSHIPS**

**National**

1976 -1990 Canadian Association of Clinical Surgeons (Eastern Division)

1977 -1990 Canadian Association of Gastroenterology

1977 - \* Canadian Association of General Surgeons

1990 - 2005 Canadian Association of Surgical Chairman

1990 - \* Canadian Association of University Surgeons

1973 - \* Canadian Medical Association

1975 -1995 Canadian Undergraduate Surgical Education Committee

1969 -1990 Ontario Medical Association

1971 - \* Royal College of Physicians and Surgeons of Canada

1990 - \* Saskatchewan Medical Association

**International**

1975 - \* American College of Surgeons

1983 - \* American Gastroenterological Association

1985 - \* American Hepato Pancreatico Biliary Association

1974 - \* American Pancreas Club

1995 - \* American Surgical Association

1981 - \* Central Surgical Association

1993 - 2001 Central Surgical Association Foundation

1995 – 2003 International Federation of Societies of Endoscopic Surgeons

1986 - \* International Hepato Pancreatico Biliary Association

1976 - \* International Society of Surgery

1986 - \* James IV Association of Surgeons

1973 - \* Royal College of Surgeons of England

1983 - \* Society for American Gastrointestinal Endoscopic Surgeons

1981 - \* Society for Surgery of the Alimentary Tract

1991 – 2003 Society of Surgical Chairs

1995 - \* Surgeons Travel Club

**12. PROFESSIONAL PRACTICE AND CONTINUING MEDICAL EDUCATION**

**Clinical Practice:**

Tertiary referral practice for diseases of the liver, biliary tract  
and pancreas:

1973-1990 Toronto, Ontario

1990-2016 Saskatoon, Saskatchewan

- Practice of gastrointestinal endoscopy including ERCP  
Surgical treatment of liver, biliary tract and pancreatic disease  
Academic clinical practice as a tenured faculty member:
- 1973-1990 University of Toronto  
1990-2016 University of Saskatchewan
- 1973-2010 Administrator of University clinical, teaching and research programs
- 1976-2010 Extra University roles in Canadian national specialty committees (Royal College) and national specialty societies (Canadian Association of General Surgeons, etc.)

**External Surveyor – University Departments of Surgery:**

- June, 2004 Invited Review; Division of General Surgery. University of Western Ontario, London, Ontario
- 1998 Member, Royal College Survey Team, University of Ottawa, Ottawa, Ontario
- 1993 Department of Surgery, Queen Mary Hospital, Hong Kong University; Hong Kong, China

**Commissions:**

- 1998-2000 Invited member, National Advisory Committee  
Commission on Resource Based, Relative Value Schedule;  
Department of Health, Government of Ontario

**Editorial Boards and Manuscript Reviewer:**

**Editor:**

- 1992-1996 Co Editor, Canadian Journal of Surgery

**Editorial Boards:**

- 2006 - \* Selected Readings in General Surgery, A.C.S.  
1996-2009 World Journal of Surgery  
1998-2002 HPB Journal  
1995-2005 Saudi Journal of Gastroenterology  
1986-1996 Canadian Journal of Surgery

**Reviewer:**

- Annals of Surgery  
British Journal of Surgery  
Canadian Journal of Surgery  
Canadian Medical Association Journal  
HPB Journal

International Journal of Pancreatology  
Surgery  
Surgical Endoscopy  
World Journal of Surgery

**Selected External Referee – University Departments of Surgery**

- 2009 Dr. William Fitzgerald; Professor, Memorial University,  
St. John's, Newfoundland
- 2007 Dr. Richard Nason; Chair, University of Manitoba
- 2007 Dr. Lorne Rotstein, Professor, University of Toronto
- 2007 Dr. Chris de Gara, Professor, University of Alberta
- 2005 Dr. Vivian McAlister, Department Head, Dalhousie University,  
Halifax, Nova Scotia
- 2002 Dr. John Butsch, Professor, University of Buffalo
- 2000 Dr. Michael Marcaccio, Professor, McMaster University,  
Hamilton, Ontario
- 1999 Dr. William Pollett, Professor, Memorial University,  
St. John's, Newfoundland
- 1999 Dr. Dale Mercer, Professor, Queen's University,  
Kingston, Ontario
- 1999 Dr. Daniel Tasse', Chair, University of Montreal
- 1999 Dr. William Pollett, Chair, Memorial University,  
St. John's Newfoundland
- 1998 Dr. Cyrus Kotwall, Associate Professor with Tenure,  
University of North Carolina
- 1997 Dr. Tarek M.S. Malatani, Professor, King Saud University,  
Saudi Arabia
- 1996 Dr. Charles Scudamore, Professor, University of British Columbia
- 1996 Dr. Aaron Fink, Professor, Emory University, School of Medicine,  
Atlanta, GA
- 1994 Dr. Marvin Wexler, Professor, McGill University, Montreal, P.Q.
- 1994 Dr. Jarley Koo, External Research Evaluation, University of Toronto
- 1994 Dr. David McCready, Associate Professor, University of Toronto
- 1993 Dr. Keith Apelgren, Professor, Michigan State University,  
East Lansing, MI
- 1993 Dr. Noelle Davis, Associate Professor, University of British Columbia
- 1993 Dr. Michael Marcaccio, Associate Professor, McMaster University  
Hamilton, ON
- 1993 Dr. Mark Meloche, Associate Professor, University of British Columbia
- 1992 Dr. Robert MacKenzie, Associate Professor, University of Toronto
- 1992 Dr. William Wall, Professor, University of Western Ontario,  
London, Ontario
- 1991 Dr. Philip Crowe, Active Staff, University of Sydney, Australia
- 1991 Dr. Lorne Rotstein, Associate Professor, University of Toronto
- 1991 Dr. Dale Mercer, Associate Professor, Queen's University,

Kingston, Ontario

**Grant Review:**

Physicians' Services Incorporated Fund (Ontario)  
Canadian Surgical Research Fund

**13. CONSULTING WORK UNDERTAKEN:**

2005 Surgical Review Yorkton Union Hospital, Yorkton, Saskatchewan  
2002 Consultations, American Association of Medical Colleges

**Medicolegal Reviews:**

2009 Expert Witness, Court of Queen's Bench, Regina, Saskatchewan  
2009 Review for McKercher, McKercher, Regina, Saskatchewan  
2009 Expert Witness, Court of Queen's Bench, Saskatoon, Saskatchewan  
2008 Review for McKercher, McKercher, Saskatoon, Saskatchewan  
2008 Review for Stones Carbert Waite, Calgary, Alberta  
2007 Expert Witness, Court of Queen's Bench, Saskatoon, Saskatchewan  
2001 Review for McCarthy, Tetrault, Saskatoon, Saskatchewan  
2001 Review for Dutton, Brock, MacIntyre and Collier, Calgary, Alberta  
1999 Review for McKercher, McKercher, Saskatoon, Saskatchewan  
1999 Review of Balfour, Moss, Saskatoon, Saskatchewan  
1996 Review for Cuelenaere, Kendall, Katzman and Richards,  
Saskatoon, Saskatchewan  
1994 Expert Witness, Court of Queen's Bench, Saskatoon, Saskatchewan

**14. PUBLIC AND COMMUNITY CONTRIBUTION**

**University Related:**

Dec. 2016 Facilitator, Meeting with Minister of Health (Sask) and CAGS t  
June, 2002 Welcome Address (College of Medicine) to the 5<sup>th</sup> Annual  
Shokeir Lectureship  
Nov. 1999 Expectations Conference, College of Medicine Presentation,  
Academic Clinical Services Member, Planning Committee  
July, 1999 Saskatchewan Indian Federated College Career Camp,  
Regina, Saskatchewan  
June, 1999 2<sup>nd</sup> Annual Guild of Friends Gathering, Royal University Hospital,  
Saskatoon, Saskatchewan  
June, 1998 Saskatchewan Indian Federated College Math/Science and  
Health Career Camp, Regina, Saskatchewan  
1998-2000 Saskatchewan Health, Regina, Saskatchewan  
Member, Health Services Advisory Committee  
1998-2000 Government of Ontario, Commission Member, National Advisory  
Council for Resource Based Relative Value Schedule

- 1998-2005 Saskatoon District Health Board:  
 Member, Executive Committee, Surgical Operations  
 Member, Executive Committee, Department of Surgery  
 Physician Site Manager, Royal University Hospital  
 Member, Shared Services Committee  
 Member, Liaison and Planning Committee  
 Chairman, Ambulatory Care and Emergency Committee  
 Member, Medical Advisory Committee  
 Member, Operating Room Committee  
 Executive Member, Working Groups: Oncology, Surgery,  
 Short Stay  
 Member, Ad Hoc Committee on Admissions  
 Member, Task Force for Hospital Closures  
 Member, Medical Capital Equipment Committee  
 Member, Medical Human Resources Committee  
 Member, Credentials Committee
- 1995 Facilitator for: Saskatchewan Government Insurance,  
 Department of Surgery, College of Medicine, University of  
 Saskatchewan.  
 Minimal Brain Injury Research Funding (\$300,000.00)
- 1994 Department Survey – Impact of Regionalization on Academic  
 Surgery
- 1993-1994 Facilitator for: Saskatchewan Government Insurance, Department  
 of Surgery, College of Medicine, University of Saskatchewan -  
 Whiplash Research Project
- 1990-2005 Department of Surgery – Invited External Reviews:  
 1990: Reviewers: Dr. John Duff – University of Western Ontario  
 Dr. David Mulder – McGill University  
 1997: Reviewer: Dr. David Mulder – McGill University  
 2005: Reviewer: Dr. David Mulder – McGill University
- Oct. 1990 Department of Surgery Retreat, Waskesiu, Saskatchewan

**Non University Related:**

- 1989-1992 Ontario Curling Association  
 Member, Executive Council, Toronto, Ontario
- 1983-1986 World Curling Championship,  
 Toronto Silver Broom, 1986, Inc.  
 Member, Board of Directors
- 1981-1983 Toronto Curling Association,  
 Air Canada Silver Broom Bid Committee  
 Vice Chairman and Member, Executive Committee
- 1979-1984 Toronto Curling Association  
 President 1982-1984  
 Member, Executive Council 1979-1982

## 15. APPEARANCE ON TELEVISION

1995	British Television: Animals in Surgical Research and Teaching
1991	CBC (Saskatchewan): Interview – Cardiac Surgery
1990	CBC News: Interview – Surgical Manpower

## 16. TEACHING RECORD

### UNDERGRADUATE EDUCATION

1990-2010	GI Systems Lectures 411.8
2004-2015	Clinical Sciences (Surgery) 412.8
1990-2016	Small group teaching, and examinations
1990-2016	Clinical Clerkship (JURSI) Surgery 501.8
1990-2016	JURSI Surgery Examinations
1990-2016	JURSI Surgery Interim Evaluations

### Medical Student Electives

2005	C. Mueller, Germany
2005	H. Ulber, Germany
2002	J. Fagnow, University of Alberta

### Summer Student Research – Dean’s Project

1993	Neal Maber, Demographics of Cholelithiasis in Saskatchewan
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### University of Toronto

1987-1990	Member, Undergraduate Curriculum Committee - Year 3 GI System
1978-1984	Member, Undergraduate Curriculum Committee - Endocrinology and Metabolism

### University of Toronto, St. Michael’s Hospital

1989-1990	Introduction to Surgery; Course Coordinator and Instructor Elective Course Year 1
1988-1990	Instructor, Clinical Methods Program Year 2
1987-1990	Course Coordinator, GI System Year 3
1986-1990	Introduction to General Surgery Year 3 Course Coordinator, Instructor and Examiner
1986-1990	Clerkship, General Surgery Year 4 Hospital Coordinator and Instructor

### University of Toronto: Sunnybrook Medical Centre

1980-1985	Instructor, Clinical Methods Program Year 2
1980-1985	Instructor, Comprehensive Examination Year 3

1980-1985     Examiner, GI Systems, Year 3  
1973-1985     Instructor, GI Systems, Year 3  
1976-1985     Instructor and Examiner, Surgery Clerkship Year 4

**Medical Student Elective**

1985             Elective Clerkship – Student, Dundee University, Scotland

**Summer Student**

1982             Undergraduate Program in Medical Science  
                     Institute of Medical Science, Medical Research Council  
                     - University of Toronto, Student: S.H. Keshavjee

**GRADUATE STUDENTS:**

2005-2007     MSc     Dr. Samaad Malik  
1998-2004     PhD     Dr. Abebola Obayan  
2000-2002     MSc     CoSupervisor, Dr. Anees Chagpar

**Chairman Thesis Defence Committee (Surgery)**

2008             MSc     Dr. Adam Wu  
2007             MSc     Dr. Samaad Malik  
2007             MSc     Dr. Khalid Ataelmannan  
2004             PhD     Dr. Abebola Obayan  
2002             MSc     Dr. Anees Chagpar  
1999             MSc     Dr. Patrick Colquhoun  
1998             MSc     Dr. Sumeer Lal  
1997             MSc     Dr. Pierre Cote

**Chairman, Advisory Committee (Surgery)**

2005-2007     MSc     Dr. Samaad Malik  
2003-2004             Dr. Tommy Lee  
1999-2002     MSc     Dr. Anees Chagpar  
1998-2004     PhD     Dr. Abebola Obayan  
1997-1999     MSc     Dr. Patrick Colquhoun  
1997-1998             Dr. Leyo Ruo  
1994-1998     MSc     Dr. Sumeer Lal

**Member Advisory Committee (Surgery)**

2005-2007     MSc     Dr. Adam Wu  
2002-2007     MSc     Dr. Khalid Ataelmannan  
1998-1998     MSc     Dr. Joseph Lemire  
1993-1996     MSc     Dr. Pierre Cote

**College of Graduate Studies and Research**  
**Degrees Granted (Thesis); Surgery**

2008	MSc	Dr. Adam Wu “The role of retrograde repression in limiting axonal regeneration in the central nervous system.”
2008	MSc	Dr. Khalid Ataelmannan “Radiosensitizing glioblastoma in a rat model using L-Buthionine-SR-Sulfoximine (BSO).”
2007	MSc	Dr. Samaad Malik “Laparoscopic cholecystectomy and the dyspeptic patient: identifying the appropriateness of operative intervention.”
2004	PhD	Dr. Adebola Obayan “Oxidate Stress: Natural history and modulation in surgery and trauma patients.”
2002	MSc	Dr. Anees Chagpar “Microsatellite instability and mismatch repair in breast cancer.”
1999	MSc	Dr. Patrick Colquhoun “An exploration of molecular pathways involved in colorectal tumourigenesis: differentiating the rectum from the colon.”
1998	MSc	Dr. Sumeer Lal “Calmodulin-dependent Cyclic Nucleotide Phosphodiesterase in the human central nervous system.”
1997	MSc	Dr. Pierre Cote “The prevalence and determinants of chronic neck pain in the Saskatchewan adult population.”

### **POSTGRADUATE EDUCATION**

2005-2010	University Program for Hepatic, Pancreatic and Biliary Disease
1991-2003	Department of Surgery Grand Rounds, Coordinator
1991-2000	Department of Surgery Trauma Rounds, Coordinator
1990-2003	Department of Surgery Resident Research Days, Coordinator
1990-2003	Department of Surgery; Davis & Geck/Johnson and Johnson Visiting Professor Program

### **Division of General Surgery Residency Training Program**

1990-2005	Member, Residence Training Program Committee
1990-2016	Faculty Clinical Teacher
1990-2016	Examiner, General Surgery Residents
1991-2016	Instructor, General Surgery Academic Half Day
1991-2014	Member, General Surgery Resident Selection Committee
1992-2003	Member, Core Surgery Program, Committee
1991-2000	Seminar Leader, Professor Rounds of Residents
1991-2000	Seminar Coordinator, Journal based Problem Solving Rounds
1995-2001	Coordinator, General Surgery Annual Resident Retreat

1991-1998 Supervisor, Resident Research Projects:  
 1998 - S. Meiers; ERCP and Biliary Leaks  
 1995 – J. Baerg; Neonatal Enterocolitis  
 1995 – A. Valji; MRI and Obstructive Jaundice  
 1995 – O. Farooq; Colon Cancer  
 1992 – G. Miller; Liver Hemodynamics after Biliary Obstruction  
 1991 – S. Seneshen; Experimental Sclerosis of the Gallbladder

**POSTGRADUATE FELLOWS - Hepatopancreaticobiliary Fellows**

2014	Dr. A. Obayan	University of Saskatchewan
2000	Dr. T. Jaber	University of Toronto
1994	Dr. G. Murty	Smiths Falls, Ontario
1992	Dr. Keith Apelgren	Michigan State University
1992	Dr. Herb Jansen	Grande Prairie, Alberta
1991	Dr. T. Matsubara	University of Manitoba

**University of Toronto**

1990	Dr. N. Hadjis	Athens, Greece
1989	Dr. W.A. Felix	Memorial University
1989	Dr. S. Dhalla	University of Manitoba
1988	Dr. A.D. Forward	University of British Columbia
1988	Dr. R. Fairfull Smith	University of Ottawa
1987	Dr. M. Marcaccio	McMaster University
1986	Dr. R. Lui	University of Calgary
1986	Dr. C. Kotwall	SUNY, Buffalo

**DISTINCTION ACHIEVED BY GRADUATE STUDENTS, RESIDENTS AND FELLOWS**

2004	Dr. S. Malik	Assistant Professor, University of British Columbia (Victoria)
2003	Dr. A. Karimuddin	Assistant Professor, University of British Columbia (Victoria)
2003	Dr. A. Chagpar	Professor, University of Louisville
2002	Dr. P. Colquhoun	Associate Professor, University of Western Ontario
2002	Dr. T. Jaber	Associate Professor, Saudi Arabia University
1993	Dr. K. Apelgren	Professor, Michigan State University
1991	Dr. N. Hadjis	Research Scientist, University of Saskatchewan
1990	Dr. R. Fairfull Smith	Program Director, University of Ottawa
1990	Dr. W. Felix	Professor, Memorial University
1989	Dr. M. Marcaccio	Professor, Chief of Surgery. McMaster University
1987	Dr. R. Lui	Assistant Professor, University of Calgary
1986	Dr. C. Kotwall	Associate Professor, University of North Carolina

**TEACHING WORKSHOPS, SEMINARS PRESENTED**

October, 2005 Career Dialogues      Student Medical Society  
University of Saskatchewan

October, 2003 Pancreatic Disease      P.G. Course, American College of Surgeons

July, 2002      Basic Modular Workshops      Royal College of Physicians  
-Video on Examination Process and Surgeons of Canada

May, 2002      Symposium Chair, Chronic Pancreatitis, Society for Surgery of the  
Pancreatitis; Postgraduate Alimentary Tract Course

2000      Invited International Examiner, Health Council of Resident Final Examinations  
Saudi Arabia

1999      Invited Faculty, SAGES Laparoscopy Course San Antonio, Texas

1993      Postgraduate Course in Surgery University of Saskatchewan

1993      Faculty, SAGES Laparoscopy Michigan State University Course

1992-1994      C.M.E. Visits – Surgery Saskatchewan Medical Association (Meadow  
Lake, Nipawin, Yorkton)

1992.1993      Laparoscopic Cholecystectomy, University of Saskatchewan/  
Saskatchewan Site Visits      Sask. Health

1991-1992      Saskatchewan Laparoscopic      University of Saskatchewan  
Cholecystectomy Training Program

1991      Surgery for Family Practitioners University of Saskatchewan

1985-1990      Chair and Course Director, University of Toronto  
Annual Refresher Course for General  
Surgeons

1984.1987      Course Director, GI Endoscopy Workshops. Canadian Association of  
General Surgeons

**TEACHING INNOVATION – University of Saskatchewan**

2005.2010      Hepatico pancreatico biliary Diseases; Monthly Rounds

2005-2016      Chief Resident Weekly Rounds (“Keith Rounds”)

1995-2003      General Surgery Annual Resident Retreats

1995      Founder, Student Surgical Society

1993-1994      Established Core Program in Surgery

1993-1994      Established Weekly Professor Rounds

1993-1994                      Established Problem Solving Rounds for General Surgery  
 1990                                Established Davis and Geck Visiting Professor  
    Program and Resident Research Days

**ADMINISTRATION ASSOCIATED WITH TEACHING**

2000-2004	Chairman, Examination Committee in General Surgery	Royal College of Physicians and Surgeons of Canada
2004	Invited External Reviewer, Division of General Surgery	University of Western Ontario
1999-2004	Member, Core Surgery Committee	Royal College of Physicians and Surgeons of Canada
1999-2003	Member, Education Committee	Canadian Association of General Surgeons
1996-2002	Chairman, Specialty Committee for General Surgery	Royal College of Physicians and Surgeons of Canada
1995-1999	Member, GI Examinations Committee	College of Medicine
1993-2006	Graduate Chair, Surgery	College of Graduate Studies and Research
1991-1996	Member, GI Curriculum Committee	College of Medicine
1990-2005	Chairman, Postgraduate Education Committee	Department of Surgery
1990-2005	Member, Residency Training Committee for General Surgery	College of Medicine
1990-2016	Chairman, National Resident in Training Examination Committee	Canadian Association of General Surgeons
1987-1989	Chairman, Board of Examiners for General Surgery	Royal College of Physicians and Surgeons of Canada
1987-1989	Chairman, Test Committee in General Surgery	R.S. McLaughlin Examination and Research Centre

1984-1986	Vice Chairman, Board of Examiners for General Surgery	Royal College of Physicians and Surgeons of Canada
1984-1986	Vice Chairman, Test Committee in General Surgery	R.S. McLaughlin Examination and Research Centre
1976-1986	Member, Board of Examiners for General Surgery	Royal College of Physicians and Surgeons of Canada

## 17. BOOKS, CHAPTERS IN BOOKS, EXPOSITORY AND REVIEW ARTICLES

### A/ BOOKS PUBLISHED

2. Keynes, WM, Keith RG. The Pancreas. Appleton, Century, Crofts, New York, NY (2<sup>nd</sup> Printing) 1982
1. Keynes WM, Keith RG. The Pancreas. Wm. Heinemann Medical Books Ltd, London, England, 1981

### B/ CHAPTERS PUBLISHED

19. Keith RG. Pancreatic ductal disruption leading to pancreatic fistula, pancreatic ascites or pancreatic pleural effusion. (pp 547-551) in Current Surgical Therapy. Cameron JL (Ed), Mosby, St. Louis 2001
18. Keith RG, Pancreaticoduodenectomy for chronic pancreatitis (pp 367-376) In Surgical Diseases of the Pancreas, Howard J, Ihse I, Idezuki Y, Prinz R (Eds); Williams and Wilkins, Philadelphia, PA 1998
17. Keith RG. Acute cholecystitis (pp 730-734) In Current Therapy in Adult Medicine (4<sup>th</sup> Ed). Kassirer JP, Greene HL (Eds), Mosby-Year Book Inc. St. Louis, 1997
16. Keith, RG. Practice of Surgery in the early 2000's. A view from the fence. (pp 12-15) In Crucial Controversies in Surgery. Schein M, Wise L (Eds), Karger Landes Systems, Basel Switzerland 1997
15. Keith, RG. Pancreatic ascites and pancreatic pleural effusions. (pp 432-436) In Current Surgical Therapy (5<sup>th</sup> Ed). Cameron JL (Ed), Mosby-Year Book, Philadelphia, PA 1995
14. Keith, RG. Surgery for pancreas divisum. (pp 171-180) in Gastrointestinal Endoscopy Clinics of North America. WB Saunders Company, Philadelphia, PA 1995

13. Keith, RG. The pancreas (pp 1558-1617) in Clinical Surgery (2<sup>nd</sup> Ed). Davis JH (Ed), CV Mosby, St. Louis, 1995
12. Keith, RG. Pancreas. (pp 153-157) In Q and A Review of Surgery. Gamelli RL, Foster RS, Moore EE (Ed) Mosby-Year Book, Philadelphia, PA 1995
11. Keith, RG. Acute cholecystitis (pp 602-606) In Current Therapy in Gastroenterology and Liver Disease. Bayless TM (Ed) Mosby – Year Book. St. Louis, 1994
10. Keith, RG. Anatomic developmental and functional aspects of surgical diseases of the pancreas. (pp 407-431) In Surgical Diseases of the Biliary Tract and Pancreas. Braasch JW, Tompkins RK (Eds) Mosby – Year Book, St. Louis, 1994
9. Keith, RG. Pancreas divisum (pp 414-418) In Current Surgical Therapy (4<sup>th</sup> Ed). Cameron JL (Ed), C.V. Mosby, St. Louis, 1992
8. Keith, RG. Pancreas. (pp 362-375) In Essentials of Clinical Surgery. Davis JH, Foster RS, Gemelli RL (Ed), Mosby – Year Book, St. Louis 1991
7. Keith, RG. Pancreatitis, surgical considerations. (pp 548-553) In Current Therapy in Gastroenterology and Liver Disease. Bayless TM (Ed), B.C. Decker, Toronto, 1990
6. Keith, RG. The pancreas (pp 1680-1740) In Clinical Surgery. Davis JH (Ed); C.V. Mosby, St. Louis, 1987
5. Keith, RG. Chronic pancreatitis. (pp 245-249) In Current Surgical Therapy. Cameron JL (Ed), C.V. Mosby, St. Louis, 1986.
4. Keith, RG. Pancreatitis. (pp 334-340) In Nutrition in Clinic Surgery (2<sup>nd</sup> Ed). Deitel M (Ed), Williams and Wilkins, Baltimore, MI 1985
3. Keith, RG. Gastrinomas and other non insulin producing islet cell tumours. (pp 241-259) In The Pancreas. Keynes WM, Keith RG (Ed), Wm Heinemann, London, England, 1981
2. Keith, RG. Operative Pancreatography. (pp 142-147) In The Pancreas. Keynes WM, Keith RG (Eds), Wm Heinemann, London, England, 1981
1. Keith, RG. Pancreatitis. (pp 247-253) In Nutrition in Clinical Surgery. Deitel M. (Ed), Williams and Wilkins, Baltimore, 1980

**C/ SYMPOSIUM**

Keith, RG. Surgical Management of Chronic Pancreatitis (Invited Ed)  
(21 articles) World Journal of Surgery, Vol 27, No. 11; November, 2003

## **18. PAPERS IN REFEREED JOURNALS**

42. Keith RG. A tribute to Lloyd D. MacLean.  
Canadian Journal of Surgery: 2015; 58: 223-224
41. Keith RG. Surgical management of chronic pancreatitis.  
World Journal of Surgery: 2003; 27 (11): 1171
40. Keith RG. Definition and classification of chronic pancreatitis.  
World Journal of Surgery: 2003; 27 (11): 1172-1174
39. Barkun J, Keith RG. Biliary pancreatitis; Canadian Association of  
General Surgeons Evidence Based Reviews in Surgery 2.  
Canadian Journal of Surgery: 2002; 45(3): 207-209
38. Keith RG. Advocacy-answering old mail; Canadian Association of  
General Surgeons Presidential Address. Canadian Journal of Surgery:  
1999; 42 (3): 177-180
37. Kwauk STM, Cameron R, Burbridge B, Keith R. Traumatic pseudoaneurysm  
of the hepatic artery after percutaneous liver biopsy and laparoscopic  
cholecystectomy in a patient with biliary cirrhosis: a case report.  
Canadian Journal of Surgery: 1998; 41(4): 316-320
36. Moyana TN, Miller GG, Keith RG. Sporadic ampullary hamartoma  
simulating cancer. Canadian Journal of Surgery: 1997; 40: 227-230
35. Keith RG. More with less: Central Surgical Association Presidential Address.  
Surgery: 1995; 118(4) 557-581.
34. Keith RG. Is the increasing frequency of laparoscopic bile duct injury  
justifiable? Canadian Journal of Surgery: 1993; 36: 501-502
33. Keith RG. Current management of choledocholithiasis.  
Canadian Journal of Surgery: 1993; 36: 7-8
32. Keith RG. To Barb and Lloyd.  
Canadian Journal of Surgery: 1992; 35: 226-227
31. Hadjis NS, Keith RG. Liver atrophy induced by selective bile duct  
obstruction is independent of porta blood flow. Surgical Forum:  
1992; 43: 117-175

30. Gardiner GW, Lajoie G, Keith RG. Hepatoid adenocarcinoma of the papilla of Vater. *Histopathology*: 1992; 20: 541-44
29. Keith RG, Hadjis N. Pancreas divisum and sphincter of Oddi dysfunction. *Pancreas*: 1991; 6: 60-65
28. Keith RG. Laparoscopic cholecystectomy – training guidelines. *Canadian Journal of Surgery*: 1991; 34: 105-106
27. Keith RG. Laparoscopic cholecystectomy: let us control the virus. *Canadian Journal of Surgery*: 1990; 33: 435-436
26. Keith RG. Universal utilization of endoscopic retrograde pancreatography for investigation of pancreatic disease. *International Journal of Pancreatology*: 1989; 5: 313-315
25. Keith RG, Shapero, TF, Saibil FG, Moore TL. Dorsal duct sphincterotomy is effective long term treatment for acute pancreatitis associated with pancreas divisum. *Surgery*: 1989; 106: 660-667
24. Kotwall CA, Keith RG. Lymphoma pancreatitis: a real entity. *Canadian Journal of Surgery*: 1989; 32: 375-377
23. Keith RG, Saibil FG, Sheppard RH. Treatment of chronic alcoholic pancreatitis by pancreatic resection. *American Journal of Surgery*: 1989; 157: 156-162
22. Keith RG. The general surgeon and sepsis in the critical care unit. *Canadian Journal of Surgery*: 1988; 31: 301-302
21. Gertzbein SD, Stile M, McMurtry RY, Kellam JF, Keith RG, Harsanyi Z, Luffman J. Analysis of the analgesic efficiency of acetaminophen 1000 mg, codeine phosphate 60 mg and the combination of acetaminophen 1000 mg and codeine phosphate 60 mg in the relief of postoperative pain. *Pharmacotherapy*: 1986; 6 (3): 104-107
20. Keith RG. Perspectives on malignant biliary obstruction: does the surgeon have a role in management? *Canadian Journal of Surgery*: 1986; 29: 225-226
19. Keith RG. Role of surgery in chronic pancreatitis. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1986; 19: 105-109
18. Keith RG, Keshavjee S, Kerényi N. Neuropathology of chronic pancreatitis in humans. *Canadian Journal of Surgery*: 1985; 28: 207

17. Keith RG, Ranson JHC, Sarles H. Symposium: pancreatitis. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1984; 17: 237
16. Keith RG, Fisher MM, Rosen IE, Brow JR. Surgical management of primary bile duct carcinoma. *Canadian Journal of Surgery*: 1984; 21: 51
15. Transvedlt E, Keith RG, Fonger J, Fisher MM. Annular pancreas with coexistent ampullary carcinoma in an elderly woman. *Canadian Journal of Surgery*: 1982; 25: 687
14. Keith RG, Shapero TF, Saibil FG. Treatment of pancreatitis associated with pancreas divisum by dorsal duct sphincterotomy alone. *Canadian Journal of Surgery*: 1982; 25: 622
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12. Keith RG, Mustard RA, Saibil EA. Gastric variceal bleeding due to occlusion of splenic vein by pancreatic disease. *Canadian Journal of Surgery*; 1982; 25: 301
11. Keith RG. Surgical pros and cons. *Surgery, Gynecology and Obstetrics*: 1981; 152: 337
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9. Keith RG. Effect of a low fat elemental diet on pancreatic secretion during pancreatitis. *Surgery, Gynecology and Obstetrics*: 1980; 151: 337
8. Manuel MA, Saiphoo CS, Keith RG. Treatment of ascites by ascitic fluid ultra-filtration and reinfusion. *Dialysis and Transplantation*: 1978; 7: 710
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6. Keith RG. Conservative management of acute pancreatitis. *Canadian Journal of Surgery*: 1978; 21:56
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1973; 136-353

3. Keith RG, Taylor GA. Use of a flexible fiberoptic bronchoscope in the diagnosis of malignant tumors of the lung. *Canadian Journal of Surgery*: 1973; 16:1
2. Keith RG. Correspondence. *Canadian Medical Association Journal*: 1971; 105:691
1. Keith RG, Mahoney LJ, Garvey MB. Disseminated intravascular coagulation: an important feature of the fat embolism syndrome. *Canadian Medical Association Journal*: 1971; 105:74

#### **19. PAPERS IN NON REFEREED JOURNALS**

4. Keith RG. Chronic pancreatitis. Open for Discussion. *Science and Medicine*: 1992; Toronto, Canada
3. Keith RG. Management of pancreatic cancer. *Medicine North American*: 1991; 16: 2150-2155
2. Broughan TA, Hermann RE, Keith RG. Distal pancreatectomy and splenectomy for insulinoma. *Surgery Illustrated*: 1990; LTI Medical, New York
1. Keith RG. Management of chronic pancreatitis. *Contemporary Surgery*: 1989; 35: 37-50

#### **20. INVITED PAPERS IN PUBLISHED CONFERENCE PROCEEDINGS AND ABSTRACTS:**

22. Keith RG. Discussion: Outcomes after pancreatectomy for intraductal papillary mucinous neoplasms of the pancreas: an institutional experience. Yang et al *Surgery*: 2007; 142(4): 536
21. Keith RG. Discussion: Current management of pancreatic fistula after pancreaticoduodenectomy. Aranha, et al. *Surgery*: 2006; 140(4): 568
20. Keith RG. Discussion: Pancreatic duct obstruction is a common cause of recurrent pancreatitis after successful management of pancreatic necrosis. Howard, et al. *Surgery*: 2004; 136; 909-16
19. Keith RG. Discussion: Vascular complications associated with pancreaticoduodenectomy adversely affect clinical outcome. Kim, et al *Surgery*: 2002; 132(4): 747
18. Keith, RG. Discussion: Current management of common bile duct stones:

Is there a role for laparoscopic cholecystectomy and intraoperative endoscopic retrograde cholangiopancreatography as a single stage procedure. Wright, et al. *Surgery*: 2002; 132(4): 737

17. Obayan A, Keith R, Juurlink BHJ. The effect of trauma on plasma oxidative hemeostasis. *Canadian Journal of Surgery*: 2002; 45(5), August
16. Keith, RG. Discussion: Roux-en-Y internal drainage is the best surgical option to treat patients with disconnected duct syndrome after severe acute pancreatitis. Howard, et al. *Surgery*: 2001; 130(4): 720
15. Keith, RG. Clinical review of trial of management of common bile duct stones. *Canadian Journal of Surgery*: 2000; 43(5), August.
14. Keith, RG. Discussion: Endoscopic drainage of the pancreatic pseudocyst. Vitale et al. *Surgery*: 1999; 126: 622
13. Keith RG. Discussion: Clinical pathway implementation improves outcome for complex biliary surgery. Pitt, et al. *Surgery*: 1999; 126: 757
12. Keith RG. Discussion: Contemporary treatment strategies for external pancreatic fistulas. Howard, et al. *Surgery*: 1998; 124: 633
11. Keith RG. Discussion: Mammographic density in women on post-menopausal hormone replacement therapy. Leung, et al. *Surgery*: 1997; 122: 674
10. Keith RG. Discussion: Effect of failed computed tomography guided and endoscopic drainage on pancreatic pseudocyst management. Rao et al. *Surgery*: 1993; 114: 848
9. Keith RG. Discussion: Secondary pancreatic infections: are they distinct clinical entities? Fedorak, et al. *Surgery*: 1992; 112: 981
8. Keith RG. Discussion: Neuroendocrine differentiation and prognosis of EBT carcinomas. Hsu, et al. *Surgery*: 1991; 110: 610
7. Keith RG. Discussion: Treatment of dorsal duct syndrome. Warshaw. *American Journal of Surgery*: 1990; 159: 65
6. Keith RG. Discussion: Long term results of pancreaticojejunostomy in patients with chronic pancreatitis. Bradley. *American Journal of Surgery*: 1987; 153: 213
5. Keith RG. Discussion: Pancreas divisum: a normal variant? Sugawa, et al. *American Journal of Surgery*: 1987; 153: 67

4. Keith RG. Discussion: Myocardial depression during acute pancreatitis: fact or fiction? Altamari, et al. *Surgery*: 1986; 100: 730
3. Keith RG. Discussion: Biliary pancreatitis: Clinical presentation and surgical management. Frey, et al. *American Journal of Surgery*: 1986; 151: 174
2. Keith RG. Discussion: The management of retained and recurrent bile duct stones. Brougham, et al. *Surgery*: 1985; 98: 750
1. Keith RG. Discussion: Near total pancreatectomy for chronic pancreatitis. Eckhauser, et al. *Surgery*: 1984; 96: 599

## **21. CONTRIBUTED PAPERS IN PUBLISHED CONFERENCE PROCEEDINGS AND ABSTRACTS:**

27. Keith R, Malik S, Reeder B, Chibbar R. Only pain from acute inflammation is relieved one year following laparoscopic cholecystectomy in dyspeptic patients with cholelithiasis. *Gastroenterology*: 2008; 134(4) S: A897
26. Malik, S, Reeder B, Keith R. Timing of operation and frequency of attacks do not influence patient satisfaction one year following laparoscopic cholecystectomy. *HPB Journal*: 2008; 10(52)
25. Obayan A, Juurlink B, Keith R. Oxistress assay: novel bedside technique for measuring oxidative stress in surgical patients. *Canadian Journal of Surgery*: 2005; 48(S) August
24. Obayan A, Laing B, Juurlink B, Keith R. Protein carbonyls as a measure of oxidative stress in trauma patients. *Canadian Journal of Surgery*: 2005; 48(S) August.
23. Obayan A, Juurlink B, Keith R. Understanding neutrophil activity following trauma and association with plasma free radical production. *Canadian Journal of Surgery*: 2003; 46(S), August
22. Obayan A, Juurlink B, Keith R. Effect of trauma on plasma oxidative hemeostasis. *Canadian Journal of Surgery*: 2002; 45(S) August
21. Obayan A, Givelichian L, Sankaran K, Juurlink B, Keith R. Measuring oxidative stress in neonates: evaluating the sensitivity and specificity of a novel urine assay. 10<sup>th</sup> Annual Life Sciences Student Research Day; College of Medicine, University of Saskatchewan: 2003; January
20. Hadjis N, Ruo L, Cameron R, Keith R. Role of increased biliary pressure in hepatocellular injury associated with segmental bile duct obstruction.

Hepatology: 1996; 110(4): 1424

19. Valji A, Rawat B, Loewy J, Keith R. MRI cholangiography is predictive for cholelithiasis. *Gastroenterology*: 1997; 110(4): 1424
18. Hadjis N, Seneshen S, Moyana T, Keith RG. Spectrum and reversibility of liver lesions after common or segmental bile duct obstruction. *Gastroenterology*: 1994; 106: A903
17. Miller G, Hadjis N, Xavier F, McNeill R, Keith RG. Hepatic and renal blood flow in chronic biliary obstruction. *Clinical and Investigative Medicine*: 1993; 16: 54
16. Hadjis N, Keith RG. Significant liver atrophy and hepatocyte hyperplasia are induced by segmental biliary obstruction. *Clinical and Investigative Medicine*: 1991; 14: A51
15. Keith RG, Brow JR, Miller H, McKee J, Reid R. Improved survival with surgical treatment of pancreatic abscess. *Canadian Journal of Surgery*: 1987; 30: 297
14. Keith RG. Pancreatitis and pancreas divisum: splitting the divided. *Clinical and Investigative Medicine*: 1985; 8: A110
13. Keith RG, Keshavjee SH, Kerényi NR. Neuropathology of chronic pancreatitis in humans. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1984; 17: 317
12. Keith RG, Keshavjee SH, Kerényi NR. Neuropathology for chronic pancreatitis in humans. *Gastroenterology*: 1984; 86: 1132
11. Keith RG, Sheppard RH, Saibil RG, Brow RJ. Resection for chronic pancreatitis. *Current Surgery*: 1981; 38: 433
10. Keith RG, Sheppard RH, Saibil FG. Pain relief after resection for chronic alcoholic pancreatitis. *Modern Medicine*: 1981; 36: 1642
9. Keith RG. Effect of low fat elemental diet on pancreatic secretion during pancreatitis. *Current Surgery*: 1981; 38: 358
8. Keith RG, Mustard RA, Saibil EA. Current management of gastric variceal bleeding due to pancreatic disease with splenic vein occlusion. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1981; 14: 187
7. Keith RG, Fonger J, Chin-Sang H, Wilson SR. Non invasive assessment of the the biliary tract following high bile duct reconstruction. *Annals of the*

- Royal College of Physicians and Surgeons of Canada: 1981; 14: 187
6. Keith RG, Sheppard RH, Saibil F, Brow JR. Results following resection for chronic pancreatitis (alcoholic). *Annals of the Royal College of Physicians and Surgeons of Canada*: 1980; 13: 124
  5. Keith RG, Wilson SR, Dorsey JS. Ultrasonic diagnosis of acute cholecystitis. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1978; 11: 37
  4. Keith RG, Serum gastrin interrelation in a kindredship with multiple endocrine adenomatosis. *Irish Journal of Medicine*: 1977; 18(S); October
  3. Keith RG, Brow JR, Tator CH, Sheppard RH. Serum gastrin variation in multiple endocrine adenomatosis during stages of total surgical treatment. *Annals of the Royal College of Physicians and Surgeons of Canada*. 1976; 9: 40
  2. Keith RG, Smith R. Effect of an elemental diet on pancreatitis. *The VIII European Pancreatic Symposium 1975*
  1. Keith RG, Effect of an elemental diet on pancreatic secretion in pancreatitis. *Annals of the Royal College of Physicians and Surgeons of Canada*: 1974; 7: 24

## **22. TECHNICAL REPORTS RELEVANT TO ACADEMIC FIELD**

### **A. Advisory Reports and Presentations:**

Keith RG. Review of Clinical Review Panel Report.  
Royal University Hospital, Saskatoon, SK  
September, 1993

Keith RG. Governance of the Academic Clinical Service.  
College of Medicine, University of Saskatchewan; Saskatoon, SK  
May, 1992

Keith RG. Report on Academic Surgery and Organization of Surgical Services in Regina and Saskatoon. Ministry of Health – Urban Hospitals Branch. Saskatoon, SK March, 1992

Keith RG. Laparoscopic Cholecystectomy. Ministry of Health - Technical Advisory Committee; Saskatoon, SK March, 1991

Keith RG. Laparoscopic Cholecystectomy. Report to Council, College of Physicians and Surgeons of Saskatchewan. Saskatoon, SK January, 1991

**B. Audio Cassette Presentations:**

Keith, RG. Controversial Areas in General Surgery. University of California - Los Angeles. Audio-Digest Foundation; April, 1993

Keith RG. Advances in Pancreatic Surgery. Audio Programs for Specialists. Ottawa, ON Medifacts, Ltd. November, 1984

**C. Motion Picture Presentations:**

Keith RG. Resection of a Choledochal Cyst in an Adult with Reconstruction by Roux-en-Y Hepaticojejunostomy:

- American College of Surgeons, Clinical Congress Atlanta, GA Oct. 1989
- American College of Surgeons, Clinical Congress San Francisco, CA October, 1987
- Registered in American College of Surgeons Film Library Chicago, ILL, October, 1980
- American College of Surgeons – Clinical Congress, Atlanta GA Oct. 1980
- University of Toronto General Surgery Refresher Course Toronto, ON June, 1980

Keith RG. Longitudinal Pancreaticojejunostomy for Juvenile Pancreatitis:

- University of Toronto General Surgery Refresher Course. Toronto, ON April, 1984
- Academy of Medicine – Section of General Surgery Toronto, ON Dec. 1981
- American College of Surgeons – Clinical Congress San Francisco, CA October, 1981

**D. Video Presentations:**

Keith RG. Basic Modular Workshops – Examination Process. (Annual Royal College Program). Royal College of Physicians and Surgeons of Canada. Ottawa, ON. July, 2001

**23. BOOK REVIEWS**

Keith RG. (Review) Surgical Management of the Diabetic Patient. Bergman M, Sicard GA (Eds). Canadian Journal of Surgery: 1992; 35: 280

Keith RG. (Review) Laparoscopy for Surgeons. Salky BA (Ed) Canadian Journal of Surgery: 1991; 34: 250

Keith RG. (Review) Acute Pancreatitis. Beger H (Ed) Canadian Journal of Surgery: 1988; 31: 340

## **24. INVITED LECTURES OUTSIDE U OF S AND INVITED CONFERENCE PRESENTATIONS:**

### **A. International**

81. May, 2012: Surgical Grand Rounds: “Canadian Health Care System.” Department of Surgery, The Ohio State University Medical Center
80. May, 2008: Surgical Grand Rounds: “Management of non ulcerative lesions of the papilla of Vater.” Department of Surgery, University of Louisville, Louisville, KY
79. August, 2007: Invited Moderator: Colorectal Surgery I International Surgical Week; Montreal, PQ
78. February, 2007: “Work up of the liver lump.” HPB Surgery for the General Surgeon. Annual Meeting of the Alberta Association of General Surgeons. Banff, AB
77. May, 2006: Invited Lecturer, Named Lecture: 35<sup>th</sup> Behrend Visiting Professorship, “Long term outcome following aggressive surgery for pancreatic sepsis.” Department of Surgery, Albert Einstein Medical Centre; Philadelphia, PA
76. May, 2006: Invited Lecturer: “Training and evaluation of Canadian General Surgery Residents – is there a difference?” Albert Einstein Medical Center; Philadelphia, PA
75. February, 2006: Invited Faculty: “Managing intra-abdominal surgical infections.” Train the Trainer Program, Wyeth Pharmaceuticals; Toronto, ON
74. October, 2005: Invited Discussant: “Laparoscopic gastrectomy for Cancer.” Cine Video Symposium. American College of Surgeons - Clinical Congress. San Francisco, CA
73. September, 2004: Invited Lecturer; Named Lecture: 15<sup>th</sup> Annual Winfield L. Butsch Memorial Lecture: “Surgical Management of pancreatic sepsis:.” Department of Surgery, University of Buffalo. Buffalo, NY
72. September, 2004: “Training and evaluation of Canadian General Surgery Residents”. Department of Surgery, University of Buffalo, Buffalo, NY
71. June, 2004: Visiting Professor. “Long term outcome following surgery for

- pancreatic sepsis.” Department of Surgery, Lund University, Lund, Sweden.
70. June, 2004: Visiting Professor, Department of Surgery Edinburgh University, Edinburgh, Scotland.
  69. May, 2004: Visiting Fellow, Royal College of Surgeons of England. London, England.
  68. May, 2004: Invited Lecturer, “Surgical management of pancreatic sepsis.” Department of Surgery, University of Louisville, Louisville, KY
  67. April, 2004: Visiting Professor: General Surgery Rounds, Department of Surgery, University of California at San Francisco. San Francisco, CA
  66. March, 2004: Invited Lecturer: “The role of duct decompression in chronic Pancreatitis.” Surgical Grand Rounds. Rush University. Chicago, IL
  65. January, 2004: Visiting Professor: Department of Surgery, University of California at Los Angeles, CA
  64. October, 2003: Invited Faculty: “The role of duct decompression in chronic pancreatitis.” Hepatic, Biliary and Pancreatic Surgery, Post Graduate Course. American College of Surgeons. Clinical Congress. Chicago, IL
  63. May, 2002: Invited Symposium Chair: “Unresolved issues in the management of hepatobiliary and pancreatic disease.” Chronic pancreatitis Postgraduate Course. Society for Surgery of the Alimentary Tract. San Francisco, CA
  62. October, 2001: Invited Faculty:
    - a) “Canadian Health Care”
    - b) “Surgery for upper GI bleeding”People to People Ambassador Program. Havana, Cuba
  61. April, 2001: Invited Symposium Chair: “Maintenance of competence.” American College of Surgeons Spring Meeting. Toronto, ON
  60. February, 2001: Invited Lecturer: “Surgical Audit”. Egyptian Society of Surgeons, Cairo, Egypt.
  59. January, 2000: Visiting Professor, Department of Surgery National Guard Hospital. Jeddah, Saudi Arabia
  58. October, 1999: Invited Lecturer: “Long term pancreatic function following Surgery for pancreatic sepsis.” Department of Surgery, University of

Cincinnati, OH

57. October, 1999: Invited Lecturer. "The role of ERCP in the era of laparoscopic cholecystectomy." University of Cincinnati. Cincinnati, OH
56. September, 1999. Invited Lecturer. "The role of ERCP in the era of Laparoscopic cholecystectomy." Department of Surgery, University of Illinois College of Medicine at Peoria. Peoria, IL
55. September, 1999: Invited Lecturer: "Academic Surgery under the new Canadian Health Care Program" Peoria Surgical Society. Peoria, IL
54. August, 1999: Invited Moderator, "Hepatobiliary Surgery – Laparoscopic cholecystectomy free papers session." International Surgical Society. Vienna, Austria
53. October, 1992: Invited Lecturer. "Pathogenesis of pain in chronic pancreatitis." Collegium International Chirurgiae Digestive Meeting. Orlando, FL
52. October, 1998: Visiting Professor: "Carcinoma of the ampulla." Department of Surgery, Rush University, Chicago, IL
51. October, 1998: Invited Lecturer: "The role of ERCP in the era of laparoscopy." Rush Presbyterian - St. Luke's Medical Center. Chicago, IL.
50. June, 1998: Invited Panel Chair: "Tissue approximation by sealants and Alternative techniques". 6<sup>th</sup> World Congress of Endoscopic Surgery. Rome, Italy.
49. June, 1998: Invited Lecturer. "Management options for treatment of CBD stones, sequential approach." 6<sup>th</sup> World Congress of Endoscopic Surgery. Rome, Italy.
48. May, 1998: Invited Faculty and Moderator: "Pancreatitis and the papilla". Postgraduate Course, Society for Surgery of the Alimentary Tract. New Orleans, LA.
47. September, 1997: Invited Faculty: "Surgical management of pancreatic sepsis." 12<sup>th</sup> Annual Scientific Symposium. Norwalk Hospital Department of Surgery. Cape Cod, MA
46. September, 1997: Invited Faculty: "Surgical practice under the Canadian Health Care System.: 12<sup>th</sup> Annual Scientific Symposium. Norwalk Hospital Department of Surgery, Cape Cod, MA

45. August, 1997: Invited Lecturer: "Hepatobiliary surgery – new frontiers in Laparoscopic Surgery." International Federation of Societies of Endoscopic Surgeons. Acapulco, Mexico
44. August, 1997: Invited Moderator: "Bile duct – free paper session." World Congress of Surgery. Acapulco, Mexico
43. March, 1997. Invited Moderator/Program Coordinator: Poster Presentations and awards. Society of Gastrointestinal Endoscopic Surgeons World Conference on Endoscopic Surgery. San Diego, CA
42. February, 1997: Invited Moderator: "Ampullary tumors free papers session." American Hepato pancreatico biliary Association Congress. Miami, FL
41. March, 1996: Invited Session Chair: "New techniques in pancreatic Surgery." Society for American Gastrointestinal Endoscopic Surgeons World Conference on Endoscopic Surgery." Philadelphia, PA
40. November, 1995: Invited Faculty "Comparison of wide local resection to Whipple procedure for ampullary carcinoma." Pancreatic Cancer Symposium, Tokyo. Women's Medical College. Tokyo, Japan.
39. November, 1995: Invited Faculty "Canadian experience with resection for pancreatic carcinoma." Pancreatic Cancer Symposium, Tokyo Women's Medical College. Tokyo, Japan.
38. May, 1995: Invited Lecturer "Surgical management of chronic pancreatitis." Department of Surgery, University of Nebraska. Omaha, NB
37. July, 1994: Invited Lecturer; "A single aggressive approach in management of pancreatic sepsis." Surgical Grand Rounds, Emory University Hospital. Atlanta, GA.
36. July, 1994: Invited Lecturer; "Pancreas divisum, sphincter of Oddi dysfunction and other unusual causes of pancreatitis." Department of Surgery, VA Hospital. Atlanta, GA.
35. June, 1994: Invited Lecturer and Moderator; Training in Endoscopic Surgery; "Regulation and credentialing of training in laparoscopic surgery in Canada." 4<sup>th</sup> World Congress of Endoscopic Surgery. Kyoto, Japan.
34. April, 1994: Invited Faculty, Session Chair; "Laparoscopic adrenalectomy and splenectomy." Society for American Gastrointestinal Endoscopic Surgeons Annual Scientific Meeting. Nashville, TN.

33. April, 1993: Invited Lecturer: "Flow cytometry for pancreatic cancer." UCLA Postgraduate Course. Indian Wells, CA.
32. April, 1993: Invited Lecturer: "Management of pancreatic sepsis." Controversial Areas in General Surgery, Post graduate Course – UCLA. Indian Wells, CA.
31. September, 1992: Invited Faculty: Canadian Experience with acute pseudocysts". International Symposium on Acute Pancreatitis, Emory University. Atlanta, GA.
30. April, 1992: Invited Lecturer: "Postgraduate surgical education in evolving Canadian Health care," Association for Surgical Education Annual Meeting. Quebec, PQ
29. October, 1991: Invited Faculty: International Symposium on Somatostatin. Monte Carlo, Monaco
28. August, 1991: Invited Faculty: Panel Management of chronic pancreatitis ." International Hepato Biliary Pancreatic Association, 13<sup>th</sup> Annual Meeting. Stockholm, Sweden.
27. August, 1991: Invited Session Chair: Hepatic Blood Flow. International Hepato Biliary Pancreatic Association, 13<sup>th</sup> Annual Meeting. Stockholm, Sweden.
26. April, 1991: Invited Lecturer; Named Lecture: Marion S. Deweese Lecture, "The evolving patterns of health care in Canada." Department of Surgery, University of Missouri. Columbia, Missouri.
25. December, 1990: Invited Faculty: "Surgical management of pancreatic sepsis." Postgraduate Course, University of Arizona and ACS, Arizona Chapter. Phoenix, AZ
24. December, 1990: Invited Faculty: "Differentiating periampullary tumors." Postgraduate Course, University of Arizona and ACS, Arizona Chapter. Phoenix, AZ.
23. November, 1990: Invited Lecturer: "Diagnosis and Management of Pancreaticobiliary neoplasms." St. Luke's Hospital, Temple School of Medicine. Bethlehem, PA
22. November, 1990: Invited Faculty: "Pancreas divisum and sphincter of Oddi dysfunction." Postgraduate Course, University of Cincinnati. Cincinnati, OH

21. August, 1990: Invited Faculty: "Operative strategy and results: single aggressive operation." International Hepato Biliary Pancreatic Association, 12<sup>th</sup> Annual Meeting, Hong Kong.
20. August, 1990: Invited Session Chair: Cine Session on Hepatobiliary Disease. International Hepato Biliary Pancreatic Association, 12<sup>th</sup> Annual Meeting. Hong Kong.
19. September, 1989: Invited Session Chair: Cine Clinics, Pancreas and Biliary Tract. World Congress of Surgery. Toronto, ON
18. September, 1989: Invited Chair; Pancreatic Disorders, paper sessions. World Congress of Surgery. Toronto, ON.
17. December, 1988: Invited Faculty: "Resection for chronic pancreatitis." Postgraduate Course: Controversies, Problems and Techniques in Surgery. Department of Surgery, Albert Einstein College of Medicine. New York, NY
16. September, 1988: Visiting Professor, "Acute pancreatitis." Division of Gastrointestinal Surgery, Hopital Purpan. Toulouse, France.
15. September, 1988: Invited Faculty, "Sclerosing cholangitis and inflammatory bowel disease." Symposium on Sclerosing Cholangitis. International Biliary Association, 10<sup>th</sup> Annual Meeting. Nice, France.
14. October, 1988: Invited Faculty; "Pancreas divisum." Postgraduate Course; Diseases of Liver, Biliary Tract and Pancreas. American College of Surgeons - Clinical Congress, San Francisco, CA.
13. September, 1987: Invited Faculty; "Resection for chronic pancreatitis." Symposium Pancreatitis. International Biliary Association, 9<sup>th</sup> Annual Meeting. Adelaide, Australia.
12. June, 1987: Visiting Professor; "Management of bile duct carcinoma." Department of Surgery, Piedmont Hospital Emory University, Atlanta, CA.
11. May, 1986: Visiting Professor; "Pain of chronic pancreatitis." Department of Surgery, Center for the Health Sciences, UCLA. Los Angeles, CA.
10. May, 1986: Visiting Lecturer; "Non biliary, non alcoholic pancreatitis." Department of Surgery, Wadsworth VA Hospital, UCLA. Los Angeles, CA.
9. December, 1984: Invited Faculty; "Sphincterotomy for pancreatitis associated with pancreas divisum." International Workshop on Pancreas Divisum. The Middlesex Hospital. London, England.

8. October, 1984: Invited Faculty; “Surgical treatment of acute and chronic alcoholic pancreatitis.” Postgraduate Course; Alcohol and Drug Induced Disease of the GI Tract. American College of Gastroenterology. Toronto, ON
7. January, 1984: Invited Lecturer; “Pancreatic Sepsis.” Department of Surgery, Tawan Hospital, Al Ain, United Arab Emirates.
6. October, 1979: Visiting Professor; Division of General Surgery, The Cleveland Clinic. Cleveland, OH.
5. October, 1979: Visiting Professor; Service du Gastroenterologie, Centre Hospitalier Regional de Clermont – Ferrand. Clermont-Ferrand, France.
4. October, 1977: Visiting Professor; Department of Surgery, Royal Infirmary. Glasgow, Scotland.
3. October, 1977: Visiting Professor; Division of Surgery, Westminster Hospital. London, England.
2. October, 1977: Invited Faculty; Symposium: Acute Pancreatitis. St. Mary’s Hospital. London, England.
1. October, 1976: Invited Faculty; “Pancreatic hormones.” Postgraduate Course, Diseases of the Liver, Biliary Tract and Pancreas. American College of Surgeons – Clinical Congress, Chicago, IL.

**B. National**

88. September, 2004: Invited Introduction; Honorary Member Dr. Fred Inglis. Canadian Association of General Surgeons, Ottawa, ON.
87. February, 2004: Visiting Professor, Division of Gastroenterology. St. Michael’s Hospital, Toronto, ON.
86. January, 2004: Visiting Professor, Section of Hepatobiliary Surgery. University of British Columbia. Vancouver, BC.
85. September, 2003: Invited Introduction; Honorary Member Dr. Julius Stoller. Canadian Association of General Surgeons. Vancouver, BC.
84. September, 2003: Invited Panellist: Unexpected Findings at Surgery, Canadian Surgery Forum. Vancouver, BC.
83. September, 2003: Invited Adjudicator: Poster Presentations. Canadian Association of General Surgeons, Vancouver, BC.

82. September, 2002: Invited Lecturer: “The role of the American Board of Surgery,” Surgery Resident Symposium. Canadian Surgery Forum. London, ON.
81. September, 2002: Invited Panellist: Unexpected Findings at Surgery. Canadian Surgery Forum. London, ON.
80. September, 2001: Invited Introduction of CAGS Lecturer: Dr. Andrew Warshaw. Canadian Surgery Forum. Quebec, PQ.
79. September, 2001: Invited Lecturer: “APP for academic Surgeons - Western exposure.” Canadian Surgery Forum. Quebec, PQ.
78. November, 2000: Invited Lecturer; “Surgical management of chronic pancreatitis”, 6<sup>th</sup> Annual General Surgery Refresher Course for Community Surgeons, Dalhousie University. Halifax, NS.
77. November, 2000: Invited Lecturer, “Surgical and endoscopic management of pancreatic cancer.” 6<sup>th</sup> Annual General Surgery Refresher Course for Community Surgeons, Dalhousie University. Halifax, NS.
76. September, 2000: Invited CoChair; Poster Presentations, Canadian Association of General Surgeons. Edmonton, AB.
75. September, 2000: Invited Introduction of CAGS Lecturer: Dr. Josef Fischer. Canadian Association of General Surgeons. Edmonton, AB.
74. September, 2000: Invited Lecturer; “Pancreatitis – what’s new?” Postgraduate Course, CAGS and Canadian Critical Care Society. Edmonton, AB.
73. May, 1999: Invited Speaker: “The perspective from a national specialty society – CAGS”. Association of Canadian Medical Colleges Annual Meeting. Winnipeg, MB.
72. March, 1999: Visiting Professor: Department of Surgery. Memorial University. St. John’s, NL.
71. March, 1999: Invited Lecturer, “Local resection of ampullary carcinoma”. Surgical Society of Newfoundland and Labrador. Corner Brook, NL.
70. March, 1999: Invited Faculty, “New directions for Maintenance of Competence.” Surgical Society of Newfoundland and Labrador. Corner Brook, NL.

69. May, 1998: Invited Faculty, “The place of ERCP in the era of laparoscopic cholecystectomy” 51<sup>st</sup> Annual Meeting, British Columbia Surgical Society. Kelowna, BC.
68. May, 1998: Invited Lecturer: “The impact of five years of health care restructuring on academic surgery”. 51<sup>st</sup> Annual Meeting British Columbia Surgical Society. Kelowna, BC.
67. May, 1998: Visiting Professor; “Local resection for ampullary tumors”. Department of Surgery, University of British Columbia. Vancouver, BC.
66. May, 1997: Invited Moderator, “Impact of changed resource allocation on academic surgery.” Canadian Association of University Surgeons. Halifax, NS.
65. June, 1996: Invited Symposium Chair; “Practice plans in Departments of Surgery.” Canadian Association of University Surgeons. Quebec, PQ.
64. January, 1996: Visiting Professor, “Surgical management of pancreatic sepsis.” Department of Surgery, University of Alberta. Edmonton, AB.
63. January, 1996: Invited Lecturer: “Future of general surgery residency training”. Edmonton Surgical Society. Edmonton, AB.
62. May, 1995: Invited Faculty, “Impact of regionalization and rationalization on the clinical practice plan and training programs in surgery at the University of Saskatchewan.” Forum of the Association of Canadian Teaching Hospitals. Montreal, PQ.
61. April, 1995: Invited Faculty: “Pancreaticobiliary neoplasms”, Symposium - Current Topics in Surgical Oncology, University of Calgary, Lake Louise, AB.
60. November, 1994: Invited Faculty, “Common pancreatic and hepatobiliary problems.” General Surgery Refresher Course, University of Ottawa. Ottawa, ON.
59. September, 1994: Invited Faculty, “Role of Surgery in acute pancreatitis.” CAGS/Royal College Symposium. Toronto, ON.
58. September, 1994: Invited Faculty, “How and when to integrate laparoscopy into standard general surgical practice.” CAGS Postgraduate Course. Toronto, On.
57. September, 1993: Invited Faculty; “Common abdominal emergencies, efficient diagnosis and management.” CAGS/Royal College Symposium. Vancouver, BC.

56. September, 1993: Invited Faculty, “Quality assurance in general surgical practice.” CAGS/Royal College Symposium. Vancouver, BC.
55. September, 1993: Invited Faculty, “Clinical Practice Guidelines”. CAGS/Royal College Symposium. Vancouver, BC.
54. September, 1993: Invited Chairman, “Biliary tract disease”. Laparoscopic Surgery Course. CAGS/Royal College Annual Meeting. Vancouver, BC.
53. September, 1993: Invited Lecturer, “Credentialing Universities”. CAGS/Royal College Annual Meeting. Vancouver, BC.
52. April, 1993. Invited Faculty, “Anaesthesia and sedation.” Consensus Conference – Gastrointestinal Endoscopy, Canadian Association of Gastroenterology. Cambridge, ON.
51. September, 1992: Invited Faculty, “Management of biliary obstruction.” Symposium, Canadian Association of General Surgeons Annual Meeting. Ottawa, ON.
50. September, 1992: Invited Faculty, “Unexpected findings at laparotomy.” Canadian Association of General Surgeons Annual Meeting. Ottawa, ON.
49. June, 1992: Invited Lecturer and External Adjudicator; “Management of Ampullary carcinoma”. Surgical Residents’ Research Days, Department of Surgery, McMaster University. Hamilton, ON.
48. October, 1991: Invited Faculty, “Surgical management of gallstones, laparoscopic vs. conventional cholecystectomy.” Postgraduate Course, 14<sup>th</sup> Annual Gastroenterology Days. University of Saskatchewan. Regina, SK.
47. October, 1991: Invited Lecturer; “Periampullary carcinoma and carcinoma of the head of the pancreas.” 14<sup>th</sup> Annual Gastroenterology Days, Plains Health Centre. Regina, SK.
46. October, 1991: Invited Panellist; “Liver tumors – selected cases”. Postgraduate Course, 14<sup>th</sup> Annual Gastroenterology Days, University of Saskatchewan, Regina, SK.
45. September, 1991: Invited Faculty, “Unexpected findings at surgery.” Symposium, CAGS/Royal College Annual Meeting. Quebec, PQ.
44. September, 1991: Invited Faculty, “Early Intervention for acute cholangitis.” CAGS Postgraduate Course – Controversies in Management of Surgical

- Infections, CAGS/Royal College Annual Meeting. Quebec, PQ.
43. April, 1991: Visiting Professor and External Adjudicator: “Surgical management of chronic alcoholic pancreatitis”. Surgical Grand Rounds and Resident Research Days, Department of Surgery, University of Alberta, Edmonton, AB.
  42. April, 1991: Invited Lecturer: “Rationalization of health care in Saskatchewan”. Edmonton Surgical Society. Edmonton, AB.
  41. April, 1991: Invited Faculty: “Chronic pancreatitis – a surgeon’s perspective”. General Surgery Update, University of Toronto, Postgraduate Course, Toronto, ON.
  40. November, 1990: Invited Faculty, “Management of upper GI Hemorrhage”. Postgraduate Course – General Surgery, 1990, Department of Surgery, McGill University. Montreal, PQ.
  39. November, 1990: Invited Lecturer, “Current management of biliary pancreatitis”. Postgraduate Course – General Surgery 1990, Department of Surgery, McGill University. Montreal, PQ.
  38. October, 1990: Invited Lecturer, “Management of periampullary carcinoma”. Department of Surgery, University of Manitoba, Winnipeg, MB.
  37. October, 1990: Visiting Professor, “Assessment of competence in general surgery”. Department of Surgery, University of Manitoba, Winnipeg, MB.
  36. September, 1990: Invited Lecturer, “Timing of surgery in biliary pancreatitis”. CAGS Postgraduate Course – Controversies and Recent Advances in Management and Surgery of the Biliary Tract. CAGS/Royal College Annual Meeting. Toronto, ON.
  35. September, 1990: Invited Session Chair and Lecturer, “Technique of Choledochotomy”. Postgraduate Course – Controversies and Recent Advances in Management and Surgery of the Biliary Tract. CAGS/Royal College Annual Meeting. Toronto, ON.
  34. September, 1990: Invited Faculty, “Unexpected Findings at Surgery”. CAGS/Royal College Annual Meeting. Toronto, ON.
  33. May, 1990: Visiting Professor and External Adjudicator: “Periampullary Carcinoma”. 10<sup>th</sup> Annual General Surgery Resident Research Day, Department of Surgery, University of Western Ontario. London, ON.
  32. April, 1990: Visiting Professor and External Adjudicator: “Differentiating

- distal bile duct and pancreatic cancers”. 13<sup>th</sup> Annual Surgical Residents’ Research Days, Department of Surgery, University of British Columbia, Vancouver, BC.
31. November, 1989: Visiting Professor, “Pancreatic Sepsis”. Department of Surgery, University of Saskatchewan. Saskatoon, SK.
  30. September, 1989: Invited Faculty, “Endoscopy in diagnosis and management of benign gastroduodenal disease”. Postgraduate Course - Upper Gastrointestinal Surgery. Canadian Association of General Surgeons Annual Meeting. Edmonton, AB.
  29. May, 1989: Invited Lecturer; “Biliary Lithotripsy”. Ontario Medical Association Annual Meeting. Toronto, ON.
  28. November, 1988: Invited Faculty, “Upper GI Bleeding”. Refresher Course for General Surgeons, Department of Surgery, University of Ottawa, Ottawa, ON.
  27. November, 1988: Invited Faculty, “Unexpected biliary tract problems”. Refresher Course for General Surgeons, Department of Surgery, University of Ottawa. Ottawa, ON.
  26. November, 1988: Invited Lecturer, “Acute pancreatitis”. Refresher Course for General Surgeons, Department of Surgery, University of Ottawa. Ottawa, ON.
  25. June, 1988: Invited Lecturer; “Recent advances in treatment of biliary obstruction”. New Brunswick Surgical Society Annual Meeting, Ludlow, NB.
  24. June, 1988: Invited Lecturer, “Pancreatic Sepsis”. New Brunswick Surgical Society Annual Meeting. Ludlow, NB.
  23. April, 1988: Visiting Professor and Invited Adjudicator: “Management of Chronic Pancreatitis”. Surgical Residents’ Research Day, Department of Surgery, University of Saskatchewan. Saskatoon, SK.
  22. April, 1988: Invited Lecturer, “Assessing Competence in Surgical Trainees”. Surgical Residents’ Research Day, University of Saskatchewan, Saskatoon, SK.
  21. April, 1988: Invited Lecturer, “Surgical treatment of bile duct carcinoma”. Department of Surgery, University of Saskatchewan. Saskatoon, SK.
  20. November, 1987: Invited Faculty, “Surgical decision making in biliary obstruction”. British Columbia Surgical Society Clinical Days.

Vancouver, BC.

19. September, 1987: Invited Course Director, “Role of laparoscopy in abdominal trauma”. Postgraduate Course – Colonoscopy and laparoscopy for General Surgeons, Canadian Association of General Surgeons Annual Meeting. Winnipeg, MB.
18. September, 1986: Invited Course Director and Sessions Chair: “Intervention in pancreaticobiliary disease”. Postgraduate Course, Canadian Association of General Surgeons Annual Meeting. Toronto, ON.
17. February, 1986: Invited Lecturer, “Intra abdominal abscess, diagnosis and treatment”. Alberta Association of General Surgeons Annual Meeting. Banff, AB.
16. February, 1986: Invited Lecturer, “Acute pancreatitis”. Alberta Association of General Surgeons Annual Meeting. Banff, AB.
15. September, 1985: Invited Course Director: “GI endoscopy for general surgeons”. Postgraduate Course, Canadian Association of General Surgeons Annual Meeting. Vancouver, BC.
14. May, 1985: Invited Faculty; “Sphincterotomy in acute pancreatitis”. Interventional Biliary Imaging Workshop, McMaster University. Hamilton, ON.
13. September, 1984: Invited Course Director and Lecturer, “ERCP for chronic pancreatitis”. Postgraduate Course – GI endoscopy for General Surgeons, Canadian Association of General Surgeons Annual Meeting. Montreal, PQ.
12. February, 1984: Invited Faculty, “Surgery for common duct stones”. Refresher Course in General Surgery, University of Ottawa, Ottawa, ON.
11. February, 1984: Invited Faculty, “Surgical management of primary bile duct carcinoma”. Refresher Course in General Surgery, University of Ottawa. Ottawa, ON.
10. February, 1984: Invited Lecturer, “Surgery in acute pancreatitis”. Department of Surgery, University of Ottawa. Ottawa, ON.
9. September, 1983: Invited Lecturer, “Antibiotics in biliary surgery”. Postgraduate Course – Controversies and Advances in Management of Biliary Tract Disease, Canadian Association of General Surgeons Annual Meeting. Calgary, AB.
8. September, 1983: Invited Faculty, “Retained or recurrent stones”. Post-

graduate Course, Canadian Association of General Surgeons Annual Meeting. Calgary, AB.

7. September, 1983: Invited Faculty, "Biliary pancreatitis". Postgraduate Course, Canadian Association of General Surgeons Annual Meeting. Calgary, AB.
6. April, 1983: Invited Lecturer, "Pancreatic Sepsis". Department of Surgery, University of Saskatchewan. Regina, SK.
5. April, 1983: Invited Lecturer; "Primary bile duct carcinoma". Department of Surgery, University of Saskatchewan. Regina, SK.
4. February, 1983: Invited Faculty, "Primary bile duct carcinoma". Clinic on Liver and Biliary Tract Disease, Thunder Bay Medical Society. Thunder Bay, ON.
3. September, 1982: Invited Faculty and Session Chair, "Pancreatic abscess". Royal College of Physicians and Surgeons of Canada Annual Meeting. Quebec, PQ.
2. November, 1981: Visiting Professor, Department of Surgery, University of Calgary, Calgary, AB.
1. November, 1976: Visiting Professor, Department of Surgery, Ottawa Civic Hospital and University of Ottawa. Ottawa, ON.

### **C. LOCAL**

27. October, 1996: Invited Lecturer, Chair Panel Discussion, "Management of space occupying lesions of the liver". GI Days. Plains Health Centre. Regina, SK.
26. March, 1995: Invited Moderator, Free papers session. Canadian Association of Clinical Surgeons (Western Division) Saskatoon, SK.
25. October, 1994: Invited Lecturer, "Diagnosis and management of small liver lesions" GI Days. Regina, SK.
24. June, 1992: Invited Lecturer, "Techniques in laparoscopic cholecystectomy" Melville and District Medical Society, Melville, SK.
23. December, 1991: Invited Lecturer: "Advances in management of cholelithiasis". Meadow Lake District Medical Society. Meadow Lake, SK.
22. May, 1991: Invited Lecturer, "Laparoscopic cholecystectomy". Post-

graduate Course – Surgery for Family Practitioners, University of Saskatchewan, Saskatoon, SK.

21. October, 1986: Invited Lecturer, “Pancreatic Sepsis”. Grand Rounds, Department of Surgery, Toronto East General Hospital. Toronto, ON.
20. October, 1986: Invited Lecturer, “Screening for colorectal diseases”. Clinical Days, Scarborough General Hospital. Scarborough, ON.
19. October, 1986: Invited Lecturer, “Management of chronic pancreatitis”. Ajax and Pickering General Hospital. Ajax, ON.
18. October, 1986: Invited Lecturer, “Periampullary carcinoma”. Department of Surgery, North York General Hospital. North York, ON.
17. January, 1985: Invited Lecturer, “Pancreatic Sepsis”. Surgical Grand Rounds. Department of Surgery, McMaster University, Hamilton, ON.
16. November, 1984: Invited Lecturer, “Management of chronic pancreatitis”. Surgical Clinical Day, Women’s College Hospital. Toronto, ON
15. January, 1984: Invited Lecturer, “Chronic pancreatitis”. Section of General Surgery, Academy of Medicine. Toronto, ON.
14. January, 1984: Invited Lecturer, “Pancreatic Sepsis”. North York Gut Club. Toronto, ON.
13. January, 1983: Invited Lecturer, “Acute pancreatitis”. Refresher Course for Immigrant Physicians, Canadian Polish Congress. Toronto, ON.
12. January, 1983: Invited Lecturer, “Postoperative obstructive jaundice”. Section of General Surgery, Academy of Medicine. Toronto, ON.
11. February, 1982: Invited Lecturer, “Apudomas revisited”. North Toronto Gut Club. Toronto, ON.
10. May, 1981: Invited Lecturer, “Bile Duct Stricture”. Department of Surgery, Oshawa General Hospital. Oshawa, ON.
9. February, 1981: Invited Lecturer, “Pancreatitis and pancreatic carcinoma”. Department of Surgery, Doctor’s Hospital. Toronto, ON.
8. June, 1980: Invited Lecturer, “Serological endocrine tumor markers”. Centennial Meeting, Section on General Surgery, Ontario Medical Association. Toronto, ON.

7. December, 1978: Invited Lecturer, "Insulinoma". North Toronto Gut Club. Toronto, ON.
6. February, 1978: Invited Lecturer, "Biliary calculus disease". Welland County Medical Society. Welland, ON.
5. November, 1977: Invited Lecturer, "Perspectives on pancreatitis". North Toronto Gut Club. Toronto, ON.
4. June, 1976: Invited Lecturer, "Gastrointestinal hormones in diseases of the pancreas". Society of Clinical Chemists. Toronto, ON.
3. June, 1976: Invited Lecturer, "Elemental diet and pancreatitis". St. Joseph's Hospital. Brantford, ON.
2. April, 1976: Invited Lecturer, "Pancreatitis". Department of Surgery, Oakville Trafalgar Hospital. Oakville, ON.
1. May, 1974: Invited Lecturer, "Multiple endocrine adenomatosis". Gallie Day, Department of Surgery, University of Toronto, Toronto, ON.

## **25. PRESENTATIONS AT CONFERENCES (NON-INVITED):**

### **A. INTERNATIONAL**

23. Keith R, Malik S, Reeder B, Chibbar R. Only pain from acute inflammation is relieved one year following laparoscopic cholecystectomy in dyspeptic patients with cholelithiasis. (poster) Society for Surgery of the Alimentary Tract. San Diego, CA. May, 2008.
22. Malik S, Reeder B, Keith R. Timing of operation and frequency of attacks do not influence patient satisfaction one year following laparoscopic cholecystectomy. (poster). American Hepato Pancreatico Biliary Congress, Fort Lauderdale, FL. March, 2008.
21. Obayan A, Juurlink B, Keith R. Enteral alanyl-glutamine is effective in improving clinical outcome and reducing oxidative stress following major surgery. Surgical Forum, American College of Surgeons Annual Meeting. San Francisco, CA. October, 2005.
20. Gaboury J, Obayan A, Keith R. Evaluating the effect of medical history modifications to the trauma index. British Trauma Society, Annual Scientific Meeting. Leeds, England. October, 2001.
19. Obayan A, Keith R. The determinants of oxidative stress in trauma. The British Trauma Society, Annual Scientific Meeting. Leeds, England.

October, 2001.

18. Keith R. The role for local resection for carcinoma of the ampulla of Vater. 38th World Congress of Surgery. Vienna, Austria. August, 1999.
17. Meiers S, Keith R. The role of ERCP in the era of laparoscopic cholecystectomy. (poster). 38<sup>th</sup> World Congress of Surgery. Vienna, Austria. August, 1999.
16. Hadjis NS, Keith RG. Liver atrophy induced by selective bile duct obstruction is independent of portal blood flow. Surgical Forum, American College of Surgeons Annual Meeting. New Orleans, LA.
15. Hadjis NS, Keith RG. Compensatory hepatocyte hyperplasia after selective portal venous occlusion in chronic biliary obstruction is diminished but not abolished. International Hepato Biliary Pancreatic Association. San Diego, CA. September, 1992.
14. Hadjis NS, Keith RG. Electrocoagulation is a safe and effective method of gallbladder sclerosis in a rabbit. (poster). International Hepato Biliary Pancreatic Association Annual Meeting. San Diego, CA. September, 1992.
13. Hadjis NS, Keith RG. Significant liver atrophy and hepatocyte hyperplasia are induced by segmental biliary obstruction. (poster). Society for Surgery of the Alimentary Tract. New Orleans, LA. May, 1991.
12. Keith RG. Dorsal duct sphincterotomy is effective long term treatment for acute pancreatitis divisum. Central Surgical Association Annual Meeting. Banff, AB. March, 1989.
11. Keith RG, Brow JR. Treatment of chronic alcoholic pancreatitis by pancreatic resection. Society for Surgery of the Alimentary Tract Annual Meeting. New Orleans, LA. May, 1988.
10. Keith RG, Shapero T. Long term results of sphincterotomy for pancreatitis associated with pancreas divisum. International Biliary Association, 9<sup>th</sup> Annual Meeting. Adelaide, Australia. September, 1987.
9. Keith RG. Long term results of surgical treatment of pancreatic abscess. International Society of Surgery, 32<sup>nd</sup> World Congress. Sydney, Australia. September, 1987.
8. Keith RG. Improved survival with pancreatic abscess. World Congress on Hepato Pancreatic Biliary Surgery. Lund, Sweden. June, 1986.
7. Keith RG, Keshavjee S. Neuropathology of chronic pancreatitis in humans.

World Congress on Hepato Pancreatico Biliary Surgery. Lund, Sweden.  
June, 1986.

6. Keith RG. Endoscopic assessment of postgastrectomy problems. Association of Surgeons of Great Britain and Ireland, Annual Meeting. Birmingham, England. March, 1985.
5. Keshavjee S, Keith RG. Neuropathology of chronic pancreatitis in humans. (poster). American Pancreas Club, Digestive Disease Week. New Orleans, 1984.
4. Keith RG, Saibil EA. Non invasive assessment of high bile duct reconstruction. International Biliary Association, 4<sup>th</sup> Annual Meeting. Paris, France. June, 1982.
3. Keith RG. Serum gastrin and calcium interrelation in a kindredship with multiple endocrine endomatosis. 10<sup>th</sup> European Pancreas Club Symposium. Dublin, Ireland. October, 1977.
2. Keith RG. Surgical complications of acute pancreatitis. Southern Society of Clinical Surgeons, Annual Meeting. Toronto, ON. April, 1977.
1. Keith RG. Elemental diet and pancreatitis. 8<sup>th</sup> European Pancreas Club Symposium. Toulouse, France. October, 1975.

**B. NATIONAL**

27. Obayan A, Juurlink B, Keith R. Oxistress assay: novel bedside technique for measuring oxidative stress in surgical patients. Canadian Surgery Forum, Montreal, PQ. September, 2005.
26. Obayan A, Laing B, Juurlink B, Keith R. Protein carbonyls as a measure of oxidative stress in trauma patients. (poster). Canadian Surgery Forum. Montreal, PQ. September, 2005.
25. Obayan A, Juurlink B, Keith R. Understanding neutrophil activity following trauma and association with plasma free radical production. (poster). Canadian Surgery Forum. Vancouver, BC. September, 2003.
24. Obayan A, Juurlink B, Keith R. Effect of trauma on plasma oxidative hemeostasis. Canadian Surgery Forum. London, ON. September, 2002
23. Obayan A, Juurlink B, Keith R. Determinants of oxidative stress after trauma. Annual Life Science Research Day. University of Saskatchewan, Saskatoon, SK. January, 2002

22. Mannan KA, Obayan A, Keith R, Juurlink B. Urine carbonyl precipitates and trauma severity: is there any association? Annual Life Science Research Day. University of Saskatchewan, Saskatoon, SK. January, 2002
21. Obayan A, Keith R, Greibel R . Trauma involving head injury results in greater body oxidative stress than those involving spine injury. Canadian Congress of Neurological Science. Halifax, NS. June, 2001.
20. Miller G, Hadjis NS, Xavier F, McNeill R, Keith RG. Hepatic and renal blood flow in chronic biliary obstruction. Royal College Annual Meeting. Vancouver, BC. September, 1993.
19. Keith RG, Hadjis NS, Malik B. The training of rural general surgeons in Laparoscopic cholecystectomy. Royal College Annual Meeting. Ottawa, ON. September, 1992.
18. Hadjis NS, Keith RG. Significant liver atrophy and hepatocyte hyperplasia are induced by segmental biliary obstruction. (poster). CAGS/Royal College Annual Meeting. Quebec, PQ. September, 1991.
17. Seneshen S, Eckersley T, Lew T, Hadjis NS, Keith RG. Sclerosis of the gallbladder –experimental studies. Canadian Association of General Surgeons Research Conference. Montreal, PQ. June, 1991.
16. Keith RG. The Canadian general surgeon is a gastrointestinal endoscopist. Royal College of Physicians and Surgeons of Canada Annual Meeting. Edmonton, AB. September, 1989.
15. Keith, RG. Improved survival with surgical treatment of pancreatic abscess. Royal College of Physicians and Surgeons of Canada Annual Meeting. Winnipeg, MB. September, 1987.
14. Keith, RG. Long term results of dorsal duct sphincterotomy alone for pancreatitis associated with pancreas divisum. Canadian Association of Clinical Surgeons Annual Meeting. St. John's NL. June. 1987.
13. Keith RG. Pancreatitis and pancreas divisum: splitting the divided. Royal College of Physicians and Surgeons of Canada Annual Meeting. Vancouver, BC. September, 1985.
12. Keith RG. Neuropathology of chronic pancreatitis in humans. Royal College of Physicians and Surgeons of Canada, Annual Meeting. Montreal, PQ. September, 1984.
11. Keith RG. Surgical Management of primary bile duct carcinoma. Canadian Association of General Surgeons Annual Meeting. Halifax, NS.

May, 1983.

10. Keith, RG. Treatment of pancreatitis associated with pancreas divisum. Canadian Association of Clinical Surgeons Annual Meeting. Ottawa, ON May, 1982.
9. Keith RG, Mustard R. Current management of gastric variceal bleeding due to pancreatic disease with splenic vein occlusion. Canadian Association of General Surgeons Annual Meeting. Toronto, ON September, 1981.
8. Keith, RG. Non invasive assessment of the biliary tract following high bile duct reconstruction. Canadian Association of General Surgeons Annual Meeting. Toronto, ON. September, 1981.
7. Keith, RG. Results following resection of chronic pancreatitis. Canadian Association of General Surgeons Annual Meeting. Ottawa, ON June, 1980.
6. Keith RG. Results following resection of chronic pancreatitis. Canadian Association of Clinical Surgeons Annual Meeting. Toronto, ON June, 1978.
5. Keith RG, Wilson S. Ultrasonic diagnosis of acute cholecystitis. Canadian Association of General Surgeons Annual Meeting. Vancouver, BC. January, 1978.
4. Keith RG. Serum gastrin and calcium interrelation in a kindredship with multiple endocrine adenomatosis. Canadian Association of Clinical Surgeons. St. John's, NL. June, 1977.
3. Keith RG. Conservative management of acute pancreatitis. Canadian Association of General Surgeons, 1<sup>st</sup> Annual Meeting. Toronto, ON. April, 1977.
2. Keith RG. Serum gastrin and multiple endocrine adenomatosis. Royal College of Physicians and Surgeons of Canada Annual Meeting. Quebec, PQ. January, 1976.
1. Keith RG. Elemental diet and pancreatitis. Royal College of Physicians and Surgeons Annual Meeting. Montreal, PQ. January, 1974.

## **26. PATENTS GRANTED OR PENDING:**

Obayan A, Juurlink B, Keith R. Patent: Rapid Assay for Oxidative Stress. University of Saskatchewan Technologies Inc. June, 2005.

## 27. RESEARCH GRANT INFORMATION:

Malik S, Keith RG. Outcome following laparoscopic cholecystectomy for biliary dyskinesia with cholelithiasis. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$120,000. 2005-2007.

Obayan A, Juurlink B, Keith RG. Oxidative stress homeostasis. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$360,000. 1998-2004.

Hadjis NS, Britto T, Keith RG. Indefinite anicteric survival after complete biliary obstruction. College of Medicine Clinical Teaching and Research Fund, University of Saskatchewan. \$12,800. 1996.

Valji A, Loewy J, Keith RG. Role of MR cholangiography in choledocholithiasis. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$5,000. 1994-1995.

Hadjis NS, Ruo L, Keith RG. Splenic function in obstructive jaundice. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$5,000. 1995-1996.

Hadjis NS, Ruo L, Keith RG. Hepatic and renal hemodynamic changes in normovolemic and jaundiced rabbits during laparoscopic insufflation. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$23,000. 1995-1996.

Hadjis NS, Keith RG, Alhindawi R. Reappraisal of portocaval anastomosis in rabbits. Department of Surgery Academic Programs Fund, University of Saskatchewan. \$11,150. 1993-1995.

Hadjis NS, Seneshen S, Keith RG. Spectrum and reversibility of liver lesions after common or segmental bile duct obstruction in the rabbit. College of Medicine Teaching and Research Fund, University of Saskatchewan. \$15,000. 1992-1994.

Hadjis NS, Miller GG, Keith RG. Hepatic hemodynamic changes in chronic biliary obstruction. College of Medicine Teaching and Research Fund, University of Saskatchewan. \$15,000. 1991-1992.

Clark K, Hadjis NS, Keith RG. Compensatory hepatocyte hyperplasia after selective portal venous occlusion in biliary obstruction. College of Medicine Teaching and Research Fund, University of Saskatchewan. \$5,675. 1990-1991.

Swenia M, Hadjis NS, Keith RG. The significance of portal blood in the path-

ogenesis of liver atrophy associated with selective bile duct obstruction. College of Medicine Teaching and Research Fund, University of Saskatchewan. \$6,700. 1990-1991.

Seneshen S, Hadjis NS, Keith RG. Experimental sclerosis of the gallbladder. College of Medicine Teaching and Research Fund, University of Saskatchewan. \$7,455. 1990-1991.

Hadjis NS, Sarma DSA, Keith RG. Significant liver atrophy and hepatocyte hyperplasia are induced by major segmental biliary obstruction. St. Michael's Hospital Research Society, University of Toronto. \$9,500. 1989-1990.

Keith RG, Crowe PJ, Hadjis NS, Murray D, Kerényi N. Flow Cytometry for pancreatic biliary neoplasms. St. Michael's Hospital General Surgery Research Fund, University of Toronto \$4,000. 1989-1991.

Keith RG, Kotwall CA. Lymphoma and pancreatic disease. St. Michael's Hospital, University of Toronto 1988-1989.

Kotwall CA, Mahoney LJ, Keith RG. DNA flow cytometry and morphometry in breast cancer. St. Michael's Hospital Research Society, University of Toronto. \$2,585. 1988-1989.

Keith RG, Saibil F, Sheppard RH. Resective treatment for chronic alcoholic Pancreatitis. Sunnybrook Medical Centre, University of Toronto. 1976-1986.

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