



## The Future of General Surgery: Evolving to meet a changing practice



Final Report of the Task Force on the Future of General Surgery

**Date:** February 2014

## Foreword

Discussions with senior surgical leaders served as the impetus for this project on the future of General Surgery in Canada. Launched in 2012 after the Royal College's Committee on Specialties meeting and subsequent discussions, this project endeavoured to reassess surgical training in order to ensure that all graduates of Canada's General Surgery residency programs were optimally prepared to provide surgical care in a variety of practice settings across the country.

Recognizing that this task would only be possible through collaboration and expertise, surgical leaders across the country were enlisted to contribute their expertise and to chart a way forward for the discipline. Throughout the two years of the project, significant energy was devoted to the three key phases of the project: multiple stakeholders and international surgical leaders were engaged in thought-provoking discussions; a full scale national survey was launched with excellent uptake from Fellows of the Royal College; and a very successful and meaningful national summit was held in Spring 2013.

It is our hope that this report will inform, as well as inspire, the future of General Surgery and create a lasting positive impact, not only for the discipline of General Surgery but for other surgical specialties as well through a reasonable but challenging way forward. The findings of this report are particularly acute for General Surgery, but we recognize that these issues are potentially a microcosm of what is happening in other disciplines.

As we review the findings of this project, it has become very clear to us that this is a very exciting time of profound change for all of postgraduate specialty education in Canada. The recommendations in this report not only align very closely with the *Competence by Design* program, an innovative competency-based medical education framework currently being pursued by the Royal College, but also to other initiatives such as the Future of Medical Education in Canada – Postgraduate project and international trends towards competency-based medical education and innovation throughout the field.

We extend our sincere appreciation to everyone who participated in this project. To our Task Force members, Specialty Committee members, and to our survey respondents, interviewees, and other collaborators, we are indebted to you for responding with thoughtfulness and vision.



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# Executive Summary and Recommendations

General Surgery has a long history as one of two founding disciplines recognized in Canada and the founding discipline of all surgery. Originally known as “Surgery,” General Surgery is now one of ten primary surgical specialties recognized by the Royal College of Physicians and Surgeons of Canada (Royal College).

As highlighted by discussions at the Royal College’s Committee on Specialties, a committee responsible for specialty discipline recognition in Canada, the discipline of General Surgery has seen significant evolution. Changes in surgical training and services are due to a variety of factors such as the development of other surgical specialties, growing subspecialization, technological changes, fiscal restraint, and demographic changes (Pellegrini, Warshaw, & Debas 2004). Many of these changes have significantly impacted surgical knowledge, contributed to different divisions of labour among both surgical and non-surgical disciplines and, consequently, have led to changes in the delivery of surgical care (Warnock, 2012). Without parallel evolution in training programs, there is a concern that the current training of General Surgeons does not provide the skills required to practice General Surgery in all Canadian communities and practice settings where General Surgeons work. This project was launched as a result of discussions with surgical leaders in Canada and is intended to ensure Royal College General Surgery residency training programs are optimally preparing residents for practice in a broad range of locations across Canada.

## Project Process and Timelines

Led by a national Task Force on the Future of General Surgery, this project had two key objectives: to lead a national surgical summit on the Future of General Surgery and to develop recommendations on the optimal configuration of General Surgery training in Canada. Recognizing the importance of evidence-informed decision-making, a series of four sub-studies and a national survey were launched to inform these objectives.

The project’s goals were carried out over a series of three phases throughout 2012 and 2013: preliminary research (phase 1), full-day summit (phase 2), and development of recommendations (phase 3).

## Key Activities of the Project

Research conducted in Phase 1 informed the development of Phase 2, the Surgical Summit held in May 2013, a national discussion on the future of General Surgery. Activities from the Summit informed the development of recommendations. The project involved the following key activities and research methods to come to the conclusions detailed within:

- Interviews with stakeholders
- National Survey of General Surgeons
- Jurisdictional Review

- Historical Analysis
- National Summit on the Future of General Surgery

## Key Findings on General Surgery Training and Practice

### **General Surgeons have very different practice patterns depending on the location of practice**

One of the key findings of the historical analysis related to the heterogeneity of the discipline of General Surgery. As evidenced by definitions developed by the Specialty Committee in General Surgery, General Surgeons have a broad range of practices depending on the location in which they train and practice, and the other surgical and nonsurgical specialists working in these areas. Indeed, findings from the national survey corroborate this observation. General Surgeons in different practice settings—from Academic Health Science Centres (AHSCs) to rural or remote hospitals—experience different patterns of surgical practice.

### **General Surgery training offers strong preparation for overall clinical competence**

Research conducted through this project underlines many strengths of the current system of General Surgery residency education in Canada. In particular, residents are well prepared in terms of technical ability and clinical knowledge. Additionally, General Surgery residency programs in Canada are also commended for providing residents with diverse and significant caseloads, exposure to a wide range of specialty and subspecialty areas, and consistent training.

### **General Surgery training should ensure optimal preparation for practice**

Stakeholders, including practicing surgeons and residents, cited a number of areas of General Surgical training that would benefit from further attention and development. Across the national survey and in consultation with stakeholders, the most frequently cited suggestions included: ensuring a smooth transition to independent practice, increasing exposure to certain aspects of training, adjusting the design of residency programs, leveraging innovative teaching models such as competency-based medical education (CBME), and increasing technology in the learning environment.

Research conducted through this project highlighted a need to assess the fundamentals of training for all General Surgeons and to ensure that training is appropriately and efficiently matched to eventual practice for all General Surgeons.

### **Subspecialized training and focused practice is a new reality for today's General Surgeons**

In the United States, United Kingdom, and Australia (jurisdictions evaluated as part of Phase 1), a high percentage of General Surgeons are undertaking further training in other surgical subspecialties. A variety of reasons were cited, including, for example, a perception that further training was necessary for employment, the undervalued status of General Surgery, and a sense that pursuing subspecialized training in order to focus one's practice might be a way of achieving mastery and excellence that is otherwise difficult to achieve in an all-encompassing discipline such as General Surgery.

The increasing prominence of fellowships and further training was cited as a concern for many stakeholders: these individuals suggested that such training was leading to the fragmentation of a discipline that fulfills an important role within each of their jurisdictions. Surgical leaders referenced a perception that fragmentation and subspecialization are seen to be at odds with the promotion of generalism and a generalist ethos: a concern, especially, in smaller and more isolated communities in Canada.

## **A Way Forward**

The discipline of General Surgery is in flux due to a variety of factors. These changes have significantly impacted surgical knowledge and surgical care. This project intends to contribute to national and international discourse on the topic and to posit a path forward for the discipline within Canada. Several key principles underline the recommendations:

### **International Precedent of Enhanced Training**

Throughout the project, stakeholders expressed support for a redesigned approach to residency education in General Surgery that could be tailored to differing practice contexts, such as smaller communities or larger urban centres. There are two notable facets of this proposal. First, this is the first time that Canadian residency training might be explicitly adjusted by anticipated future practice patterns, rather than solely by anatomic regions of the body, as has been the case in this and other disciplines to date. Second, if pursued, this will also be the first time that explicit pathways for General Surgical training will be implemented in the discipline of General Surgery, in Canada or abroad, for the purposes of ensuring optimal preparation for practice.

### **The Importance of Foundational Training**

Common foundational training across a variety of surgical specialties is a reality in many jurisdictions and is generally accepted as an appropriate way forward to ensure optimal skill development. Akin to Australia and the United Kingdom, the Canadian postgraduate medical education system has developed a horizontal curriculum of foundational training for trainees entering many surgical specialties, entitled the Surgical Foundations Program.

### **Promoting the Generalist Ethos of General Surgery**

As defined by the Task Force on the Future of Generalism in Medicine, generalists are: “a specific set of physicians and surgeons with core abilities characterized by a broad-based practice. Generalists diagnose and manage clinical problems that are diverse, undifferentiated, and often complex. Generalists also have an essential role in coordinating patient care and advocating for patients” (Task Force on the Future of Generalism in Medicine, 2013). Many stakeholders spoke highly of the importance of maintaining such an approach within General Surgery. In many communities, the generalist skills are important for General Surgeons to play key roles in the managements of trauma and other conditions requiring urgent care.

### **Ensuring Equitable Service Delivery across the Country**

Many stakeholders spoke of a “rural imperative” for the reassessment of surgical delivery and care in order to ensure equitable access and surgical care delivery. The provision of surgical services in many jurisdictions is fraught with a similar set of challenges in the United States, Canada, and Australia: a predominantly urban population with a very large

land mass that is sparsely populated, an insufficient distribution of General Surgeons in specific practice settings, given societal health needs, a lack of access to surgeons practicing in other disciplines, and limited resources. These challenges are compounded by ongoing issues of difficulty recruiting and retaining General Surgeons in more isolated communities.

### **Necessity of a Nimble Education System**

Stakeholders reaffirmed the importance of pragmatism in the design of surgical training. They spoke about the importance of designing an education system that begins, first and foremost, with the identification of societal health needs. Second, leaders underlined the importance of an education system that is sufficiently flexible to train surgeons with the appropriate skills for a range of practice environments. In order to operationalize this, it was suggested by one individual that efforts should be geared towards the development of a more flexible system that acknowledged high level generic capabilities and increased opportunities to allow transitions among various specialties.

## **Recommendations for the Future of General Surgery**

In an effort to posit a way forward for the optimization of General Surgery for the 21st century, four key recommendations, and a set of enabling actions, are outlined below. The recommendations are based on various avenues of research and a national summit with General Surgical leaders.

### **1.0 Redesign General Surgery training and curricula through the introduction of enhanced areas of expertise that are tailored to differing practice contexts in addition to foundational training.**

- 1.1 The Specialty Committee in General Surgery should review its committee structure, membership, and process for recruitment of members in order to ensure the committee is representative of the diverse experience of professionals from all types of practice locations across Canada.
- 1.2 The Specialty Committee in General Surgery, with support from the Royal College of Physicians and Surgeons of Canada and in collaboration with stakeholder groups, such as the Canadian Association of General Surgeon (CAGS) and others, should undertake further research and analysis on surgical care delivery to determine an accurate profile of health human resources needs as pertinent to the General Surgery workforce in all contexts in Canada.
- 1.3 The Specialty Committee in General Surgery, with support from the Royal College of Physicians and Surgeons of Canada, should define the enhanced areas of expertise and a profile of competencies associated with each through the development of a preliminary identification of competencies document which would outline differing scopes of practice.

1.4 The Specialty Committee in General Surgery should consult broadly with all Subspecialty Committees of the current subspecialties of General Surgery to determine the implications of new enhanced areas of expertise upon the overall system of specialty training, including entry routes and recognition.

**2.0 General Surgery residency programs should incorporate an explicit period of training geared towards, and focused upon, an individual making the transition to independent practice.**

2.1 In collaboration with the Task Force on Examination Timing and the Assessment Committee of the Royal College, a systematic consultation process should be undertaken to identify the optimal timing and content of the Royal College Certifying Examination(s) in General Surgery and to determine the feasibility of adjusting the timing of these examinations to minimize disruption of the educational program during this period of residency.

**3.0 Support broader transition to a hybrid model of competency-based medical education in postgraduate medical education.**

3.1 The Royal College, in collaboration with the Specialty Committee in General Surgery and the General Surgery Examination Committee, should develop a new, national guide intended to promote and serve as a resource for nationwide surgical education in a tailored set of General Surgical competencies.

3.2 The Royal College, in collaboration with the Specialty Committee in General Surgery and the General Surgery Examination Committee, should develop a comprehensive toolkit for assessment in General Surgery that incorporates greater emphasis on assessment of performance, including work-based assessment, rather than just knowledge.

3.3 The Specialty Committee in General Surgery should support ongoing efforts to develop an electronic portfolio to track progress toward milestones.

**4.0 Post-General Surgery residency training, in the form of recognized subspecialty residency programs, Areas of Focused Competence (diplomas), and clinical fellowships, should be developed as complements to enhanced areas of expertise in General Surgery residency programs and undertaken as they are relevant to particular professional practice environments.**

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## 1.0 Introduction to the Project

### 1.1 Introducing the Discipline of General Surgery

The Royal College of Physicians and Surgeons of Canada (Royal College) is responsible for recognizing surgical specialties and subspecialties, accrediting residency training programs, and certifying specialist and subspecialist surgeons on completion of their training in Canada. General Surgery has a long history as one of two founding disciplines recognized in Canada and the founding discipline of all surgery. Originally known as “Surgery,” General Surgery is now one of ten primary surgical specialties recognized by the Royal College.

The discipline itself incorporates a broad and varied practice, arguably seen as foundational in the surgical specialties. According to the most recent Objectives of Training for the Discipline of General Surgery (2010), General Surgery is defined as follows:

*The specialty of General Surgery embraces the principles and techniques of safe and effective surgical care of the whole person of any age, and is the parent discipline of all surgical specialties. The General Surgeon is an eclectic surgical specialist whose practice deals mainly with the alimentary tract, trauma and critical care, endocrine and breast diseases, cancer surgery and endoscopy.*

The demography of General Surgeons in Canada provides insight on its composition and current status. A significant proportion of Royal College Fellows are registered as General Surgeons: as of 2013, there are 2743 Fellows (22% of all primary surgical Fellows). General Surgeons have the highest representation of Fellows among all ten primary surgical specialties, ahead of Obstetrics and Gynecological Fellows at 20% and Orthopedic Surgeons at 17%. Looking only within the demography of General Surgery Fellows in 2013, 84% of General Surgery Fellows are male and the largest proportion of these General Surgeons is over 65 years of age (39%). In addition, the demographic makeup of practicing General Surgeons in Canada is in flux as a growing proportion of young female surgeons are entering the discipline. Knowing who is practicing General Surgery in Canada provides useful context for the premise of this project.

### 1.2 Why talk about the Future of General Surgery?

The current configuration of General Surgery dates back a number of years, to an earlier era of medical practice. General Surgery has seen significant evolution due to a variety of factors such as the development of other surgical specialties, growing subspecialization, technological changes, fiscal restraint, and demographic changes (Pellegrini, Warshaw, &

Debas 2004). Many of these changes have significantly impacted surgical knowledge, contributed to different divisions of labour among both surgical and non-surgical disciplines and, consequently, have led to changes in the delivery of surgical care (Warnock, 2012). Although such changes have certainly exerted influence on many disciplines, these changes are perhaps most notable within this discipline, as it is one of the oldest in Canada. Without parallel evolution in training programs, there is a concern that the current training of General Surgeons does not provide the skills required to practice General Surgery in all Canadian communities and practice settings where General Surgeons work.

In an effort to ensure that General Surgeons have the expertise to meet the health needs of the Canadian public, many stakeholders agree that General Surgery residency training must be fundamentally re-examined (Warnock, 2012). In particular, discussions at the [Committee on Specialties](#), a committee responsible for providing advice and making recommendations on matters relating to the disciplines recognized by the Royal College of Physicians and Surgeons of Canada, raised particular concerns for the Specialty Committee in General Surgery to consider. This project draws a significant impetus from such discussions and is intended to posit a path forward for the discipline.

### 1.3 Project Objectives

Driven by a recognized need to reassess General Surgery residency training, this project's ultimate goal was to ensure Royal College General Surgery residency training programs are optimally preparing residents for practice in a broad range of locations across Canada. To realize this overall goal, the project had two key objectives:

1. Facilitate a national surgical summit on the Future of General Surgery; and
2. Review and make recommendations regarding the optimal configuration of General Surgery training in Canada given the evolving Canadian health care landscape, with targeted discussions regarding scopes of practice in larger urban centres and smaller or isolated communities, overlaps with other surgical disciplines, and impacts of resident duty hour restrictions.

Recognizing the importance of evidence-informed decision-making, a series of four sub-studies and a national survey were launched to achieve these objectives. As a result, the project has established a strong evidence base in addition to positing a way forward for the discipline of General Surgery. In addition to the project's objectives, this report was created in collaboration with the members of the Task Force on the Future of General Surgery.

### 1.4 Project Timeline and Activities

The project's goals were carried out over a series of three phases throughout 2012 and 2013, see Figure 1. The project's goals, overall plan, and timeline are listed in Figure 2.



**Figure 1:** Future of General Surgery project phases

MONTH	PROJECT ACTIVITIES	PROJECT PHASE
<b>Spring 2012</b>	Task Force launched <ul style="list-style-type: none"> <li>• Development of strategic direction</li> <li>• Orientation to the project, meetings to gain input on objectives, methodology, and key considerations</li> </ul>	Phase 1: Preliminary Research
<b>Fall 2012</b>	Preliminary research <ul style="list-style-type: none"> <li>• Interviews for stakeholder perspectives on training</li> <li>• National survey</li> <li>• Jurisdictional review</li> <li>• Historical analysis</li> </ul>	
<b>May 2013</b>	Surgical Summit, Ottawa, ON <ul style="list-style-type: none"> <li>• Overview challenges facing the future of General Surgery</li> <li>• Recommend competencies</li> <li>• Begin to develop preliminary recommendations</li> </ul>	Phase 2: Full-day Summit
<b>Summer 2013</b>	Development of recommendations <ul style="list-style-type: none"> <li>• Task Force collaboration and input</li> </ul>	Phase 3: Development of Recommendations
<b>Fall 2013</b>	Conference presentations <ul style="list-style-type: none"> <li>• Scholarly dissemination of results from Phase 1 at the 2013 Canadian Surgical Forum and the International Conference on Residency Education (ICRE) 2013</li> </ul>	
<b>February 2014 and ongoing</b>	Completion of Final Report and begin discussions regarding next steps, including policy implications and implementation.	

**Figure 2:** Future of General Surgery project timeline

## 1.5 Project Governance

This project and the development of this report was overseen by the Task Force on the Future of General Surgery.

### Task Force Composition

The Task Force included leaders from a variety of surgical disciplines and was co-chaired by Dr. Eric Webber, Chair of the Specialty Committee in General Surgery, and Dr. Kenneth A. Harris, Executive Director of Education at the Royal College. This Task Force worked in collaboration with staff in the Office of Specialty Education at the Royal College over the last year to:

- Set the research agenda and establish the evidence base for deliberations;
- Provide strategic advice to the Office of Specialty Education on the planning and content of the Summit on the Future of General Surgery;
- Review and provide feedback on preliminary research materials and background materials; and
- Develop and come to consensus on collaborative, evidence-based recommendations regarding the proper configuration of General Surgery training in Canada.

This diverse group of experts comprised individuals with a strong background in, and knowledge of, surgical specialization and the field of medical education. A full list of Task Force members and Royal College staff involved in this project can be found in Appendix A of this report.

## 2.0 Project Methodology

Four research questions were developed to guide the analysis through the initial research phase:

#1	What are stakeholders' perceptions of today's General Surgical training?	Focus groups and individual interviews
#2	What competencies are required of today's graduating General Surgeons?	Mixed-methods quantitative and qualitative design
#3	How is surgical specialization organized in other, similar international contexts?	Interviews and literature review
#4	What is the history of surgical specialization and recognition in Canada?	Archives-based search

Preliminary research and analysis relating to these four research questions was undertaken by the Educational Strategy, Innovations, and Development (ESID) Unit in the Office of Specialty Education at the Royal College of Physicians and Surgeons of Canada, in collaboration with the Task Force on the Future of General Surgery. Research conducted in Phase 1 informed the development of Phase 2, the Surgical Summit held in May 2013, a national discussion on the future of General Surgery. The following activities were carried out during the first phase of the project: interviews with stakeholders, a national survey of Royal college-certified General Surgeons, a jurisdictional review, and an historical analysis. For a more detailed account of the methodology undertaken during Phase 1, see Appendix B.

## 2.1 Phase 1: Preliminary Research

### Interviews with Stakeholders

Informal group discussions were held between representatives of the Task Force and surgical leaders in Canada throughout the fall of 2012. These discussions informed the Task Force's work and contextualized forthcoming policy discussions on the future of General Surgery residency education. Stakeholders were engaged to provide their insights on the current strengths and opportunities inherent in the training of today's General Surgeon.

### National Survey of Royal College-certified General Surgeons

The national survey of General Surgeons was developed by the Royal College in collaboration with the Task Force of Canadian surgical leaders and the Medical Education Research Group at the Children's Hospital of Eastern Ontario (CHEO) Research Institute. All Active Fellows certified in General Surgery by the Royal College were invited via email to participate in a self-administered online survey regarding General Surgery residency and practice. Invitations were sent to 2,125 practicing surgeons certified in General Surgery, of whom 672 responded to the survey (32% response rate). The purpose of the study was to assess the surgeons' perceptions of their preparedness for practice upon completion of their residencies. Responses provided a sense of how past and current training are succeeding, and what areas and opportunities may need to be reconsidered; ultimately, it provides context and evidence for this initiative intended to reassess General Surgical training.

### Jurisdictional Review

The jurisdictional review was undertaken to provide an overview of the current organization of surgical education and specialization in Canada as well as in three other jurisdictions seen to be comparable to the Canadian context: the United States, the United Kingdom, and Australia. Six informal semi-structured individual interviews were held with key representatives from international jurisdictions at the International Conference on Surgical

Education and Training (ICOSET) and the International Conference on Residency Education (ICRE) in the fall of 2012.

A literature-based search was also conducted to acquire factually-based information on the jurisdictions in question. The literature search was intended to delineate differences in the training approach and pathways, as well as recognition of surgical disciplines, in other countries.

## Historical Analysis

An historical analysis was undertaken to inform the Task Force's work and contextualize the policy discussions on the future of General Surgery residency training at the national summit in May 2013. Two primary sources of data were used for the historical analysis:

- **Archives-based search** of the Royal College's minutes and records of decision-making pertinent to discipline recognition (including approvals of new disciplines, change in status or scope of practice of existing disciplines, discipline name changes, etc.) was undertaken to understand the chronology of changes to the recognition of surgical specialization over time.
- **Review of current and historic Objectives of Training (OTR) documents** for the discipline of General Surgery (1982-current) was undertaken to identify changes in the definition and certification requirements of a General Surgeon.

## 2.2 Phase 2: National Summit

On May 13, 2013, a national Summit on the Future of General Surgery was held at the Royal College headquarters in Ottawa, Ontario. This meeting provided an opportunity for key surgical leaders to examine challenges facing the discipline, to recommend competencies needed of General Surgeons to meet societal health needs now and in the future— in various practice settings across the country— and to begin to develop recommendations for the future of General Surgery residency education. Recognizing the value of diverse perspectives in the deliberations, the summit's attendees included both surgical leaders and a number of other other key stakeholders such as residents, representatives from regulatory authorities, Ministries of health, and other organizations. Participants included Canadian representatives from a number of diverse practice locations and several American colleagues. Summit participants were provided with a delegate package to prepare them for the discussions of the day. The delegate package included a brief summary of the Phase 1 preliminary research (not including results of the national survey which were still ongoing at the time) and an annotated bibliography, which was intended as a prompt for discussion at the summit (see Appendix C for the annotated bibliography).

Throughout the day, key sessions occurred as follows:

- Opening remarks to share data and research findings, as gathered through the project thus far;
- A panel presentation and discussion intended to outline the challenges and opportunities facing the discipline, from a variety of perspectives both domestically and internationally, reflecting large urban centres, and smaller or isolated communities;
- A debate on the future of the multi-specialty General Surgeon; and
- Small group discussions in order to assess proposed directions for reform, such as training requirements and training length, approaches to the design of residency and post-residency training, and the role of competency-based medical education in General Surgery training.

The summit was intended to function as one of the first steps towards achieving consensus on the path forward for the discipline and approaches to training.

## 2.3 Phase 3: Development of Recommendations

Early recommendations were developed by delegates of the Summit on the Future of General Surgery and were intended to be reflective of research and materials collected through the entire length of the project. Throughout the summer of 2013, Task Force members were engaged to construct, modify, and provide insight and feedback on the recommendations. In addition, the draft recommendations were shared with the Royal College's Specialty Committee in General Surgery and senior leaders through the executive of the Canadian Association of General Surgeons, in order to obtain their input on the policy implications, overall feasibility, and appropriateness of the recommendations in terms of ensuring that training is optimally configured to prepare graduating residents for practice in any setting across the country.

## 3.0 Key Themes and Findings

The key themes and findings from this project are discussed in five main sections. The preliminary research conducted in Phase 1 was a large component of the Future of General Surgery project. Findings from this phase are reported in four sections: the historical analysis, the jurisdictional review, the stakeholder perspectives, and the national survey analysis. The fifth section highlights the outcomes from the National Summit (Phase 2). A brief summary of the key conclusions are also highlighted.

### 3.1 History of the Discipline of General Surgery in Canada

Recognizing that the discipline of General Surgery has experienced substantial evolution, an historical analysis was undertaken to delineate the evolution of recognized surgical expertise in Canada through a historical summary, chronology, and analysis of key changes that have occurred in surgical discipline recognition.

There has been a steady increase in the number of surgical disciplines recognized by the Royal College. As illustrated by Figure 1 below, over the past 80 years, the total number of surgical disciplines has increased from one (i.e., “Surgery,” now known as “General Surgery”) to sixteen disciplines (see Appendix D for definitions of discipline recognition).

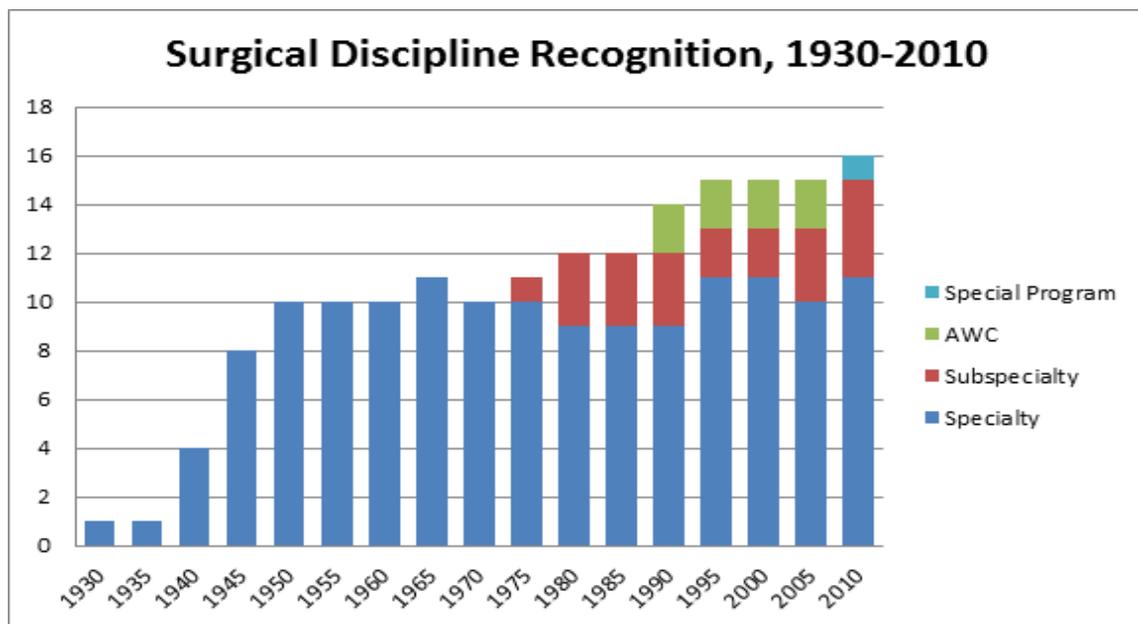


Figure 3: Surgical discipline recognition, 1930-2010

In addition, since the college’s inception in 1929, new categories of discipline recognition have also been introduced to distinguish between the various specialties. These distinctions now include: specialties, subspecialties, Areas of Focused Competence (Diplomas), and the “special program” designation of Surgical Foundations. Surgical Foundations are the core fundamental knowledge and skills that all surgeons possess. The core curriculum, taken during the first two years of residency, has a defined set of objectives that can be reached by a variety of surgical rotations. This approach has allowed Canadian surgical residency programs to train for purpose.

#### Timeline of Surgical Recognition in Canada

Upon its inception in 1929, the Royal College of Physicians and Surgeons of Canada offered just two specialty qualifications: Fellowship in Medicine and Fellowship in Surgery (see

Table 1, for a detailed timeline). Now, the Royal College recognizes 80 disciplines, granting Fellowships in 29 specialties, 35 subspecialties, three special programs, and 13 Areas of Focused competence (Diplomas). The following timeline details major changes that occurred within the surgical disciplines.

Primary surgical specialties are those for which the residency training can be entered directly after graduation from medical school. Surgical subspecialties require completion of residency training in a specific primary surgical specialty that is recognized as a prerequisite for the subspecialty.

**Table 1:** A detailed timeline of surgical recognition in Canada

1929	The Royal College of Physicians and Surgeons initially recognized only two disciplines: Medicine and Surgery. Surgery would later become known as General Surgery.
1937	Three surgical specialty disciplines are added: Ophthalmology, Otolaryngology, and Urology.
1943	Two additional surgical disciplines are approved by Council: Obstetrics and Gynecology. Later, these two specialties would merge.
1944	Orthopedic Surgery is recognized as a primary specialty.
1945	Neurosurgery is recognized as a primary specialty.
1946	Plastic Surgery and Thoracic Surgery are both recognized as new disciplines.
1962	Thoracic Surgery merges with Cardiovascular and Thoracic Surgery.
1966	Obstetrics and Gynecology merge to become Obstetrics and Gynecology.
1974	Trial exam in Principles of Surgery occurs.
1975	Pediatric General Surgery is recognized as a subspecialty.
1980	Vascular Surgery is recognized as a subspecialty.
1989	General Surgical Oncology is recognized under the "Accreditation without Certification" (AWC) category.
1990	Colorectal surgery is recognized under the "Accreditation without Certification" (AWC) category.
1994	Cardiac Surgery is recognized as a primary specialty. Cardiothoracic Surgery becomes Cardiac Surgery, and at the same time, Thoracic Surgery is recognized as a primary specialty.
2002	Thoracic Surgery becomes a subspecialty.
2007	Surgical Foundations is recognized as a Special Program.
2009	Colorectal Surgery and General Surgical Oncology transition from AWC to subspecialty.
2010	Vascular Surgery changes from a subspecialty to a primary specialty.

## Training Requirements for General Surgeons

A number of sources provide context and data which elaborate upon changes to the history of subspecialization, as well as any technical, demographic, and fiscal changes that have exerted influence on the discipline. In particular, the Objectives of Training (OTR) documents for the specialty of General Surgery provide valuable insight regarding the changing expectations of General Surgeons and the relevant educational goals for the residency programs intended to train those surgeons. OTR documents are developed by

Specialty Committees for each discipline and approved by the Specialty Standards Review Committee at the Royal College of Physicians and Surgeons of Canada. These documents are intended to outline the outcomes a resident is expected to achieve by the completion of their residency program in anticipation of beginning independent practice.

### **First available iteration of Objectives of Training (OTR)**

The Objectives of Training (OTR) is a document outlining the full range of competencies specific to a particular discipline. The first available OTR document for the discipline of General Surgery was approved in September 1982. This document distinguishes between “General Objectives” and clinical competence. The general objectives cover a broad range of competencies and include mention of non-operative skills, such as:

*Satisfactory knowledge of the principles common to all surgical practice. These principles include shock, resuscitation, post-operative care and complications, trauma to all parts of the body and the response to trauma, fluid, electrolyte, and acid-base disturbances, infections, neoplasia, bleeding, coagulations, thrombosis, surgical immunology, clinical pharmacology, genetics, and probability and statistics. (Objectives of Training for the Discipline of General Surgery, 1982)*

Interestingly, this document presents an early indication of the potential impact of geography on surgical patterns of practice:

*It is accepted that in some areas of the country, General Surgeons may need training in fields of surgery additional to those listed above and that in some circumstances the General Surgeon may be required to provide not only the initial care but more advanced management of trauma in the nervous, cardiovascular, respiratory, genitourinary, and musculoskeletal system (Objectives of Training for the Discipline of General Surgery, 1982).*

Such variance in the pattern of practice of General Surgeons in Canada is a longstanding and ongoing theme in Canadian General Surgery practice. Many years later, Dr. William G. Pollett and Elizabeth Dicks would write: “the practice of General Surgery in Canada varies widely: according to the size of the community, availability of other surgical specialists, the training and interests of community practitioners, available resources and the particular needs of individual communities” (Can J Surg 2005; 48(3) 219-224).

### **Revisions to the Objectives of Training**

While a minor editorial revision was made to the OTR in May 1985, the next significant iteration was approved in September 1988. This document outlines a series of objectives under three major themes: A) Information and Judgement, B) Surgical Technique, and C) Behaviour. In the first section, Information and Judgement, the document describes the

type of disorders that a General Surgeon should be able to manage. These disorders span major content areas across the entire body: according to the 1985 OTR, General Surgeons should be competent in disorders of the abdomen, endocrine system, oral cavity, chest, vascular system, and other content areas.

Six years following the first iteration of the OTR, the 1988 OTR document continues to reference the variability of a General Surgeons' pattern of practice according to the type of health centre they are working from and its location in a large urban centre or smaller or more isolated communities. As noted, "the fully trained General Surgeon is expected to function competently in the initial management of conditions that, in major centres, fall within the realm of other surgical specialties." As the document continues, a General Surgeon practicing outside of a major centre should be able to manage the critically ill patient, including specific conditions such as liver failure, management of common fractures, and upper and lower urinary tract injuries, among others. Secondly, a number of surgical techniques that a General Surgeon should be able to perform "safely and competently" are referenced (Objectives of Training for the Discipline of General Surgery, 1988). Finally, attitudes and behaviours expected of a General Surgeon are noted. These include: a sense of responsibility for the care of the patient, ethical relationships with colleagues, patients, and relatives, and an "ability to adapt to innovations and changes in General Surgery" (Objectives of Training for the Discipline of General Surgery, 1988).

### **Introduction of CanMEDS Roles to the Objectives of Training**

The CanMEDS physician competency framework was endorsed by the Royal College in 1996. At that time, accreditation standards stipulated that these competencies "should be" (rather than "must be") integrated into medical education. Subsequently, some amendments were made in the 1996 iteration of the General Surgery Objectives of Training (OTR) to include references to head and neck surgery; however, it took a few more years to re-write the objectives of training and specialty training requirements into the CanMEDS 2000 format.

In 2002, a revised version of the OTR introduced significant and dramatic changes. The 2002 OTR document was the first iteration that incorporated the CanMEDS Roles. CanMEDS Roles include: Medical Expert (central Role), Communicator, Collaborator, Manager, Health Advocate, Scholar, and Professional. The framework is updated every decade to accommodate for evolving issues and technology, and its next release is expected in the fall of 2015. Additionally, the 2002 iteration also included a definition of General Surgery that highlighted the diverse responsibilities and commitment to generalism. As the document states:

*The specialty of General Surgery embraces the principles and techniques of safe and effective surgical care of the whole person of any age, and is the parent of all surgical specialties. The Resident in General Surgery is an eclectic surgical specialist whose practice deals mainly with the alimentary tract,*

*trauma and critical care, endocrine and breast diseases, cancer surgery, and endoscopy. By virtue of training, special interest or circumstance, the practice of General Surgery may be narrowly focused or may extend to diseases or injuries affecting virtually any system of the body... (Objectives of Training for the Discipline of General Surgery, 2002)*

Since then, an updated CanMEDS Framework was released in 2005, in which the new standards became mandatory. Given the extensive work involved in updating the OTR in 2002, the current iteration (2010) is very similar. The definition of General Surgery, as provided in the 2010 version, is akin to the 2002 version. However, the specialty committee decided to increase the document's focus on content related to the technical and procedural skills. As such, the document highlights the skills required of General Surgeons, rather than the procedures for which General Surgeons must demonstrate competence. This decision was made in order to ensure the document has high applicability in a pedagogic context: it was intended to clearly delineate the key skills that should be taught to general surgical residents in training.

### **3.2 Jurisdictional Review: International Contexts in General Surgery Training**

Recognizing that the discipline of General Surgery has experienced profound evolution not only in Canada, but also within other jurisdictions, a jurisdictional analysis was undertaken to understand the current organization of surgical education and specialization in three other jurisdictions seen to be comparable to the Canadian context: the United States, the United Kingdom, and Australia. General Surgery is practiced all over the world; however, we were selective about the countries chosen for comparison with Canada in the jurisdictional review. Recognizing health care and training systems vary significantly around the world, only those countries with approaches to postgraduate medical education that mirrored Canada were selected. This decision was made in order to reduce, at least to some extent, variability in case comparison. Each country will be reviewed regarding the following topics: surgical specialties, General Surgery training, program accreditation and governance, and the current state of the discipline in the respective country.

#### **Canada**

##### **Surgical Specialties**

In Canada, the Royal College of Physicians and Surgeons of Canada (Royal College) is solely responsible for recognizing surgical specialties and subspecialties, accrediting residency training programs, and certifying specialist and subspecialist surgeons on completion of their training.

Presently, the Royal College recognizes ten primary surgical specialties: Cardiac Surgery,

General Surgery, Neurosurgery, Obstetrics and Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology – Head and Neck Surgery, Plastic Surgery, Urology, and Vascular Surgery.

### **General Surgery Training**

After completion of medical school, surgical trainees enter residency training in one of these ten surgical specialties, which range in length from five to six years. All residency programs are based at universities with medical schools. Nine<sup>1</sup> of the surgical specialties (all except Ophthalmology) participate in the Surgical Foundations special program, a two-year curriculum that is included during the first two years of the residency programs. In addition to the surgical specialties, there are seven recognized surgical subspecialties: three (Gynecologic Oncology, Gynecologic Reproductive Endocrinology and Infertility, and Maternal-Fetal Medicine) are entered following completion of specialty training in Obstetrics and Gynecology, while four (Colorectal Surgery, General Surgical Oncology, Pediatric Surgery, and Thoracic Surgery) are entered following completion of specialty training in General Surgery. Residents training in Canada must fulfill the Specialty Training Requirements in General Surgery in order to be certified by the Royal College in General Surgery.

Based on discussions with trainees and leaders in medical education, it is our impression that an increasing number of surgeons undertake post-residency fellowships on completion of their residency training. This observation is supported by research undertaken by William G. Pollett, FRCSC, and Elizabeth Dicks, in which a survey of surgeon members of the Canadian Association of General Surgeons (CAGS) found that 148 of 240 respondents (61.7%) had undertaken additional training beyond their basic Canadian residency programs. In addition to subspecialty fellowships and Areas of Focused Competence (AFCs, or diplomas) which are recognized by the Royal College, there are also numerous post-residency fellowships that are not recognized or accredited by the Royal College.

### **Program Accreditation and Governance**

The Royal College, conjointly with the College of Family Physicians of Canada (CFPC) and the Collège des médecins du Québec (CMQ), is responsible for the accreditation of residency programs in Canada. Accreditation is granted in accordance with general standards developed by the three colleges; the general “A” standards apply at the level of the postgraduate office, and the general “B” standards apply to each residency program. In addition, for the Royal College, Specialty-Specific Standards of Accreditation (SSAs) with specific requirements for each discipline are reviewed along with the general “B” standards in each residency program. For the specialty of General Surgery, residency programs must demonstrate sufficient compliance with the general “B” standards, as with the SSA for General Surgery. A similar accreditation process applies for the ten surgical specialties and

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<sup>1</sup> As of 2013, it has been proposed that trainees in Obstetrics and Gynecology should begin using the Surgical Foundations special program. This policy decision intends to be implemented over the coming years.

the seven surgical subspecialties.

In addition, nine surgical specialty residency programs (as discussed above) are required to complete the two-year Surgical Foundations special program, as part of their residency program. As of 2013, the Surgical Foundations special program has its own Specialty Specific Standards of Accreditation, Specialty Training Requirements, and Objectives of Training.

Post-residency fellowships are not accredited in Canada. However, Areas of Focused Competence (AFC) (diploma) programs—a new category of discipline recognition providing one to two years of additional training building upon a broader discipline, and designed to enhance scope of practice—are accredited, similar to residency programs. Standards of accreditation separate from the “A” and “B” standards for residency programs have been developed by the Royal College for all AFC (diploma) programs; namely, the General Standards for Areas of Focused Competence (AFC) Programs “C” Standards. AFC (diploma) programs must demonstrate sufficient compliance with the “C” standards in order to be accredited.

#### **Current State: Reflections on AFCs and Acute Care Surgery**

In 2011, a new category of discipline recognition, entitled Areas of Focused Competence (AFC) (diploma), was launched to allow practitioners to acquire additional competency-based qualifications. AFC (diploma) programs represent highly focused disciplines of specialty medicine that address legitimate societal needs. Presently, Trauma General Surgery is the only surgical AFC (diploma) that has been approved by the Committee on Specialties, but it is foreseeable that other disciplines will apply for recognition.

Recently, acute care surgery services have also emerged as an important facet of General Surgery care in the Canadian health care system (Hameed et al., 2010, Can J Surg, vol. 53, No. 2) and in other countries nationally. Acute care surgery has become necessary to handle incoming patients who frequently have complex and comorbid acute illnesses, with minimal pre- or post-operative planning. These services are recognized for their strength in providing critical care, and they serve as an important element of the overall spectrum of surgical care delivery in Canada.

## **United States**

### **Surgical Specialties**

In the United States, the American College of Surgeons currently recognizes fourteen surgical specialties: Cardiothoracic Surgery, Colon and Rectal Surgery, General Surgery, Gynecology and Obstetrics, Gynecologic Oncology, Neurological Surgery, Ophthalmic Surgery, Oral and Maxillofacial Surgery, Orthopaedic Surgery, Otorhinolaryngology, Pediatric Surgery, Plastic and Maxillofacial Surgery, Urology, and Vascular Surgery.

## General Surgery Training

After the completion of medical school, surgical trainees in the United States enter subsequent training in the form of a residency that focuses on a specific specialty. Surgical residencies vary in length from five to seven years depending on the specialty. After completion of their residency, General Surgery residents complete first a written, knowledge-based qualifying examination and, subsequently, an oral certification examination, both of which are conducted by the American Board of Surgery.

Additionally, many General Surgery graduates undertake further study in a post-residency specialty or subspecialty discipline after they complete their residency. In the United States, General Surgery training serves as a foundation for other surgical disciplines: for instance, a trainee wishing to become a Pediatric Surgeon would complete General Surgery training and then enroll in two years of full time education in a Pediatric Surgery Fellowship leading to additional certification. Many other disciplines also follow this classical model of training.

The pursuit of post-residency subspecialties following certification in General Surgery has been steadily increasing. According to Frank R. Lewis and Mary E. Klingensmith, the percentage of residents finishing General Surgery residency training and continuing in this fashion “has been steadily increasing for the last three decades and at this time it exceeds 80%” (2012).

## Program Accreditation and Governance

The Accreditation Council for Graduate Medical Education (ACGME) is responsible for the accreditation of residency training in the United States. Program requirements for residencies in each specialty are set by both the ACGME and “Residency Review Committees” (RRCs) in each specialty, organizations that develop rules and criteria to which every accredited program must abide.

The role of the ACGME has impacts for the American medical education system. As a private professional organization, the ACGME is not a political arm. This was seen as a key strength of the American surgical education system. However, as one stakeholder noted, the separation of accreditation and certification processes is acknowledged as a hurdle: lacking control of the spectrum of authorities, decision-makers are left to “hope that the other body follows the lead” in the face of new or ongoing initiatives.

While all American residency programs are accredited by the ACGME, in contrast only a few<sup>2</sup> of the American post-residency fellowships are accredited by the ACGME. The others are generally overseen by specialty societies and, as noted by Klingensmith and Lewis, “the degree of standardization and rigor in the oversight process is variable” (2012).

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<sup>2</sup> As of 2013, post-residency/subspecialty surgical disciplines accredited by the ACGME include vascular surgery, pediatric surgery, surgery critical care, and hand surgery.

### **Current State: Reflections on New Initiatives and Early Specialization**

Several new initiatives have been introduced to postgraduate medical education in the United States in recent years. First, an “Integrated Specialty Track” has been developed. Entering this program directly out of medical school, residents undertake General Surgical training in the first three years of residency before a seamless transition into a different specialty training program. Trainees have readily adopted this approach where it is offered and, in some specialties, such as Plastic Surgery, this integrated approach has replaced the classic model of separate General Surgery residency and subspecialty training (Lewis and Klingensmith 2012). Second, the American Board of Surgery has also recently introduced a “flexibility” option, whereby the resident could spend approximately twelve months during the last three years of their General Surgery residency focused on a single specialty or subspecialty area in an effort to accumulate enhanced knowledge and experience in an area relevant to their intended specialty. However, utilization of this option has been limited by Program Directors (Lewis and Klingensmith 2012).

As of 2006, surgical education in the United States adopted the Surgical Council on Resident Education (SCORE®) curriculum. The SCORE Curriculum is designed as a training tool for General Surgery residents to ensure residents graduate with sufficient training. Still in the process of development, the SCORE curriculum is based on six competencies required of graduating General Surgery residents in the United States: patient care and procedural skills, medical knowledge, professionalism, communication, practice-based learning, and systems-based practice.

Over the last few years, increased discussion regarding the potential for “early specialization” in surgery (Longo et al., 2008) has occurred in the United States. Recognizing the changing scope of surgical training, such an approach suggests tracking and integrating programs that begin right from medical school. According to Longo, this early approach to specialization is driven by a number of factors including “decreasing the duration of training, rising medical school debt, and [...] the fact that most residents who embark on fellowship training will limit the scope of their practice” (2008). However, to date, American surgical leaders suggest that a true “streamed” or “tracked” option will not be immediately forthcoming owing to the challenges of service delivery across the entire country, stakeholder perspectives, pervasiveness of the status quo, and sheer depth of the changes required.

## **United Kingdom**

There are a number of medical royal colleges in the United Kingdom (UK), many of which are affiliated with particular disciplines or jurisdictions throughout the UK. For example, surgical colleges include the Royal College of Surgeons of Edinburgh, the Royal College of Physicians and Surgeons of Glasgow, the Royal College of Surgeons in Ireland, the Royal College of Surgeons of England, and others. These individual medical royal colleges are members of the Academy of Medical Royal Colleges, which serves a facilitation, promotion,

and coordination role for member parties.

### **Surgical Specialties**

One of the medical royal colleges, the Royal College of Surgeons of England, currently recognizes nine surgical specialties: Cardiothoracic Surgery, General Surgery, Neurosurgery, Oral and Maxillofacial Surgery, Otolaryngology, Paediatric Surgery, Plastic Surgery, Trauma and Orthopaedic Surgery, and Urology. Additionally, trainees can opt to enroll in academic surgery as a focus area.

### **General Surgery Training**

Recently, surgical training in the United Kingdom has undergone significant changes as prompted by the introduction of the Intercollegiate Surgical Curriculum Program (ISCP) (Joint Committee on Surgical Training, 2013). This collaboration between the surgical Royal Colleges of Great Britain and other professional bodies responsible for surgical training, including postgraduate deaneries and the General Medical Council is intended to bring surgical training in the United Kingdom in line with “changing societal, political and professional expectations” (Joint Committee on Surgical Training, 2013).

After completing medical school in the United Kingdom, surgeons in training immediately move into a two-year foundation program in clinical practice. Under the ISCP, the first year of postgraduate training (ST1) is built on a common core module for all surgical specialties called “Generic Surgical Skills and Knowledge.” Curricular content for this core module has been adopted by all nine surgical specialties and is based on the CanMEDS roles. The second year of training (ST2) is based on requirements for the trainee’s chosen specialty. By the end of ST1 and ST2, trainees are expected to have completed the curricular requirements for their chosen specialty. There are four principal types of assessment that are used within the ISCP: workplace-based assessments, examinations at the beginning and end of specialist training, the learning agreement and educational supervisory report, and an annual review of competence progression (known as “ARCP”).

The rest of training is focused on incremental development in a clinical setting in an effort to teach clinical judgement, technical and operative skills, specialty-based knowledge, and generic professional skills. Curricular content for the rest of training is developed by advisory committees (Specialty Advisory Committees, or SACs) that are affiliated with each of the specialties.

### **Program Accreditation and Governance**

The General Medical Council (GMC) in the UK oversees postgraduate education and training (both foundation and specialty training) through an accreditation process termed a “quality assurance activity”. The GMC sets requirements for postgraduate medical education and training, and tests whether these requirements are being met. In this vein, accreditation standards are incorporated in two main documents— “The Trainee Doctor,” and “Standards for curricula and assessment systems,”— which set out the requirements that faculties and

specialty associations must apply when developing and monitoring curricula and assessment systems. Similar to Canadian accreditation standards, these two key documents address aspects of education such as the learning experience and supervision, and contain both mandatory and non-mandatory standards. Unlike in Canada, accreditation visits are organized regionally, whereby a team of surveyors visits the applicable deaneries in a region at a given time. Reports of site visits are available publicly.

### **Current State: Reflections on Access to Surgical Care**

Given the geographic size and population density of the United Kingdom, stakeholders and leaders in General Surgery training did not note as many concerns regarding access to surgical care in very remote areas as are applicable in the Canadian context. Early indications suggest that the United Kingdom is embracing a move towards the centralization of surgical services in larger hospitals while still ensuring that all hospitals are well-equipped to handle emergency services.

## **Australia**

Surgical education, standards, and training in Australia (and New Zealand) are guided by the Royal Australasian College of Surgeons (RACS).

### **Surgical Specialties**

In Australia, nine surgical specialties are recognized: Cardiothoracic Surgery, General Surgery, Neurosurgery, Orthopaedic Surgery, Otolaryngology Head & Neck Surgery, Paediatric Surgery, Plastic and Reconstructive Surgery, Urology, and Vascular Surgery. These specialties are governed by RACS and are managed by specialty boards.

### **General Surgery Training**

Since its introduction by RACS in 2008, Australian surgical trainees complete a course called “Surgical Education and Training” (SET) after the completion of medical school, an internship year, and two to three years training in HMO (vocational) positions.

SET is a comprehensive program based on nine competencies of the Royal Australasian College of Surgeons including: collaboration, communication, health advocacy, judgement, management and leadership, medical expertise, professionalism, scholar and teacher, and technical expertise. According to William G. Pollett, FRCSC, and Bruce P. Waxman, FRACS, the first two years of SET are somewhat similar to the surgical foundational requirement in Canada (2012). Built on rotations, these years include several skills courses and are meant to provide a comprehensive curriculum in General Surgery. A multitude of assessment approaches are utilized and RACS is in the process of developing additional online, modular content and assessments that are intended to be launched in 2013.

The third, fourth, and fifth years of the SET training program offer trainees specialty-specific training in one of the nine surgical disciplines. These years offer the ability to

undertake major cases and complete their research requirements. During SET, trainees enroll in Skills training courses such as CCrISP (Care of the Critically Ill Surgical Patient), CLEAR (Critical Literature Evaluation and Research), and EMST (Early Management of Severe Trauma).

At the end of SET training, trainees undergo summative assessment in seven parts: two written and five oral. After the completion of SET and the granting of a FRACS diploma, many graduates spend several years in post-fellowship training in the subspecialty of their choice (Pollett and Waxman, 2012).

### **Program Accreditation and Governance**

The SET program is governed by the council of RACS through a dedicated board. The development of accreditation guidelines and standards is the responsibility of RACS. In contrast to Canadian training, Australian universities have “virtually no role in surgical postgraduate medical education” (Pollett and Waxman, 2012). Accreditation occurs on a five-year cycle but focuses on the hospital or training site rather than the training program itself. Furthermore, standards and guidelines for this process are set by RACS (Pollett and Waxman, 2012).

## **Implications and Reflections for Canada**

This research on surgical specialization was undertaken to assess potential conclusions for the Canadian context and inform contemporary decision-making in Canada (see Table 2 for a brief overview of international surgical training). However, it must be recognized that there is variation, sometimes significantly so, in the health and medical education systems of these jurisdictions. The evidence is nonetheless instructive, although admittedly not conclusive, for our work. In particular, one of the key findings of this work underlined that the challenges of a changing and constantly-evolving discipline are not confined to the Canadian health care and medical education system. Indeed, the technological and social changes exerting influence on General Surgery cross borders of all kinds: economic, cultural, and national. The spectrum and complexity of diseases have changed in all countries. Although the impact of such changes may be variable across particular contexts, all nations are contending with a major evolution in the discipline of General Surgery.

**Table 2:** Brief international overview of surgical training

	<b>Canada</b>	<b>United States</b>	<b>United Kingdom</b>	<b>Australia</b>
<b>Organization of surgical specialties<sup>3</sup></b>	10 primary surgical specialties, including General Surgery, flow from Foundations of Surgery special program.  Additional subspecialties, many of which follow similar training pathways as in other jurisdictions such as the US.	14 surgical specialties including General Surgery.	9 surgical specialties, including General Surgery.	9 surgical specialties, including General Surgery.
<b>Entry and Selection</b>	Direct entry into specialty training immediately after completion of medical school.	Direct entry into specialty training after completion of medical school.	Direct entry into specialty after completion of medical school.	Entry into specialty training occurs after an internship mandated by the Australian Medical Board and vocational training.
<b>Approaches to foundational training</b>	Common surgical curriculum on varied rotations: Surgical Foundations, with written assessment upon completion.	Seemingly no explicit, separate foundational curriculum.	Common core modules for all surgical specialties (ST1 and ST2).	Common curriculum for surgical specialties: SET1 and SET2.
<b>Governance of postgraduate programs</b>	Dual role for both Universities and the Royal College: Royal College approves new disciplines, sets/administers exams for each discipline, and Specialty Committees of the Royal College develop objectives of training.	ACGME sets program requirements for each specialty. Within each specialty, the ACGME houses residency review committees that set rules and guidelines for accredited programs.	Under the ICSP, curricular framework is common to all surgical specialties. Content of the curriculum is developed by the Specialist Advisory Committees (SACs).	Universities have limited role: key players are hospital-based surgical supervisors and specialty boards.

<sup>3</sup> Across these jurisdictions, surgical specialties may be differentiated by “primary” and “subspecialty” disciplines and, as such, may not be directly comparable.

### **A centralized and independent system of postgraduate medical education governance is an asset.**

According to stakeholders, the dual roles of accreditation and certification should be linked and together undertaken by an independent body. Canada is well-positioned in this respect: here, postgraduate medical education for surgical specialists is overseen principally by the Royal College of Physicians and Surgeons of Canada.

The Royal College is responsible for the development of national standards, the accreditation of both continuing professional development and the specialty education residency programs of Canada's seventeen universities. Finally, the Royal College also certifies specialist physicians in Canada. The Royal College works in collaboration with the Collège des médecins du Québec (CMQ), a college which certifies specialist and family physicians in the province of Quebec. It remains the Task Force's perspective that the Canadian accreditation process for postgraduate medical education, well-regarded as a strong system, is the most appropriate lever to ensure that excellent, comprehensive, and optimal training is provided within all residency programs.

## **3.3 Contextualizing Today's General Surgeon in Canada: Stakeholder Perceptions of General Surgical Training**

The preliminary mixed-methods research relating to stakeholders' perceptions of General Surgical training (interviews and focus groups) and the national survey on competencies required for graduating General Surgeons resulted in numerous findings. Canadian and international surgical leaders, General Surgery residents, and members of the Task Force on the Future of General Surgery were included as stakeholders for this phase of the preliminary research. The findings from the interviews and focus groups with stakeholders related to the strengths of General Surgery residency training, transitions to independent practice, the variety in scopes of practice, and potential program improvements and Areas of Focus.

### **Strengths of General Surgery residency training**

Stakeholders highlighted four strengths of Canadian General Surgery residency programs. First, stakeholders noted that a diverse and significant caseload is available, which provides trainees with a substantial volume and variety of clinical experience. Stakeholders also commended the consistency in training across Canada. General Surgery residency provides training in foundational and essential care; stakeholders reported that the Canadian residency system provides knowledge of the principles of surgery and teaches a skillset that is both essential and transferable across other procedures and specialties. Additionally, participants expressed an appreciation for the broad base of training and exposure to a wide range of specialties and subspecialties. General Surgery residency programs in Canada also teach trainees how to care for complex patients with multiple comorbidities.

The fourth strength that stakeholders recognized was related to General Surgery's role as a foundation in the postgraduate medical education system. This discipline is widely recognized as a key support for the education of a broad range of other residents, particularly those in the surgical disciplines.

## Transition to independent practice

Stakeholders noted numerous concerns over the transition of General Surgery residents from training to independent practice. Although the length of General Surgery residency training has remained stable over time (5 years), the volume of information in medicine and surgery has changed tremendously. There is concern that the ongoing divergence between training time and the requisite knowledge and skills required for independent practice will become problematic and unsustainable. Stakeholders also expressed concern that the skillset possessed by residents at the end of their residency was somewhat less comprehensive than it has been previously. They identified a need to define the fundamentals of General Surgery training to ensure a smooth transition to practice through adoption of necessary skills. However, stakeholders also noted that feeling unprepared for practice is not a new phenomenon; it may be an appropriate reaction to the rigours of any major professional transition.

## Reflections on the scope of practice

Stakeholders reflected on General Surgeons' scope of practice. There is a recognized tension inherent in scope of practice discussions, specifically regarding the balance between specialists and generalists. International stakeholders agreed that subspecialized training is a new reality for an increasing number of General Surgeons. Stakeholders alluded to significant differences in the necessary skillsets for General Surgeons depending on the type of practice that they eventually undertake. The training required to prepare a general surgical resident for community-based practice is particular and specific to that practice setting.

## Potential improvements and areas of focus

Stakeholders highlighted numerous areas for improvement and focus. These themes are summarized as follows:

- Increase resident rotations in regional and community settings for breadth of exposure
- Maintain and increase flexibility in General Surgery residency training
- Explore the role of residency program accreditation as a lever to ensure consistent access to comprehensive training opportunities
- Promote and explore competency-based medical education (CBME)
- Consider increased adoption of technology in the simulation learning environment
- Define the fundamentals of training

- Recognize the complex balance between the dual roles of General Surgery residents: service provision and education
- Address the political tensions between disciplines which are detrimental to education
- Reconsider the timing of exams to optimize training and transition to practice
- Implement improved career counselling
- Explore avenues of recruitment and retention

### 3.4 Results from the National Survey of General Surgeons

A national survey on General Surgeons' level of preparedness upon completion of residency training was conducted in Fall 2012-Winter 2013. All Active Fellows certified in General Surgery by the Royal College were invited to participate in the survey. Invitations were sent to 2,125 practicing General Surgeons, of whom 566 completed the survey (27% response rate). Seventy-four percent of respondents were male and 96% were Canadian-trained General Surgeons. On average, participants had completed residency training 19 years ago (standard deviation of 12 years). The results from the survey focused on general preparedness and specific procedural skills, improvements to residency training, and reflections of training on current practice. Some key demographics are also highlighted to contextualize the responses and provide a clearer picture of the participating General Surgeons, see Table 3.

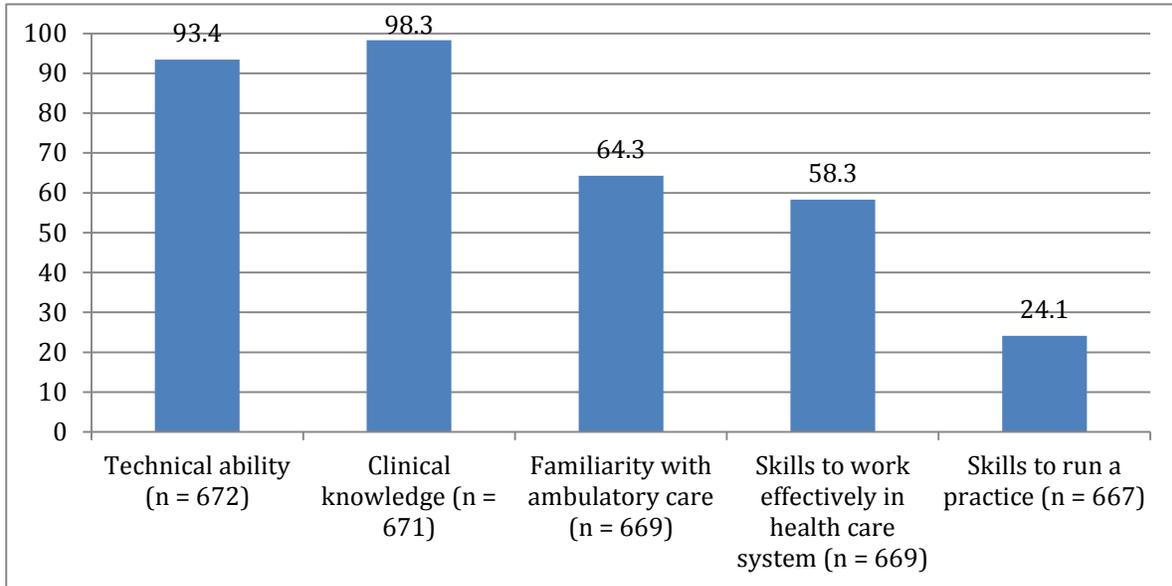
#### General preparedness and procedural skill

When asked how prepared General Surgeons were upon completion of their residency training, almost all respondents indicated being prepared in terms of overall technical ability and clinical knowledge. However, fewer General Surgeons indicated feeling prepared with respect to the skills needed to run a practice (see Figure 4, p. 36).

General Surgeons were also asked how prepared they were to independently perform a list of 78 index surgical procedures—a list intended to represent the breadth of practice—upon completion of residency training. Almost all respondents indicated that they were confident to independently perform at least 8 of the 10 most commonly performed procedures (i.e., procedures performed 11+ times in the past year). For two of the procedures (appendectomy – MIS, and cholecystectomy – MIS), a minority (20-30%) of respondents indicated that they did not receive training in these procedures. However, it is important to note that these are relatively newer procedures, which were introduced after many respondents had already completed their residencies (see Figure 5, p. 37).

**Table 3:** Demographics of General Surgeons who responded to the national survey

Variable	Percentage (%)	
<b>Age group</b>	30-39 years old	<b>23</b>
	40-49 years old	<b>29</b>
	50-59 years old	<b>25</b>
	Older than 60 years	<b>23</b>
<b>Province</b>	Ontario	<b>38</b>
	Quebec	<b>17</b>
	British Columbia	<b>15.5</b>
	Alberta	<b>11</b>
	Saskatchewan	<b>4</b>
	Manitoba	<b>4</b>
	East provinces (NB, PE, NS, NL)	<b>9</b>
	Territories (YK, NT, NU)	<b>&lt; 1</b>
<b>Catchment Area Population</b>	>1,000,001	<b>30</b>
	500,001 – 1,000,000	<b>16</b>
	100,001 – 500,000	<b>26</b>
	50,001 – 100,000	<b>13</b>
	<50,000	<b>12</b>
<b>Current affiliation</b>	Academic Health Sciences Centre (AHSC)	<b>40</b>
	Non-AHSC teaching hospital	<b>19</b>
	Community hospital	<b>27</b>
	Rural or remote hospital	<b>8</b>
	Other	<b>4</b>
	<b>Current practice</b>	Practicing General Surgeon
Subspecialist only		<b>16</b>
Subspecialist and practice in General Surgery		<b>16</b>
Subspecialist and take call for General Surgery		<b>7</b>
Retired/Semi-retired		<b>6</b>
Other		<b>6</b>
<b>Practices primarily in a segment within General Surgery</b>		<b>43</b>
<b>Does <i>not</i> practice in a segment within General Surgery</b>		<b>55</b>
<b>Primary segment of General Surgery</b>	Breast surgery	<b>16</b>
	Colorectal surgery	<b>28</b>
	Endocrine surgery	<b>3</b>
	Hepatobiliary surgery	<b>8</b>
	Minimally Invasive Surgery	<b>10</b>
	Surgical oncology	<b>16</b>
	Transplant surgery	<b>0.5</b>
	Trauma	<b>4</b>
	Other	<b>15</b>

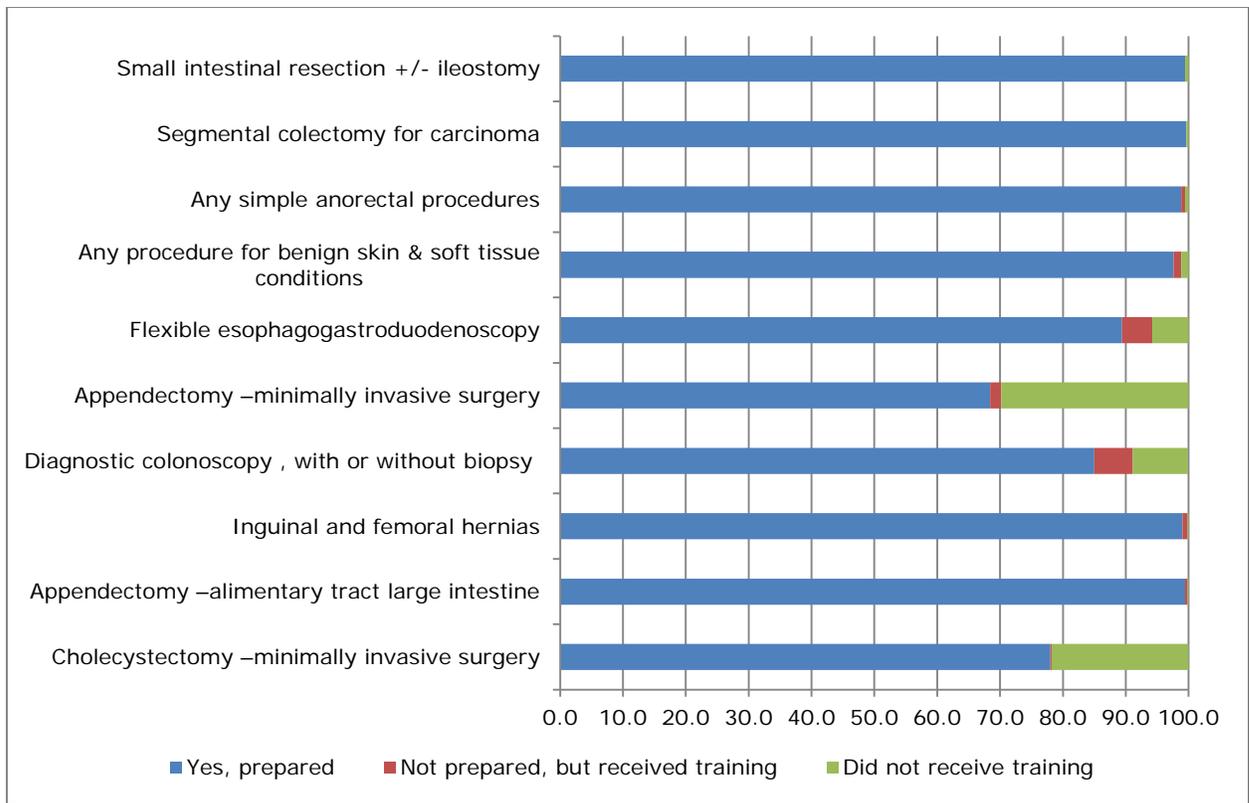


**Figure 4:** Percent of respondents who indicated being 'well prepared' to 'very well prepared' for aspects of future practice upon completion of residency training.

Not all residents indicated feeling competent to perform certain procedures (without supervision) upon completing residency. For example, more than one-half of residents indicated that despite receiving training, they did not feel competent to perform a pancreaticoduodenectomy or a hepatic lobectomy (see Table 4). This likely reflects the difference between the case-mix at the hospitals where residents trained and their subsequent practice. More research may be needed to develop an appropriate way forward, taking into account the imperative to train in a manner that is efficiently and meaningfully linked to eventual practice.

### Additional Subspecialized Training

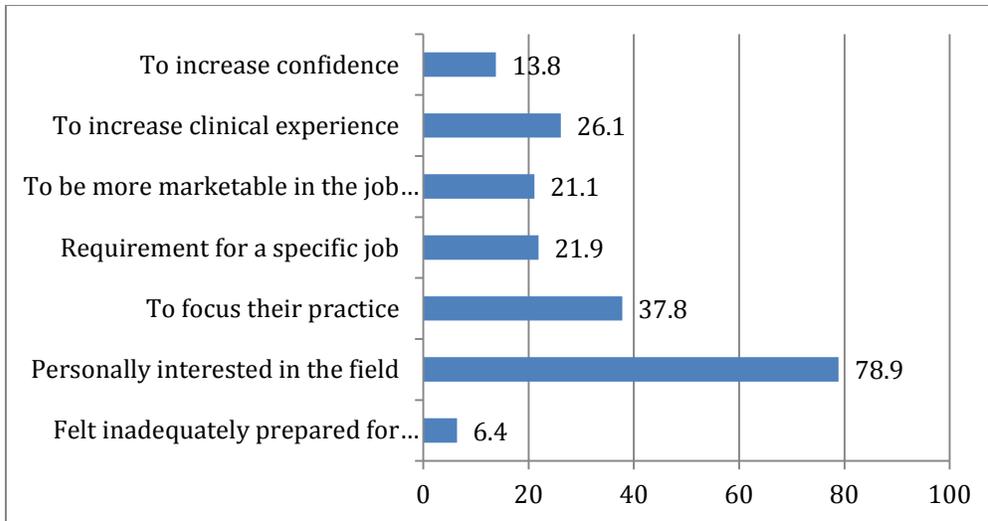
Sixty-three percent of respondents indicated undergoing additional formal training following completion of their General Surgery residency programs. Of those who indicated receiving additional training, the majority stated that this was due to personal interest in the field (See Figure 6, p. 38). Few respondents indicated undergoing additional training because they felt inadequately prepared or because they needed to increase their confidence. This is an important finding which seems to contradict the current perception that such training is undertaken to address inadequate preparation or a sense that graduating surgeons do not feel ready to enter independent practice.



**Figure 5:** Percent of respondents who indicated feeling prepared to perform the most commonly performed General Surgery procedures upon completion of residency training

**Table 4:** Percent of residents indicating that they were trained in a specific procedure but they did not feel competent performing that procedure independently upon completion of residency training (top ten procedures noted)

Procedure	Respondents % (n)
1. Pancreaticoduodenectomy	61.2% (314)
2. Hepatic lobectomy	58.3% (302)
3. Repair infrarenal aortoiliac aneurysm	54.4% (276)
4. Segmentectomy/lobectomy	54.0% (215)
5. Any lung resection	51.7% (258)
6. Total esophagectomy	48.5% (251)
7. Any complex anorectal procedures	47.9% (246)
8. Emergency embolectomy/thrombectomy artery	42.3% (215)
9. Repair of esophageal perforation	41.3% (213)
10. Adenectomy – open or MIS	39.1% (198)



**Figure 6:** Reasons for undergoing additional training (n = 421)

## Improvements to residency training

Participants suggested some improvements for General Surgery residency training based on their experiences. The following are the most frequently cited suggestions for improvement:

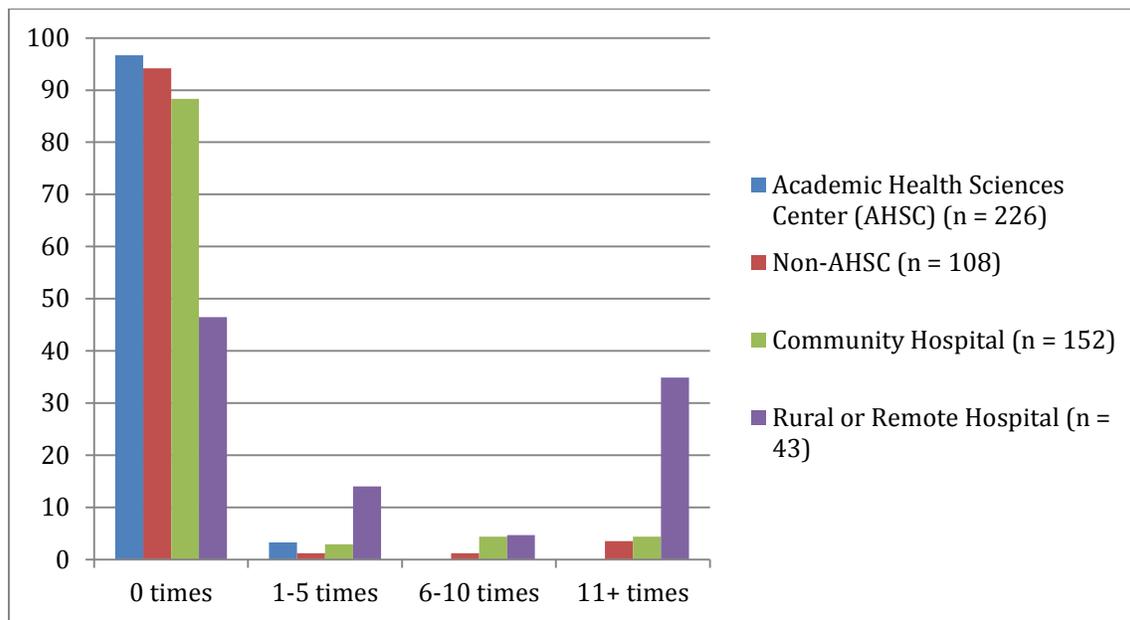
- **Increased exposure to certain aspects of General Surgery, particularly:**
  - Skills to run a practice
  - Community surgery rotations
  - General clinical training
  - Ambulatory care
  - Career counselling
- **Adjust the design of residency programs, specifically:**
  - Adjust the scope of training
  - Adjust the timing of Royal College certifying examinations
  - Lengthen training for General Surgeons
  - Promote and encourage more independent practice during residency
- **Leverage innovative teaching models such as competency-based medical education (CBME)**

## Relationship between training and current practice

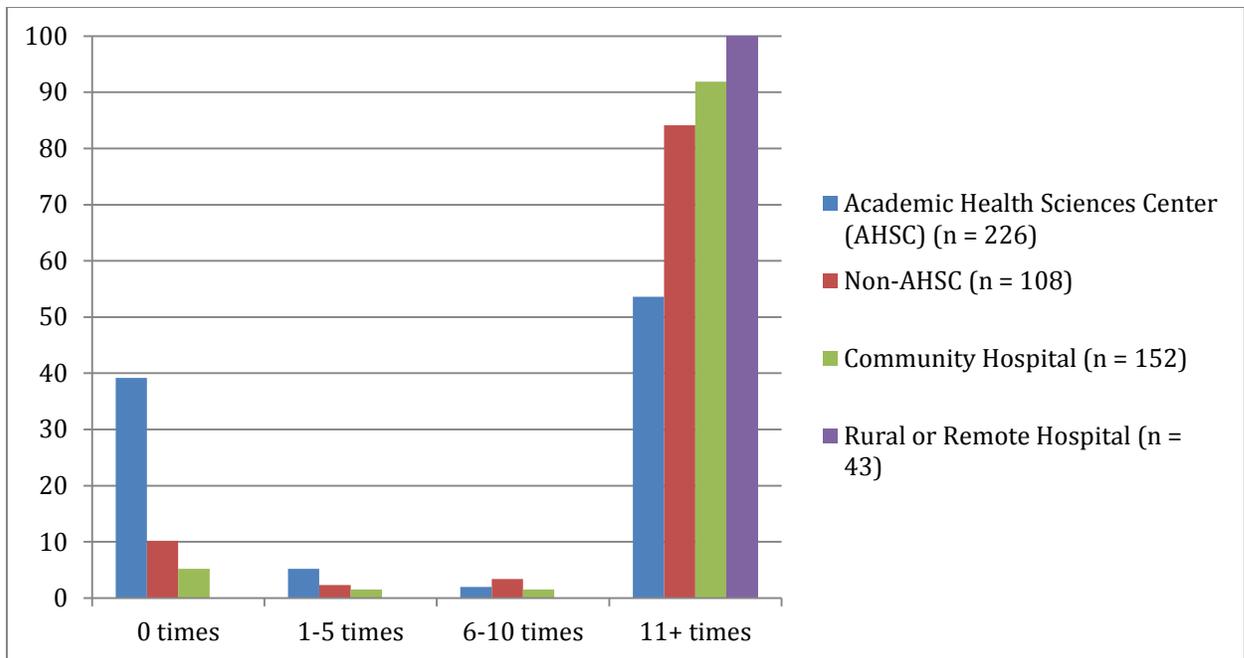
Participants were asked to reflect on how residency training could be geared to eventual practice. Results revealed that General Surgeons in different practice settings (e.g.,

“Academic Health Science Centers (AHSC),” “Non-AHSC teaching hospital,” “Community hospital,” or “Rural or remote hospitals”) experienced distinctly different patterns of surgical practice. For example, results showed that General Surgeons in “rural and remote hospitals” were more likely to frequently perform (11+ times per year) caesarian sections and diagnostic colonoscopies, compared to those practicing in the “Academic Health Sciences Centers” (see Figures 7 & 8).

The findings from this national survey on General Surgeons’ level of preparedness upon completion of residency training were crucial to understanding the current context of General Surgery, particularly regarding the relationship between training and practice.



**Figure 7:** Percent of General Surgeons performing Caesarian Sections 11+ times in the past year by type of center.



**Figure 8:** Percent of General Surgeons performing Diagnostic Colonoscopies 11+ times in the past year by type of center.

### 3.5 Outcomes from the Summit

As outlined in section 2.2, a national Summit on the Future of General Surgery was held in May 2013 with the following three objectives:

- Overview challenges facing the discipline of General Surgery as perceived by a variety of stakeholders.
- Recommend competencies needed of General Surgeons to meet societal health needs now and in the future, in various practice settings across the country.
- Develop recommendations for the future of General Surgery residency education.

Throughout the day, surgical leaders and a number of key national and international stakeholders (e.g., residents, representatives from regulatory authorities, Ministries of health, and national organizations) provided valuable expert insight and diverse perspectives on these three topics. The first objective, to outline challenges facing the discipline, underlined the importance of many of the discussions that had been undertaken by the Task Force to date. Challenges regarding access to surgical care, the exponential increase of surgical knowledge, and the variability of General Surgery practice in particular locations were cited by summit delegates as challenges facing the United States and Canada alike.

A key session at the summit involved a discussion on the “multi-specialty” General Surgeon, and the role of that surgeon in the spectrum of care provision for the 21st century. The multi-specialty General Surgeon is one who is capable of providing broad-based care in a wide range of areas that may be considered the domain of other surgical

specialties in larger centres. It was acknowledged that the time of the multi-specialty General Surgeon may well be adjusting to suit the needs of the new paradigm of care provision in the 21st century and there was agreement regarding the value of both generalism and specialty care provision in order to suit the needs of various communities across Canada. This fruitful discussion prompted delegates to reflect on the best ways to design training to meet societal health needs in the broad range of communities served by General Surgeons in Canada.

## Summit Conclusions

Sessions intended to delineate implications of various proposals for reform were also held on the day of the summit. Several concluding principles emerged from the summit. First, the summit delegates expressed support for redesigning residency training in a way that would ensure education could be tailored to the various types of practice. Second, summit delegates directed the Task Force to address specific barriers, such as the timing of certifying examinations, which were seen to interrupt residency education and impede the optimal transition to independent practice for trainees. Third, a principle for future work was articulated as such: residency training in General Surgery must ensure competency. That is, any additional training pursued after the completion of residency must be seen to be undertaken in order to acquire added competencies, and should not be viewed as a substitute for deficits in residency training. Fourth, there remains a need to define the scope and competencies of General Surgeons. These conclusions factored heavily into the recommendations and way forward contained within the report.

### 3.6 Key conclusions

In this section, key conclusions are synthesized from the multiple methods of the project, notably the historical analysis, jurisdictional review, national survey, and the summit.

#### General Surgeons have very different practice patterns depending on the location of practice

One of the key findings of the historical analysis related to the heterogeneity of the discipline of General Surgery. As evidenced by definitions developed by the Specialty Committee in General Surgery, General Surgeons have a broad range of practices depending on the location in which they train and practice, and the other surgical and nonsurgical specialists working in these areas. As noted previously, this was exemplified by the definition of General Surgery posited in the 1982 iteration of the Objectives of Training. As this document reads:

*It is accepted that in some areas of the country, General Surgeons may need training in fields of surgery additional to those listed above and that in some circumstances the General Surgeon may be required to provide not only the*

*initial care but more advanced management of trauma in the nervous, cardiovascular, respiratory, genitourinary, and musculoskeletal system (Objectives of Training for the Discipline of General Surgery, 1982).*

Indeed, findings from the national survey corroborate this observation. As mentioned previously, General Surgeons in different practice settings—from Academic Health Science Centres (AHSCs) to rural or remote hospitals—experience a different pattern of surgical practice. For example, nearly eight times as many General Surgeons in rural or remote hospitals performed Caesarian Sections in the past year than General Surgeons in AHSCs. Likewise, all General Surgeons in rural settings performed colonoscopies in the past year compared to only half of General Surgeons in AHSCs.

Early discussions seem to suggest that there may be two or three major subgroups of practice patterns depending on location, size of community, and size of health centre. There are significant implications of such divergence in practice patterns. Variance in practice impacts not only upon the efficiency of training, but it may also limit accurate health human resources modelling.

## **General Surgery training offers strong preparation for overall clinical competence**

Results from the national survey highlighted that almost all respondents indicated being prepared in terms of technical ability and clinical knowledge. In addition, almost all respondents indicated that they were confident to independently perform at least 8 of the 10 most commonly performed procedures (11+ times in the past year). These findings are also corroborated by early discussions with leaders in General Surgery undertaken as part of the stakeholder perceptions. During these discussions, leaders in Canadian General Surgery cited key strengths of General Surgery residency programs as follows:

- Diverse and significant caseload;
- Consistency of training across Canada; and
- Exposure to a wide range of specialties and subspecialties.

These strengths allow General Surgery residents to develop strong competencies in technical abilities and clinical knowledge.

## **General Surgery training should ensure optimal preparation for practice**

Stakeholders, including practicing surgeons and residents, cited a number of areas of General Surgery training that would benefit from further attention and development. Across the national survey and in consultation with stakeholders, the most frequently cited

suggestions include: ensuring a smooth transition to independent practice, increasing exposure to certain aspects of training, adjusting the design of residency programs, leveraging innovative teaching models such as competency-based medical education (CBME), and increasing technology in the learning environment.

Research conducted through this project highlighted a need to assess the fundamentals of training for all General Surgeons and to ensure that training is appropriately and efficiently matched to eventual practice for all General Surgeons. In particular, a substantial percent of General Surgeons in the national survey indicated that although they had received training, they still did not feel comfortable performing specific surgeries independently (see Table 4). More research may be needed to develop an appropriate way forward, taking into account the imperative to train in a manner that is efficiently and meaningfully linked to eventual practice.

## **Subspecialized training is a new reality for today's General Surgeons**

In all jurisdictions studied (i.e., the United States, the United Kingdom, and Australia), a high percentage of General Surgeons are undertaking further training in other surgical subspecialties. A variety of reasons were cited, including, for example, a perception that further training was necessary for employment, the undervalued status of General Surgery, and a sense that pursuing subspecialized training in order to focus one's practice might be a way of achieving mastery and excellence that is otherwise difficult to achieve in an all-encompassing discipline such as General Surgery. As reported in the national survey results, approximately two thirds of General Surgeons indicated undertaking additional formal training (most frequently due to personal interest).

While it is widely recognized that subspecialists as well as the multispeciality General Surgeon— who practices the broad reaches of this discipline— have valuable roles in the spectrum of care delivery, some individuals have cited the increasing prominence of fellowships and further training as a concern: these individuals suggested that such training was leading to the fragmentation of a discipline that fulfills an important role within each of their jurisdictions. Surgical leaders referenced a perception that fragmentation and subspecialization are seen to be at odds with the promotion of generalism and a generalist ethos: a concern, especially, in smaller or more isolated communities in Canada. These discussions reaffirmed the approach that has been prevalent in Canada: the value of subspecialized training and focused practice is significant, provided that such skills are layered onto a foundation of skills and knowledge common to all General Surgeons and matched to care delivery needs in all communities across the country.

## Optimizing General Surgery for the 21st Century

The discipline of General Surgery is in flux due to a variety of factors (see section 1.2). These changes have significantly impacted surgical knowledge and surgical care. This project intends to contribute to national and international discourse on the topic and to outline a path forward for the discipline within Canada. The Future of General Surgery project appears to have met its goals through the development of preliminary recommendations (see section 4.2). The creation of these recommendations was based on various avenues of research (i.e., historical analysis, jurisdictional review, stakeholder perspectives, and a national survey) and a national summit with leaders from General Surgery and related disciplines. Several key principles underline the recommendations: introducing an international precedent of enhanced training in General Surgery, the importance of foundational training in General Surgery (i.e., skills that all General Surgeons must learn), promoting the generalist ethos of General Surgery, ensuring equitable service delivery across the country, and discussing the necessity of a nimble education system.

### 4.1 A Way Forward

#### International Precedent of Enhanced Training

Throughout the project, stakeholders have expressed support for a redesigned approach to residency education in General Surgery that could be tailored to differing practice contexts, including large urban centres and smaller communities. Such training would be based upon foundational aspects of the discipline that all General Surgeons, regardless of their practice location, should possess and maintain. There are two notable facets of this proposal. First, this is the first time that Canadian residency training might be explicitly adjusted by anticipated future practice patterns, rather than by anatomic regions of the body, as has been the case in this and other disciplines to date. Second, if pursued, this will also be the first time that explicit pathways for General Surgery training will be implemented in the discipline of General Surgery by a certification college, in Canada or abroad, for the expressed purpose of ensuring optimal preparation for practice in a range of settings. This redesigned approach to residency education is intended to maintain the current, high national standard for surgical training. It will reaffirm the focus of training and practice on the health care needs of the local population served.

#### The Importance of Foundational Training

Common foundational training across a variety of surgical specialties is a reality in many jurisdictions and is generally accepted as an appropriate way forward to ensure optimal skill development. Akin to Australia and the United Kingdom, the Canadian postgraduate medical education system has developed a horizontal curriculum of foundational training for trainees

entering many surgical specialties, entitled the Surgical Foundations Program. This program, billed as an “initial period of postgraduate training required to acquire the knowledge, skills, and attitudes underlying the basics to the practice of surgery in general and preparatory to further training in a surgical specialty or subspecialty” (Royal College), is based on a curriculum of learning objectives common to nine surgical specialties including General Surgery. These learning objectives need to be achieved by all surgeons in disciplines that flow from this program, but are designed to be possible to acquire on almost any surgical rotation. Surgical Foundations courses typically have a very well-defined curriculum and leaders speak of this characteristic as being a key strength.

## Promoting the Generalist Ethos of General Surgery

As defined by the Task Force on the Future of Generalism in Medicine, generalists are: “a specific set of physicians and surgeons with core abilities characterized by a broad-based practice. Generalists diagnose and manage clinical problems that are diverse, undifferentiated, and often complex. Generalists also have an essential role in coordinating patient care and advocating for patients” (Task Force on the Future of Generalism in Medicine, 2013). Many stakeholders spoke highly of the importance of maintaining such an approach within General Surgery. As one stakeholder noted succinctly, “General Surgery requires the ability to apply basic surgical principles to varied surgical settings.”

One of the key strengths of the General Surgery residency program, as cited by stakeholders, concerned the Canadian residency system’s provision of knowledge in the Surgical Foundations and its education in a skillset that is both essential and transferable across other procedures and specialties. Stakeholders spoke about the importance of access to education that promotes self-awareness and ready access to other surgical specialists with high volumes of atypical cases to whom referrals of complex cases can be made in the interests of safe patient care.

Stakeholders and leaders cited a similar rationale for the promotion of generalist surgeons. In many communities, generalist skills are important for General Surgeons so that they are well-equipped to play key roles in the management of trauma and other conditions requiring urgent care. As one surgical leader noted, communities should have access to a surgeon who is “emergency safe,” capable of handling a variety of conditions requiring immediate care which can be provided in the community.

## Ensuring Equitable Service Delivery across the Country

Many stakeholders spoke of a “rural imperative” for the reassessment of surgical delivery and care to ensure equitable access and surgical care delivery. The provision of surgical services in many jurisdictions is fraught with a similar set of challenges in the United States, Canada, and Australia: a predominantly urban population with a very large land mass that is sparsely populated, an insufficient distribution of General Surgeons in specific practice settings given societal health needs, a lack of access to surgeons practicing in other disciplines, and limited

resources. These challenges are compounded by ongoing issues of difficulty recruiting and retaining General Surgeons in more isolated communities.

## Necessity of a Nimble Education System

Stakeholders reaffirmed the importance of pragmatism in the design of surgical training. They spoke about the importance of designing an education system that begins, first and foremost, with the identification of societal health needs. Second, leaders underlined the importance of an education system that is sufficiently flexible to train surgeons with the appropriate skills for a range of practice environments. In order to operationalize this, it was suggested by one individual that efforts should be geared towards the development of a more flexible system that acknowledged high level generic capabilities and increased opportunities to allow transitions among various specialties.

## 4.2 Recommendations for the Future of General Surgery

In an effort to identify the key steps needed to find a way forward for the optimization of education and training in General Surgery for the 21st century, four key recommendations, and a set of enabling actions, are outlined below. The recommendations are based on various avenues of research and a national summit with General Surgical leaders.

### **1.0 Redesign General Surgery training and curricula through the introduction of enhanced areas of expertise that are tailored to differing practice contexts in addition to foundational training.**

The Specialty Committee in General Surgery should assess the key aspects of a tailored approach to preparation for practice, including the number and types of enhanced areas of expertise (to be determined, but would be based on particular practice settings, and may include Clinician Scientist preparation, among others), and develop a preliminary document outlining the competencies associated with each proposed enhanced area of expertise.

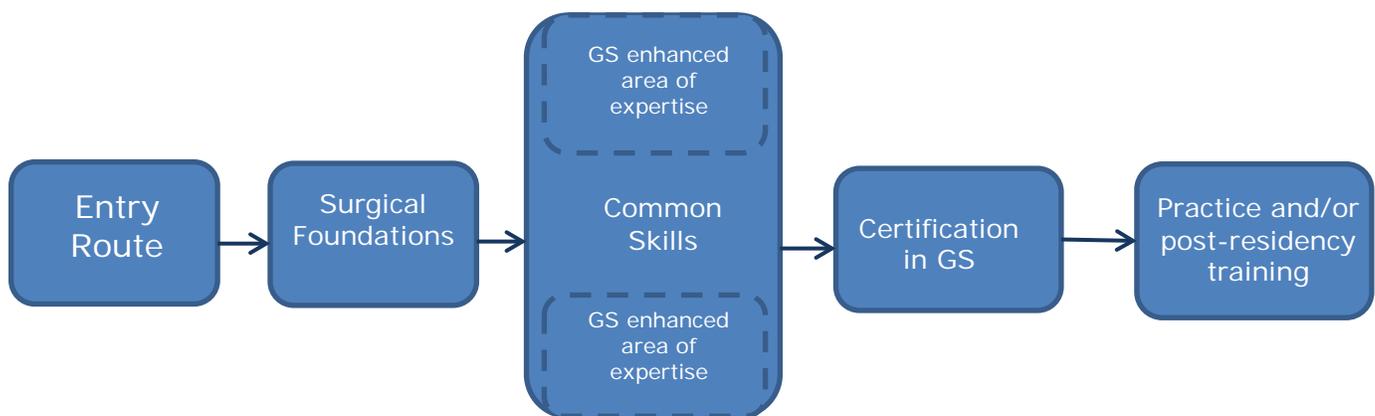
It is imperative that the objectives of such training facilitate the achievement of exit competencies that match those skills required for independent practice as General Surgeons in the broadly identified enhanced areas of expertise. As shown in Figure 9, the “fit for purpose” training is built within the foundational aspects of training in General Surgery. It is expected that this process would require a reconsideration of the entire five year residency training in General Surgery. It is recommended that there would remain a single entry route for General Surgery at the first year resident level, and the early part of the residency program would be linked to Surgical Foundations<sup>4</sup>. This would expand into core training for

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<sup>4</sup> Surgical Foundations are the core fundamental knowledge and skills that all surgeons possess. The core curriculum, taken during the first two years of residency, has a defined set of objectives that can be reached by a variety of surgical rotations.

the competencies all General Surgeons must possess; the branching into enhanced areas of expertise would occur at some point following completion of Surgical Foundations (see Figure 9). All residents would acquire the same certification in General Surgery at the end of residency.

An **enhanced area of expertise** is an approach of residency training within the primary specialty of General Surgery that is distinctly tailored to future intended practice, rather than focused on specific anatomic regions of the body. Enhanced areas of expertise are *not* intended as a new category of discipline recognition—they continue to lead to certification in General Surgery similar to the current model of General Surgery residency training—and are different from the definitions of subspecialties and Areas of Focused Competence (diplomas), as shown in Appendix D. In short, enhanced areas of expertise are different from other categories of discipline recognition in two key ways: a) enhanced areas of expertise are specifically employed within *residency training*, and b) enhanced areas of expertise are designed based on *intended practice*.



**Figure 9:** Proposed pathway of General Surgery residency training with enhanced areas of expertise.

There are four specific key actions that will be necessary to enable the pursuit of this recommendation:

- 1.1 The Specialty Committee in General Surgery should review its committee structure, membership, and process for recruitment of members in order to ensure the committee is representative of the diverse experience of professionals from all types of practice locations across Canada.
- 1.2 The Specialty Committee in General Surgery, with support from the Royal College of Physicians and Surgeons of Canada and in collaboration with stakeholder groups, such as the Canadian Association of General Surgeon (CAGS) and others, should undertake further research and analysis on surgical care delivery to determine an accurate profile of health human resources needs as pertinent to the General Surgery workforce in all contexts in Canada.

1.3 The Specialty Committee in General Surgery, with support from the Royal College of Physicians and Surgeons of Canada, should define the enhanced areas of expertise and a profile of competencies associated with each through the development of a preliminary identification of competencies document which would outline differing scopes of practice.

1.4 The Specialty Committee in General Surgery should consult broadly with all Subspecialty Committees of the current subspecialties of General Surgery to determine the implications of new enhanced areas of expertise upon the overall system of specialty training, including entry routes and recognition.

**2.0 General Surgery residency programs should incorporate an explicit period of training geared towards, and focused upon, an individual making the transition to independent practice.**

The Specialty Committee in General Surgery should support the development of an explicit transition period from clinical training to practice at the end of residency. In order to do so, the following enabling action should be undertaken:

2.1 In collaboration with the Task Force on Examination Timing and the Assessment Committee of the Royal College, a systematic consultation process should be undertaken to identify the optimal timing and content of the Royal College Certifying Examination(s) in General Surgery and to determine the feasibility of adjusting the timing of these examinations to minimize disruption of the educational program during this period of residency.

**3.0 Support broader transition to a hybrid model of competency-based medical education in postgraduate medical education.**

A new hybrid competency-based approach should be launched. This model would be intended to prioritize the achievement of milestones at various stages of residency training, rather than prioritizing time spent in training.

Recognizing the challenges of undertaking such a transition, it must be noted that agreement on competencies (Recommendation 1.0) has been highlighted as essential to the successful launch of a competency-based model of postgraduate medical education. In addition, three enabling actions are also noted:

3.1 The Royal College, in collaboration with the Specialty Committee in General Surgery and the General Surgery Examination Committee, should develop a new, national guide intended to promote and serve as a resource for nationwide surgical education in a tailored set of General Surgical competencies.

Current curricular content for General Surgical residency training lacks appropriate specificity for the development of particular specialty-specific milestones geared towards the level of education and training.

- 3.2 The Royal College, in collaboration with the Specialty Committee in General Surgery and the General Surgery Examination Committee, should develop a comprehensive toolkit for assessment in General Surgery that incorporates greater emphasis on assessment of performance, including work-based assessment, rather than just knowledge.

A new hybrid model of competency-based medical education would be facilitated by a meaningful assessment system based on both formative and summative assessments. A new, national toolkit for assessment in General Surgery should be designed to cover the breadth of assessment approaches and that would leverage the current, final examination as one element of an overall, comprehensive approach. The assessment tools should be both formative and summative, to be used both in-training and at the conclusion of residency training.

- 3.3 The Specialty Committee in General Surgery should support ongoing efforts to develop an electronic portfolio to track progress toward milestones.

It is imperative that efforts to launch an electronic portfolio continue unabated, for this initiative was seen by the Task Force as essential to tracking and communicating progress, thereby increasing the robustness of achievement in a competency-based model.

**4.0 Post-General Surgery residency training, in the form of recognized subspecialty residency programs, Areas of Focused Competence (diplomas), and clinical fellowships, should be developed as complements to enhanced areas of expertise in General Surgery residency programs and undertaken as they are relevant to particular professional practice environments.**

Any fellowships or diplomas should be adaptable and flexible in order to be relevant to practice and tailored to the individual needs of a particular professional. The Specialty Committee in General Surgery should support applications for General Surgery-specific Areas of Focused Competence (diplomas) that support different enhanced areas of expertise in General Surgery.

# APPENDIX A

## Task Force Membership

### Co-Chairs

<b>Dr. Eric Webber</b>	Chair, Royal College Specialty Committee (General Surgery)
<b>Dr. Ken Harris</b>	Executive Director, Office of Education, Royal College
Dr. Juan Bass	Chair, Royal College Specialty Committee; Pediatric Surgeon, Children's Hospital of Eastern Ontario
Dr. Sami Chadi	Chair, Resident Section, CAGS
Dr. Richard Finley	Head, University of British Columbia Division of Thoracic Surgery; Thoracic Surgeon
Dr. Gerald Fried	Edward W. Archibald Professor and Chairman, Department of Surgery, McGill University
Dr. Jamie Gregor	President, OAG; Gastroenterologist & Medicine Site Chief, London Health Sciences Centre - Victoria Hospital; Professor of Medicine, Western University
Dr. Stewart Hamilton	Professor, Division of General Surgery, University of Alberta; Past-President, Royal College of Physicians and Surgeons of Canada
Dr. Douglas Hedden	Head, University of Alberta Dept. of Surgery; Chair, Surgical Foundations Royal College
Dr. Kevin Imrie	President-Elect, Royal College of Physicians and Surgeons; Physician-in-chief, Dept. of Medicine, Sunnybrook Health Sciences Centre
Dr. Stewart Kribs	Associate Professor, Department of Medical Imaging, Western University
Dr. Donna Maziak	Thoracic Surgery Residency Program Director, University of Ottawa; Thoracic Surgeon, Ottawa Hospital
Dr. Bill Pollett	Professor of Surgery, Memorial University of Newfoundland
Dr. Mac Quantz	Chair, Royal College Specialty Committee (Cardiac Surgery); Cardiac Surgeon, London Health Sciences Centre
Dr. Susan Reid	Chair, Department of Surgery, McMaster University; General Surgeon
Dr. Richard Reznik	Dean, Faculty of Health Sciences, Queen's University; General Surgeon
Dr. Nicole Robbins	Nucleus member, Royal College Specialty Committee (General Surgery); General Surgeon, Williams Lake, British Columbia
Dr. Lawrence Rosenberg	Chief of Surgical Services, SMBD-Jewish General Hospital, Montreal
Dr. David Taylor	Vascular Surgeon, Vancouver General Hospital
Dr. Trevor Theman	Registrar, College of Physicians and Surgeons of Alberta
Dr. Brock Vair	General Surgeon, Exam Chair Royal College of Physicians and Surgeons
Dr. Mark Walton	Assistant Dean, Postgraduate Medical Education, McMaster University
Dr. Garth Warnock	Past-President, Canadian Association of General Surgeons; General Surgeon, University of British Columbia
Dr. Mary Katherine Wells	General Surgery Residency Program Director, Memorial University of Newfoundland; General Surgeon, St. John's, Newfoundland
Dr. Brian Westerberg	Chair, Royal College Specialty Committee (Otolaryngology-HNS)
Dr. Jonathan White	Associate Professor, University of Alberta; Endowed Chair in Surgical Education, University of Alberta
Dr. Jim Wilson	Chair, Royal College Committee on Specialties; Urologist, Kingston General Hospital; Head, Department of Urology, Queen's University
Dr. Debrah Wirtzfeld	President Elect, Canadian Association of General Surgeons

**Royal College Core Project Team**

Dr. Jason Frank	Director, Specialty Education, Strategy, and Standards
Ms. Sarah Taber	Assistant Director, Education Strategy and Accreditation
Ms. Lisa Gorman	A/Team Lead, Educational Strategy, Innovations, and Development Unit
Ms. Ashley Ronson	Policy Analyst, Educational Strategy, Innovations, and Development Unit
Ms. Jennifer Stewart	Manager, Specialties Unit
Ms. Stacy Nesbitt	Administrator, Specialties Unit

## APPENDIX B

### Detailed Methodology of the Preliminary Research

Preliminary research conducted in Phase 1 of the Future of General Surgery project informed the development of Phase 2, the Surgical Summit held in May 2013. The following activities were carried out during the first phase of the project: interviews with stakeholders, a national survey of Royal College-certified General Surgeons, a jurisdictional review, and an historical analysis.

#### Interviews with Stakeholders

Informal group discussions were held between representatives of the Task Force and surgical leaders in Canada throughout the fall of 2012. All discussions were recorded and notes were taken from the recordings.

These discussions informed the Task Force's work and contextualized forthcoming policy discussions on the future of General Surgery residency education. Stakeholders were engaged to provide their insights on the current strengths and opportunities inherent in the training of today's General Surgeon. The discussions were carried according to the details listed in the following table:

	<b>Group discussion 1</b>	<b>Group discussion 2</b>	<b>Group discussion 3</b>
<b>Setting</b>	Canadian Surgical Forum	Canadian Surgical Forum	Teleconference
<b>Date</b>	September 2012	September 2012	November 2012
<b>Target group</b>	Board members of the Canadian Association of General Surgeons (CAGS)	General Surgery residents	Task Force on the Future of General Surgery
<b>Number of participants</b>	15	~20	16
<b>Question topics</b>	Strengths and weaknesses of today's General Surgery residency training model, trainees' level of preparedness for independent practice, post-residency fellowship programs, and differences and preparedness in the practice of General Surgery in various settings (e.g., rural, urban)	Strengths of the current General Surgery training model, suggested modifications to General Surgery training, anticipated preparedness for independent practice, and the general scope of General Surgery	Strengths and weaknesses of today's General Surgery residency training model, trainees' level of preparedness for independent practice, post-residency fellowship programs, and differences and preparedness in the practice of General Surgery in various settings (e.g., rural, urban)
<b>Duration</b>	60 minutes	60 minutes	60 minutes

## National Survey of Royal College-certified General Surgeons

The national survey of General Surgeons was developed by the project secretariat at the Royal College of Physicians and Surgeons of Canada in collaboration with the Task Force of Canadian surgical leaders and the Medical Education Research Group at the CHEO Research Institute. All Active Fellows certified in General Surgery by the Royal College were invited via email to participate in a self-administered online survey regarding General Surgery residency and practice. Invitations were sent to 2,125 practicing surgeons certified in General Surgery, of which 672 responded to the survey (32% response rate; 74% male; 96% Canadian-trained). The purpose of the study was to assess residents' perceptions of preparedness upon completion of residency. Responses provided a sense of how current training is succeeding and what areas and opportunities may need to be reconsidered; ultimately providing context and evidence for a current initiative intended to reassess General Surgery residency training.

## General Surgery Survey Questions

The survey contained 24 questions, organized according to the following four groups of questions:

- Demographics (gender, age, work location)
- Preparedness upon completion of residency training
  - *General preparedness*— technical ability, clinical knowledge, familiarity with ambulatory care, skills to work effectively within the health care system, and skills to run a practice.
  - *Procedural skill*— competent to perform (i.e., without supervision) 78 index surgical procedures (intended to represent the breadth of practice).
- Additional formal training
  - Respondents were asked if they had undergone any additional formal training of 3 months or greater in duration after completing General Surgery residency training.
- Current practice
  - Respondents were asked to indicate how often, in the past 12 months, they performed (i.e., without supervision) the same 78 index surgical procedures.

## Jurisdictional Review

The jurisdictional review was undertaken to provide an overview of the *current* organization of surgical education and specialization in Canada as well as in three other jurisdictions seen to be comparable to the Canadian context: the United States, the United Kingdom, and Australia.

Six semi-structured individual interviews were held with key representatives from international jurisdictions at the International Conference on Surgical Education and Training (ICOSSET) and the International Conference on Residency Education (ICRE). Interviews lasted between 15-90 minutes. Interviewees were asked a range of questions about international perspectives on: surgical training, the delivery of surgical services, the evolution of surgical training to meet changing health care delivery requirements; and their opinions on the Canadian surgical training system.

A literature-based search was also conducted to acquire factually-based information on the jurisdictions in question. The literature search was intended to delineate differences in the training approach and pathways, as well as recognition of surgical disciplines, in other countries.

## Historical Analysis

In addition to stakeholders' perceptions, the General Surgery survey, and a jurisdictional review, an historical analysis was undertaken to inform the Task Force's work and contextualize the policy discussions on the future of General Surgery residency at the national summit in May 2013.

Two primary sources of data were used for the historical analysis:

- **Archives-based** search of the Royal College's minutes and records of decision-making pertinent to discipline recognition (including approvals of new disciplines, change in status or scope of practice of existing disciplines, discipline name changes, etc.)
  - To understand the chronology of changes to the recognition of surgical specialization over time.
  
- Review of **current and historic Objectives of Training (OTR)** documents for the discipline of General Surgery (1982-current).
  - To identify changes in the definition and certification requirements of a General Surgeon.

# APPENDIX C

## Annotated Bibliography of Selected Scholarship Related to General Surgery for Delegates at the National Summit

### Introduction

There exists a significant amount of literature on the topic of General Surgical training, in varying jurisdictions worldwide. In order to contextualize forthcoming discussions at the Summit on the Future of General Surgery, several key resources are provided for review, should you wish to do so. However, it must be noted that these resources are not intended to represent a systematic review of the literature. Rather, implications for discussions regarding the discipline and residency training are summarized within this annotated bibliography and are intended to serve as an orientation to, and a prompt for discussion at, the 2013 Summit on the Future of General Surgery in Canada.

Bell RH, Biester TW, Tabuenca A, Rhodes RS, Cofer JB, Britt LD, Lewis FR. 2009. **Operative Experience of Residents in US General Surgery Programs: A Gap Between Expectation and Experience.** *Annals of Surgery.* 249(5): 719-724.

The Bell et al study was undertaken with the objective to determine the level of actual resident experience with priority procedures (as identified by Program Directors) in the United States. The impetus for this work was, as noted by Bell et al, provided by concerns regarding the adequacy of training of general surgeons in the United States. Bell et al's study identified a gap between "expectation [of procedures thought to be essential to the practice of general surgery, as identified by the program directors] and experience [of the residents during their 5 years of training]". The methodology for this study involved both a survey of program directors and review of actual operative experience of residents as reported to the Residency Review Committee for Surgery. With findings bolstered by a strong methodology premised on objective data, Bell et al concluded that the data posed "important problems for surgical educators." In particular, of the 121 of 300 procedures thought to be essential, graduating residents performed only 18 of those 121 procedures an average of more than 10 times during residency. Bell et al concluded that additional methods (e.g. simulation or other) were needed to ensure residents have competence in all essential procedures and noted that increased attention was also needed to ensure consistency in operative experience across the country, especially if a national educational model in surgery were to be developed, as recommended by the Blue Ribbon Committee responsible for the reassessment of American surgical training from 2002-2004.

Brennan MF, Debas HT. 2004. **Surgical Education in the United States: Portents for Change.** *Annals of Surgery.* 240(4):565-572.

Positing that change is necessary for the postgraduate surgical education system in the United States, Brennan and Debas sought to identify key factors that are increasingly putting pressure on the system through an examination of the expectations of key constituencies served by postgraduate medical education: the patient, the medical student, the surgical resident, the surgical generalist, the surgical specialist, the health care provider/payor, and the hospital/academic department, including the faculty. In an era of increasingly patient-centered care provision, Brennan and Debas suggest that patients not only expect access to care, but may increasingly wish to be cared for by specialists rather than generalists and by experienced practitioners rather than residents. Regarding the constituency of the General Surgeon, Brennan and Debas suggest that the "classic" General Surgeon is a vanishing breed and that the fate of the generalist is unsure and "varies between the urban setting and small communities that require comprehensive surgical and medical care." The General Surgeon working in urban communities progressively differentiate, sometimes becoming "identified with areas that he or she may or may not have specialist training in, but in which experience substitutes for formal training."

Debas HT, Bass BL, Brennan MF, Flynn TC, Folse R, Freischlag JA, Friedmann P, Greenfield LJ, Jones RS, Lewis FR, Malangoni MA, Pellegrini CA, Rose EA, Sachdeva AK, Sheldon GF, Turner PL, Warshaw AL, Welling RE, Zinner MJ. 2005. **American Surgical Association Blue Ribbon Committee Report on Surgical Education: 2004.** *Annals of Surgery.* 241(1): 1-8.

In recognition of changes to medical education and surgical training, the American Blue Ribbon Committee was launched in June 2002 to develop recommendations to “enhance the training of surgeons to serve all the surgical needs of [the United States], and to keep training and research in surgery at the cutting edge in the 21<sup>st</sup> Century.” The recommendations presented in the report are broad-ranging, addressing topics related to the surgical/medical workforce, medical student education in surgery, resident workhours and lifestyle in surgery, residency education in surgery, the structure of surgical training, education support and faculty development, training in surgical research, and continuous professional development. Of particular relevance for the Summit on the Future of General Surgery participants and reforms overtly directed to residency education, the Blue Ribbon committee recommended that residency programs are more explicit about the type of surgeon created by the program, that increased diversity is needed in recruitment, that surgical programs must address the issue of indebtedness of residents and salaries for residents, and that basic topics that all surgical residents need to master need to be defined and should serve as the foundation for further training in the specialties. Regarding the structure of residency training, the Blue Ribbon committee concluded that “one size no longer fits all” and that a “new [training] paradigm is needed that promotes both the varieties of general surgical practice and the subspecialties that derive from general surgery.” In particular, the Blue Ribbon Committee proposed a new model of surgical training (see Figure 1 in the article) that begins with basic surgery care and, following verification of competence, leads to a Specialist in General Surgery (Rural or Urban) or to a Specialist in Surgery (in any of 8 subspecialties). Both Specialists in General Surgery and Specialists in Surgery would have access to additional Fellowship models such as HPB, MIS/laparoscopy, breast surgery, hand surgery, etc. and any subspecialty program that deems that general surgery certification is a requirement could require its trainees to complete general surgery training.

Hwang H. 2009. **Does general surgery residency prepare surgeons for community practice in British Columbia?** *Can J Surg.* 52(3): 196-200.

In order to determine preparation for practice, this study is based on a comparison of procedures performed by the author during the last three years of training and his first year of clinical practice. During the last three years of residency training, Hwang performed 1170 procedures, with a significant percentage performed during community rotations. In his first year of practice, he performed 1440 procedures in his general surgery position at a hospital with a catchment area of approximately 100,000 (within an hour’s drive as of 2001). Procedures performed in residency match those in practice fairly consistently, with his residency providing “a wide range of experience in the “general” category, including cutaneous and subcutaneous, abdominal, gastric, intestinal, colonic and benign breast procedures.” Hwang notes, however, some exceptions: first, his current practice includes outpatient procedures he was not exposed to in residency and less experience in areas such as endoscopy, pediatric surgery, and hand surgery. According to Hwang, this “may reflect the need to incorporate more ambulatory-based training in residency” and to schedule rotations that would provide exposure in these areas closer to the end of residency training.

Hameed SM, Brennerman FD, Ball CG, Pagilarello JP, Razek T, Parry N, Widder S, Minor S, Buczkowski A, MacPherson C, Johner A, Jenkin D, Wood L, McLoughlin K, Anderson I, Davey D, Zabolotny B, Saadia R, Bracken J, Nathens A, Ahmed N, Panton O, Warnock GL. 2010. **General Surgery 2.0: the emergence of acute care surgery in Canada.** *Can J Surg.* 53(2): 79-83.

This article has been included in the meeting package as a result of our recognition that the emergence of Acute Care Surgery (ACS) has important implications for the future of General Surgery and for surgical education writ broadly. As detailed in Hameed et al, ACS is a team-based service explicitly directed toward the treatment of

general surgical emergencies. It has been suggested that ACS is a “unifying factor” in general surgery that may provide a new way forward for treatment and service delivery.

Pollett WG, Dicks E. 2005. **Training of Canadian General Surgeons: Are they really prepared? CAGS questionnaire on surgical training.** *Can J Surg.* 48(3): 219-224.

In recognition of the significant variability of General Surgery practice in Canada, a survey study was launched to determine whether Canadian training programs are appropriate for “single system subspecialty practice” and “multisystem broad-based practice in smaller communities.” According to the study, approximately 60% of respondents had completed additional formal training beyond their General Surgical residency training. When analyzed by size of the community, Pollett and Dicks found that the completion of post-fellowship training was more typical of respondents from communities of larger populations than communities of smaller populations and surgeons in smaller centres may receive mentoring from senior colleagues to address gaps in training. This study also found that the size of community influenced the degree of subspecialty practice: surgeons in smaller communities performed more subspecialty and other specialty surgical practice than those in larger communities. As such, Pollett and Dicks concluded that “surgical skill sets may need to be tailored to those of individual communities and may cross traditional specialty and subspecialty lines.” Concerned that current training programs may frequently fail to prepare residents for practice in smaller settings, Pollett and Dicks outline a number of suggestions for residency training in Canada including the development of specific objectives to define practice for community based generalists (including appropriate referrals) and the adjustment of the level of training to ensure that residents are technically competent in the defined objectives and procedures. In addition, Pollett and Dicks suggested that some training should take place in rural and regional communities and that short fellowships or sabbaticals may be valuable models for the development of new skills should they become needed by a surgeon in a particular community.

Polk HC, Bland KI, Ellison EC, Grosfeld J, Trunkey DD, Stain SC, Townsend CM. 2012. **A Proposal for Enhancing the General Surgical Workforce and Access to Surgical Care.** *Annals of Surgery.* 255(4): 611-617.

With an explicit focus on General Surgery workforce shortfalls, this paper outlines consensus on primary recommendations from a focused meeting in October 2010. The paper posits that the general surgeon is currently, and increasingly, essential to health care delivery given the general surgeon’s unique comprehensive skills. The authors outline analysis based on the history of the discipline and suggest three contemporary issues facing the discipline of General Surgery in the United States, including “demanding call schedules (residency and practice), “comparatively poor reimbursement for care,” and “broad and irregular skill set requirements.” A series of six specific recommendations are provided to address workforce and population projections which highlight shortfalls of general surgical service provision: 1) enhance the number of General Surgery trainees and the breadth of training, 2) incorporate more flexibility and breadth in residency, 3) minimally invasive surgery should largely return to General Surgery, 4) broader use of community hospitals in these efforts, 5) publicize loan forgiveness and improved visa status for international medical graduates going into General Surgery, and 6) select candidates with a bias toward a general surgical career.

Rosenberg L. 2012. **Surgery: Down for the Count?** *CMAJ.* 184(4): 496.

While acknowledging that technological innovation was previously a driver for increased surgical care, Rosenberg argues that recent technological innovations may well “jeopardize the surgeon’s traditional role.” In particular, Rosenberg traces changes such as improvements in imaging technology and new procedures that allow diseases to be treated non-operatively that are leading to a decrease in the scope and volume of surgical care. Furthermore, Rosenberg highlights a lessening of the previously distinct boundary between “surgical and nonsurgical treatment,” and between “what surgeons do and what nonsurgeons do.”

Warshaw AL. **Restoration, Not Preservation, of General Surgery Residency.** 1993. *Arch Surg.* 128: 265-268.

As an early account of the challenges facing General Surgery residency, Warshaw presents a broad overview of implications for medical education in the United States. Warshaw argues that general surgical residency training is well-suited for generalists, but that a “new mechanism” might be needed for providing further special training to general surgeons. Warshaw cites additional literature regarding concerns such as a lack of clear linkage between education and practice, a tendency toward fellowships, and training length. One of the key concerns related to the American model of General Surgical training as cited by Warshaw is as follows: “The first problem is that we are using one training system to try to do it all: to train some surgeons (general general surgeons); to train others (special general surgeons) who focus more narrowly, perhaps with academic interest; and to train a third group (subspecial surgeons) who go on to derivative subspecialty training, perhaps far removed from general surgery.” In 1993, Warshaw argued that one of the necessary solutions lies in the strengthening of primary certification in surgery. He spoke to the importance of restoring “to general surgery a sense of specialization,” or the development of a surgeon with a particular identify, focus skills, interest, and knowledge.

## APPENDIX D

### Definition Comparison of Royal College Categories of Discipline Recognition with Proposed Enhanced Area of Expertise in General Surgery

The following table outlines the definitions of the categories of discipline recognition— Specialty, Subspecialty, and Area of Focused Competence (Diploma)—for the purposes of distinguishing them from the proposed Enhanced Area of Expertise within General Surgery. Examples from the General Surgery family are given to illustrate the definitions more clearly.

		Definition	Example
Existing categories of discipline recognition	<b>Specialty</b>	A specialty is an area of medicine with a broad-based body of knowledge that is relevant in both community and tertiary settings and is a foundation for additional competencies (such as subspecialties).	General Surgery
	<b>Subspecialty</b>	A subspecialty is an area of medicine with a more focused or advanced scope that builds upon the broad-based body of knowledge defined in a parent specialty.	Colorectal Surgery Critical Care Surgery General Surgical Oncology Pediatric Surgery Thoracic Surgery
	<b>Area of Focused Competence (Diploma)</b>	An Area of Focused Competence (AFC) is a highly focused discipline of specialty medicine that addresses a legitimate societal need, but does not meet the criteria for a specialty, fundamentals program, or subspecialty. Typically, AFC (diploma) programs represent either a) <i>supplemental</i> competencies that enhance the practice of physicians in an existing discipline, or b) a <i>highly specific and narrow</i> scope of practice that does not meet the criteria of a subspecialty.	Trauma General Surgery
<b>Proposal for General Surgery</b>	<b>*Enhanced Area of Expertise for General Surgery residency training</b>	An enhanced area of expertise is an approach of residency training within the primary specialty of General Surgery that is distinctly tailored to future intended practice, rather than focused on specific anatomic regions of the body.	To be determined, but would be based on particular practice settings (e.g., community-based General Surgery), and may include Clinician Scientist preparation, among others.

\*It should be emphasized that enhanced areas of expertise are **not** intended as a new category of discipline recognition, but instead aim to *tailor* existing primary residency training in General Surgery based on future intended practice.