

Surgical fellowship training in Canada: What is its current status and is improvement required?

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This paper examines current issues concerning surgical fellowship training in Canada. Other than information from a few studies of fellowship training in North America, there are scant data on this subject in the literature. Little is known about the demographic characteristics of those who pursue fellowship training in Canada, what the experiences and expectations are of fellows and their supervisors with respect to the strengths and weaknesses of this level of training, or how this level of education fits in with Canadian undergraduate and postgraduate medical training. We summarize current knowledge about fellowship training in Canada as it pertains to demographic characteristics, finances, work hours, residency training, preparation for clinical and research work and satisfaction with training. Most information on surgical fellowship training comes from the United States. As such, we used information from American studies to supplement the Canadian data. Because a surgical fellowship experience in Canada may be different from that in the United States, we propose that Canadian surgical fellows and their supervisors should be surveyed to gain an understanding of such information. This knowledge could be used to improve surgical fellowship training in Canada.

Cet article analyse les enjeux d'actualité entourant la formation au niveau du fellowship en chirurgie au Canada. Outre l'information tirée de quelques études sur ce type de formation en Amérique du Nord, les données sont rares à ce sujet dans les publications. On connaît peu de choses des caractéristiques démographiques des personnes qui suivent une formation au niveau du fellowship au Canada, des expériences des boursiers et de leurs superviseurs, de leurs attentes au sujet des forces et des faiblesses de ce niveau de formation, ou de l'intégration de ce niveau de formation dans l'éducation médicale prédoctorale et postdoctorale au Canada. Nous résumons le savoir actuel sur la formation au niveau du fellowship au Canada sur les plans suivants : caractéristiques démographiques, questions financières, heures de travail, formation en résidence, préparation au travail clinique et à la recherche et satisfaction à l'égard de la formation. La majeure partie de l'information au sujet de la formation au niveau du fellowship en chirurgie provient des États-Unis. Nous avons donc utilisé de l'information tirée d'études américaines pour compléter les données canadiennes. Comme une expérience de formation au niveau du fellowship en chirurgie vécue au Canada peut être très différente d'une expérience vécue aux États-Unis, nous proposons de sonder les boursiers canadiens en chirurgie et leurs superviseurs afin de comprendre cette information. Ces connaissances pourraient servir à améliorer la formation au niveau du fellowship en chirurgie au Canada.

A surgical fellowship is often a 1- or 2-year clinical experience performed after residency (postgraduate) training. The Royal College of Physicians and Surgeons of Canada identifies a resident as a trainee enrolled in a recognized specialty or subspecialty training program accredited with one of the university postgraduate medical education offices in Canada. Training taken outside these programs is often referred to as "fellowship" training, and such training is not accredited by the Royal College, nor does it lead to Royal College certification.

Fellowship training is obtained in one of the focused areas of a specific surgical specialty or subspecialty. For example, in orthopedic surgery, a fellowship may be done in spine, hand, upper extremity, foot and ankle, trauma, sports medicine, arthroplasty or pediatric surgery. The duties of the fellow vary by institution but are typically performed under the supervision of 1 or more staff

surgeons in a university-affiliated hospital. In addition to the clinical experience, the fellow is usually responsible for producing research and participating in the education of residents, medical students or allied health professionals. The goal of fellowship training is to produce an expert in a focused surgical area. In addition, many fellowships train surgeons who can become leaders in the fields of clinical medicine, research and education.¹ It is these surgeons who play an important role in teaching future medical students, residents and allied health professionals.

Unlike in the United States, nationalized guidelines for the standards of education and training in fellowship programs have not been developed in Canada. University-based guidelines may exist, but fellowship programs are monitored by the individual program and supervisor. This is partly owing to the fact that in Canada the qualification process to be a either a general or subspecialty surgeon ends after passing the Royal College certification examinations, which are taken after completion of the residency. In the United States, the qualification process to be a specialist is different. To obtain certification in a surgical specialty, a surgeon must pass a specialty board exam, which is organized by a regulatory body (e.g., American Board of Orthopaedic Surgery, American Board of Thoracic Surgeons).¹ Many surgeons complete a fellowship to obtain appropriate additional training in their particular specialties before taking the examinations. Most fellowships in the United States are accredited by a regulatory body; this status ensures that trainees receive appropriate education consistent with their level of training. The terminology around fellowship training on either side of the border may vary by jurisdiction, making the study of fellowships and additional training quite difficult.

Considering the popularity of fellowship training in Canada and the United States, concerns have been voiced about the impact such training may have on resident and medical student training and on the profession in general. In the 1980s, these issues were hotly debated. Those who supported fellowship training argued that fellows could help educate residents, medical students and allied health professionals; fulfill their supervising surgeons' clinical work load; increase research productivity in their field; and, once the training had been completed, allow for improved patient outcomes (as the fellows would be able to apply their enhanced clinical skills).² In contrast, those who did not support fellowship training argued that it led to suboptimal residency training (poorly trained residents needed extra training in the form of a fellowship to become competent); could lead to "slave labour" (supervisors could require fellows to perform jobs that residents were legally protected from having to perform); increased the cost of medical education (salaries had to be obtained from funding agencies for further years of training); and could possibly lead to increased litigation in the profession ("generalist" surgeons performing procedures offered by fellowship-trained spe-

cialists could be at increased risk of being sued if their outcomes were below the standard of care set by fellowship-trained surgeons).²

In response to these issues, guidelines for the standards of education and training for fellowship programs in the United States were developed by a regulatory body, the Accreditation Council for Graduate Medical Education (ACGME).¹ These guidelines addressed issues, such as the provision of sufficient clinical, research and education experience; evaluation; funding; work hours; and the protection of resident education.¹ Fellowship programs that complied with the ACGME guidelines would obtain nationally recognized "accreditation" status. Having this status ensured that trainees at all levels received appropriate education consistent with their level of training.

Accreditation of fellowship programs and certification of many focused areas of practice for surgeons do not exist in Canada. Nevertheless, each provincial regulatory authority, university and hospital has clear guidelines about the supervision of trainees, including fellows, and the most responsible physician. For example, the regulations of the College of Physicians and Surgeons of Ontario state that all clinical fellows must either be recognized specialists in their countries of origin or have completed a residency in the "base specialty" in Canada or the United States. The medical licenses granted from provincial regulatory authorities for clinical work during a fellowship can either be unrestricted or educational. Unrestricted medical licenses are typically granted to Canadian graduates who have completed their residency training and have passed their Royal College certification examinations. Clinical fellows with such a license may practise medicine without the supervision of a teacher/supervising surgeon. Educational licenses are granted to trainees who must work and learn in a university environment where teachers must supervise their delivery of care.

In addition to these licenses, variations in licensure may occur at specific training centres. For example, at the University of Toronto, most international clinical fellows are given temporary educational licenses during the initial months of their fellowships, during which time they must pass a pre-entry assessment period (PEAP). Only after passing the PEAP are these trainees given educational licenses under which they can continue their training. Recognizing that there would be a benefit to standards for additional training, the Royal College has started a consultation process on new categories of recognition that might be appropriate for some fellowships.

Despite the recent recognition of the Royal College on this matter, there continues to be concern among Canadian medical educators about what defines a successful fellowship experience and what impact fellows have on resident education. We believe that an assessment of the current state of fellowship training in Canada is due. Because a summary of the literature on this topic, to our knowledge,

does not exist, we sought to summarize the current state of knowledge about fellowship training in Canada as it pertains to demographic characteristics, finances, work hours, residency training, preparation for clinical and research work, and satisfaction with training.

METHODS

We conducted a broad computerized search using the PubMed, MEDLINE and Cochrane review databases from the earliest available date to August 2009. We used the following keywords: “fellowship,” “fellows,” “surgery,” “training” and “residency.” Furthermore, we scanned the reference lists of all identified articles for additional relevant studies.

The following sections provide an overview of various aspects of fellowship training. Although we included all the Canadian references found, it is important to note that we also used information from American studies to supplement the Canadian data when information was lacking.

DEMOGRAPHIC CHARACTERISTICS

Although, to our knowledge, no published numbers exist in Canada, several hundred clinical surgical fellows are supervised by several hundred surgeons. In Ontario alone, about 260 clinical surgery fellows are enrolled per academic year in teaching hospitals; they are supervised by about 300–325 staff surgeons. Exact numbers of supervisors are difficult to determine because some fellows work with more than 1 supervisor during the training period.

The number of residents choosing to undergo fellowship training is on the rise in Canada and the United States. A recent review of graduating general surgery residents from the University of Toronto found that the number entering nonaccredited clinical fellowships significantly increased from 22.7% in 1995–1997 to 43.5% in 2004–2006. A survey of residents taking the American Board of Surgery In-Training Examination in 1993–2005 indicated that the percentage choosing fellowships increased from 67% to 77%.³ Patterns of change from “no fellowship” to “any fellowship” were spread heterogeneously across individual and residency subsets. Increases were greatest among graduates from the Midwest and Southeast of the United States, women and residents from community hospitals or small training programs.³ Specialty top choice patterns varied, leading to disproportionate demographic subgroup representation within some specialties (i.e., a higher proportion of women entered into general surgery fellowships than other surgical fellowships).

Up to two-thirds of orthopedic surgeons in the United States complete a fellowship.^{4,5} Residents who go on to pursue a fellowship are typically younger, come from larger training programs and train in the Mideast and New England.⁶ This finding is consistent in the specialty of vascular

surgery, where 70% of American program directors have completed a fellowship.⁷

WHY A FELLOWSHIP IS CHOSEN

It appears as though the main determinant in how residents select a fellowship is the relationship they have with the attending staff during a specific residency rotation.^{8,9} For example, a national survey of American orthopedic foot and ankle fellows indicated that the relationship trainees had with their residency foot and ankle specialist was the primary catalyst for pursuing a foot and ankle practice as a career.⁸

But why do a fellowship? Information from several different medical and surgical specialties indicates that the main reason a fellowship is chosen is to gain extra training in that clinical area of interest and gain confidence and maturity.⁴ A survey of general surgery fellows specializing in minimally invasive surgery in the United States and Canada revealed that most fellows felt unprepared for clinical practice at the completion of residency, especially with regards to performing advanced laparoscopic surgery, a skill that is becoming more commonplace in practice.¹⁰ A recent review of graduating general surgery residents at the University of Toronto revealed that there were significantly fewer graduates entering directly into practice in 2004–2006 than in 1998–2000 and 2001–2003.¹¹ Graduates who did not enter directly into practice chose a clinical fellowship. The authors of the study concluded that the reason for this phenomenon was that although graduates possess an acceptable skill set, they lack the clinical confidence and experience to enter directly into practice. With the recent restrictions in work hours during residency training, it is possible that more and more residents turn to fellowships to obtain the clinical skills they need to safely practice their specialties. When palliative medicine fellows were asked about the relative priorities for receiving various types of fellowship training, 94% identified clinical training as very important, 63% identified educational training as important, 33% identified research training as very important and 21% identified administrative training as very important.¹² Other reasons included the perception of entering a more favourable job market and receiving more prestige.¹³

But are there reasons other than gaining more clinical experience for surgeons to pursue a fellowship? What is it about fellowships that they desire? For example, do they want more of an opportunity to perform common procedures or do they want to focus primarily on complex procedures? Do differences exist between the reasons of domestically trained fellows and foreign-trained fellows? Are certain academic centres chosen over others because of the reputations of specific supervising surgeons or a university's clinical or research work? Further information is needed about why fellowships are chosen in Canada.

EFFECT ON RESIDENCY TRAINING

Considering the historic and ongoing concerns on this topic and the accreditation process in the United States, it is interesting to note that a poll of American orthopedic residency directors in 1998 showed that 70% thought having fellows helped their training programs, whereas 10% thought that fellows were a hindrance, and 21% were neutral.¹⁴ A survey on faculty, fellow and resident opinions on the fellowship structure, fellow selection and impact on resident training and education in one large Canadian academic urology centre revealed that fellowship programs add value to residents' overall education.¹⁵ Proficiency in technical skills, clinical knowledge, teaching and teamwork were cited as the most attractive characteristics of an effective clinical fellow. Nevertheless, residents felt that fellows "stole" operative cases and that performing operations with fellows was not equivalent to performing them with faculty alone. Residents recommended that fellowship candidates should perform an operation with faculty as part of the application process to ensure that they have the skills to focus on "specialized" training during the fellowship.¹⁵ In addition, it was recommended that the fellows' role in the operating room be better defined with respect to case volume and selection to mitigate the competing interests of the residents.

These findings are consistent with those of other studies that have shown that fellows lessen the number of complex cases performed by residents. In residency programs where fellowships have been recently introduced, it has been found that, although the total number of cases performed by residents remained the same, more complex cases were performed by fellows.¹⁶⁻¹⁸ Despite these findings, faculty members supervising fellows still believe that certain complex cases should be designated as "fellow cases."¹⁵ In addition, some fellowships, such as urologic oncology, require that each fellow be involved (as surgeon or first assistant) in at least 100 major surgical procedures during their clinical year to be considered competent on completion of the fellowship.¹⁹

Despite the potential influence fellows have on resident surgical case exposure, the presence of fellows has not been found to negatively impact certain aspects of the educational experience of residents in the United States. Surveys of residents asking what impact fellows have had on their training have yielded positive responses, and nationally standardized examination scores have not worsened.^{18,20} In the minimally invasive general surgery literature, tension and problems between fellows and residents seemed to become less of an issue between 2003 and 2006. In 2003, 39% of fellows thought that tensions with residents were at a moderative/disruptive level, whereas in 2006, 14% of fellows thought that this was the case.¹⁰

It therefore appears that although fellows have a positive influence on training programs and residents, certain

issues need to be resolved. The fellows' role in the operating room needs to be better defined vis-à-vis case volume and selection. Data on the Canadian experience come from 1 surgical specialty at 1 university. How do fellows affect residency training at other sites across the country? Do the same issues need to be resolved?

RESEARCH PRODUCTIVITY

The number of papers published and presented during the fellowship year(s) has been shown to positively correlate with the presence of a mentor,²¹ higher rank on the match list²² and training in a program with a large number of residents and fellows.²³ In addition, research productivity is increased during the second year of a 2-year fellowship, especially when protected research time is allotted to the fellow²⁴ (which occurs in about 70% of research-oriented fellowships, such as those seen in surgical oncology, urologic oncology and gynecologic oncology^{7,19}).

However, support for research is not universal. One study performed in 2002 indicated that only 35% of vascular surgery fellowship directors believed research was integral to fellowship training; 42% believed that more practice-oriented fellowships were needed.⁷ These directors believed that the clinical demand for the skills provided by fellowship-trained surgeons was great and that some fellows did not need to focus on research when entering practice; their time would be better spent on patient care.

Considering these findings from the American experience, data from Canada are lacking. How are clinical fellowships structured to allow trainees an opportunity to develop research skills? How many programs provide protected research time to fellows? What suggestions can successful programs share with others across the country to improve research productivity?

FINANCES

The cost of doing a fellowship is high, both in terms of direct costs during the fellowship years and the opportunity cost of not directly entering practice after residency. Applying and interviewing for a position involves time and money spent on travel and application and licensing forms. One Australian-trained fellow reported paying about US\$2500 in 1999 to process the paperwork necessary to complete a fellowship in the United States.²⁵ The mean salary for a surgical fellow was around US\$39 600 in 1998²⁶ and about US\$53 000 in 2006.⁵ The mean salary for a clinical fellow in the Department of Surgery at the University of Toronto for the academic year 2009-2010 is Can\$50 000.

It comes as no surprise that the presence of debt is negatively associated with pursuing fellowship-level training owing to the opportunity cost of not directly entering practice.²⁷ Gaskill and colleagues⁵ investigated the estimated

financial impact of orthopedic fellowship training in the United States in 2006. They found that the financial investment to complete a fellowship yielded variable results, depending on the subspecialty. Adult spine, shoulder and elbow, sports medicine, hand and adult arthroplasty yielded positive financial returns, trauma yielded a neutral return, and pediatrics and foot and ankle yielded a negative return. The break-even point was 2 years for spine, 7 years for hand, 8 years for shoulder and elbow, 12 years for adult arthroplasty, 13 years for sports medicine and 27 years for trauma.

A study of female pelvic medicine/reconstructive surgery fellowships in the United States indicated that compared with residents who directly entered private practice, those who pursued fellowship training experienced a financial loss of about US\$400 000–\$600 000, assuming no income differential after fellowship.²⁸ To render the additional training financially neutral was thought to require an annual income 16%–31% greater than that of general obstetrician/gynecologists — a level that is difficult to obtain when most fellows enter academic practice where incomes are often lower than in the community.²⁸

To our knowledge, no analysis of the financial investment of fulfilling a surgical fellowship in Canada has been performed. Such information, particularly from the viewpoint of foreign trainees who come to Canada, would be useful. Is the income generated during the fellowship sufficient to cover the costs of travel and living expenses?

WORK HOURS

In Canada and the United States, provincial, state and federal legislation has mandated that medical trainees (including fellows) may not work more than 72 (Ontario) to 80 (United States) hours per week. Although, to our knowledge, no data on work hours in Canadian surgical fellowships exist, a recent study of the American pediatric surgery literature showed that many fellows worked more than what was legislated, with a median of 80–90 hours worked per week.²⁹ This study indicated that 65% of fellows felt that there was no compliance to duty hour restrictions for their positions; 69% felt that they worked more hours because they had to cover for residents whose duty hour restrictions were enforced by the training program.²⁹ In addition, pulmonary and critical care fellows have reported that work hour restrictions negatively impacted their quality of life, personal life and sleep.³⁰ Fellows reported performing more resident-level duties and procedures and having less time to teach residents and students.³⁰ As regulation of work hours for Canadian fellows does not exist, it is possible that a subgroup of them may be working more or less than deemed necessary to improve their clinical, research, teaching and administrative skills. Further information on this aspect of fellowship training in Canada is necessary to determine whether fel-

lows are working an appropriate number of hours to achieve their objectives of training.

SATISFACTION WITH THE FELLOWSHIP

It appears that most fellows are satisfied with their training; between 75% and 99% of vascular surgery, otolaryngology and gynecology fellows reported satisfaction.^{21,31,32} Levels of reported satisfaction were greatest with clinical training, intermediate with educational training and lower with research and administrative training.^{12,33} Greater satisfaction was more likely when there was a mentor during the training period.³⁴

Despite this satisfaction, there is some evidence to suggest that clinical directors of fellowship programs recognize weaknesses in the training programs they oversee. Again, we found no information from the surgical or Canadian literature, but a survey of the needs of directors in the palliative care specialty showed that although directors were confident of their own clinical and teaching skills, they identified a lack of adequate training and experience in several management and educational skill areas critical to running a successful program.³⁵ It appears that weaknesses in administration and applied research skills (such as research methodology and grant writing) may be common problems in fellowship training, and improvements may be necessary.

EVALUATION OF FELLOW AND SUPERVISING STAFF

Although evaluation of fellows is one of the key components of accreditation in the United States and one of the necessary steps for completing a fellowship in Canadian universities, it appears as though this does not happen as routinely as might be expected. A survey of gynecologic oncology fellowship programs in the United States showed that 70% of fellows received evaluations.²¹ Surprisingly, only 40%–45% of the supervising staff were evaluated by the fellows in return.²¹

In addition, we found no information in the literature on how weaknesses or conflicts are resolved. A study examining resident surgical competency in ophthalmology programs in the United States found that 9% of residents were labelled by their program directors as having trouble mastering surgical skills.³⁶ The most frequently cited problems were poor hand-eye coordination and poor intraoperative judgment. Most programs were supportive of the residents and used educational measures, such as extra practice laboratory time, scheduling cases with the best teaching surgeon and counselling. Nearly one-third of the residents were thought to have overcome their difficulties before graduation. In addition, it has been suggested that integrating objective structured clinical examinations (OSCEs) into training curricula may help enhance some of the fellowship trainee's skills.³⁷ In a study investigating the effect OSCEs have on assessing the core competencies of

interpersonal and communication skills and professionalism, it has been found that fellows' communication skills were improved, possibly helping them prepare for dealing with difficult clinical situations in the future.³⁷

There is a paucity of evidence regarding whether and how weak skills in fellows are addressed and how they may be improved. Are fellows meeting with their supervisors at appropriate intervals and in appropriate circumstances to ensure that they are achieving their objectives of training? Are fellows' supervisors obtaining enough feedback (directly or anonymously) to make appropriate changes for their trainees? Further information is necessary to answer these questions.

PREPARATION FOR CLINICAL PRACTICE

As mentioned previously, it is thought that one reason why Canadian residency graduates are increasingly choosing to complete fellowships is because they lack the clinical confidence and experience to enter directly into clinical practice.¹¹ And it is known that clinical outcomes in some types of surgical procedures (that are more technically challenging to perform) are improved when performed by surgeons who obtain fellowship training. As a consequence, it is argued that fellowship-trained surgeons have less of a learning curve in early practice than those who do not obtain extra training after residency.³⁸

Nevertheless, the American literature suggests that not all fellowship-trained surgeons gain the skills and confidence needed to succeed (again, information from the Canadian experience is lacking). A survey canvassing vascular surgery fellows found that they did not perform as many cases as they wanted if they could design an "ideal" fellowship.³⁹ A survey addressing surgical capability at the time of gynecologic oncology fellowship completion showed that a significant number anticipated a lower probability to perform some surgical procedures and manage certain complications at the completion of training: 70% of those polled believed that to address this insufficiency in their training, greater emphasis should be placed on surgical training rather than on research.⁴⁰ In addition, 7%–27% of candidates for the orthopedic spine specialty board certification examination fail the exam despite having completed a 1- or 2-year fellowship in spine surgery.⁴¹

These data support the view that fellowships do not completely prepare graduates to handle all the clinical situations they will encounter in practice. In response, several surgical subspecialties (e.g., surgical oncology, ophthalmology) are recommending that the core competencies used to establish residency training programs need to be applied to their own specific domains.^{19,42,43} It is argued that by doing so, a systematic, data-driven approach toward enhancing the quality, reliability, and efficiency of fellowship education would be designed that would provide the documentation needed regarding educational outcomes.¹⁹

PREPARATION FOR ACADEMIC PRACTICE

One of the key goals of certain fellowships is to prepare a surgeon to become a productive researcher, and it appears that the additional years of fellowship training prepare surgeons well for an academic position. The number of graduates who go on to work in academic positions ranges from 30% to 70% in the surgical oncology, minimally invasive general surgery, ophthalmology and palliative medicine fields.^{12,44–46} These numbers are consistent with the 70% of vascular surgery residency directors who have completed a fellowship.⁷

Key correlates in obtaining an academic position include an interest in teaching, the presence of a mentor and research productivity during the fellowship.^{7,45} When fellows obtain an academic position, they are more likely to receive grant funding and achieve senior academic rank than their colleagues who do not have fellowship training.⁴⁷ A survey of American academic surgeons who completed a research-oriented fellowship revealed that they spent more time on research and had greater confidence in their careers than those who completed a strictly clinical fellowship.⁴⁸ As these data come from the American experience, information from the Canadian experience may be useful. Do fellowship-trained academic surgeons in Canada enjoy the same successes as their American counterparts?

THE EXPERIENCE OF WOMEN

Some studies have suggested that women experience their training years differently than men. Surveys comparing women's and men's perceptions of surgical residency training indicated that although there was no difference between the sexes in relation to choosing a surgical career, women were less likely than men to believe that their training experiences were comparable to those of their male colleagues.^{49,50} In addition, women were found to spend more of their free time than men to satisfy family and personal demands during and after residency. In a recent Internet survey designed to determine which factors motivate residents to seek fellowship training, significantly more female surgical residents listed lifestyle as an important factor in choosing their future careers.⁹ These findings are important for residency and fellowship directors to understand if recruitment of women into certain surgical specialties is to increase. Despite the concerns of female surgical trainees, studies in the general surgery literature have shown that no differences exist between the sexes in work hours and income after fellowship.^{49,50}

THE EXPERIENCE OF FOREIGN-TRAINED FELLOWS

Few studies have been conducted on the experiences of foreign-trained fellows, although some personal narratives from foreign-trained fellows in the United States have

been published. Anecdotal evidence suggests that coming to North America to complete a fellowship is considered a great accomplishment by many surgeons from around the world, and the experience is highly valued. But satisfying visa and educational requirements for training in the United States is arduous, time consuming and expensive.²⁵ As such, many foreign-trained physicians decide to pursue unfunded fellowships, as the paperwork needed to apply for these positions is often easier and the chance of obtaining a position greater.²⁵

One type of unfunded fellowship that is commonly obtained is a research fellowship. Within North America, these fellowships are spent in the research laboratory and may or may not involve clinical exposure.^{51,52} After completing the fellowship, the surgeon often returns home either without gaining further clinical skills⁵¹ or with only some clinical skills that can be applied in the home hospital setting.

One concern of foreign-trained fellows performing clinical fellowships in North America is that if clinical skills are learned, they are often learned on surgical instruments that are not available in the fellow's home country.⁵³ As such, the skills learned can often not be used after the surgeon returns home.⁵³ And by bringing home the skills and philosophies of North American health care, these fellows help modify their home country's health care system toward North American standards, which may be difficult in certain circumstances considering the home country's economic status.

Another concern of this subgroup of fellows pertains to the fact that many foreign-trained surgeons remain in North America after their training and do not return home.⁵² Those who successfully obtain licenses in Canada or the United States end up creating a "brain drain," in which the home country loses the skills of surgeons that could have serviced their communities.⁵⁴

Owing to multiple factors, including language barriers or possible cultural misunderstandings between fellows and their supervisors, the opinions and needs of this group of fellows often go unheard.^{51,54} Abuse of foreign-trained fellows is an issue that has only been spoken about anecdotally⁵⁴ but not explored in depth. Given the importance of foreign-trained fellows to both Canada and their home countries, this remains an important area for future research.

CONCLUSION

It is clear from the literature that there are numerous issues that need to be better understood and improved if fellowship training is to be optimized, especially in relation to the Canadian situation, of which so little is currently known. Key issues that require improvement include optimizing clinical, research, teaching and administrative skills; protecting the amount of hours worked;

properly integrating into residency training programs; ensuring appropriate evaluation mechanisms are in place; and addressing the concerns of women and foreign-trained fellows.

We recommend that further research into this area of medical education be initiated. Our team will undertake a national Internet-based survey of fellows and their supervisors, examining their expectations of and experiences with fellowship training. Information obtained from this survey should provide a basic understanding of the current status of surgical fellowship training in Canada. With this information, areas of current strengths and weaknesses should be recognized, and suggestions on how improvements may be made will be discussed.

We expect that this research may suggest change in an area of medical education that has, up until now, not required any substantial attention. But despite the difficulties that will certainly be encountered in this process, it must be kept in mind that the goal of improving the quality of education in this important phase of medical training is worthwhile. Fellowship-trained surgeons occupy integral positions in our current health care and medical education systems and it is the fellowship experience that has played a key role in their professional development.

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