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The changing face of academic general surgery in India: A cross-sectional cohort study

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Abstract
Background: Little is known regarding the research and training expectations faced by modern general surgery graduates interested in pursuing academic surgical careers. In this study, we describe the changing face of the Indian academic general surgeon by outlining the in-residency research productivity and post residency clinical and academic training trends over time.
Methods: Our cross-sectional cohort included Indian academic general surgeons, defined as those with a university-affiliated appointment as assistant, associate or full professor. Data points included institution, faculty appointment and rank, graduation year, graduate education, fellowship training and research productivity.
Results: Our cohort included 417 surgeons from 17 Indian academic institutions. The majority of surgeons were male (72.9%), had completed at least 1 fellowship (72.9%) and had had some form of supplementary research training (51.8%). Surgeons in the cohort had practised a median of 17 (10–27) years. The mean number of total and first-author publications for the participants in this study has increased consistently each decade before the 1980s ($p < 0.001$).
Conclusion: The academic surgeon is becoming increasingly productive in research during residency and is pursuing higher levels of graduate education and more fellowships than ever before. These changes probably correspond to an evolving employment and research funding landscape that places tremendous academic pressure on surgical trainees.

Keywords: academics, general surgery, India

Introduction
Recognizing that technical advances, increasing sub specialization and resource limitations have contributed to significant changes to surgical practice [1], a national Task Force on the Future of General Surgery recently completed a project to (a) understand the current practice landscape of general surgery and (b) ensure that residency training programs optimally prepare residents for transitioning into this environment [2].

Furthermore, the required technical competencies, such as the ability to perform cesarean sections or diagnostic colonoscopies, vary greatly between academic and community practice. Therefore, the report concluded that in addition to providing foundational training, residency programs should identify and introduce enhanced areas of expertise tailored to meet differing practice contexts. Similarly, one would expect that a surgeon's expectations that is, mentorship, medical education, medical leadership, quality improvement and research productivity — would also differ between academic and community practice.

In the United States, a national survey of general surgery program directors acknowledged that research productivity was important for surgeons pursuing academic faculty positions but much less so for those pursuing community work [3]. Furthermore, even the definition of a clinician-scientist or surgeon-scientist reflects an ever evolving academic landscape: clinicians are pursuing PhD training more often; increasingly, these candidates are "late bloomers" who choose to pursue research careers during medical school or residency training [4]. Little is known regarding the expectations faced by modern general surgery graduates interested in pursuing academic surgical careers. In this study, we describe the changing face of the Indian academic general surgeon by outlining in-residency research productivity and post residency clinical and academic training trends over time.

Methods
Our cross-sectional cohort included all Indian academic general surgeons, defined as those with a university affiliated faculty of medicine appointment as assistant, associate or full professor. Pediatric, vascular and thoracic surgeons were excluded as their disciplines typically function in distinct divisions within indian academic institutions. Surgeons without a university affiliated professor appointment of any rank, as well as those holding professor emeritus, clinical instructor/ associate or locum positions, were also excluded.

A predefined, prepiloted extraction form was used to gather data points related to institution, faculty appointment and rank, graduation year, graduate education, fellowship training and research productivity. We then confirmed the accuracy and completeness of faculty lists and academic rank information by direct email correspondence with individual general surgical divisions at each institution. We used Scopus, an abstract and citation database of peer reviewed journals in the life sciences, social sciences, physical sciences and medical sciences, to research productivity metrics including level of authorship, year of publication and H-index as a crude measure of citations and impact. This database allows for focused searches by variations of name and institution to more accurately

identify publications linked to individual authors. In the piloting phase of data extraction, initial data collection was performed by 2 authors and a 10% audit was performed by at least 3 authors to ensure greater than 90% agreement on surgeon identification and evaluation of key metrics. Differences in extraction strategy were identified, discussed and resolved, and the audit process was repeated until target agreement was achieved. Following this, data extraction was completed by 2 authors and all uncertainties were resolved by group consensus. Given the fact that this study used publicly available data, the need for ethics approval was waived by the Health Science Network Research Ethics Board.

Categorical variables were described as proportions and compared using $\chi 2$ testing. Continuous variables were described as means and standard deviations and compared using analysis of variance testing. SPSS Version 21 software was used for all statistical analyses.

Results

Our cross-sectional cohort included 417 surgeons from 17 academic institutions across Canada. Most of the surgeons were male (72.9%), had completed at least 1 fellowship (72.9%) and had obtained some form of supplementary research training (50.8%) (Table 1). Eighty-seven (20.9%) people had attained full professorship status.

Table 2 outlines the types and locations of fellowship training pursued by our cohort. The most commonly completed fellowships included surgical oncology (18.0%), hepatobiliary and transplant surgery (13.9%) and colorectal surgery (13.7%).

Table 1: Characteristics of participants (n = 417)

Characteristics	n	%
Sex		
Male	304	72.9
Female	113	27.1
Number of fellowships completed		
0	113	27.1
1	253	60.7
≥2	51	12.2
Graduate studies completed		
None	205	49.2
Master's degree	154	36.9
Doctoral degree	42	10.1
Other (certificate, research fellowships)	72	17.3
Professorship level		
Assistant Professor	196	47
Associate Professor	134	32.1
Professor	87	20.9

Table 2: Types of fellowships undertaken by participants (n = 417)

Type of Fellowship	n	%
Breast surgery	10	2.4
Critical care	40	9.6
Endocrine surgery	7	1.7
Hepatobiliary and transplant surgery	58	13.9
Minimally invasive and bariatric surgery	53	12.7
Surgical oncology	75	18.0
Trauma surgery and surgical critical care	40	9.6
Other	23	5.5
Colorectal surgery	57	13.7
No graduate fellowship	113	27.1

Discussion

The face of the academic surgeon is changing. In this study, we demonstrate that academic surgeons are becoming increasingly productive in research during residency, are pursuing higher levels of graduate education and are pursuing more fellowships than ever before. Our findings are similar to those of prior American studies outlining the increasing correlation between dedicated research fellowships, graduate education and eventual faculty positions in academia [5, 6].

The determinants of this "academic inflation" are probably multifactorial. To begin with, the employment landscape has undoubtedly placed increasing pressures on residents to be academically competitive for fellowships and eventually full-time faculty positions in large tertiary care centres. A recent survey of Canadian general surgeons noted that over 80% felt anxiety about the process of securing a job while in training and that 1 in 3 surgeons reported not working in the job they most desired [7]. Furthermore, nearly 3 in 4 surgeons believed that too many residents are being trained for the number of jobs currently available.

In this study, we have demonstrated the ever-increasing expectations of and pressures on general surgical residents pursuing careers in academia. There are 3 implications of our findings. (a) For learners interested in academic surgery, these findings allow surgical trainees to understand the academic and clinical expectations they face so that they can better plan their careers and reach out to their programs for guidance. (b) For program directors, these findings should make them aware of the values and priorities that may be important for some of their residents, which will enable them to advocate for and implement at an institutional level the resources these residents need to succeed, such as salary awards, senior mentorship and protected research time. (c) Lastly, for policy-makers, these findings highlight the possible need for a more formalized pathway outlining the training guidelines and requisite competencies for those intending to pursue academic surgery, which would guide funding allocation and accreditation procedures at the institutional level.

Ultimately, innovation is not an option. We must continue to innovate and adapt for the welfare of our patients and to stay relevant as surgeons. We must build an infrastructure for academic exchange, synergy and collaboration to foster an engaged and responsive network of innovative surgeons. Perhaps most importantly, we must oversee and inspire the successful development of the next generation of Indian surgeons.

The limitations of this study relate primarily to the observational nature of the data. By focusing on active academic surgeons in this survey, we were unable to capture individuals who may have been on academic trajectories with advanced graduate training but who ultimately sought nonacademic careers out of residency. We were similarly unable to capture those who transitioned out of academic practice as junior faculty. As such, we are only able to comment on the specific subset of surgeons who held academic rank at the time of this study. We relied upon hand-searching publicly available directories, such as those on hospital and university websites, for which data quality assurance policies are unclear.

With each passing decade, the Indian academic surgeon is

becoming increasingly productive in research during residency, is pursuing higher levels of graduate education and is pursuing more fellowships than ever before. These changes probably correspond to an evolving employment and research funding landscape that places tremendous academic pressure on surgical trainees.

References

1. Debas HT, Bass BL, Brennan MF. American Surgical Association Blue Ribbon Committee Report on Surgical Education: 2004. Ann Surg. 2005; 241:1-8.
2. Webber EM, Ronson AR, Gorman LJ. The future of general surgery: evolving to meet a changing practice. J Surg Educ. 2014; 73:496-503.
3. Roberson CM, Klingensmith ME, Coopersmith CM. Prevalence and cost of full-time research fellowships during general surgery residency: a national survey. Ann Surg. 2009; 249:155-61.
4. Ley TJ, Rosenberg LE. The physician-scientist career pipeline in 2005: build it and they will come. JAMA. 2005; 294:1341-51.
5. Ellis MC, Dhungel B, Weerasinghe R. Trends in research time, fellowship training, and practice patterns among general surgery graduates. J Surg Educ. 2011; 68:309-12.
6. Smith JJ, Patel RK, Chen X. Does intentional support of degree programs in general surgery residency affect research productivity or pursuit of academic surgery? J Surg Educ. 2014; 71:486-91.
7. Towaij C, Strickland M, Wright F. Recent graduate employment study. Peterborough (ON): Ontario Association of General Surgeons, 2015.