Strategic faculty recruitment increases research productivity within an academic university division

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Background: Research is an important mandate for academic surgical divisions. However, there is widespread concern that the current health care climate is leading to a decline in research activity. A University of British Columbia (UBC) academic surgical division attempted to address this concern by strategically recruiting PhD research scientists to prioritize research and develop collaborative research programs. The objective of our study was to determine whether this strategy resulted in increased research productivity.

Methods: We reviewed the UBC Department of Surgery database to assess research funding obtained by the Division of General Surgery for the years 1994–2004. We searched MEDLINE for peer-reviewed publications by faculty members during this period.

Results: Research funding increased from a mean of Can$417,292 per year in the 5 years (1994/95–1998/99) before the recruitment of dedicated PhD scientists to a mean of Can$1.3 million per year in the 5 years following the recruitment strategy (1999/2000–2003/04; \( p = 0.012 \)). Funding for the initial 5 years was Can$2.1 million, including 1 Canadian Institutes of Health Research (CIHR) grant. Funding increased to Can$6.8 million, including 22 CIHR grants over the subsequent 5 years (\( p < 0.001 \)). Collaborative research led to the awarding of multidisciplinary grants exceeding Can$4 million with divisional members as principle or coprinciple investigators. From 1994/05 to 1998/99, the total number of peer-reviewed publications was 116 (mean 23.2, standard deviation [SD] 7 per year), increasing to 144 from 1999/2000 to 2003/04 (mean 28.8, SD 13 per year). The trend was for publications in journals with higher impact factors in the latter 5-year period.

Conclusion: Strategic recruitment resulted in increased and sustained research productivity. Interactions between research scientists and clinicians resulted in successful program grant funding support. These results have implications for sustaining the research mission within academic departments of surgery.

Contexte : La recherche est un des importants mandats impartis aux départements de chirurgie universitaires. Un peu partout, toutefois, on s’inquiète du climat qui règne actuellement dans le milieu de la santé car il semble peu propice aux activités de recherche. À l’Université de la Colombie-Britannique, le département de chirurgie a tenté de contrer cette inquiétude en adoptant une stratégie axée sur le recrutement de chercheurs de niveau doctoral pour prioriser la recherche et élaborer des programmes de recherche en collaboration. L’objectif de notre étude était de vérifier si cette stratégie a contribué à l’accroissement de la productivité en recherche.


Résultats : Le financement de la recherche est passé d’une moyenne annuelle de 417 292 $Can par année pendant les 5 années de 1994/95 à 1998/99, soit avant le recrutement des chercheurs de niveau doctoral, à une moyenne annuelle de 1,3 million $Can au cours des 5 années suivant l’application de la stratégie de recrutement (soit de 1999/2000 à 2003/04; \( p = 0.012 \)). Pour les 5 premières années, le financement global a été de 2,1 millions $Can, incluant une subvention des Instituts de recherche en santé du Canada (IRSC). Au cours des 5 années suivantes, le financement est passé à 6,8 millions $Can, dont 22 bourses des IRSC (\( p < 0.001 \)). La recherche en
Research is an important component of the mission statement of an academic surgical division. Through research, patient care is improved, and the process of research methodology leads to better-informed surgical faculty members and resident trainees. However, there is widespread concern in academic departments of surgery that constraints on health care resources, increasing clinical pressures, perceived decline in financial remuneration and community devaluation of surgical research are leading to a decline in research activity and funding. Further, in 1986, the Conjoint Council of Surgical Research (CCSR), sponsored by the American College of Surgeons (ACS), identified a number of factors hindering effective research programs, including lack of investigators appropriately trained in the discipline of scientific methodology and skilled in modern research methods. Many of these same concerns remain 20 years later. Despite the efforts of surgical organizations, including the Canadian Association of General Surgeons (CAGS) and the ACS, the number of research proposals from departments of surgery funded by national granting agencies is low, with few exceptions.

The University of British Columbia (UBC) Division of General Surgery is an academic division providing a wide range of platform, specialty and subspecialty clinical services as well as undergraduate and postgraduate educational activities. This division faces many of the problems identified by the CCSR, including heavy clinical demands, increasing administrative loads, teaching requirements associated with an expanding medical school, and revenue generation. Several strategies have been considered to address the concerns regarding research productivity. These include prioritization of research in the residency training program; integration of research between the academic and operational aspects of the teaching hospitals; protected time, resources and income by means of Clinical Academic Service Contract (CASC) arrangements; and recruitment of basic science research investigators to establish a dedicated foundation of research within the division. Each of these strategies has impediments to overcome. The residency training program has community training requirements and lacks funding to commit the substantial time that is necessary to develop research expertise. In-
recruitment was in the academic year 1999/2000; therefore, we selected the years 1994–2004, representing a 5-year interval before and after this initial recruitment. We searched MEDLINE for peer-reviewed publications by faculty members within the Division of General Surgery during the same time interval.

Our statistical analyses on research funding included the Student t test and the χ² statistic. We considered results to be statistically significant at p < 0.05.

RESULTS

In 1994/95, there were 19 faculty members in the Divisions of General Surgery at Vancouver General Hospital and St. Paul's Hospital. From 2000 to 2002, the numbers peaked at 25, of whom 2 (4%) were PhD scientists. In 2003/04, the total was 21 including 4 (19%) PhD scientists (Fig. 1).

Research funding from all sources increased significantly during the 10-year time frame. In the first year of the analysis (1994/95), annual research funding was below Can$200 000. In the last year of the analysis (2003/04), research funding was Can$1.8 million and peaked at Can$2.1 million in 2002/03 (Fig. 2). In the 5 years before the recruitment of PhD scientists, total research funding was Can$2.1 million (mean Can$417 292, standard deviation [SD] Can$278 419). In the 5 years following the initial appointment of PhD scientists, total funding was Can$6.8 million (mean Can$1.3 million, SD Can$558 468; p = 0.012 compared with the 5 years before the recruitment of PhD scientists). Prior to 1999, there was 1 Canadian Institutes of Health Research (CIHR, formerly MRC Canada) grant held by the faculty. From 1999/2000 to 2003/04, there were 22 CIHR and 23 Michael Smith Foundation for Health Research (MSFHR, formerly known as the BC Health Research Foundation) operating grants or scholarship awards held by 6 faculty members, including 4 PhD research scientists, 1 MD–PhD and 1 MD (Box 1; p < 0.001 compared with the 5 years previous to 1999/2000).

Collaborative group funding also increased following PhD scientist recruitment. Prior to their recruitment, there were no group grants or collaborative research projects funded in the division. Following the recruitment, the division had 4 collaborative research projects totaling more than Can$4 million funded from CIHR (n = 1), MSFHR (n = 2), and Genome Canada (n = 1) for which division members were either the principle investigators or coinvestigators who had substantial roles in the projects (Fig. 3). There were no surgery resident research scholarships before 1999/2000. Subsequently, there were 4 surgery resident scholarship awards from CIHR (n = 3) and the MSFHR (n = 1).

Whereas research funding increased, the numbers of publications did not show a parallel increase (Fig. 4).
However, there appeared to be more publications appearing in journals with higher impact factors (Table 1).

**DISCUSSION**

The academic missions in clinical departments of surgery across North America are challenged by clinical, teaching and reimbursement pressures. These competing responsibilities often detract from the time and effort required to develop and maintain productive research programs. The infrastructure support provided by teaching hospitals is often eroded as these hospitals come under pressure from government and health authorities to focus on cost-effective clinical care. In British Columbia, the faculty of medicine is heavily engaged in medical school expansion, and the faculty is required to undertake increased teaching volumes for both undergraduate and postgraduate medical education. Stable funding and protected time for faculty provided by alternative payment plans or CASCs may not be universally applied.4

Research is an essential component of a vibrant and progressive department of surgery. Through research discoveries, patient care is ultimately improved. Although it may have taken years of sustained research and evaluation, many of today’s life-saving therapeutic interventions were initially derived from the work of surgeon–scientists.5,6 Several modern concepts in medical education came from surgeons engaged in research,7,8 and epidemiological studies on clinical outcomes were similarly driven by surgical investigators.9 Innovations in immunotherapy and translational research continue to be performed by surgeons.10–13 In the process of research, the surgeon–scientist and the surgical trainee undertaking research training are versed in the process of scientific methodology, which can be translated and validated in patient populations in a rigorous fashion: hypothesis development (i.e., differential diagnosis from history and physical examination), methodology (i.e., laboratory and radiological investigations), discussion (i.e., interpretation of investigations) and conclusion (i.e., provisional diagnosis).

Through analysis of its potential alternatives to consolidate research, the UBC Division of General Surgery determined that the recruitment of research scientists would be the most feasible pathway. For reasons beyond the scope of this discussion, the other alternatives described in the introduction (e.g., prioritization of research in residency; protected time, resources and income) were not deemed practical or possible. The UBC Division of General Surgery secured funding from the British Columbia Transplant Society and the Vancouver Coastal Health

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Research Institute, partners in their academic mandate, to initiate recruitment of PhD research scientists who were felt to be highly competitive for external grant funding. Once recruited, the research scientists were onsite in laboratory space at a research institute affiliated with a university teaching hospital. They were then integrated into the UBC Department of Surgery research programs to facilitate and augment the department’s research programs and develop collaborations with other members of the scientific research community.

Our data suggest that the recruitment of dedicated PhD scientists does augment research productivity in a tangible and measurable manner. Although there was a major influx of research funding over the last 4 years of the study period, including federal funding that saw the CIHR research budget double from 2001 to 2004, the actual increase in divisional research funding coincided with the implementation of the recruitment strategy and predated this funding increase (Fig. 2). Even though more than 60% of the divisional faculty received tenure-track or grant tenure-track funding from the university, research funding remained fairly stable and at a relatively low level with less than one-third of full-time faculty members receiving grant funding from any source (data not shown). Following the recruitment of research scientists to the faculty, the total research funding increased significantly, and the sources of research funding included an increase in CIHR and MSFHR operating grant funding. Whereas previously there were no research scholarship awards, the division received scholarship funding from CIHR, MSFHR and a prestigious Canada Research Chair award. All research scientist faculty members received CIHR funding as principle investigators. Two MDs received CIHR funding, and both listed one or more of the research scientist faculty members as coinvestigators. Therefore, it appears that the interaction with research scientists facilitates the ability of MDs to obtain CIHR and MSFHR funding. As a corollary, many of the CIHR grants that the research scientists received also listed one or more divisional MDs as coinvestigators. This recruitment strategy and implementation of collaborative programs has allowed the division to take advantage of the increased availability of peer-reviewed research funding, keeping pace with the doubling of the research grants awarded to UBC and the increase in CIHR funding.

With the increase in total research funding, it was apparent that the collaborative research programs also benefitted the more clinically-oriented divisional faculty members and the surgical trainees. With the infrastructure awards, a research training award and a genome biomarker research grant, there were opportunities for divisional members who might not otherwise be directly involved in research programs to become engaged in clinically applicable translational research and participate in “bench-to-bedside” research and related educational programs. Other divisional faculty members obtained research grants with divisional research scientist faculty members as coinvestigators. From an educational perspective, the research infrastructure provided an environment for nurturing graduate students from basic science graduate programs so that the surgical residents pursuing research training had ready access to research trainees and investigators from other scientific disciplines. The establishment of this environment has coincided with the surgical residents receiving a number of research fellowship awards. From a residency training perspective, residents demonstrating success in research are often successful in obtaining positions in leading fellowship programs; all 4 residents from the Division of General Surgery who received research scholarships were matched to the programs of their choice.

Somewhat surprisingly, the actual numbers of publications did not parallel the increase in research funding. This may reflect the time lag between receiving grant funding and the accumulation of sufficient data for publication. In support of this hypothesis, examination of the publications beyond 2004/05 (outside the study’s reporting period) does show a further increase in numbers and quality of publications based on journal impact factor (data not shown). Although there is concern that journal impact factor may not be the most appropriate reflection of the importance of a journal, it remains an important parameter for measuring journal quality. Although it appears that the quantity of publications did not significantly increase during the reporting period, the quality may be higher based on the impact factor of the journals in which the publications appear.

The next steps are to establish firm mentorships between clinical and research faculty members. Surgeons pursuing a research career can be mentored by research faculty members with expertise in study design, technology and identification of methodological pitfalls. Similarly, research investigators can be paired with clinical faculty members to develop bridges from bench research to patient care. Comprehensive group research projects incorporating a transdisciplinary approach are more likely to meet with funding success than individual silo research projects.

Although the recruitment of research scientists to clinical departments is not the only pathway to strengthen the research mandate within academic departments and divisions, our data suggest that careful strategic recruitment results in measurable improvements in academic productivity. The demonstrated increase in grant funding translates into greater divisional participation in research programs by way of collaborative interactions. It also provides infrastructure for resident trainees to improve research skills and prepare for competitive fellowship programs. Challenges for the department and division include the establishment of stable funding for the recruitment and retention of research faculty members and more widespread integration into clinical divisional activities.

**Competing interests:** None declared.
References


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