Hepato-pancreato-biliary surgery workforce in Canada

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SUMMARY

This article characterizes the Canadian hepato-pancreato-biliary (HPB) surgery workforce (demographics, practice patterns, career satisfaction, education and recruitment plans). This information will serve as a baseline for future national comparisons, allow informed workforce planning and facilitate mathematical modelling of the HPB workforce in Canada.

The trend toward centralization of surgical care in the United States and Canada emerged in concert with studies suggesting improved outcomes for patients who were cared for by surgeons with more training and experience in performing complex procedures.¹⁻³ Although controversial, this volume-based improvement has been demonstrated within hepato-pancreato-biliary (HPB) surgery, leading to its relatively recent appearance as a distinct subspecialty of general surgery.⁴⁻⁶

While workforce studies have been conducted in numerous other medical specialties, the characteristics of HPB surgeons in Canada have not been studied.^{7,8} More specifically, the number of surgeons performing HPB procedures and their practice patterns remain unclear. Recent concerns regarding increased rates of unemployment in the surgical workforce and in HPB surgery in particular also suggest an urgent need for a thorough assessment of demographics, education, practice patterns, satisfaction and recruitment across Canada. As a result, we conducted a survey to widely characterize the current Canadian HPB workforce; the survey was approved by the University of Calgary. The survey and subsequent analysis were based on similar work by our group surrounding thoracic surgery manpower planning.⁸ In summary, these data points not only serve as important comparators for surgeons across Canada, but also inform many of the required input elements for a future workforce Monte Carlo prognostication model.⁸ Our cross-sectional 47-question survey (modified Delphi) characterized Canadian HPB surgeons who were targeted via membership in the Canadian (CHPBA) and/or Americas (AHPBA) Hepato-Pancreato-Biliary Association, as well as from a representative HPB surgeon within each province. Responses were anonymous and pooled to protect confidentiality. The overall response rate was 79% (41 of 52 surgeons), and 94% of questions were answered, suggesting the expressed viewpoints are likely consistent with those of the majority of Canadian HPB surgeons.

The respondents were overwhelmingly male (95.1%) and had a median age of 50 ± 10.5 years (19% > 60 yr; Table 1). Formal fellowship training was nearly ubiquitous with only 1 (2.7%) outlier. The most common fellowship was HPB/transplant, with the vast majority (74.3%) of surgeons completing it within Canada (8 in United States, 2 in both United States and Canada). Most (95%) respondents described their primary institution as a university teaching hospital with residents and/or fellows as well as HPB-specific partners (Table 1). All respondents were affiliated with a university medical school (79% academic appointment; 95% engaged in research) and distributed their

time widely (65% clinical, 15% research, 10% administration, 10% teaching).

As a result, the “typical” Canadian HPB surgery cohort can be described as fellowship-trained surgeons who are often male, in their fifth decade of life, and are engaged in a broad assortment of both university-based clinical (HPB and other surgical care) and academic (teaching, research) activities. It is interesting to note that among this nearly

ubiquitous fellowship-trained group, the most common format was HPB/transplant. This is almost assuredly a direct reflection of the tradition and longevity of the University of Toronto fellowship. It is also interesting to note that training abroad is more common among younger HPB faculty, as is an HPB-specific fellowship pathway. Not surprisingly, most HPB faculty (69%) had also pursued advanced academic degrees. Taken together, this caricature

Table 1. Demographic, training, institutional and practice pattern characteristics

Characteristic	No. (%)*
Age, median $\pm$ SD, yr (<i>n</i> = 41)	50.0 $\pm$ 10.5
Age distribution, yr (<i>n</i> = 41)	
< 40	10 (24.4)
40–50	11 (26.8)
51–60	14 (34.1)
> 60	6 (14.6)
Male sex (<i>n</i> = 41)	39 (95.1)
Fellowship training (<i>n</i> = 37)	
HPB	10 (27.0)
HPB and transplant	19 (51.4)
Surgical oncology	7 (18.9)
None	1 (2.7)
Advanced degrees (<i>n</i> = 39)	
Masters degree	19 (48.7)
Doctor of philosophy	8 (20.5)
None	13 (33.3)
Primary institution of practice (<i>n</i> = 40)	
University teaching hospital, residents and fellows	27 (67.5)
University teaching hospital, residents, no fellows	11 (27.5)
Community hospital, residents	1 (2.5)
Community hospital, no residents	1 (2.5)
Surgeons performing HPB in same institution, median $\pm$ SD (<i>n</i> = 41)	3.0 $\pm$ 2.5
Non-HPB surgeons at your institution performing	
Liver	4 (9.8)
Pancreas	7 (17.1)
HPB-specific call schedule	29 (70.7)
Scope of practice (<i>n</i> = 38)	
HPB only	2 (5.3)
HPB and transplant	14 (36.8)
HPB and elective general surgery	9 (23.7)
HPB and trauma	1 (2.6)
HPB and acute care surgery/general surgery call	12 (31.6)
Participation in research (<i>n</i> = 37)	33 (89.2)
Basic science/laboratory	2 (5.4)
Clinical	—
None	—
Affiliation with medical school or university (<i>n</i> = 39)	30 (76.9)
Full-time academic appointment	1 (2.6)
Part-time academic appointment	8 (20.5)

HPB = hepato-pancreato-biliary; SD = standard deviation.

*Unless otherwise indicated.

Table 2. Practice patterns, operative volume and satisfaction

Characteristic	No. (%)*
Hours worked per week, all duties (<i>n</i> = 39)	
$\leq$ 40	1 (2.6)
41–50	2 (5.1)
51–60	4 (10.3)
61–70	13 (33.3)
71–80	11 (28.2)
81–90	5 (12.8)
91–100	1 (2.6)
> 100	2 (5.1)
HPB-specific on call frequency (<i>n</i> = 38)	14 (36.8)
No. HPB-specific call	
1:2	1 (2.6)
1:3	8 (21.1)
1:4	14 (36.8)
1:5	1 (2.6)
Weeks of personal vacation per year (<i>n</i> = 39)	
1–2	5 (12.8)
3–4	13 (33.3)
5–6	18 (46.2)
7–8	3 (7.7)
9 or more	0
Days away from practice for continuing education (<i>n</i> = 39)	
0	1 (2.6)
< 3	1 (2.6)
3–7	9 (23.1)
8–14	19 (48.7)
15–21	6 (15.4)
22–28	2 (5.1)
> 28	1 (2.6)
Procedures performed last year, median $\pm$ SD (<i>n</i> = 39)	
Pancreatoduodenectomy	15.0 $\pm$ 11.1
Distal pancreatectomy	7.9 $\pm$ 11.1
Major hepatectomy (3 or more segments)	15.0 $\pm$ 11.0
Minor hepatectomy (fewer than 3 segments)	20.0 $\pm$ 17.0
Satisfaction with HPB career (<i>n</i> = 39)	
Very unsatisfied	5 (12.8)
Somewhat unsatisfied	6 (15.4)
Neither satisfied nor unsatisfied	1 (2.6)
Somewhat satisfied	9 (23.1)
Very satisfied	18 (46.2)
Planning to move within 2 years (<i>n</i> = 39)	
Definitely not	17 (43.6)
Unlikely	17 (43.6)
Not sure	4 (10.3)

HPB = hepato-pancreato-biliary; SD = standard deviation.

*Unless otherwise indicated.

indicates a long and dedicated training paradigm with an eventual goal of becoming a robust clinical, technical and academic (research and education) surgeon. The reported mix of faculty time between clinical care, research and teaching duties indicates success in this regard.

Although most institutions confirmed the vast majority (liver 90.2%, pancreas 82.9%) of HPB cases were performed by HPB-specific surgeons covering an HPB call schedule (63.2%), most surgeons (95%) had additional clinical responsibilities as well (Tables 1 and 2). Within HPB content, the time devoted to specific topics was broad (liver 40.0% $\pm$ 17.9%, biliary tract 15.0% $\pm$ 10.1%, pancreas 30.0% $\pm$ 12.9%, transplant 7.5% $\pm$ 20.6) and corresponds well to the reported operative distribution (Table 2). As a result, the clinical practice pattern of respondents describes a surgeon who manages complex hepatic, pancreatic and biliary conditions in addition to other elements of general surgery and/or transplantation. It is also clear that the evolution of formal HPB services has led to the consumption of the vast majority of these cases by surgeons with HPB expertise and to a demand for HPB-specific call schedules. Given the strong evidence for volume–outcome relationships in both hepatic and pancreatic surgery, this development of HPB-specific care by high-volume surgeons and institutions is not overly surprising.^{3–5} Interestingly, only 10% of reported cases (excluding cholecystectomy) were performed using minimally invasive techniques. This represents a potential opportunity for improvement.

The HPB surgeons reported a varied mix of time away for continuing medical education and vacation in the context of substantial weekly work hours and heavy on-call volumes (60.5% participate in > 1:4 call; Table 2). Despite this reality, the majority (69.3%) of HPB surgeons described being very satisfied with their careers. The lack of planned movement from their current institutions also remains distinct from our more migratory American colleagues (Table 2). The planned retirement age for most HPB surgeons is 65 years (Table 3).

In addition to reported and unplanned retirement, numerous other factors also drive recruitment. Although most (56.4%) respondents felt there was an appropriate number of HPB surgeons currently practising in their region, numerous programs (44.7%) planned to recruit an additional HPB-specific partner in the near future (75.7% within 5 yr; Table 3). It is important to remember, however, that these rates are based on individual surgeon opinions and are not necessarily program- or city-based visions. Given that the majority (64.1%) of surgeons reported having an HPB fellowship program at their current institution, it is particularly interesting to note that many also felt that too many HPB fellows were being trained in Canada given the availability of faculty positions (Table 3). To this end, many (30.8%) respondents recommended a non-HPB career path to resident trainees during the past year. Taken together, these observations show continued confusion

Table 3. Retirement plans, recruitment profile, practice environment and training

Characteristic	No. (%) [*]
Planned age of retirement, median $\pm$ SD (<i>n</i> = 38)	65.0 $\pm$ 6.4
Plans to recruit a new HPB member in the next 2.5 yr (<i>n</i> = 38)	
Yes	17 (44.7)
No	14 (36.8)
Unsure	7 (18.4)
No. of surgeons practising HPB in your region (<i>n</i> = 39)	
Too few	12 (30.1)
Appropriate	22 (56.4)
Too many	5 (12.8)
Perception of appropriate HPB surgeon to population ratio (<i>n</i> = 39)	
Not sure	14 (35.9)
1:100 000	3 (7.7)
1:250 000	10 (25.6)
1:500 000	9 (23.1)
1:1 000 000 or more	1 (2.6)
Training too many HPB fellows at present (<i>n</i> = 39)	
Yes	19 (48.7)
No	8 (20.5)
Unsure	12 (30.8)
Too many HPB fellowship programs in Canada (<i>n</i> = 39)	
Yes	10 (25.6)
No	16 (41.0)
Unsure	13 (33.3)
HPB = hepato-pancreato-biliary; SD = standard deviation.	
[*] Unless otherwise indicated.	

within the HPB community with regard to training and recruitment and clearly highlight the need for an advanced supply-demand model relevant to manpower planning. This has become even more critical in the new era of work hour restrictions and trainee lifestyle desires.⁹

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References

1. Dixon E, Vollmer CM, Bathe O, et al. Training, practice and referral patterns in hepatobiliary and pancreatic surgery: survey of general surgeons. *J Gastrointest Surg* 2005;9:109-14.
2. Dixon E, Bathe OF, McKay A, et al. Population-based review of the outcomes following hepatic resection in a Canadian health region. *Can J Surg* 2009;52:12-7.
3. Nathan H, Cameron JL, Choti MA, et al. The volume-outcomes effect in hepato-pancreato-biliary surgery: hospital versus surgeon contributions and specificity of the relationship. *J Am Coll Surg* 2009;208:528-38.
4. Csikesz NG, Simons JP, Tseng JF, et al. Surgical specialization and operative mortality in hepato-pancreatico-biliary surgery. *J Gastrointest Surg* 2008;12:1534-9.
5. McKay A, You I, Bigam D, et al. Impact of surgeon training on outcomes after resective hepatic surgery. *Ann Surg Oncol* 2008;15:1348-55.
6. McColl RJ, Shaheen AAM, Brar B, et al. Survival after hepatic resection: impact of surgeon training on long-term outcome. *Can J Surg* 2013;56:256-62.
7. Feindel CM, Ouzounian M, Latham TB, et al. The Canadian society of cardiac surgeons perspective on the cardiac surgery workforce in Canada. *Can J Cardiol* 2012;28:602-6.
8. Grondin SC, Schieman C, Kelly E, et al. A look at the thoracic surgery workforce in Canada: how demographics and scope of practice may impact future workforce needs. *Can J Surg* 2013;56:E75-81.
9. Maruscak AA, VanderBeek L, Ott MC, et al. Implications of current resident work-hour guidelines on the future practice of surgery in Canada. *J Surg Educ* 2012;69:487-92.

Correction

A 7-YEAR REVIEW OF MEN'S AND WOMEN'S ICE HOCKEY INJURIES IN THE NCAA

There was an error in the results reported in the article "A 7-year review of men's and women's ice hockey injuries in the NCAA" (*Can J Surg* 2010;53:319-23). The article stated that "The rate ratio of overall men's to women's hockey injuries was 1.5 (95% CI 1.07-1.25, $p < 0.001$). The correct rate ratio is 1.15.

We apologize for this error.