

Medical Education

Recruitment in anaesthesia: results of two national surveys

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Two national surveys were conducted in order to understand better the dynamics of anaesthesia recruitment. The first survey documented undergraduate anaesthesia curricula in Canadian medical schools. Also documented was the number of students from each school entering anaesthesia at the first-year postgraduate level (PGY1) in 1993; the number was then correlated with the undergraduate anaesthesia exposure in that school. Although all medical schools offered anaesthesia electives, a wide variation existed in the annual total anaesthesia lecture time, the length of anaesthesia rotations and the level at which they occurred. There was no correlation between the number of students entering anaesthesia in 1993 and the aspects of anaesthesia exposure surveyed in the study. The second survey examined why anaesthesia residents choose the specialty. The reasons were grouped into five categories and residents were asked to select as many reasons as applicable. Respondents were also asked to indicate two or three principal reasons for choosing anaesthesia. Four reasons were found to be among both the most selected reasons and principal reasons for choosing anaesthesia: "Hands-on", "Time-off", "Physiology/Pharmacology", and "Immediate gratification". Five reasons were found to be among both the least selected reasons and principal reasons: "Research", "Role model", "Earning potential", "Technology", and "Pain management". It is concluded that anaesthesia recruitment is not related to the duration of undergraduate anaesthesia exposure but is influenced by technical, applied basic sciences and life-style factors.

Deux enquêtes ont été menées dans le but de mieux comprendre la dynamique associée au recrutement des anesthésistes. La première s'intéressait au curriculum offert en anesthésie par les écoles de médecine canadiennes. On a compilé le nombre

Key words

ANAESTHETISTS, EDUCATION: medical students, residents;
MANPOWER: anaesthetists.

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Accepted for publication 19th March, 1994.

d'étudiants de chacune des écoles inscrit en première année du cours d'anesthésie de cinq ans (résidents I) en 1993. Ce nombre a par la suite été mis en corrélation avec la durée du contact en anesthésie particulière à cette école. Bien que toutes les écoles de médecine offrent des stages facultatifs en anesthésie, il existe une très grande variabilité pour la durée totale de l'enseignement de l'anesthésie, la durée des rotations et leur niveau. On ne trouve pas de corrélation entre le nombre d'étudiants acceptés en anesthésie pour l'année 1993 et les modalités du contact avec la discipline. La deuxième enquête portait sur la motivation du choix de l'anesthésie par le résident. Les raisons de ce choix ont été groupées en cinq catégories. On a demandé au résidents d'en choisir le plus nombre possible parmi celles qui semblaient appropriées. On a aussi demandé aux résidents d'identifier les deux ou trois raisons principales qui avaient motivé ce choix. Quatre se retrouvent parmi les raisons principales et les plus souvent choisies: « la pratique », « le modèle à émuler », « le potentiel de gain », « la physiologie et pharmacologie » et « la gratification immédiate ». Cinq figurent aussi parmi les raisons principales et les moins choisies: « la recherche », « le modèle à émuler », « le potentiel de gain », « la technologie » et « la gestion de la douleur ». On conclut qu'en anesthésie, le recrutement n'a pas de rapport avec la durée du contact avec la discipline pendant les études de médecine mais subit l'influence de facteurs liés à la technique, aux sciences fondamentales appliquées et au style de vie.

In the past, for the purpose of medical licensure after medical school in Canada, a student would enter an internship consisting of 12 mo postgraduate training. Further training or certification in a Royal College specialty of Family Medicine was not required.

In 1987, Quebec introduced a two-pathway system for licensure: physicians would be licensed only after certification in Family Medicine or in a Royal College specialty. Since Family Medicine Residency is a two-year programme and most Royal College programmes are four or more years in length, the minimum postgraduate training before licensure would be two years. In July 1993, many of the provinces in Canada, including Ontario, in-

troduced similar systems. The result is that medical students in those provinces must choose between Family Medicine or a Royal College specialty during their final medical school year.

In March 1993, under the new requirements, 1265 Canadian medical graduates participated in a national match (CIMS) for PGY1 positions. Thirty-three graduates selected Anaesthesia as their first choice. After the initial match, seven of the 45 PGY1 positions in Anaesthesia were unmatched. The vacant positions were filled subsequently. The ratio of number of students selecting a specialty as their first choice to the number of available PGY1 positions in that specialty was available after the match. The ratio for Anaesthesia was 0.73; this ratio placed 21st out of 32 specialties in the match. It was above only those of Physical Medicine and Rehabilitation, General Pathology, Anatomical Pathology, Laboratory Medicine, Community Medicine, Medical Biochemistry, Medical Microbiology, Haematological Pathology, and Occupational Medicine.¹

In view of the match results, two surveys were conducted in order to understand better the dynamics of anaesthesia recruitment. One survey documented the undergraduate anaesthesia curriculum across the country. The second survey examined why current anaesthesia residents chose the specialty. This article is a report of those surveys.

Methods

Undergraduate survey

A survey form was mailed to the Programme Director at each Canadian university department of anaesthesia. The length of anaesthesia rotations and lectures, as well as the level at which they occurred were surveyed. Also surveyed was the availability of anaesthesia electives at each centre. A French version was mailed to the francophone departments.

The number of students from each medical school entering anaesthesia at the PGY1 level in 1993, and who had participated in the CIMS was also noted. Linear correlation analyses were then performed between the number of students and their undergraduate anaesthesia exposure, namely the length of mandatory rotations, the level when the rotations occurred, and the total anaesthesia lecture time.

Residents survey

Survey forms were mailed to the Programme Director at each Canadian university department of anaesthesia for distribution to residents. The survey took the form of a checklist of reasons, grouped into five categories (Table I). Individual residents were asked to check off

TABLE I Anaesthesia residents survey

(A) <i>Aspects of the specialty</i>	Critical Care Medicine (ICU). Chronic/Acute Pain Management (Pain). Physiology/Pharmacology (Phys/Pharm). Technology/Computer Sciences as applied to Medicine/ Anaesthesia (Tech). Research.
(B) <i>Lifestyle advantages</i>	My time off will truly be my own (Time off). High degree of portability (Port.). Minimal paperwork (Paperwork). No office to maintain (Office). High immediate earning potential upon starting practice (Earning). Flexibility of a group, including job-sharing (Group).
(C) <i>Nature of the specialty</i>	"Hands-on" specialty (Hands-on). Short term goals, with immediate gratification in one's own work (Grat.). Patient-oriented practice, with minimal time spent on bureaucracy, time mostly devoted to patient care (Patient). Operating room environment/atmosphere (Environ.). No chronic patient management to contend with (Acute).
(D) <i>Inspired by a certain individual (role model)</i>	
(E) <i>Other reason(s) not mentioned above</i>	

Reasons listed on the survey form sent to Anaesthesia residents in March 1993. Respondents would select any of the reasons as applicable for choosing anaesthesia.

as many reasons as applicable and to indicate two or three principal reasons for choosing anaesthesia. Reasons not listed in the survey were also solicited. A French version was mailed to the francophone programmes. Two follow-up telephone calls were made to each programme to encourage response.

Survey results were tabulated by frequency for each reason as well as for each principal reason as indicated by the respondents. Statistical analyses were performed using χ^2 2 × 2 tables between the frequencies of "Selected" and "Not selected" for each reason or principal reason vs the sum frequencies of the remaining reasons. Odds ratios and 95% confidence intervals were calculated.

Results

Undergraduate survey

Responses were received from all 16 departments of anaesthesia. The forms were completed by Programme Directors, Department Chairmen, or individuals in charge of anaesthesia undergraduate education in the medical school. The duration and level of undergraduate

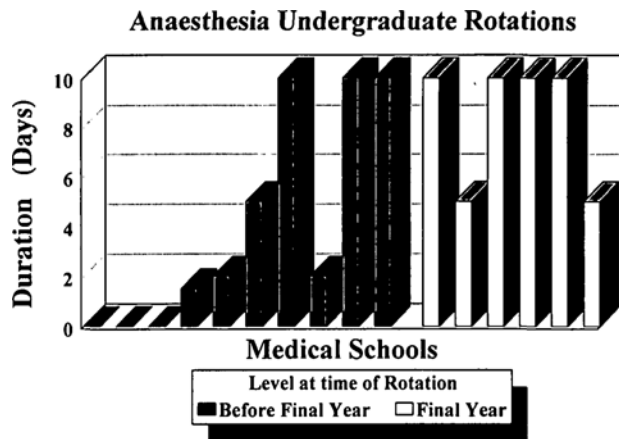


FIGURE 1 Histogram of number of days for anaesthesia rotations at each medical school. Results from medical schools are positioned randomly on the ordinate. Grey bars represent rotations offered before the final medical school year, the white bars represent rotations offered in the final year.

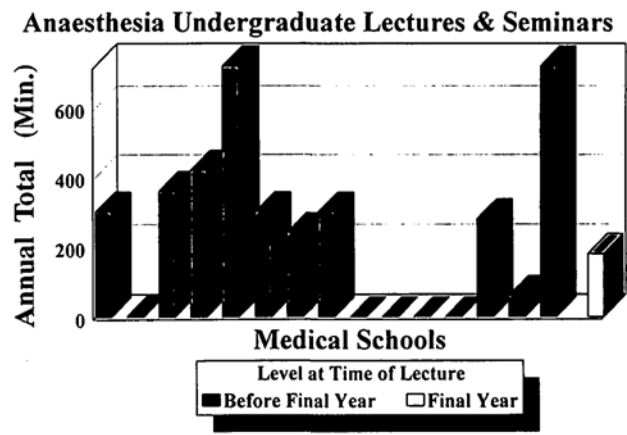


FIGURE 2 Histogram of annual total number of minutes for lectures or seminars offered by departments of anaesthesia at each medical school. Results from medical schools are positioned in the same order as in Figure 1. Grey bars represent lectures offered before the final medical school year; the white bar represents lectures offered in the final year.

exposure to clinical anaesthesia are shown in Figure 1. Three schools did not provide a mandatory anaesthesia rotation, seven provided ten-day rotations, and the remaining six schools provided rotations ranging from 1½ – 5 days in duration.

The annual total number of minutes and the level of undergraduate anaesthesia lectures are shown in Figure 2. Five schools did not provide any undergraduate anaesthesia lectures while two provided over 600 min. Only one university reported lectures given in the final year of medical school.

All of the schools offered anaesthesia electives. Six offered electives in the final year only while five offered electives both before and during the final year. One school offered electives in the second year only. The remaining four schools did not indicate the level at which their electives were offered (Table II).

The distribution of 1993–1994 anaesthesia PGY1 by medical school of graduation is shown in Figure 3. No correlation was found between the number of students and the anaesthesia exposure in their respective medical schools, namely the duration or level of rotations, or the annual anaesthesia lecture time (Table III). Note that only students who had participated in the CIMS were considered.

Residents survey

One hundred and twenty-nine residents responded, out of the 378 residents in Canadian anaesthesia programmes as of March 1993 (34% response). Table IV lists the reasons for choosing anaesthesia surveyed in the study, followed by the number of respondents who selected and

TABLE II Undergraduate anaesthesia electives

Time of elective	No. of universities
2nd year only	1
Final year only	6
Final & other years	5
Unknown	4

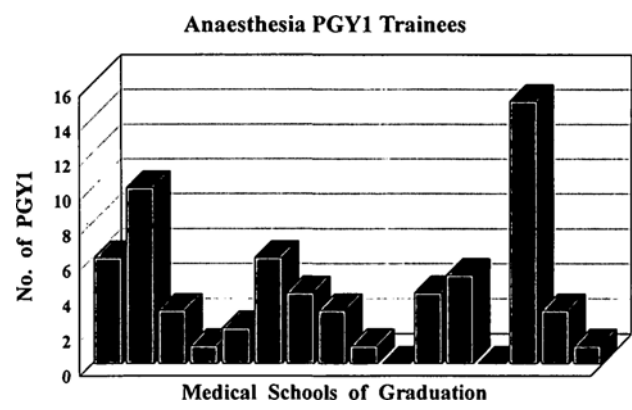


FIGURE 3 Histogram of number of anaesthesia PGY1 in 1993–1994, by their medical school of graduation. Results from medical schools are positioned in the same order as in Figure 1. Only PGY1 who had participated in the national computer match are included here.

the number who did not select each of the reasons. Odds ratios and χ^2 probabilities were calculated. The six most selected reasons, shown in Figure 4, were “Hands-on”, “Time-off”, “Portability”, “Patient care”, “Immediate grat-

TABLE III Anaesthesia undergraduate survey correlation analysis between anaesthesia PGY1 and undergraduate anaesthesia activities

<i>Correlation between number of 1993-1994 anaesthesia PGY1 & length of anaesthesia rotation</i>	
Constant	2.71
R ²	0.08
Std Err of Y Est	4.07
No. of Observations	11
Degrees of Freedom	9
X Coefficient	0.27
Std Err of Coef	0.30
<i>Correlation between number of 1993-1994 anaesthesia PGY1 & level of anaesthesia rotation</i>	
Constant	2.92
R ²	0.029
Std Err of Y Est	4.19
No. of Observations	11
Degrees of Freedom	9
X Coefficient	0.46
Std Err of Coef	0.88
<i>Correlation between number of 1993-1994 anaesthesia PGY1 & annual total anaesthesia lecture time</i>	
Constant	6.00
R ²	0.11
Std Err of Y Est	4.01
No. of Observations	11
Degrees of Freedom	9
X Coefficient	-0.0058
Std Err of Coef	0.0055

ification", and "Physiology/Pharmacology", ($P \leq 0.001$), with odds ratios ≥ 1.84 (Table IV). Also significant ($P \leq 10^{-6}$), with odds ratios less than or equal to 0.29, were the five least frequently selected reasons: "Research", "Pain", "Technology", "Earning potential", and "Role model" (Table IV). Figure 5 illustrates the odds ratio and 95% confidence interval for each of the reasons.

Ninety-three respondents indicated their principal reasons for choosing anaesthesia. Table V shows the number who selected and the number who did not select each of the principal reasons. Odds ratios and χ^2 probabilities are shown. The most frequently selected principal reasons were "Hands-on", "Time-off", "Immediate gratification", "Physiology/Pharmacology", and "Acute care" (Figure 6), ($P \leq 0.002$), with odds ratios ≥ 2.15 (Table V). The least frequently selected principal reasons were "Earning potential", "Technology", "Research", "Pain", "Role model", and "No office to maintain". They were also statistically significant ($P \leq 0.004$), with odds ratios less than or equal to 0.24 (Table V). Figure 7 shows the odds ratio and 95% confidence interval for each of the principal reasons.

A list of "other reasons" cited by the respondents is shown in Table VI. The "variety of clinical material",

the opportunity to care for "one patient at a time", and the ability to be involved in the "global care of a patient" were frequently cited by the respondents. Five respondents cited a dislike of family medicine as a reason for choosing anaesthesia. Three respondents cited job satisfaction among anaesthetists as a factor. The potential to "reduce stress/pain in an otherwise unpleasant experience", and the "acquisition of life-saving skills" were also cited.

Discussion

The undergraduate survey showed that although anaesthesia electives were offered by all medical schools, there was a wide variation across Canada in the duration of anaesthesia rotations, annual total anaesthesia lecture time, and the level at which those experiences occurred. There was no correlation between the number of PGY1 anaesthesia trainees in 1993 and the undergraduate anaesthesia exposure in their respective medical schools. In view of the potentially important role anaesthetists may play in teaching physiology and pharmacology to medical students, the result from the correlation analysis deserves comment. Studies show that clinical exposure alone exerts little influence on students; the interplay of experiences and faculty members exert a much greater influence.² Without examining the quality of teaching activities, one study even suggests that clinical exposure might contribute to the development of negative attitudes towards anaesthesia.³ Our undergraduate survey examined only the quantitative aspects of anaesthesia exposure; the lack of correlation found here is consistent with the earlier studies.

In the residents' survey, four reasons: "Hands-on", "Time off", "Physiology/Pharmacology", and "Immediate gratification in one's own work", were found to be among both the most frequently selected reasons and the most frequently selected principal reasons. "Hands-on" nature of the specialty is crucial to the practice of anaesthesia and therefore its importance to the respondents is not surprising. The importance of "Time-off" is in agreement with recent studies showing the increasing trend of lifestyle considerations by students.⁴

Five reasons: "Research", "Role model", "Earning potential", "Technology", and "Pain", were among both the least frequently selected reasons and the least frequently selected principal reasons for choosing anaesthesia. It is unclear how the low frequency of selection of these reasons will affect the specialty. Nevertheless, the low importance placed on research by the respondents is noteworthy.

The low frequency of selection of role model seen here can be placed in perspective; the importance of role model has been investigated in the literature. In a survey of

TABLE IV Anaesthesia residents survey reasons for specialty choice odds ratio & χ^2 probability

Reasons	Selected*	Not selected†	Odds ratio‡	95% Confidence interval	P§	Power of χ^2 $\alpha = 0.05$
Research	8	121	0.06	0.03–0.13	<10 ⁻⁶	>0.999
Pain	23	106	0.21	0.13–0.34	<10 ⁻⁶	>0.999
Tech	26	103	0.25	0.16–0.39	<10 ⁻⁶	>0.999
Earning	29	100	0.29	0.18–0.44	<10 ⁻⁶	>0.999
Role model	29	100	0.29	0.18–0.44	<10 ⁻⁶	>0.999
Group	66	63	1.11	0.77–1.61	0.63	0.08
Acute	67	62	1.15	0.79–1.66	0.5	0.11
Paperwork	71	58	1.31	0.90–1.90	0.16	0.30
Environment	72	57	1.35	0.93–1.97	0.12	0.37
Office	72	57	1.35	0.93–1.97	0.12	0.37
ICU	72	57	1.35	0.93–1.97	0.12	0.37
Phys/Pharm	81	48	1.84	1.26–2.70	0.001	0.93
Grat.	81	48	1.84	1.26–2.70	0.001	0.93
Patient	82	47	1.91	1.30–2.80	<0.001	0.95
Port.	83	46	1.98	1.34–2.91	<0.001	0.97
Time off	94	35	3.01	1.99–4.56	<10 ⁻⁶	>0.999
Hands-on	112	17	7.64	4.45–13.28	<10 ⁻⁶	>0.999
Total	1068	1125				

*Number of respondents selecting the reason.

†Number of respondents not selecting the reason.

‡Odds ratio is calculated by dividing the ratio “Selected”/“Not selected” for each reason by the ratio of total “Selected”/total “Not selected” for the remaining reasons.

§P is the χ^2 probability using a 2 × 2 table of “Selected” and “Not selected” for each individual reason vs the sum frequencies of the remaining reasons.

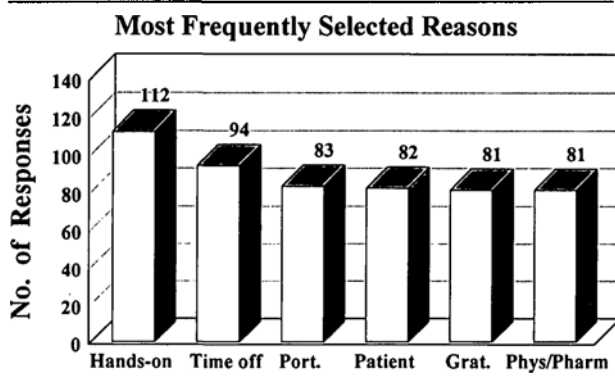


FIGURE 4 Hands-on – technical aspects of the specialty, Time off – “time off will truly be my own”, Port. – portability of practice, Grat. – short term goals, immediate gratifications, Patient – minimal bureaucracy, time mostly devoted to patient care, Phys/Pharm – physiology & pharmacology. 129 residents responded to the survey. The total number of responses is more than 129 because each resident may select more than one reason.

graduates from UCSF,⁵ specialties were grouped as “technology-oriented” and “personal care”. The technology-oriented group included anaesthesia, emergency medicine, ophthalmology, pathology, radiology, etc. The personal care group included family medicine, paediatrics, internal medicine, psychiatry, etc. The experiences with residents or with attending consultants during

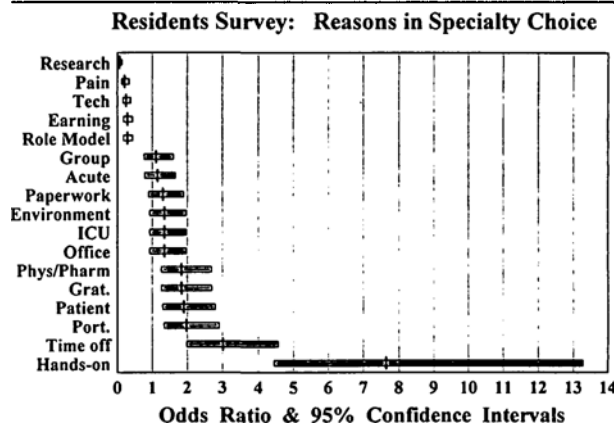


FIGURE 5 The odds ratios are arranged in ascending order. The confidence intervals are calculated at $\alpha = 0.05$ and plotted in grey on the graph. The reasons were considered by the 129 respondents to be factors in their choice of anaesthesia. See Table I for legend of reasons.

medical school was equally and highly important to both groups as factors in their choice of specialties. In a survey at Cornell,⁶ specialties were grouped into five categories: paediatrics and family practice; internal medicine; surgery; psychiatry; and “hospital services” which included radiology, anaesthesia and pathology. In the last group, faculty or house staff members were found to exert an important influence on the choice of specialty. Faculty or house staff influence was also highly important to the

TABLE V Anaesthesia residents survey principal reasons for specialty choice odds ratio & χ^2 probability

Principal reasons	Selected*	Not selected†	Odds ratio‡	95% Confidence interval	P§	Power of χ^2 $\alpha = 0.05$
Earning	1	92	0.06	0.01–0.37	<0.001	0.99
Tech	2	91	0.11	0.03–0.47	<0.001	0.97
Research	2	91	0.11	0.03–0.47	<0.001	0.97
Pain	4	89	0.24	0.09–0.68	0.004	0.88
Role model	4	89	0.24	0.09–0.68	0.004	0.88
Office	5	88	0.30	0.11–0.78	0.01	0.80
Group	7	86	0.43	0.18–0.99	0.05	0.57
Paperwork	7	86	0.43	0.18–0.99	0.05	0.57
Patient	10	83	0.65	0.31–1.32	0.27	0.23
Environment	12	81	0.81	0.41–1.56	0.61	0.10
Port.	13	80	0.89	0.47–1.68	0.83	0.06
ICU	21	72	1.67	0.97–2.85	0.063	0.51
Acute	25	68	2.15	1.29–3.57	0.002	0.91
Phys/Pharm	25	68	2.15	1.29–3.57	0.002	0.91
Grat.	29	64	2.71	1.66–4.41	<0.001	0.997
Time off	33	60	3.37	2.10–5.39	<10 ⁻⁶	>0.999
Hands-on	42	51	5.34	3.36–8.37	<10 ⁻⁶	>0.999
Total	242	1339				

*Number of respondents selecting the reason.

†Number of respondents not selecting the reason.

‡Odds ratio is calculated by dividing the ratio "Selected"/"Not selected" for each reason by the ratio of total "Selected"/total "Not selected" for the remaining reasons.

§P is the χ^2 probability using a 2×2 table of "Selected" and "Not selected" for each individual reason vs the sum frequencies of the remaining reasons.

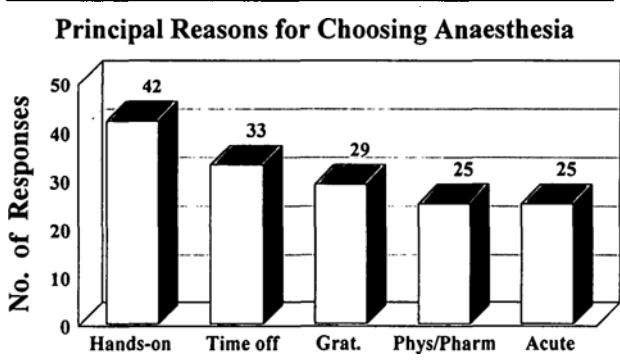


FIGURE 6 93/129 residents listed their principal reasons. The six most common ones are plotted. Hands-on – technical aspects of anaesthesia, Time off – "time off will truly be my own", Grat. – immediate gratification, Phys/Pharm – physiology & pharmacology, Acute – no chronic patient management. The total number of responses is more than 93 because a resident may select 2 or 3 principal reasons.

other groups on the choice of specialty. These studies show that the influence of role models on the choice of specialty is vital. In the present survey, the low importance given to role model by the respondents provokes speculation.

In the residents' survey, a response rate of 34% is commensurate with other similar national surveys.⁴ The sta-

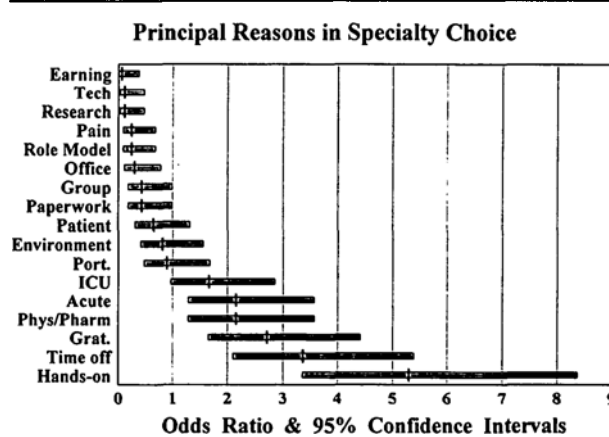


FIGURE 7 The odds ratios are arranged in ascending order. The confidence intervals are calculated at $\alpha = 0.05$ and plotted in grey on the graph. The principal reasons were reported by 93 of the 129 respondents. See Table I for legend of principal reasons.

tistical significance and confidence intervals provide strong support that the observations among the respondents are real. However, it is unclear if non-respondents would place the same emphasis on the reasons for choosing anaesthesia.

In conclusions, two surveys were conducted to understand better the dynamics of anaesthesia recruitment. The

TABLE VI Anaesthesia residents survey: other reasons cited by respondents

Variety of clinical material, encompassing all areas of medicine.
One patient at a time.
Global care of a patient.
Dynamic, exciting subject.
Specialty with pure consultative expertise.
Tremendous opportunities in clinical anaesthesia, research, and teaching.
The potential to reduce stress/pain in an otherwise unpleasant experience.
Acquisition of life saving skills.
Excellent combination of cerebral aspects with technical hands on activities.
"Agreeable personality" of anaesthetists: "Seem happy."
Dynamic, emerging specialty.
Dislike of Family Medicine.

Other reasons cited by the respondents to have played a role in their decision to enter Anaesthesia. These reasons were abstracted from category (E) of Table I.

undergraduate survey showed a wide variation in undergraduate anaesthesia exposure across Canada. There was no correlation between the number of students entering anaesthesia at the PGY1 level in 1993 and the quantitative aspects of undergraduate anaesthesia exposure in the students' graduating medical schools; namely the duration and level of anaesthesia rotations, and the annual total anaesthesia lecture time. In the residents' survey, "Hands-on", "Time-off", "Physiology/Pharmacology", and "Immediate gratification" were most frequently selected as reasons and as principal reasons for choosing anaesthesia. Five factors were among the least selected reasons and the least selected principal reasons for choosing anaesthesia: "Research", "Role model", "Earning potential", "Technology", and "Pain management".

Acknowledgment

The authors wish to thank Dr. A. Dauphin for the French translation of the survey forms.

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