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Summer 2001 Table of Contents • Été 2001 Table des matières

Procedural skills practised by British Columbia family physicians

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Contents

• Abstract • Introduction • Methods • Results • Discussion • References

Objective: To document and analyze procedural skills practised by British Columbia family physicians/general practitioners (FPs/GPs).

Design: The tabulation of a 132-item procedural skills application form.

Setting: Thirty-nine communities in British Columbia.

Participants: A total of 314 physicians completed a detailed procedural skills application form as part of a voluntary provincial Royal College of Physicians and Surgeons of Canada credentialling process; of these, 154 physicians came from the 26 northern and isolation allowance (NIA) communities and 160 physicians from 31 non-NIA communities.

Main outcome measures: CCFP accreditation status of FPs/GPs and status as a Canadian- or foreign-trained medical graduate, skill level with respect to the 132 procedures, specialty course work completed, including Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), Pediatric Advanced Life Support (PALS) and Neonatal Advanced Life Support (NALS) certification.

Results: With respect to education, 224 (71.8%) of 312 respondents were Canadian-trained, and 88 (28.2%) of 312 were foreign-trained; 93 (29.8%) of 312 had their CCFP certification, and 219 (70.2%) did not. With respect to course work accreditation 28 (8.9%) of the 314 participants

had completed PALS, 64 (20.4%) NALS, 165 (52.5%) ATLS and 252 (80.2%) ACLS courses. CCFP physicians were significantly more likely ($p < 0.01$) than non-CCFP physicians to have completed these 4 courses. Canadian-trained physicians were significantly more likely ($p < 0.01$) to have completed NALS and ACLS courses than foreign-trained physicians. Thirty-five procedures were being performed by more than 93% of the respondents. A sharp drop was noted in the number of participants performing the remaining listed procedures. CCFP physicians were significantly more likely to deliver babies and perform laryngoscopy and intubation than non-CCFP physicians ($p < 0.01$). Foreign-trained physicians were significantly more likely to do cesarean sections, laparotomy for ectopic pregnancy, and marsupialization of Bartholin's cysts than Canadian-trained physicians ($p < 0.01$).

Conclusions: British Columbia's FPs/GPs are applying a wide range of procedural skills. There is, however, a large variation in the number and type of skills practised by these physicians.

Objectif : Décrire et analyser les techniques d'intervention des médecins de famille/omnipraticiens (MF/OP) de la Colombie-Britannique.

Conception : Tabulation des résultats d'un questionnaire de 132 questions sur l'application des techniques d'intervention.

Contexte : Trente-neuf communautés de la Colombie-Britannique.

Participants : Au total, 314 médecins ont répondu à un questionnaire détaillé sur l'application des techniques d'intervention dans le cadre d'un mécanisme provincial volontaire d'attribution de titres du Collège royal des médecins et chirurgiens du Canada. Sur ce total, 154 médecins provenaient des 26 communautés couvertes par la prime d'éloignement dans le Nord (PEN) et 160, de 31 autres communautés.

Principales mesures de résultats : Agrément des MF/OP et diplôme d'une faculté de médecine canadienne ou étrangère, niveau de la technique en ce qui a trait aux 132 interventions, cours spécialisés terminés, y compris certificat en soins avancés en réanimation cardiaque (SARC), en soins avancés en réanimation traumatologique (SART), soins avancés en réanimation pédiatrique (SARP) et soins avancés en réanimation néonatale (SARN).

Résultats : En ce qui a trait à la formation, 224 (71,8 %) des 312 répondants avaient reçu leur formation au Canada et 88 (28,2 %) l'avaient reçue à l'étranger; 93 (29,8 %) sur 312 avaient leur certificat CCMF et 219 (70,2 %) ne l'avaient pas. En ce qui a trait à l'agrément, 28 (8,9 %) des 314 participants avaient terminé leur cours SARP, 64 (20,4 %), leur cours SARN, 165 (52,5 %), leur cours SART et 252 (80,2 %), leur cours SARC. Les médecins titulaires d'un certificat du CCMF étaient beaucoup plus susceptibles ($p < 0,01$) que les autres d'avoir terminé ces quatre cours. Les médecins qui ont reçu leur formation au Canada étaient beaucoup plus susceptibles

($p < 0,01$) d'avoir terminé leur cours SARN et SARC que les médecins formés à l'étranger. Plus de 93 % des répondants pratiquaient 35 interventions. On a constaté une baisse marquée du nombre des participants qui pratiquaient les autres interventions figurant sur la liste. Les médecins titulaires d'un CCMF étaient beaucoup plus susceptibles d'effectuer des accouchements, des laryngoscopies et des intubations que leurs collègues qui ne détenaient pas de certificat ($p < 0,01$). Les médecins formés à l'étranger étaient beaucoup plus susceptibles que les médecins formés au Canada ($p < 0,01$) d'effectuer des césariennes, des laparotomies pour grossesse ectopique et la marsupialisation des kystes des glandes de Bartholin.

Conclusions : Les MF/OP de la Colombie-Britannique utilisent un vaste éventail de techniques d'intervention. Le nombre et le type des techniques pratiquées par ces médecins varient toutefois énormément.

Contents

• Abstract • Introduction • Methods • Results • Discussion • References

Introduction

The issue of procedural skills training for family practice residents is receiving increasing attention.1–4 Studies reveal that many Canadian-trained family physicians/general practitioners (FPs/GPs) do not feel comfortable or do not feel competent to apply important procedural skills such as adult and pediatric resuscitation, simple fracture reduction, casting techniques, intravenous access, lumbar puncture and endotracheal intubation.5–8 It has been postulated that physician discomfort with certain procedural skills is one of the reasons why Canada's northern and rural communities are having difficulty attracting and retaining Canadian family practice graduates.9–11

A recent study on procedural skills practised in rural British Columbia revealed that significantly more graduates of foreign medical schools perform vasectomies, tubal ligations, cesarean sections and forceps/vacuum deliveries than graduates of Canadian medical schools.12 This supports the belief that one of the reasons why foreign-trained doctors don't seem to mind working in Canadian rural communities is because they are better trained with respect to procedural skills.

As far as we can ascertain there have been no published studies comparing procedural skills being practised by physicians trained in Canada versus foreign-trained physicians; no published studies comparing procedural skills being applied by physicians with College of Family Physicians of Canada certification (CCFP) and non-CCFP practitioners; and no studies summarizing which procedures are being applied by what proportion of physicians after completion of residency training programs.

In British Columbia some of this information does exist but it is in the form of administrative data collected by the College of Physicians and Surgeons of British Columbia. In 1993, the BC

College began a credentialling process for procedural skills. They were asked to do this because physicians, hospital boards and administrators were frustrated with the process of periodic evaluation of medical staff. Smaller communities in particular were finding it difficult to be objective and thorough in their evaluation of procedural skills competency. To respond to these concerns the BC College established an Advisory Panel on Credentials (APC). The APC's self-stated role is to offer assistance to hospitals and diagnostic and treatment centres (D&Ts) in credentialling physicians for procedural skills in each community's medical facility. The APC is made up of 5 practising physicians: a general practitioner from a semi-urban community as chairperson; 2 family physicians, 1 each from a rural and an urban centre; a general surgeon from an urban centre; and an internist from an urban centre. The committee's mandate is to review a physician's credentials and suitability for procedure privileges, both at the time of the initial hospital appointment and on a periodic basis. The credentialling process is carried out in a rotating community fashion, in alphabetical order, with an in-depth review of physicians' credentials being carried out every 3 to 5 years. The APC acts only in an advisory capacity to the medical staff and hospital board, as the ultimate responsibility for appointment and the approval of procedural skills rests with the hospital board. Thus, participation in the credentialling process by each physician and each community is said to be voluntary.

Part of the process is the completion of a detailed procedural skills application form by physicians who choose to participate. The BC College kindly allowed us to review the APC procedural skills application forms, with the proviso that, for reasons of confidentiality, we could not identify communities or physicians participating in the credentialling process. The objective of this paper is to summarize this APC administrative data so that we might better understand which procedural skills are being practised by FP/GPs and by whom: Canadian- versus foreign-trained, CCFP versus non-CCFP.

Contents
• Abstract • Introduction • Methods • Results • Discussion • References

Methods

The APC form requests information on medical school attended, date of graduation, year of LMCC (Licentiate of the Medical Council of Canada) licensure, specialty course work, course work accreditation and family practice certification (CCFP). Course work accreditation includes Advanced Cardiac Life Support (ACLS), Advanced Trauma Life Support (ATLS), Pediatric Advanced Life Support (PALS) and Neonatal Advanced Life Support (NALS). These courses have nationally or internationally recognized protocols.

The form also contains a list of 132 procedural skills (Table 1, Table 2, Table 3). Participants are asked to check off the skills they practise. Skills range from basic (e.g., phlebotomy, anesthetic infiltration and laceration repairs) to complex skills that normally require specialist training and

certification (e.g., hysterectomy or prostatectomy). This 132-item list was compiled by the APC committee using information obtained from the provincial colleges of physicians and surgeons of Alberta, Saskatchewan and Manitoba.

Community population estimates were obtained from BC's 1996 census data. Estimates the number of FP/GPs working in communities were obtained from the 1998–99 BC Medical Directory. The BC Medical Services Plan office in Victoria provided us with a list of northern and isolation allowance (NIA) communities, as well as an NIA rurality score and estimated FP/GP counts for each of these communities.13

Doctors living in NIA communities are given a fee over and above that provided to physicians working in less "needy" communities. The BC Medical Services Plan has developed a Rurality Index score, which it uses to determine whether a community is northern and/or isolated enough to qualify for the NIA, and just how much that community's NIA allowance should be.14 This scoring system is similar to that proposed by Leduc15 and takes into account such things as number of physicians in the community, number of specialists in the community, distance (km) from a major medical community, exceptional circumstances, doctor:patient ratio, distance from a major population centre, and population size of the community.

Demographic statistics and procedural skills were tabulated, and percentages of FP/GPs performing individual procedures and having specific course certification were calculated. The chi-squared test to determine statistically significant differences between CCFP and non-CCFP physicians and between Canadian-trained and foreign-trained physicians.16 Given the high probability of false-positive findings from multiple testing, $p < 0.01$ was used as the guideline for statistical significance.

Two of the 314 physicians did not report certification or education status, so comparisons of non-CCFP versus CCFP and Canadian- versus foreign-trained are based on a sample size of 312. However, all other parameters are based on 314 cases.

Contents
• Abstract • Introduction • Methods • Results • Discussion • References

---

Results

A total of 314 physicians from 39 communities completed the detailed APC application form. Twenty-six of these communities, representing 154 physicians, were NIA communities. Since there are a total of 57 NIA communities with a hospital or a D&T, the NIA community response rate was 46%. According to the 1998–99 BC Medical Directory the estimated number of physicians working in the 26 participating NIA communities was approximately 133. Since 154 physicians actually completed APC application forms, there appears to have been good

participation by physicians working in NIA communities. The greater-than-100% response likely reflects the fact that locums working in these communities also completed the APC. There was no significant difference between respective participating and non-participating NIA communities in mean (± SD) population size (6002 [5315] v. 7068 [7024]; mean (± SD) NIA score (77.9 [30.7] v. 82.8 [29.3]), or mean number of physicians working per community (5.1 [4.9] v. 6.6 [6.2]). Of the 26 NIA communities participating in the credentialling process, 8 have D&Ts and 18 have hospitals. In comparison, of the 31 NIA communities not participating in the credentialling process, 7 have D&Ts, and 24 have hospitals.

In terms of number of hospital beds in the participating NIA communities, there was an average of 24.7 beds per community (range from 0 to 89) (D&Ts have no acute inpatient beds). The 154 physicians in these NIA communities received their LMCC certification on average in 1983 (ranging from 1962 to 1995).

The remaining 160 participants came from 31 non-NIA communities, all of which had hospitals. As expected, these non-NIA communities tended to be larger (mean [and SD] population size 18 658 [20 816], ranging from 2800 to 85 000), have more physicians (12.3 [6.2]) and have hospitals with a greater number of hospital beds (average 36.9 beds per community, excluding 1 community that had 260 hospital beds). The estimated number of FP/GPs working in these 31 non-NIA communities is 264, which indicates that, compared to the NIA situation, not all physicians working in the participating non-NIA communities took part in the College's APC credentialling process.

On average, physicians from non-NIA communities received their LMCCs in 1977 (range from 1947 to 1994). With respect to education, 224 (71.8%) of 312 participants were Canadian-trained, and 88 (28.2%) were foreign-trained; 93 (29.8%) had their CCFP certification and 219 (70.2%) did not. With respect to course work accreditation, 28 (8.9%) of the 314 participants had completed PALS, 64 (20.4%) had completed NALS, 165 (52.7%) ATLS, and 252 (80.5%) ACLS courses. CCFP physicians were more likely ($p < 0.01$) than non-CCFP physicians to have completed these 4 courses. Canadian-trained physicians were more likely ($p < 0.01$) to have completed the NALS and ACLS courses than foreign-trained physicians.

One physician only did counselling and therefore did not check off any of the skills listed in Table 1. Thirty-five procedures were reported as being practised by more than 90% of the 314 respondents (Table 1). There was a sharp drop in the number of participants who practised the remaining listed skills (Tables 2 and 3). For example, 202 participants (64.3%) practised cephalic deliveries (including episiotomy and laceration repair), 134 (42.7%) performed laryngoscopy and intubation, 74 (23.6%) reduced acute nasal deformities, 40 (12.7%) performed tubal ligation, 19 (6.1%) performed therapeutic abortions, and 1 (0.3%) did flexor tendon repairs in the hand. Twenty-seven procedures were reported as not being performed by any of the 314 respondents.

According to our criterion that $p < 0.01$ is the level for statistical significance using chi-squared

tests of independence, 2 procedures are significantly different for non-CCFP and CCFP respondents (Table 4), and 3 procedures are significantly different for Canadian-trained and foreign-trained respondents (Table 5).

CCFP physicians were more likely to deliver babies and perform laryngoscopy and intubation than non-CCFP physicians ($p < 0.01$). Consistent with the finding that CCFP physicians are more likely to do obstetrics is the finding that CCFP physicians also tended to do more vacuum extraction/outlet forceps and medical inductions than non-CCFP physicians ($0.01 < p < 0.05$) (Table 4).

Foreign-trained physicians were more likely to do cesarean sections, laparotomy for ectopic pregnancy and marsupialization of Bartholin's cyst than Canadian-trained physicians ($p < 0.01$). Foreign-trained physicians tended to perform more appendectomies, hemorrhoidectomies, manage varicose vein problems and uncomplicated tibial, fibular and humeral fractures than Canadian-trained physicians ($0.01 < p < 0.05$) (Table 5).

Contents
• Abstract • Introduction • Methods • Results • Discussion • References

---

Discussion

In Canada, physicians are increasingly being asked about their practical experience with respect to specific procedures: how many have they done, especially in the recent past, and what was the outcome? In some US centres proof of competency in a procedural skill is required before the privilege of performing the procedure in the hospital is even granted.17 Despite all this, evaluation of procedural skills competency is not yet part of the certification process by the College of Family Physicians of Canada.3 There is not even agreement among the various family practice training programs as to what constitutes "basic" surgical and procedural skills, let alone "special" skills. Our study shows that British Columbia FP/GPs are practising a wide range of procedural skills. There is, however, a large variation in the number and type of skills used by individual physicians.

Of special interest are the number of physicians who reported using basic obstetric skills and basic anesthesia skills. Approximately 64% of general practitioners in this study provide basic obstetrical care to patients, but only 17% provide general anesthetics in uncomplicated cases, and only 12% perform cesarean sections. Significantly more foreign-trained physicians perform cesarean sections than Canadian-trained physicians. These data have implications as to the provision of cesarean sections in rural communities.18,19 If rural Canadians want to have their babies delivered closer to home and have access to immediate cesarean section surgery, Canadian universities must to do a better job of training rural physicians to competently and comfortably practise the necessary surgical and anesthetic skills.

Foreign-trained physicians also appear to be more comfortable handling various types of fractures, and they more commonly perform finger and toe amputations, with an average of 10% to 15% more foreign-trained doctors providing these skills. This suggests that Canadian training programs could improve their training of family physicians in the area of simple orthopedic care. This issue has been noted in a previous study.8

In terms of other skills, the data strongly suggest that relatively more non-CCFPs and foreign-trained physicians perform procedures such as appendectomy, vasectomy, Bartholin's cyst marsupialization, hemorrhoidectomy and varicose vein sclerotherapy than CCFP and Canadian-trained physicians. Perhaps Canadian family practice programs should also offer more surgical skills training to their resident physicians.20

Relatively more CCFP physicians have done course work in ACLS, ATLS, NALS and PALS than non-CCFP physicians. This finding suggests that CCFP training emphasizes a more structured course work approach to training, as opposed to acquisition of procedural skills.

Unfortunately our records on gender and year of medical school graduation were incomplete and so we were unable to determine from our data whether there was a gender difference in the performance of procedural skills. We were also unable to determine whether younger or older physicians were less likely to perform procedural skills.

The medicolegal factor, which probably plays a role in determining whether a physician will do procedures, is another factor we did not study. Students are being told during their training to avoid certain procedures because of perceived high medicolegal risk associated with that procedure. Older physicians have been known to give up procedures after being involved in lawsuits or college investigations.

We hope that other researchers will design studies that take into account the age, gender and medicolegal factors so that their importance can be more fully understood.

Our study is not perfect. It is not a randomized, cross-sectional survey with a high return rate, but rather a summary of administrative data. This kind of data sometimes suffers from lack of generalizability, and can suffer from response bias.

Despite these potential limitations, we feel that our data should be of interest to educators currently involved in procedural skills training of Canadian family medicine residents.

Our data involves a large number of physicians, it samples almost half of British Columbia's NIA communities, it provides information on many different types of procedural skill, and it provides some insight into the percentages of FP/GPs performing particular procedures today. Our data confirm the impression that foreign-trained physicians use more surgical-type skills than

Canadian-trained physicians and suggest there are differences between CCFP physicians and non-CCFP physicians. Such information can be used to develop programs that better ensure family practice residents will become more comfortable and more proficient in applying specific procedural skills.8,20

Competing interests: None declared.

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