

Procedural skills training

Canadian family practice residency programs

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ABSTRACT

OBJECTIVE To survey Canadian family practice residency programs to discover which procedural skills residents are expected to learn.

DESIGN Cross-sectional eight-item questionnaire.

SETTING AND PARTICIPANTS The survey was sent to all 92 program directors and site or unit directors of family practice residency programs across Canada.

MAIN OUTCOME MEASURES Information on procedural skills lists was solicited. We sought date of creation, date of most recent revision, and who was involved in creating the list. A copy of the most recent list available was requested.

RESULTS We received 65 responses, for a 71% return rate. Surveys were received from all provinces and from all Canadian universities offering family practice residency programs. We received 24 unique lists of procedural skills: the shortest listed only 10 procedural skills; the longest, 75 skills; and the average, 36 skills. Only five procedural skills were found on more than 80% of the lists; 30 skills were listed on half or more of the lists.

CONCLUSIONS Canadian family practice residency programs have widely varying expectations of procedural skills for their residents. This survey is a first step in examining the whole issue of procedural skills training in Canadian family medicine programs.

RÉSUMÉ

OBJECTIF Effectuer une enquête auprès des programmes de résidence en médecine familiale au Canada pour faire ressortir les aptitudes opératoires exigées des résidents.

CONCEPTION Un questionnaire transversal en huit points.

CONTEXTE ET PARTICIPANTS Le questionnaire a été envoyé aux 92 directeurs de programme et directeurs d'établissement ou d'unité dispensant des programmes de résidence en médecine familiale au Canada.

PRINCIPALES MESURES DES RÉSULTATS Nous avons demandé des renseignements sur les listes d'aptitudes opératoires. Nous cherchions à savoir la date de leur création, celle de leur plus récente mise à jour et les personnes qui avaient participé à leur élaboration. Nous avons aussi demandé de fournir la liste disponible la plus récente.

RÉSULTATS Nous avons reçu 65 réponses, ce qui représente un taux de retour de 71%. Les questionnaires nous sont parvenus de toutes les provinces et de toutes les universités canadiennes qui dispensent des programmes de résidence en médecine familiale. Nous avons reçu 24 listes distinctes d'aptitudes opératoires; sur la plus courte d'entre elles figuraient seulement 10 aptitudes opératoires; sur la plus longue, 75 aptitudes; en moyenne, elles en comptaient 36. Seulement cinq aptitudes opératoires apparaissaient sur plus de 80% des listes; 30 aptitudes figuraient sur la moitié ou plus du nombre de listes.

CONCLUSIONS Les programmes de résidence en médecine familiale au Canada varient considérablement dans les exigences imposées à leurs résidents en matière d'aptitudes opératoires. Cette étude représente une première étape dans l'examen de l'ensemble de la formation offerte par les programmes canadiens de résidence en médecine familiale aux fins d'acquérir des aptitudes opératoires.

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The issue of family physicians performing procedures is receiving increasing attention.^{1,2} Formal residency training programs offer an opportunity to acquire technical procedural skills in settings where experienced teachers can demonstrate, guide, and appraise this learning.^{3,4}

The College of Family Physicians of Canada (CFPC) takes the position that the specifics of family practice training programs are the responsibility of the universities involved. Each university is expected to create family practice training objectives on the basis of guidelines provided by the College. These guidelines are contained in a publication entitled *Residency Program Accreditation and Certification* ("the red book").⁵ The guidelines are rather vague on surgical and procedural skills; they state simply that residents must have an opportunity to learn surgical and procedural skills that can be practised appropriately in family practice offices, outpatient departments, and emergency departments.

Some family practice residents would like to know exactly which surgical and procedural skills they should learn, and they question whether training programs have an obligation to ensure that residents master these skills. Having a list of essential skills could theoretically lead to uniformity of expectations among residents, teachers, and everyone else who works with newly graduated Canadian family physicians. Having no list could lead to uncertainty about which procedural skills physicians could competently perform after graduation.

Some studies⁶⁻⁹ suggest that some Canadian family physicians do not feel comfortable or competent performing important procedures, such as adult and pediatric resuscitation, simple fracture reduction, casting, intravenous access, lumbar puncture, and endotracheal intubation. A recent study of medical procedures in rural British Columbia revealed that substantially more graduates of foreign medical schools perform vasectomies, tubal ligations, cesarean sections, and forceps or vacuum deliveries than graduates of Canadian medical schools do.⁹ A recent review¹⁰ of admissions and reasons for transfer from one rural emergency department led to formal incorporation of an orthopedics rotation in the

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University of Alberta's Department of Family Medicine curriculum.

According to Dr Elizabeth Gray, a family medicine resident and member of the CFPC's Section of Residents' Survey Subcommittee, one of the reasons rural family practice rotations are so popular is that residents tend to practise more skills in these rotations. She also noted that one reason more and more family medicine residents are requesting third-year residency training positions in emergency, anesthesia, and obstetrics (the most popular positions) is that these programs offer more opportunities for becoming proficient in certain procedural skills.¹¹

According to Paul Rainsberry, CFPC's Director of Education, attempts to generate lists of procedures appropriate to family medicine have been unsuccessful to date. He thinks the inability to reach consensus reflects the fact that family medicine is such a broad field and is practised in so many different settings. A skill useful in one setting (eg, anesthesia administration in an isolated rural hospital) could be totally useless in another setting (eg, a large teaching hospital staffed with anesthesia specialists).

Evaluation of competence in procedural skills is currently not part of the CFPC's certification examination. In some United States centres, however, proof of competence in procedural skills is required for the privilege of performing procedures in hospitals. Not unexpectedly, a US study¹² found a positive correlation between number of procedural skills offered in a family practice residency program and recruitment into that program.

In Canada, hospital boards and provincial licensing authorities are also starting to look for proof of competence in procedures before privileges are granted. Increasingly physicians are asked about their practical experience with specific procedures: how many have they done, especially recently, and what the outcome was.

According to the 1997 Section of Residents Annual Resident Survey, only 50% of respondents had taken the Advanced Trauma Life Support (ATLS) course. The course is not required for certification, but doctors working in most emergency facilities are expected to have successfully completed the ATLS course.¹¹

Last but not least, more doctors are needed to work in areas outside large urban centres where competence in a greater number of procedural skills is required. It seems that the issue of procedural skills training in Canadian family practice residency will become more and more important. We believe that the issue should be dealt with in a structured way.

RESEARCH

Procedural skills training

This descriptive study looks at the issue of procedural skills training in Canadian family medicine residency programs. It seeks to answer questions such as: Are there lists of procedural skills that residents are expected to learn within the various residency training programs? What is on these lists, how are they derived, and how do the lists compare with one another? Is the ability to perform procedural skills assessed in any way?

METHODS

A questionnaire was mailed to all 92 program directors and site or unit directors of all residency programs listed in the CFPC's *Directory of Departments of Family Medicine*.¹³ The eight-item questionnaire asked for facts rather than opinion regarding procedural skills training. Information sought included verification of the existence of a procedural skills list, how and when the list was created and revised, whether the list differentiated mandatory from optional procedures, and whether residents' procedural skills were assessed in any way. A French-language version of the questionnaire was sent to all units whose address was given in French.

Respondents were asked to return copies of their procedures lists with their completed surveys. Contents of lists were compared for overlap and duplication. A master list was compiled to show all mandatory skills mentioned by any program and the number of times they were mentioned.

The definition of "procedure" was loosely applied to include anything that involved physical interaction with patients, was invasive, or required use of a tool or piece of equipment (eg, intravenous cannula, catheter, Ayers spatula, swab). This study did not look at interpretive skills such as "interpret electrocardiogram" or "fetal heart monitoring." Skills that appeared on a list as management (eg, manage acute anaphylaxis) were not included either. Where the procedure listed was stated in a general manner, such as "excision of lumps and bumps," it was tallied as "excisions." Removal of a foreign body from the eye or cornea was assumed to include use of a slitlamp and ocular patching. Laceration repair was assumed to include infiltration with local anesthetic. If a list mentioned "nasal packing," it was assumed to mean anterior packing only.

If a procedure was clearly and consistently listed as optional, it was not included in the frequency-distribution data, and lists that were obviously duplicates were deleted from the

frequency-distribution calculation. For a list to be considered unique, there had to be at least three items not found on any other list. Skills included on the 24 unique lists were tabulated using Lotus 123, and frequency distributions were calculated.

RESULTS

Sixty-five (71%) of the 92 surveys were returned. Surveys were received from all provinces and from all Canadian universities offering family practice residency programs. Fifty-four of 65 respondents stated they had printed lists of skills. Of these respondents, 42 sent copies of their lists; 44 said the skills list was reviewed periodically, usually by faculty and residents (Table 1). Hospital committees and specialists were rarely consulted about the lists.

Forty-two respondents mentioned that acquisition of procedural skills was mandatory for their family

Table 1. Results of procedural skills survey (65 respondents)

LIST CHARACTERISTICS	NO.
Respondents who had a printed list of skills	54
Respondents who specified when the list was created	35
Lists revised and reviewed periodically	36
Who revises the skills list?	
• Faculty	44
• Practising rural family physicians	26
• Practising urban family physicians	20
• Residents	34
• Hospital committees	2
• Other (eg, consultation with specialists)	10
How skills list was created	
• Consensus of those listed above	44
• Comparison with similar published lists	15
• Comparison with hospital privileges lists	6
• Do not know	7
• Other	4
Skills stated as mandatory for residents	42
Procedural skills are assessed	44
Manner of assessment	
• Logbook	24
• Specifically indicated on evaluation form	24
• Remarkd upon in general	22
• None	4
Survey respondents	
• Program director	27
• Site or unit director	37
• Curriculum faculty	1

Table 2. List of mandatory procedures gathered from all respondents (N = 65)

INJECTIONS (intravenous, intramuscular, subcutaneous, intradermal, intralesional)

SKIN-RELATED PROCEDURES

Wound management (eg, laceration repair)

Anesthesia

- local wound infiltration
- nerve blocks (ring, metatarsal, metacarpal, pudendal block)

Hematoma evacuation

Fish-hook removal

Repair of lacerated extensor tendon

Burn escharotomy and debridement

Suturing (simple, mattress, subcuticular)

Incision and drainage

Paronychia

Perianal abscess

Cysts

Thrombosed hemorrhoids

Other sites

Ulcer care (debridement)

Management of miscellaneous skin lesions

Cryotherapy, wart treatment

Paring callus

Excision, any (eg, sebaceous cyst)

Biopsy (punch)

Curettage

Chemical cautery (podophyllin, cantharidin)

Electrocautery

Nails

Toenail removal (wedge, partial, total)

Toenail cutting

Drain subungual hematoma

Dressings (eg, dry, wet, compression)

Miscellaneous

Skin scraping for fungus

Wood's lamp use

HEAD AND NECK PROCEDURES

Ophthalmic

Foreign body removal

Slitlamp examination

Use of fluorescein

Eye patch

Schiötz tonometry

Visual acuity examination

Incise and drain chalazion

Cover-uncover eye test

Ears, nose, throat

Foreign body removal

Cerumen removal

Indirect laryngoscopy

Caloric testing

Epistaxis management

- Anterior packing
- Posterior packing
- Cautery

CARDIORESPIRATORY PROCEDURES

Nebulizer therapy

Simple spirometry

Electrocardiogram (performing, not interpreting)

BASIC LIFE SUPPORT (cardiopulmonary resuscitation)

ADVANCED CARDIOVASCULAR MANAGEMENT (ACLS)

Airway management

Placement of oral airway, nasal airway

Intubation (oropharyngeal, nasopharyngeal)

Suction techniques

Ventilation (bag-valve-mask)

Circulation and dysrhythmia management

External cardiac compression

External pacemaker application

Cardioversion

Vascular access

Peripheral intravenous (adult, child, infant)

Venous cutdown

Central venous access

Intraosseous access

Arterial access (radial, femoral)

GASTROINTESTINAL PROCEDURES

Endoscopy

Sigmoidoscopy (flexible, rigid)

Proctoscopy, anoscopy

Nasogastric tube placement

Gastric lavage

Feeding tube placement

Paracentesis

Stool disimpaction

Laboratory testing

Stool for ova and parasites

Stool for white blood cells

Pinworm smear

Occult blood

GENITOURINARY PROCEDURES

Vasectomy

Catheterization (transurethral, suprapubic)

Urethral dilation

Prostatic massage

Aspiration of hydrocele

Laboratory testing

Semen analysis

Urinalysis, dipstick, microscopic

continued...

Table 2. List of mandatory procedures gathered from all respondents (N = 65): *continued*

GYNECOLOGICAL PROCEDURES

Breast cyst aspiration

Pap test

Intrauterine device insertion

Endometrial biopsy

Diaphragm insertion

Pessary use

Cautery of cervix

Dilation and curettage

Culdocentesis

Laboratory testing

Potassium hydroxide preparation

Wet preparation, hanging drop

Swabs

Pelvic examination of adolescent

Removal of foreign body from pediatric vagina

NEUROLOGICAL PROCEDURES

Lumbar puncture (adult, child, infant)

ORTHOPEDIC PROCEDURES

Spinal stabilization (cervical, thoracic, lumbar)

Extremity fracture stabilization (traction)

Dislocations (shoulder, digital, radial head, other)

Casting (forearm, long leg, walking, scaphoid)

Splinting

Taping (ankle, clavicle, finger, other)

Cortisone injection (joint, bursa, tendon sheath)

Joint aspiration

Vertebral manipulation

TRAUMA MANAGEMENT (ATLS)

Airway management with C-spine control

Needle thoracentesis

Chest tube placement

Pericardiocentesis

Vascular access

Diagnostic peritoneal lavage

Extremity fracture stabilization

PEDIATRIC MANAGEMENT

Denver developmental screen

RADIOLOGICAL PROCEDURES

Intravenous pyelogram

LABORATORY TESTING

Capillary glucose

Gram stain

Prepare blood smear

MISCELLANEOUS

Doppler examination (fetal heart, leg veins)

Bone marrow aspiration or biopsy

Catheter flushing

Hypodermoclysis

OBSTETRICAL PROCEDURES

Normal delivery

Episiotomy and repair

Pudendal block

Forceps delivery

Vacuum extraction

Non-stress test

Manual removal of placenta

Assisted rupture of membranes

Scalp clip attachment

Emergency management

Cord prolapse

Shoulder dystocia

Postpartum hemorrhage

Retained placenta, uterine inversion

NEONATAL PROCEDURES

Resuscitation (intubation and suction, CPR)

Umbilical vein catheter placement

Umbilical artery catheter placement

Circumcision

practice residents, and 44 said that residents' ability to perform procedural skills was formally assessed. In all, 42 lists were received. A master list of mandatory procedures from all respondents' lists is given in **Table 2**.

Of the 42 procedural skills lists received, 24 were considered unique. The other 18 were classified as duplicates and omitted from the frequency analyses. The frequency with which the various procedural skills were mentioned on the 24 unique lists is shown in **Table 3**. The shortest list had only 10 items, the longest 75, and the average 36. Only five skills were found on more than 80% of the lists; 30 skills were listed on half or more lists.

DISCUSSION

No Canadian lists of procedural skills were found in the literature. Four articles describing lists of core procedural skills for family practice residency were found¹⁴⁻¹⁷; three from the United States and one from Australia. All these studies described starting by circulating a list of skills to respondents. We did not do this because we thought it might create bias toward the skills appearing on the list and against any additional skills, perhaps very relevant skills, not included on the progenitor list. We also wanted to look at differences between the lists being used by the various program or site directors across Canada.

Comparing the lists

Comparing the Canadian lists with the American and Australian lists¹⁴⁻¹⁷ revealed some glaring omissions in many of the Canadian lists. For example, mastery of Pap smears was indicated as an essential skill on only 15 of the 24 (62.5%) lists even though it is reasonable to assume that all residents should and would be familiar with this procedure. There were also some illogical combinations on all lists (eg, listing sigmoidoscopy but not anoscopy, and listing nasal packing without listing cautery). We cannot assume, therefore, that Canadian residents are being taught only the procedures on their various lists. Similarly, just because a procedure appears on a list does not ensure its mastery.

We found obstetric skills listed on fewer than half the lists. This could reflect differences in the proportion of deliveries attended by family physicians in various provinces. According to 1993-1994 data from Statistics Canada, family physicians manage 80% of deliveries attended by physicians in British Columbia, but only 29% in Ontario. The other provinces fall in between these two extremes.¹⁸

Of the lists previously published, DeWitt's list appears to be most similar to ours.¹⁶ DeWitt's article provides a list of suggested core procedural skills for family practice that appears to have been derived from a conjoint committee of the American Board of Family Practice, the American Academy of Family Physicians, and the Society of Teachers of Family Medicine. DeWitt's list resembles ours in that it includes resuscitation skills (eg, advanced cardiac life support and cardiopulmonary resuscitation), electrocardioversion, and invasive procedures such as chest tube placement, thoracentesis, and paracentesis. Other items on DeWitt's list, such as Swan-Ganz catheter insertion, arterial line placement, and treadmill testing, were rarely mentioned on the 24 Canadian lists.

Where to begin

A review of the literature suggests that there is no established way to go about creating a procedural skills list. Wigton¹⁹ used four sources when compiling his procedural skills list for internal medicine residency: faculty members, internal medicine residents, procedures listed on hospital privilege request forms, and procedures mentioned in the literature. By comparison, nearly all procedural skills lists for Canadian family practice residents were generated by faculty or faculty and residents. Less than half our respondents said they consulted practising family physicians, and even fewer mentioned consulting the medical literature or hospital privilege request forms.

Conclusion

This survey is a basic step in examining the whole issue of procedural skills training in Canadian family medicine programs. It provides some current numbers that educators planning future curricula might find useful. One of the serious limitations of this survey is that it does not compare the lists of skills to skills actually used in practice. Practice needs vary with populations served, geographical location, and referral patterns in communities.

A logical way to pursue the issue of procedural skills training would be to identify what family physicians in urban, regional, and rural settings are actually doing and to compare their procedures with the list of procedural skills recommended for residents preparing for independent practice in those settings. Once appropriate lists of skills are generated, the final challenge will be to ensure that the skills are actually acquired and that residents are assessed for competence in those skills. It seems reasonable that

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Table 3. Frequency with which skills were listed in the 24 unique lists

PROCEDURE	N (%)	PROCEDURE	N (%)
Incision and drainage, any	22 (91.7)	Subcutaneous injection	10 (41.7)
Laceration repair	22 (91.7)	Visual acuity test	10 (41.7)
Skin excision, any	21 (87.5)	Electrocautery (lesion)	10 (41.7)
Joint or tendon or bursa injection	21 (87.5)	Breast cyst aspiration	10 (41.7)
Epistaxis, anterior packing	20 (83.3)	Neonate resuscitation	10 (41.7)
Nail removal, any	18 (75.0)	Urine, microscopic	10 (41.7)
Intrauterine device insertion	18 (75.0)	Advanced cardiac life support (ACLS)	9 (37.5)
Diaphragm fitting	18 (75.0)	Callus paring	9 (37.5)
Lumbar puncture, adult or unspecified	17 (70.8)	Neonatal circumcision	9 (37.5)
Casting, any	17 (70.8)	Taping, any	9 (37.5)
Joint aspiration	17 (70.8)	Airway management	9 (37.5)
Foreign body removal (ear, nose, throat)	16 (66.7)	Occult blood testing	9 (37.5)
Skin and punch biopsy	16 (66.7)	Electrocardiogram (not interpretation)	9 (37.5)
Sigmoidoscopy	16 (66.7)	Wet preparation, hanging drop	9 (37.5)
Pap smear	15 (62.5)	Cardiopulmonary resuscitation	8 (33.3)
Incision and drainage of thrombosed hemorrhoids	15 (62.5)	Arterial puncture	8 (33.3)
Proctoscopy or anoscopy	15 (62.5)	Slitlamp examination	8 (33.3)
Cryotherapy (warts)	15 (62.5)	Gastric lavage	8 (33.3)
Cerumen removal	14 (58.3)	Urinalysis, dipstick	8 (33.3)
Schiötz tonometry	14 (58.3)	Swab, any site	8 (33.3)
Foreign body removal (eye)	13 (54.2)	Manual removal of placenta*	8 (33.3)
Epistaxis, cautery	13 (54.2)	Epistaxis, posterior packing	7 (29.2)
Intramuscular injection	12 (50.0)	Local infiltration	7 (29.2)
Transurethral catheter	12 (50.0)	Vacuum extraction*	7 (29.2)
Episiotomy and repair	12 (50.0)	Bone marrow aspiration	6 (25.0)
Nasogastric tube	12 (50.0)	Potassium hydroxide preparation	6 (25.0)
Paracentesis	12 (50.0)	Capillary glucose testing	6 (25.0)
Dislocation (shoulder, other)	12 (50.0)	Vasectomy	6 (25.0)
Indirect laryngoscopy	12 (50.0)	Chemical cautery of skin	6 (25.0)
Needle thoracentesis	11 (45.8)	Suprapubic bladder aspiration	6 (25.0)
Venipuncture	11 (45.8)	Subungual hematoma	5 (20.8)
Intradermal or purified protein derivative injection	11 (45.8)	Laboratory procedures, infant or child	5 (20.8)
Splinting	11 (45.8)	Denver screening	5 (20.8)
Normal delivery*	11 (45.8)	Cover-uncover eye test	5 (20.8)
Outlet forceps*	11 (45.8)	Dilation and curettage	5 (20.8)
Chest tube insertion	10 (41.7)	Cautery of cervix	5 (20.8)
Peripheral intravenous access	10 (41.7)	Pudendal block*	5 (20.8)

*Obstetric procedures.

Key points

- All family medicine programs in Canada were surveyed regarding the procedural skills residents were expected to learn.
- Programs varied widely in their expectations of procedural skills. Some required residents to learn as few as 10, some as many as 75.
- Only five procedural skills were found on 80% of program lists.

residents would be motivated to acquire skills if they were, at the outset, made aware of the scope of skills recommended and had confidence that the list of recommended procedural skills was both appropriate and comprehensive. ❖

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References

1. Reid A. Editor's notes. *Can Fam Physician* 1998;44:467.
 2. Wetmore SJ, Agbayani R, Bass MJ. Procedures in ambulatory care. Which family physicians do what in southwestern Ontario? *Can Fam Physician* 1998;44:521-9.
 3. College of Family Physicians of Canada and Royal College of Physicians and Surgeons of Canada. *The report of the working group in emergency medicine to the postgraduate education joint committee*. Mississauga, Ont: College of Family Physicians of Canada and Royal College of Physicians and Surgeons of Canada; 1992.
 4. College of Family Physicians of Canada. *The report of the post-graduate family medicine education joint committee on residency training in family medicine*. Mississauga, Ont: Section of Teachers of Family Medicine, College of Family Physicians of Canada; 1990.
 5. College of Family Physicians of Canada. *Residency program accreditation and certification. July 1997*. Mississauga, Ont: College of Family Physicians of Canada; 1997.
 6. O'Connor HM, Davidson JR. Emergency medicine skills. Are primary care physicians adequately prepared? *Can Fam Physician* 1992;38:1789-93.
 7. Kelly L. Surgical skills for family physicians. Do family physicians make the cut? *Can Fam Physician* 1998;44:469-70.
 8. Dixon-Warren N. Competency scores of common procedural skills as self-reported by graduating family medicine residents in Ontario. *North Ont Med Prog News* 1997;(Dec):3.
 9. Whiteside C, Mathias R. Training for rural practice. Are the graduates of a UBC program well prepared? *Can Fam Physician* 1996;42:1113-21.
 10. De Freitas TL, Spooner GR, Szafran O. Admissions and transfers from a rural emergency department. *Can Fam Physician* 1998;44:789-95.
 11. Gray E. Residents' page. *Can Fam Physician* 1998;44:585-7.
 12. Harper MB. Procedural training in family practice residencies: current status and impact on resident recruitment. *J Am Board Fam Pract* 1995;8(3):189-94.
 13. College of Family Physicians of Canada. *Directory of Departments of Family Medicine*. Mississauga, Ont: College of Family Physicians of Canada; 1995.
 14. Heikes LG, Gjerde CL. Office procedural skills in family medicine. *J Med Educ* 1985;60:444-51.
 15. Al-Turk M, Susman J. Perceived core procedural skills for Nebraska family physicians. *Fam Pract Res J* 1992; 12(3):297-303.
 16. DeWitt DE. Skills training in primary care residency: problems and solutions from the family practice perspective. *Postgrad Med* 1987;81(2):155-62.
 17. Spike NA, Veitch PC. General practice procedural skills. *Aust Fam Physician* 1991;20(9):1312-6.
 18. Medical Services of British Columbia claims files. *Economics and policy analysis*. Vancouver, BC: British Columbia Medical Association; 1997.
 19. Wigton RS. Training internists in procedural skills. *Ann Intern Med* 1992;116(12):1091-3.
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