

Residency Education

Rural-Urban and Gender Differences in Procedures Performed by Family Practice Residency Graduates

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Objective: We compared the types of procedures performed and obstetrical care provided by family practice residency graduates, by practice location and physician gender. **Methods:** We conducted a cross-sectional questionnaire survey of 702 graduates who completed family practice residency programs in Alberta, Canada, from 1985 to 1995, inclusive. Graduates were asked to indicate which of 28 procedures and 7 obstetrical care practices they performed. The data were analyzed by gender and current practice location. **Results:** A total of 442 (63%) of the graduates responded to the survey. The top five procedures performed by family practice graduates were minor office surgery, foreign body removal (eye), joint aspiration, joint injection, and anterior nasal packing. There was a declining trend in the number of procedures performed by family practice graduates from rural, to regional, to metropolitan areas. Relatively more males performed procedures; however, more females did IUD insertion and obstetrical care practice. Except for a few exceptions, a similar proportion of male and female graduates in rural practice performed procedures. **Conclusions:** The procedural and obstetrical care pattern of practice differs between family practice graduates in rural and urban areas, as well as between male and female graduates. Family practice residency programs should consider additional training in procedural skills for those planning to practice in rural areas, as well as encourage females to become skilled at performing procedures relevant to family practice.

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Procedures form an important part of clinical family practice and are a hands-on way for family physicians to apply their knowledge and skills. Performing procedures adds breadth to the variety of services provided by an individual family physician and contributes to continuity of care.

The broad scope of both the discipline of family medicine and its diverse settings invites inquiry into differences in the performance of procedures by family physicians. Some studies have shown that rural family physicians perform a broader range of procedures than those in urban practice.¹⁻⁴ Generally, female physicians have been noted to do fewer procedures than male physicians,^{5,6} although females perform more gynecological procedures.⁴ One study reported no difference in the procedures performed by female and male family physicians practicing outside of a metropolitan area.⁷

In teaching residents to become effective clinicians, family practice residency training programs encourage trainees to become skilled at performing diagnostic and therapeutic procedures. Training programs have been criticized, however, by rural physicians for not sufficiently preparing graduates to perform the procedures needed for rural practice.^{8,9} Indeed, some residents have graduated with a sense of not being comfortable enough with procedures to perform them in their practices, though this has been less of a concern for graduates of programs with a strong rural training component.^{6,10-12}

The analysis of procedures performed by family practice graduates in clinical practice provides programs with feedback to use in educational planning and program design. To date, there is a paucity of research studies on procedures performed by Canadian family practice graduates. Most studies in this area have concentrated on Australian and US family physicians. Differences in the health care systems in different countries, however, may result in variations in the rates with which physicians perform procedures. International data will enhance our global understanding of procedural

practice by family physicians. To provide a Canadian perspective, we examined the types of procedures and obstetrical care practiced by Alberta family practice graduates and compared these procedures by practice location and physician gender.

Methods

Setting

This survey involved family practice graduates of residency programs at the two medical schools in Alberta. The province has two medical schools; the University of Calgary is located in southern Alberta, and the University of Alberta is located in Edmonton, 275 kilometers (170 miles) to the north. Both schools have 2-year family practice training programs that are accredited by the College of Family Physicians of Canada. Procedural training is integrated into all rotations in the program.

Alberta is a western Canadian prairie province that spans a large land area but has a population of only 2.9 million. Approximately 60% of the population reside in two metropolitan areas (Calgary and Edmonton), each with a population of more than 800,000, and each has tertiary health services. Five regional centers have secondary-level acute care hospitals. Rural communities are geographically dispersed throughout the province.

Design and Sample

We conducted a cross-sectional survey of 702 graduates who completed the family practice residency program at the University of Alberta or University of Calgary from 1985 to 1995. We conducted the survey from October 1996 to February 1997. The 1996 Canadian Medical Directory and/or the Canadian Post-MD Education Registry (CAPER) were used to confirm each graduate's most recently known mailing address. Nonrespondents were contacted twice by reminder notices sent at 4-week intervals. The Health Research Ethics Board, University of Alberta, approved the study.

Questionnaire

The self-administered survey questionnaire addressed four major areas: graduates' demographic data, medical education, career history, and family practice residency program evaluation. The questionnaire was pilot tested for face validity on a group of family practice residents at the University of Calgary.

One of the sections on career history on the questionnaire asked graduates to indicate which of 28 procedures they currently performed. The list of procedures was developed from a review of the published literature and from feedback from a group of colleagues. The procedures were not defined or described in detail on the questionnaire; rather, a one- to three-word descriptor was used (eg, vasectomy, peritoneal lavage).

Respondents were also asked to identify which of seven obstetrical care practices/procedures they performed.

Within the Canadian context, current practice location was defined as rural (<10,000 population), regional (10,000–200,000 population), or metropolitan (>200,000 population). The questionnaires were numerically coded to ensure confidentiality.

Data Analysis

Procedures were analyzed to determine which procedures the graduates performed and to determine if the performance of procedures varied by gender and current practice location. Fisher's Exact, chi-square, and an alpha level of .01 were used to test for statistical significance; analyses were performed using SPSS 8.0 for Windows.[®]

Results

A total of 442 (63%) family practice graduates responded to the survey. Of the total, 229 (51.8%) were males, 202 (45.7%) were females, and for 11 (2.5%), the gender was not recorded. In terms of practice location, 85 (19.2%) were in rural practice, 113 (25.6%) in regional practice, 224 (50.7%) in metropolitan practice, and 20 (4.5%) did not record a practice location. The respondents were similar to all the 1985–1995 graduates with respect to gender (53.2% males and 46.8% females in the entire group).

Overall, the top five procedures performed by graduates were minor office surgery, foreign body removal (eye), joint aspiration, joint injection, and anterior nasal packing (Table 1). While 74.9% of all graduates included prenatal care and 72.7% included postnatal care in their practice, only 46.4% performed deliveries (Table 2).

Gender

Analysis by gender revealed that significantly more male graduates reported performing most procedures, except for IUD insertion, which were performed by relatively more females (Table 1). A significantly greater proportion of female graduates performed or were skilled in most obstetrical care practices, except for forceps deliveries, which did not differ by gender (Table 2). Only males were skilled in C-sections.

Practice Location

Comparison of procedures by current practice location revealed a significant trend for more family practice graduates in rural areas to perform each procedure (Table 1). The greatest differences between metropolitan and rural practice were for performance of chest tube placement and endotracheal intubation; 18.3% and 20.1% of graduates in metropolitan practice performed these procedures, compared with 87.8% and 89.0% of those in rural practice, respectively. The trend toward

Table 1
Practice Procedures by Gender and Practice Location

Practice Procedures	All Respondents n=442 (%)	GENDER ¹		PRACTICE LOCATION ²		
		Males n=229 (%)	Females n=202 (%)	Rural n=82 (%)	Regional n=112 (%)	Metropolitan n=224 (%)
1. Minor office surgery	384 (86.9)	201 (87.8)	173 (85.6)	80 (97.6)*	99 (88.4)	190 (84.8)
2. Foreign body removal (eye)	340 (76.9)	203 (88.6)*	127 (62.9)	80 (97.6)*	97 (86.6)	151 (67.4)
3. Joint aspiration	302 (68.3)	188 (82.1)*	106 (52.5)	75 (91.5)*	89 (79.5)	128 (57.1)
4. Joint injection	285 (64.5)	184 (80.3)*	93 (46.0)	75 (91.5)*	84 (75.0)	115 (51.3)
5. Anterior nasal packing	268 (60.6)	176 (76.9)*	87 (43.1)	79 (96.3)*	82 (73.2)	100 (44.6)
6. IUD insertion	253 (57.2)	112 (48.9)	136 (67.3)*	62 (75.6)**	58 (51.8)	124 (55.8)
7. Closed reduction and casting	253 (57.2)	172 (75.1)*	75 (37.1)	75 (91.5)*	84 (75.0)	83 (37.1)
8. Surgical assisting	217 (49.1)	132 (57.6)*	77 (38.1)	64 (75.6)*	81 (72.3)	64 (28.6)
9. Slit lamp examination	207 (46.8)	138 (60.3)*	62 (30.7)	72 (87.8)*	69 (61.6)	58 (25.9)
10. Intubation skills	195 (44.1)	133 (58.1)*	58 (28.7)	73 (87.8)*	69 (61.6)	45 (20.1)
11. Lumbar puncture	186 (42.1)	125 (54.6)*	57 (28.2)	67 (78.0)*	63 (56.3)	48 (21.4)
12. Chest tube placement	179 (40.5)	127 (55.5)*	49 (24.3)	72 (81.7)*	58 (51.8)	41 (18.3)
13. Thoracentesis	152 (34.4)	113 (49.3)*	35 (17.3)	62 (75.6)*	47 (42.0)	36 (16.1)
14. ECG reading	120 (27.1)	74 (32.3)*	43 (21.3)	24 (29.3)	57 (50.9)*	35 (15.6)
15. Posterior nasal packing	99 (22.4)	75 (32.8)*	22 (10.9)	39 (47.6)*	37 (33.0)	18 (8.0)
16. Endometrial biopsy	91 (20.6)	40 (17.5)	49 (24.3)	28 (34.1)**	26 (23.2)	35 (15.6)
17. Tendon repair	85 (19.2)	66 (28.8)*	19 (9.4)	35 (42.7)*	26 (23.2)	21 (9.4)
18. Breast biopsy	63 (14.3)	40 (17.5)	23 (11.4)	23 (28.0)**	13 (11.6)	26 (11.6)
19. Vasectomy	42 (9.5)	38 (16.6)*	3 (1.5)	18 (22.0)*	12 (10.7)	10 (4.5)
20. Dilatation & curettage	39 (8.8)	30 (13.1)**	9 (4.5)	27 (32.9)*	7 (6.3)	4 (1.8)
21. Peritoneal lavage	36 (8.1)	30 (13.1)*	6 (3.0)	13 (15.9)*	12 (10.7)	6 (2.7)
22. IV pacemaker	35 (7.9)	26 (11.4)**	8 (4.0)	7 (8.5)	10 (8.9)	15 (6.7)
23. Flexible sigmoidoscopy	32 (7.2)	30 (13.1)*	1 (.5)	19 (23.2)	10 (8.9)	3 (1.3)
24. Rigid sigmoidoscopy	23 (5.2)	19 (8.3)**	4 (2.0)	11 (13.4)	6 (5.4)	6 (2.7)
25. Stress test	10 (2.3)	6 (2.6)	3 (1.5)	2 (2.4)	3 (2.7)	5 (2.2)
26. Tubal ligation	9 (2.0)	9 (3.9)**	0 (.0)	8 (9.8)	1 (.9)	0 (.0)
27. Herniorrhaphy	7 (1.6)	6 (2.6)	1 (.5)	3 (3.7)	3 (2.7)	1 (.4)
28. Appendectomy	3 (.7)	3 (1.3)	0 (.0)	3 (3.7)	0 (.0)	0 (.0)

¹ Gender of 11 respondents was not recorded.
² A total of 418 physicians indicated a practice location.

* Chi-square test—statistically significant at $P < .001$
 ** Statistically significant at $P < .01$

fewer graduates performing procedures in metropolitan practice was similar for males and females. Whereas more than 75% of family practice graduates in rural areas performed 13 of the procedures, only five of the procedures were performed by more than 75% of graduates in regional areas and one procedure by those in metropolitan areas. Significantly more rural graduates performed obstetrical deliveries than those in either regional or metropolitan practice (Table 2).

Within rural areas, similar proportions of male and female graduates performed almost all procedures and obstetrical care (Table 3), with few exceptions. Joint aspiration, joint injection, closed reduction and casting, vasectomy, and flexible sigmoidoscopy were performed by significantly more male physicians and endometrial biopsy by more females. In regional areas, significantly more male family practice graduates performed 14 of the procedures, whereas proportionally more females were involved in prenatal and postnatal

care, delivery, and labor induction (Table 3). The profile was similar in metropolitan practice in that significantly more males performed nine of the procedures, and more females were involved in prenatal and postnatal care and labor induction. Only in metropolitan areas did significantly more females do IUD insertions.

Discussion

Our study demonstrates a declining trend in the percentage of Canadian family practice graduates who perform various procedures in rural, regional, and metropolitan areas. The finding that more graduates in rural areas perform procedures than those in metropolitan practice is consistent with findings from the United States and Australia.¹⁻³ The influence of town size on the performance of procedures by family physicians may be attributed to the presence or absence of specialists in the area. In rural or regional areas, where

Table 2
Obstetrical Care by Gender and Practice Location

Practice Procedures	All Respondents n=442 (%)	GENDER ¹		PRACTICE LOCATION ²		
		Males n=229 (%)	Females n=202 (%)	Rural n=82 (%)	Regional n=112 (%)	Metropolitan n=224 (%)
1. Prenatal care	331 (74.9)	159 (69.4)	165 (81.7)**	75 (91.5)**	79 (70.5)	169 (75.4)
2. Postnatal care	319 (72.7)	154 (67.2)	157 (77.7)	74 (90.2)**	80 (71.4)	159 (71.0)
3. Deliveries	205 (46.4)	105 (45.9)	97 (48.0)**	64 (78.0)*	59 (52.7)	79 (35.3)
4. Skilled in vacuum extraction	197 (44.6)	101 (44.1)	93 (46.0)*	64 (78.0)*	56 (50.0)	74 (33.0)
5. Skilled in labour induction	186 (42.1)	95 (41.5)	88 (43.6)*	60 (73.2)*	57 (50.9)	66 (29.5)
6. Skilled in forceps	57 (12.9)	33 (14.4)	24 (11.9)	27 (32.9)*	13 (11.6)	16 (7.1)
7. Skilled in C-sections	11 (2.5)	11 (4.8)*	0 (.0)	9 (11.0)	2 (1.8)	0 (.0)

¹ Gender of 11 respondents was not recorded.
² A total of 418 physicians indicated a practice location.
 * Chi-square test—statistically significant at P<.001
 ** Statistically significant at P<.01

there are few or no specialists, family physicians must provide the full spectrum of care. In urban areas, however, family physicians may find it more comfortable to relinquish procedures that they rarely perform to specialists who do them more frequently. Turf issues between specialists and family physicians may also come into play. In Canada, privileging in large metropolitan hospitals can sometimes be difficult for family physicians seeking to perform procedures generally performed by other specialists. Also, it is possible that there is self-selection by family physicians who become skilled at and wish to practice procedures to locate in rural areas where the turf battles are less likely to occur. Physicians who are less motivated to perform procedures may choose to practice in urban areas where there are usually a variety of other physicians to perform procedures. It is unlikely that rural patients need more procedural work than patients in urban areas; therefore, distance from a specialist may explain the increasing pro-

Table 3
Percentage of Family Practice Graduates Performing Procedures, by Gender Within Practice Location

Procedures	RURAL		REGIONAL		METROPOLITAN	
	Males n=59	Females n=22	Males n=67	Females n=41	Males n=91	Females n=128
1. Minor office surgery	98.3	95.5	89.6	85.4	82.4	86.7
2. Foreign body removal (eye)	98.3	95.5	97.0*	68.3	79.1*	57.8
3. Joint aspiration	100.0*	68.2	88.1*	63.4	69.2*	49.2
4. Joint injection	98.3*	72.7	86.6*	58.5	67.0*	39.1
5. Anterior nasal packing	96.6	95.5	83.4*	56.1	61.5*	33.6
6. IUD insertion	71.2	86.4	46.3	63.4	39.6	67.2*
7. Closed reduction & casting	94.9*	81.8	82.1*	63.4	58.2*	21.9
8. Surgical assisting	81.4	68.2	74.6	65.9	30.8	25.8
9. Slit lamp examination	94.9	68.2	70.1*	43.9	23.1	21.9
10. Intubation skills	91.5	81.8	73.1*	43.9	15.3	16.4
11. Lumbar puncture	83.1	77.3	70.1*	34.1	24.2	19.5
12. Chest tube placement	89.9	81.8	65.7*	31.7	25.3*	13.3
13. Thoracentesis	79.7	63.6	58.2*	17.1	23.1*	10.2
14. ECG reading	27.1	36.4	53.7	43.9	20.9	12.5
15. Posterior nasal packing	49.2	40.9	41.8*	19.5	14.3*	3.9
16. Endometrial biopsy	27.1	54.5*	19.4	29.3	11.0	18.8
17. Tendon repair	47.5	31.8	32.8*	9.8	14.3	6.3
18. Breast biopsy	32.2	18.2	13.4	9.8	12.1	11.7
19. Vasectomy	30.5*	.0	14.9*	2.4	9.9*	.8
20. Dilation & curettage	37.3	22.7	9.0	2.4	2.3	1.6
21. Peritoneal lavage	18.6	9.1	16.4*	2.4	4.4	1.6
22. IV pacemaker	10.2	4.5	13.4	2.4	9.9	3.9
23. Flexible sigmoidoscopy	32.2*	.0	11.9	2.4	3.3	.0
24. Rigid sigmoidoscopy	15.3	9.1	9.0	.0	4.4	1.6
25. Stress test	3.4	.0	3.0	.0	2.2	2.3
26. Tubal ligation	13.6	.0	1.5	.0	.0	.0
27. Herniorrhaphy	5.1	.0	4.5	.0	.0	.8
28. Appendectomy	5.1	.0	.0	.0	.0	.0
Obstetrical Care						
1. Prenatal care	93.2	90.9	61.2	87.8*	64.8	82.8*
2. Postnatal care	89.8	95.5	64.2	82.9*	60.4	78.1*
3. Deliveries	78.0	81.8	46.3	65.9*	28.6	39.8
4. Skilled in vacuum extraction	78.0	81.8	44.8	61.0	25.3	38.3
5. Skilled in labour induction	72.9	77.3	41.8	68.3*	24.2	32.8*
6. Skilled in forceps	32.2	36.4	11.9	12.3	6.6	7.8
7. Skilled in C-sections	15.3	.0	1.5	.0	.0	.0

* Statistically significant at P<.01 within each practice location, using Fisher's Exact test.

portion of family physicians performing procedures as one moves from urban to rural areas.

Gender Differences

The finding that overall fewer female graduates perform procedures is supported by other research.^{4,6} This may be related to more female physicians working part time. It is also possible that training, practice, professional culture, and socialization factors may be operating to produce gender differences in the performance of procedures. Our data do not suggest that female family physicians are less well-trained or less able to do procedures than males, although others have noted that female family physicians felt less prepared in surgical procedures.⁶ If there are gender biases in the teaching of procedures during the training period, they have not been identified. It is possible that male trainees may be more aggressive than female trainees in seeking out opportunities to do procedures.

The finding that more females perform IUD insertions in metropolitan areas and endometrial biopsies in rural areas has also been observed within Canada.⁷ Female physicians performing more IUDs and prenatal/postnatal care may be attributed to the preference some patients have for female physicians for their gynecological and obstetrical care. Few gender differences were noted in the performance of procedures in rural areas. This finding has been observed in Canada⁷ but not in Australia.⁵ The most dramatic gender difference in our study was observed in cities.

Overall, obstetrical care shows the same trend as procedures, with more family practice graduates in rural areas performing almost all types of obstetrical care. Relatively more female than male family physicians, regardless of practice location, provide obstetrical care, including obstetrical procedures. More male family physicians, however, perform cesarean deliveries. Gender differences here may be related to more interest in doing obstetrics by female family physicians, as well as patient selection of physicians along gender lines. Additionally, acculturation during training is certainly formative in future practice choices. Overall, the proportion of family practice graduates involved in obstetrical care in our survey was higher than that reported for Alberta as a whole.¹⁴ This difference may be attributed to the higher proportion of females in our survey or the fact that our graduates are a more homogenous group of family physicians, whereas the Alberta group, as a whole, included foreign-trained graduates and general practitioners who were not trained in a family practice residency.

Our group of family practice graduates consisted of a significantly higher percentage (45.7%) of females than Alberta family physicians in general (29.1%).¹⁴ This can be attributed to the fact that our group was comprised of more recent graduates who came from

medical classes that were more gender balanced. The entire group of Alberta family physicians included all licensed family physicians/general practitioners trained in Canada or other countries, some of whom were in practice for many years.

Age Differences

There is some congruence between the top five procedures performed by our graduates and those reported in other studies.^{7,10,15-17} A significantly greater percentage of our graduates, however, performed minor office surgery, lumbar puncture, and were involved in obstetrical care than that reported for Alberta general practitioners.¹⁴ Again, we attribute these differences to our group of recent graduates being younger and consisting of relatively more female physicians.

Limitations

This study is limited to Alberta family practice graduates and may not be generalizable to all Canadian family physicians/general practitioners, as it excludes graduates from other provinces and foreign graduates. Moreover, only recent graduates who had been in practice for up to 10–11 years were surveyed. The cross-sectional nature of the survey captured the procedures that were reported as performed at a particular point in time. Further, the study findings are based on self-reporting of procedures, rather than on procedures actually recorded as performed. The list of procedures included in our questionnaire is by no means intended to be the comprehensive list that residents were expected to learn. The 28 procedures were not defined per se beyond the two- to three-word descriptor label. The survey questionnaire did not record the frequency with which procedures were performed; therefore, we were not able to differentiate between high- and low-volume procedures.

Implications

The study findings have implications for curriculum development in the education of family physicians and for future research in this area. Given that rural family physicians perform more procedures, educators should ensure that family practice graduates who plan on going into rural practice are skilled in a broad spectrum of procedures. Family practice residency programs may consider an additional year of training to obtain further procedural skills appropriate to rural practice. The development of a consensus as to what core and extra procedures should be taught to family practice residents would go at least part way toward defining an education curriculum for rural training.¹⁸ Training programs should begin to examine whether there are gender differences in the training of procedures, especially in relation to female residents. It would also be informative to compare those procedures that family practice gradu-

ates actually perform in practice with those that are recommended as part of residency training. A mechanism for evaluating procedural competence should be developed. Assessing whether skills for procedures that are currently performed are acquired during residency training or whether they are learned in practice would also aid in the design of effective procedural training programs.

Conclusions

The procedural and obstetrical care pattern of practice differs between family practice graduates in rural and urban areas, as well as between male and female graduates, with a greater proportion of males and those in rural practice performing procedures. More procedures are performed by family practice graduates from rural areas than those in regional or metropolitan areas. There are, however, few gender differences in rural practice, with similar proportions of females and males performing most types of procedures and obstetrical care. Family practice residency programs may consider additional training in procedural skills for those planning to practice in rural areas, as well as encourage females to become more active in performing a broader range of procedures relevant to family practice. More research is needed in identifying factors that produce gender differences in the performance of procedures.

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