

# Family physicians' attitudes toward education in research skills during residency

*Findings from a national mailed survey*

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## ABSTRACT

**OBJECTIVE** To determine the attitudes of practising Canadian family physicians toward education in research skills during residency, to identify what determines these attitudes, and to investigate the effect of education in research skills on future research activity.

**DESIGN** Mailed survey.

**SETTING** Primary care.

**PARTICIPANTS** Stratified random sample of 247 practising physicians who were members of the College of Family Physicians of Canada.

**MAIN OUTCOME MEASURES** Physicians' attitudes toward education in research skills during residency, their perceptions of the value of research in primary care, and their current involvement in research activities.

**RESULTS** Overall response rate was 56%. Nearly all respondents agreed that critical appraisal skills are essential to the practice of modern family medicine. Most agreed that it is very important that the evidence base for primary care medicine be developed by family physicians, yet only one-third agreed that research skills ought to receive more emphasis during residency training, and fewer than one-quarter agreed that practising family physicians should have strong research skills. Fewer than half the respondents agreed that a core goal of family medicine residency training should be to promote and develop an active interest in research. While three-quarters agreed that research projects during residency can be formative learning experiences, only about 40% indicated that research projects should be required, and only about 20% considered their own resident research projects to have been highly influential learning experiences. Respondents whose residency programs had research in the curriculum were significantly more likely to have found their research projects to be highly influential learning experiences ( $P < .05$ ), and those who had successfully completed research projects were less likely to believe that they lacked the necessary skills and expertise to conduct their own research studies. Those who had successfully completed resident research projects participated in postresidency research activity at a significantly higher rate than those who did not complete projects ( $P < .01$ ).

**CONCLUSION** Despite a conviction that research is important in primary care, only a few practising family physicians in our sample believed that strong research skills are important or that education in research skills should receive more emphasis during residency training. Resident research projects are not invariably influential learning experiences, although some evidence indicates that successful completion of a project makes future participation in research more likely.

## EDITOR'S KEY POINTS

- Family physicians have varying ideas about the value of education in research skills during residency.
- Even though most respondents to this survey agreed that the evidence base for primary care should be developed by FPs, only a third thought that education in research skills should receive more emphasis during training. Fewer than a quarter thought practising FPs needed strong research skills.
- Nearly all respondents agreed that critical appraisal skills are essential to the practice of modern family medicine.
- Some evidence indicates that successful completion of a research project during residency makes future involvement in research more likely.

\*Full text is available in English at [www.cfp.ca](http://www.cfp.ca).

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# Attitudes des médecins de famille face à la formation en recherche durant la résidence

## Observations tirées d'une enquête postale nationale

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### RÉSUMÉ

**OBJECTIF** Déterminer les attitudes des médecins de famille (MF) canadiens face à la formation en recherche durant la résidence, identifier ce qui engendre ces attitudes et examiner les effets de la formation en recherche sur les activités de recherche futures.

**TYPE D'ÉTUDE** Enquête postale.

**CONTEXTE** Soins primaires.

**PARTICIPANTS** Échantillon aléatoire stratifié de 247 médecins en exercice, membres du Collège des médecins de famille du Canada.

**PRINCIPAUX PARAMÈTRES À L'ÉTUDE** Les attitudes des médecins à l'égard de la formation en recherche durant la résidence, leur opinion sur la valeur de la recherche dans les soins primaires et leur participation actuelle à des activités de recherche.

**RÉSULTATS** Le taux global de réponse était de 56%. Presque tous les répondants reconnaissaient qu'une capacité d'évaluation critique était essentielle pour la pratique de la médecine familiale moderne. La plupart jugeaient très important que les MF développent des soins primaires fondés sur des preuves et pourtant, seulement le tiers étaient d'avis que la compétence en recherche devrait occuper une plus grande place durant la résidence; moins du quart pensaient que le MF devrait posséder une grande compétence en recherche. Moins de la moitié des répondants pensaient qu'un des objectifs majeurs de la résidence en médecine familiale devrait être de promouvoir et favoriser un intérêt actif pour la recherche. Alors que les trois quarts jugeaient que les projets de recherche durant la résidence peuvent être des expériences d'apprentissage formatrices, seulement 40% estimaient que ces projets devraient être obligatoires, et seulement 20% considéraient leur propre projet avait été une expérience d'apprentissage marquante. Les répondants dont les programmes de résidence comportaient de la recherche étaient significativement plus susceptibles de considérer que leur projet comme une expérience d'apprentissage très marquante ( $P < 0.05$ ) et ceux qui avaient complété avec succès un tel projet étaient plus susceptibles de croire qu'il avaient la compétence et l'expertise nécessaire pour mener leur propre étude expérimentale. Ceux qui avaient complété avec succès des projets de recherche comme résidents participaient à des activités de recherche post-résidence à un taux significativement plus élevé que ceux qui n'en avaient pas effectué ( $P < 0.01$ ).

**CONCLUSION** Même s'ils étaient convaincus de l'importance de la recherche dans les soins primaires, seulement quelques-uns des MF de notre échantillon croyaient qu'une très bonne compétence en recherche est importante et que la formation en recherche devrait occuper une place plus grande durant la résidence. Les projets de recherche des résidents ne sont pas nécessairement des expériences d'apprentissage marquantes, quoique certaines données laissent croire que la réussite d'un tel projet rend plus probable une future participation à des activités de recherche.

### POINTS DE REPÈRE DU RÉDACTEUR

- Les médecins de famille (MF) ont des opinions variées concernant la valeur de la formation en recherche durant la résidence.
- Même si la plupart des répondants reconnaissaient que le MF devrait développer une médecine primaire fondée sur des preuves, un tiers seulement pensaient que la formation en recherche devrait occuper une place plus grande durant la formation. Moins d'un quart croyaient que le MF en exercice devrait avoir une grande compétence en recherche.
- Presque tous les répondants étaient d'avis qu'une très bonne capacité d'évaluation critique est essentielle à la pratique de la médecine familiale moderne.
- Certaines données laissent croire que la réussite d'un projet de recherche durant la résidence augmente la probabilité d'une participation future en recherche.

\*Le texte intégral est accessible en anglais à [www.cfp.ca](http://www.cfp.ca).

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Education in research skills is recognized by the College of Family Physicians of Canada (CFPC) as a fundamental aspect of residency training. Most Canadian medical schools now include a mandatory academic project as part of their family medicine residency curriculum. In the United States, about half of all family medicine programs require residents to complete a research project.<sup>1</sup> The objectives of research programs during residency are to enhance understanding of the medical literature, improve critical appraisal skills, increase resident research productivity, and encourage postgraduate research activities.<sup>1,2</sup>

Although these are highly laudable goals, physicians' attitudes toward education in research skills during residency appear inconsistent and conflicting. Previous studies of family practice residents in both Canada and the United States have demonstrated that, while research experience is desirable, most would not have completed projects had they been optional.<sup>3,4</sup> The available data suggest that this inconsistency is due to a lack of dedicated time for research, inadequate funding, and insufficient education in research methods.

The effect of exposure to research during family medicine residency on postgraduate practice appears weak. A recent study of Michigan family physicians indicated that those who received training in research during residency were not more likely to pursue advanced training or research careers and did not participate more actively in research activities.<sup>5</sup> These findings in family medicine contrast with those in other specialty disciplines where evidence indicates that physicians who were involved in research as residents were more likely to hold academic positions than those who were not so involved.<sup>6-9</sup>

Most investigations of attitudes toward research education during residency have surveyed resident physicians or residency preceptors and program directors. There are very few studies involving practising family physicians, and the available evidence on attitudes is inconclusive. To the best of our knowledge, there have been no other surveys of practising Canadian family physicians on this issue.

The objectives of our study were to determine the attitudes of practising Canadian family physicians toward

education in research skills during residency and to investigate the effect of research education during residency on future involvement in research.

## METHODS

### Participants and setting

A random sample of 500 Canadian family physicians was obtained from the CFPC. Canadian physicians formally certified in family medicine (as opposed to general practitioners) are registered with the CFPC. The approximately 17 000 registered family physicians in Canada account for about 60% of the total Canadian primary care physician population (ie, family physicians and general practitioners). Sample size was determined by the availability of resources rather than on the basis of an a priori power calculation. To allow for multivariate data analysis, the sample was stratified by sex and location, and the sampling frame specified an equal split between men and women, equal representation from the 10 Canadian provinces, and a two-thirds to one-third urban-rural split.

Inclusion criteria specified that participants currently be in active practice, either in family practice offices or in walk-in settings, and speak English as their primary language. Participants who worked exclusively in a specialty field, such as emergency medicine, long-term care, or sports medicine, were excluded.

This study was approved by the Research Ethics Board of Sunnybrook Health Sciences Centre in Toronto, Ont.

### Survey instrument and implementation

A self-administered questionnaire was developed and pilot-tested on staff physicians and family medicine residents in the Family Practice Unit at Sunnybrook Health Sciences Centre. Results of the pilot test informed revisions of the questionnaire.

The 4-page questionnaire, which comprised 12 questions and no personal identifiers, was printed on both sides of a single folded sheet. In addition to the questionnaire, the survey package included a personalized cover letter, a postage-paid return envelope, and a postage-paid reply postcard to be returned separately to indicate response. The first mailing went out in January 2006. After 5 weeks, a reminder letter, along with a replacement copy of the questionnaire, was sent to all nonrespondents.

### Data collection and analysis

Data were entered into an SPSS (version 11.0) spreadsheet for analysis. Univariate descriptive analyses were conducted to examine demographic variables and attitudes toward primary care research and research education during residency. Bivariate analyses were conducted to examine whether physicians' attitudes toward education in research varied by independent factors such as sex, age, years in practice, and practice setting.

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Multivariate analyses were conducted to explore potential interaction effects. A probability level of 0.05 was accepted as statistically significant.

## RESULTS

Of the 500 surveys mailed, 11 were returned to sender. Of the remaining 489 surveys, 272 were completed and returned for an overall final response rate of 56%. Twenty-five of the 272 returned surveys were excluded from the analysis because respondents were not currently in family practice, leaving a final sample of 247.

This sample appeared to be representative of the population of Canadian family physicians (Table 1). The age distribution of respondents approximates a normal curve and resembles the age distribution of the national population of Canadian family physicians.<sup>10</sup> Although an equal split between men and women was targeted, the final sample had slightly more women than men (59%). Practice location was split 60% urban or suburban to 40% rural, roughly approximating the targeted two-thirds to one-third urban-rural split. Provincial representation varied from 8% to 12% per province, again approximating the target of 10% per province. Mean number of years in clinical practice was 16. Most respondents worked in group practice (77%) and fee-for-service (70%) environments. Only 7% of respondents had advanced degrees; 36% had university appointments.

Table 2 shows our findings on attitudes toward research training during residency. Slightly more than half the respondents reported that their residency training program had included a research education curriculum. About half the respondents reported that a research project was a mandatory component of the program, and roughly the same proportion reported they had completed a resident research project. Among this group, nearly all indicated that the project was mandatory, and only a few indicated that they would have undertaken a project had it not been mandatory. Nearly all respondents reported selecting their own topic for the project, and most had mentors or supervisors. Very few had published the findings of their resident research projects in scholarly journals.

Overall, 40% of respondents reported some level of participation in research activity after residency. Those holding university appointments were significantly more likely to have participated in research since completing residency training ( $\chi^2=37.48$  [ $df=1$ ],  $P<.001$ ).

### Family physicians' attitudes toward research

Table 3 shows a summary of respondents' attitudes toward primary care research, research education during residency, and resident research projects. The overwhelming majority (94%) agreed that critical appraisal skills are essential, and two-thirds (66%) agreed that

the evidence base for primary care medicine should be developed by family physicians. Despite these positive attitudes, fewer than a quarter (23%) agreed that family physicians should have strong research skills.

Fewer than half (45%) the respondents agreed that promoting an interest in research should be a core goal of family medicine residency training. Fewer still (40%) agreed that a research project should be mandatory for all family medicine residents, and only one-third (34%) agreed that research skills should receive more

**Table 1. Demographic profile of survey respondents:**  
*Totals vary owing to missing data and percentages might not add to 100 owing to rounding.*

DEMOGRAPHIC CHARACTERISTICS	MEN N (%)	WOMEN N (%)	TOTAL N (%)
<b>Age (y)</b>			
• <35	7 (7)	27 (19)	34 (14)
• 35-44	31 (32)	57 (40)	88 (37)
• 45-54	33 (34)	45 (31)	78 (32)
• ≥55	27 (28)	14 (10)	41 (17)
Total	98 (100)	143 (100)	241 (100)
<b>Years in practice</b>			
• ≤10	18 (18)	62 (43)	80 (33)
• 11-20	42 (42)	49 (34)	91 (37)
• >20	40 (40)	34 (23)	74 (30)
Total	100 (100)	145 (100)	245 (100)
<b>Practice location</b>			
• Urban	40 (40)	60 (41)	100 (41)
• Suburban	19 (19)	28 (19)	47 (19)
• Rural	40 (40)	57 (39)	97 (40)
Total	99 (100)	145 (100)	244 (100)
<b>Type of practice</b>			
• Solo	22 (22)	35 (24)	57 (23)
• Group	78 (78)	109 (76)	187 (77)
Total	100 (100)	144 (100)	244 (100)
<b>Remuneration system</b>			
• Fee-for-service	67 (67)	104 (72)	171 (70)
• Academic unit	5 (5)	4 (3)	9 (4)
• Community health centre	9 (9)	14 (10)	23 (9)
• Health services organization	3 (3)	2 (1)	5 (2)
• Other	16 (16)	21 (14)	37 (15)
Total	100 (100)	145 (100)	245 (100)
<b>Advanced degree</b>			
• Yes	5 (5)	11 (8)	16 (7)
• No	95 (95)	134 (92)	229 (93)
Total	100 (100)	145 (100)	245 (100)
<b>University appointment</b>			
• Yes	45 (45)	44 (31)	89 (36)
• No	55 (55)	100 (69)	155 (64)
Total	100 (100)	144 (100)	244 (100)



emphasis during family medicine residency training.

About 74% of respondents agreed that resident research projects could be formative learning experiences, but only about 21% rated their own projects as highly influential learning experiences.

Results of bivariate analyses revealed that there were no significant differences in these attitudes by physicians' age, sex, main residency training setting, or current practice setting.

### Effect of research education during residency

Analysis of the effect of research education during residency revealed that respondents who had successfully completed a research project during residency training agreed significantly less frequently than those who had not with the statement "I lack the necessary skills and expertise to conduct my own research studies" ( $t = -2.00$ ,  $P < .05$ ). Those who considered their own resident research projects to have been highly influential learning experiences also agreed

**Table 2. Characteristics of respondents' research training during residency: Totals vary owing to missing data and percentages might not add to 100 owing to rounding.**

CHARACTERISTICS OF RESEARCH TRAINING	MEN N (%)	WOMEN N (%)	TOTAL N (%)
<b>Did your residency program have a curriculum for teaching research skills?</b>			
• Yes	18 (42)	52 (67)	70 (58)
• No	25 (58)	26 (33)	51 (42)
Total	43 (100)	78 (100)	121 (100)
<b>Was a research project part of your family medicine residency training?</b>			
• Mandatory	42 (44)	77 (57)	119 (52)
• Optional	6 (6)	22 (16)	28 (12)
• Not offered	47 (50)	36 (27)	83 (36)
Total	95 (100)	135 (100)	230 (100)
<b>Did you successfully complete a resident research project?</b>			
• Yes	43 (45)	80 (59)	123 (53)
• No	53 (55)	56 (41)	109 (47)
Total	96 (100)	136 (100)	232 (100)
<b>Did you select your own topic for your research project?</b>			
• Yes	41 (95)	78 (99)	119 (98)
• No	2 (5)	1 (1)	3 (2)
Total	43 (100)	79 (100)	122 (100)
<b>Did you have a mentor or supervisor for your research project?</b>			
• Yes	35 (81)	70 (89)	105 (86)
• No	8 (19)	9 (11)	17 (14)
Total	43 (100)	79 (100)	122 (100)
<b>Were the findings of your project ultimately published in a scholarly journal?</b>			
• Yes	4 (9)	5 (6)	9 (7)
• No	39 (91)	75 (94)	114 (93)
Total	43 (100)	80 (100)	123 (100)

**Table 3. Physicians' attitudes toward primary care research and research training during residency: Percentages might not add to 100 owing to rounding.**

STATEMENTS	AGREE (%)	NEUTRAL (%)	DISAGREE (%)
<b>Primary care research</b>			
Critical appraisal skills are essential to the practice of modern family medicine	94	4	2
It is imperative that the evidence base for primary care medicine be developed by family physicians	66	23	11
Practising family physicians should have strong research skills	23	50	26
<b>Research education during residency</b>			
Research skills should receive more emphasis during family medicine residency training	34	47	19
A core goal of family medicine residency training should be to promote and develop an active interest in research among tomorrow's family physicians	45	38	17
All family medicine residents should be required to complete a research project during residency	40	35	25
<b>Resident research projects</b>			
Research projects completed during residency can be formative learning experiences	74	22	4
My resident research project was a highly influential learning experience	21	44	35

significantly less frequently than those who did not hold a positive view of their residency projects with the same statement ( $t=-2.25, P<.05$ ).

Respondents whose residency programs included a research education curriculum agreed significantly more frequently than those whose residency programs did not that their projects were highly influential learning experiences ( $t=1.96, P<.05$ ). Among those who viewed their resident research projects positively, significantly more (13.5%) than those with less positive views (3.6%) held advanced degrees, such as master's degrees or doctorates ( $\chi^2=5.23, P<.05$ ).

With regard to the effect of research training during residency on future involvement in research activity, the data indicated that those who successfully completed a resident research project reported having been involved in significantly more research projects over the course of their careers to date (0.89 projects/year) than those who did not successfully complete a resident project had (0.38 projects/year) (rate ratio 2.35,  $P<.01$ ). On the other hand, having successfully completed a resident project was not significantly associated with holding an academic appointment at a university nor with having been awarded research funding from a granting agency.

### DISCUSSION

#### Main findings

Two major themes emerged from the results of our survey of practising Canadian family physicians' attitudes toward research education during residency and levels of postresidency research activity. First, these physicians seemed somewhat ambivalent toward primary care research. Most respondents reported believing that primary care research is important, yet only a few agreed that family physicians should have strong research skills or that research education should be a key focus of residency training. This begs the question: who will conduct this important primary care research if not family physicians?

This finding of some ambivalence corroborates 2 previous studies of residency research education. In an American study, Temte and colleagues found that 85% of Wisconsin family practice residents thought that research experience was desirable, and 48% were interested in pursuing research during residency, but only 8% were in any way active in research.<sup>3</sup> Similarly, Morris and colleagues found that 90% of recent University of Toronto family medicine graduates believed that critical appraisal skills were important to them as practising physicians, yet only 39% thought they had been properly educated in these skills.<sup>4</sup> In the Toronto study, most residents had completed a literature review for their resident research projects, but 79% of them would not have completed a project had it been optional.

Our second main finding was that the value of resident research projects as a mechanism for research training was unclear and ambiguous. While three-quarters of respondents agreed that resident research projects had the potential to be formative learning experiences, their evaluations of actual experiences were not encouraging: only 1 in 5 of those who had completed a project reported that it had been an influential learning experience. That those for whom it was a positive experience were less likely to report lacking research skills and expertise suggests the potential value of effectively designed research education programs. Indeed, those whose residency programs included a research education curriculum rated their research projects more highly than those whose programs did not include a formal research component.

Our findings regarding the effect of research education during residency mirror those reported in the Michigan study of family physicians where no difference was noted in knowledge of statistics, comfort with reading medical journals, or involvement with current teaching or research activities, even though graduates with research training during residency reported a greater appreciation of research and of the importance of research in guiding treatment decisions.<sup>5</sup>

According to previous studies, the characteristics of family medicine residency programs that are effective in research training include the following: a program director who supports research, dedicated time for research, a research curriculum, funding, education in research methods, and opportunities for presenting research.<sup>3,11,12</sup> In a survey of former University of British Columbia family medicine residents, Grzybowski and associates found that 69% conducted original research projects and more than half had been interested in publishing their results, yet only 7% of projects had been published, in part owing to lack of faculty support.<sup>13</sup> Thus, faculty involvement and support appears to be another critical characteristic of successful resident research programs.

#### Implications for design of programs and future research


Our findings support earlier calls for redesigning the research education curriculums of Canadian family medicine residency programs. There is mounting evidence that resident research projects are not influential learning experiences for most family medicine residents. As others have argued,<sup>11,12</sup> resident research programs require more support if they are going to increase positive attitudes toward primary care research and postgraduate involvement in research. Factors shown to increase interest in research during family practice residency, such as protected research time, dedicated support staff, and appropriate funding, should be incorporated into Canadian family practice research programs.<sup>5</sup>

Additional research is required to identify factors that promote practising family physicians' involvement in primary care research. Mailed surveys are limited with respect to the number and type of items that can be included, so future research might use qualitative methods to investigate these issues further. Evaluative studies of innovative local initiatives, such as alternative funding models and research networks, that are designed to support family physicians conducting primary care research are also needed.

### Strengths and limitations

This study represents, to the best of our knowledge, the first investigation of practising Canadian family physicians' attitudes toward research education during residency. Previous studies have sampled residents or residency program directors. Our study included only active members of the CFPC, and therefore, our results might not reflect those of all Canadian primary care physicians (at present, about 60% of full-time primary care physicians in active practice in Canada are members of the CFPC). Because membership in the CFPC is highly correlated with age (in favour of younger physicians), our data might be limited by a cohort effect. In addition, the stratified sample used in this study to achieve sex and provincial balance limited our ability to generalize to the whole population of Canadian family physicians. Our study was cross sectional in design, and as such, our data reflect a snapshot in time rather than trends over time. Data were collected through self-report questionnaires and might not reflect actual practice. Finally, while we had an acceptable response rate for a mailed survey of physicians, nonresponse bias remains a concern.

### Conclusion

Canadian family physicians' attitudes toward primary care research vary. While most believe that research is important in principle, far fewer believe that family physicians should have strong research skills or that research education should receive more emphasis during residency training. Our data on the effect of research training during residency are also mixed. Only a few respondents rated their resident research projects as highly influential learning experiences, yet those who successfully completed projects participated in research at a higher rate than those who did not. The research education curriculums of Canadian family medicine residency programs need to be redesigned and, once redesigned, need to be subject to ongoing comprehensive evaluation. 

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### Contributors

**Drs Leahy and Sheps** initiated the study, participated in analyzing the data, drafted the first version of the manuscript, and contributed to subsequent revisions. **Mr Tracy and Mr Nie** coordinated the data-collection process, participated in analyzing the data, and contributed to drafting and revising the manuscript. **Dr Moineddin** conducted the data analysis and contributed to preparation of the manuscript. **Dr Upshur** conceived the original idea for the study, participated in analyzing the data, and contributed to drafting and revising the manuscript. All the authors read and approved the final manuscript.

### Competing interests

None declared

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