Medical Student Education

Upholding the Principles of Primary Care in Preceptors' Practices

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Background and Objectives: *Family medicine preceptorships are crucial to educating future physicians, but there is a lack of research on how well preceptors are following the principles of primary care. This study used the Primary Care Assessment Tool (PCAT)-Provider Edition to determine how well medical preceptors provide quality medical care.* Methods: *A total of 134 family medicine preceptors in the Maritime provinces of Canada answered questions about their practice behaviors, along with background information about themselves, their practice, and their practice population.* Results: *The highest scores were for "coordination: integration of care," and the lowest were for "cultural competence." PCAT scores improved with the number of patients seen weekly. Scores for first contact accessibility were higher for females and for those with 11–20 years experience as a preceptor, who saw more patients weekly, and in urban centers. "Longitudinality: relationship" scores were higher among those with at least 11 years of practice experience and who saw more patients weekly. "Community orientation" scores were higher for preceptors who saw more patients weekly and accepted new patients. "Cultural competence" scores were higher for preceptors with a culturally diverse practice population and who accepted new patients. "Coordination: integration of care" scores were higher among rural practices. "Coordination: medical records continuity" scores were higher in practices with less than 5 years' experience.* Conclusions: *Maritime preceptors report providing quality primary care, and the PCAT can be used to benchmark the quality of primary care provided by preceptors.*

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Family practice is a practice-based profession that calls for its students to be trained through real-world, community-based, clinical experience.[1-3] Preceptorships are an educational vehicle by which medical students receive such experience in settings that expose them to competent role models, build supportive one-to-one teaching and learning relationships, bridge the theory-practice gap, and ease the transition and adjustment from student to practicing physician.[4,5] Further, preceptorships can provide a setting in which students are able to practice primary care that they had not experienced when completing other required, often hospital-based clerkships.[6]

Although preceptorships are used widely in several countries, including the United States, the United Kingdom, and Canada, there is little published information about the characteristics of preceptors' practices. Ideally, medical students should be working with preceptors whose practices provide quality family medicine and reflect well-established principles of primary care. Such principles abound[7-12] and are commonly linked by core elements, including first contact, longitudinality or continuity, comprehensiveness, and coordination. The four Canadian principles are that the family physician is a skilled clinician, community based, a resource to a practice, and holds the doctor-patient relationship as central.[10] Presumably, if preceptors are delivering good primary care, which means they are fulfilling these core elements, then students' learning will be enhanced through exposure to a wide variety of clinical problems and patients. However, if any of the core elements are underrepresented, then educational strategies need to be developed for preceptors to address practice gaps.

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How do we measure whether preceptors are upholding the principles of primary care? Several scales have been developed to measure the characteristics or attributes of what may be considered a quality primary care practice from a consumer or patient perspective.[13-15] Further, Starfield has developed a tool to assess primary care from providers' perspectives called the Primary Care Assessment Tool (PCAT)-Provider Edition.[12] When tested using a sample of 46 US primary care providers and facilities, the authors concluded that the key domains of primary care could be measured with reliability and validity.[15]

This study determined whether the practices of a sample of medical preceptors in Maritime Canada reflect the tenets of primary care as measured by the PCAT-Provider Edition. Specific research questions were (1) Do PCAT scores indicate that preceptors are providing quality primary care? and (2) What physician, practice, and practice population characteristics are associated with desirable practice attributes? Answers to these questions are important to medical educators since they provide baseline knowledge about preceptors' practices in the Maritimes and identify gaps to practice that are amenable to improvements. This information also helps determine the appropriateness of placing students in these practices and defines the degree of consistency in the educational experience provided. To our knowledge, there have been no previous studies that have examined the characteristics of preceptors' practices in Canada.

Methods

The Dalhousie University Health Sciences Human Research Ethics Board granted approval for the study.

Participants

The survey involved the population of family physicians identified by the Department of Family Medicine, Dalhousie University, as active medical school preceptors as of spring 2000. Preceptors' practices were located in the Maritime provinces of Nova Scotia, New Brunswick, and Prince Edward Island. There were no restrictions on the number of years that physicians had offered a preceptorship. Participation was voluntary.

Survey Methods

A modified Dillman method was used for the study.[16] Initially, an advance notice was mailed to 169 preceptors, followed a week later by a couriered package containing a personalized letter inviting each to participate, detailed study information, the survey instrument, and a stamped return-address envelope. Follow-up communication to nonrespondents included the delivery of postcard reminders at weeks 1 and 3, reminder phone calls at week 5, and a second mailing of the complete study package at week 6. Thank-you letters were provided to all respondents.

Survey Instrument

The PCAT-Provider Edition[12] was used in the study with minor revisions to the demographic questions to better reflect the Canadian health care delivery context. Surveys were pilot tested on a sample of family physicians (n=5) to ensure that the content and format were appropriate. Minor revisions were made to the survey.

The PCAT-Provider Edition has nine sub-domains with 49 questions and 131 items as described in Table 1. Most of the sub-domain items were answered on 4-point Likert scales (from 1=rarely or never to 4=always) and included not sure/don't know and not applicable options. A total of 13 additional demographic items assessed physician (gender, age, years in practice, years as a preceptor, remuneration), practice (location, practice type, acceptance of new patients), and practice population characteristics (ability to determine the number of patients seen, number of patient visits per day and per week, percent of patients seen by age group, cultural diversity).

Statistical Analysis

Mean sub-domain scores were created after a descriptive analysis of each survey item to check for frequencies, averages, and variability. Sub-domains were treated as scales; the final score for each was the mean of scale items. The total mean score was created from these sub-domain scores. Mean scores for each sub-domain and total score could range from zero to four. Multivariate linear regression analyses using manual backward elimination techniques were conducted to examine the association of the nine sub-domain and total scores with physician, practice, and practice population characteristics. The backward elimination procedure started with all variables in the model with sequential removal of the least significant terms based on a significance level of $P>.05$. Confounding variables were accounted for in the multiple regression analysis.

Results

Background Characteristics

A total of 134 preceptors completed the survey, for a response rate of 79.3%. Table 2 outlines the demographic characteristics of the preceptors. A typical respondent was male, between ages 41–60, and had more than 10 years in practice and fewer than 10 years as a preceptor.

Primary Care Sub-domain Scores

Table 3 displays the mean scores of preceptors on PCAT sub-domains and the total mean score. Two thirds of the mean sub-domain scores were above the total mean score of 2.74. The highest primary care attributes were indicated by preceptors for "coordination: integration of care" (3.26), "longitudinality: relationship" (3.07), and "comprehensiveness: services available"

Table 1

PCAT Sub-domains, Areas Addressed, Sample Questions, and Number of Items

Primary Care Sub-domains	*Areas Addressed and Sample Questions*	*# of Items*
First contact: accessibility	Facilitating access to health care, eg, is your practice open on at least some weekday evenings until 8 pm?	8
Longitudinality: relationship	Person focus of patient-physician interactions, eg, do you believe you know the patients in your practice "very well"?	16
Comprehensiveness: services available	Availability of services, eg, if a patient needs any of the following services, would they be able to get them on-site at your practice?	22
Comprehensiveness: services provided	Delivery of services, eg, how often are each of the following included as a routine part of your health assessment?	26
Coordination: integration of care	Quality of link between primary care and specialist services, eg, do you receive useful information about your referred patients back from the specialists or special services?	7
Coordination: medical records continuity	Methods of record keeping, eg, are patients expected to bring their medical records, such as medical care or immunizations they received in the past?	7
Family centeredness	Consideration of family issues in the patient's treatment, eg, do the doctors and nurses at your practice ask the patients about their ideas and opinions when planning treatment and care for the patient or family member?	12
Community orientation	Physicians' knowledge about the community they serve, eg, do you think your practice has adequate knowledge about the health problems of the communities it serves?	18
Cultural competence	Physicians' knowledge of their patients' cultures, eg, are you able to incorporate a family's special beliefs about health care or use of folk medicine, such as herbs/homemade medicines, into the treatment plan?	15

PCAT—Primary Care Assessment Tool-Provider Edition

(3.04). The lowest mean scores were reported for "cultural competence" (2.09), "community orientation" (2.34), and "coordination: medical records continuity" (2.59).

Characteristics Associated With Primary Care Sub-domain Scores

Table 4 summarizes the independent effects of physician, practice, and practice population characteristics that were significantly associated with the total mean score and with each PCAT sub-domain score in the final multivariate linear regression models. R^2 values are listed to provide an estimate of the proportion of variability explained by the characteristics remaining. No significant associations at $P \leq 5$ were found for three of nine sub-domains: "comprehensiveness: services available," "comprehensiveness: services provided," and "family centeredness." The only characteristic associated with the total mean score on the PCAT was the number of patients seen by the preceptor per week. As the number of patients seen weekly increased, so did the total mean score (P=.014). However, little of the variability in the total score can be attributed to this single characteristic (adjusted R^2 =.0411).

Four characteristics displayed independent effects with the "first contact: accessibility" sub-domain. Scores were found to be higher among females (P=.016), those who report to have been a preceptor for more than 10 but less than 21 years (P=.004), and among preceptors who saw a greater number of patients per week (P<.001). Compared to preceptor practices set in urban centers, those in semirural locales tended to provide lower "first contact: accessibility" (P=.001). Approximately 19% of the total variance in "first contact: accessibility" can be explained by these four characteristics.

"Longitudinality: relationship," "community orientation," and "cultural competence" were each associated with two characteristics exhibiting independent effects. Compared to preceptors in practice less than 5 years, "longitudinality: relationship" scores were greater among those with at least 11 years of practice experience (11–20 years, P=.019; >20 years, P=.016). "Longitudinality: relationship" scores also rose as the number of patients seen by the preceptor increased (P<.001). Similarly, "community orientation" scores improved if the preceptor saw an increasing number of

Table 2

Maritime Preceptor Demographic and Practice Characteristics*

Characteristic	*# (%) of Preceptors*
Gender	
Male	96 (71.6)
Female	35 (26.1)
Age (years)	
≤40	45 (33.6)
41–60	84 (62.7)
>60	5 (3.7)
Years in practice	
<5	6 (4.5)
5–10	34 (25.4)
11–20	43 (32.1)
>20	48 (35.8)
Years as a preceptor	
≤10	94 (70.1)
11–20	26 (19.4)
>20	10 (7.5)
Practice location	
Urban	52 (38.8)
Rural	41 (30.6)
Semirural	35 (26.1)
Practice type	
Solo	52 (38.8)
Group (two or more)	76 (56.7)
Accepting new patients	
Yes	30 (23.4)
No	77 (57.5)
Sometimes	16 (11.9)
Cultural diversity	
Diverse	34 (25.4)
Uniform	51 (38.1)
No response	48 (35.8)
Able to determine number of patients seen	
Yes	94 (70.2)
No	11 (8.2)
Not sure	21 (15.7)

* n=134

Due to missing responses, percentages may not add to 100%.

Table 3

Mean Scores of Preceptors on PCAT Total and Sub-domains*

PCAT Sub-domains	*Mean Scores (SD)*
Total score	2.74 (.30)
Coordination: integration of care	3.26 (.32)
Longitudinality: relationship	3.07 (.21)
Comprehensiveness: services available	3.04 (.49)
Comprehensiveness: services provided	2.84 (.45)
First contact: accessibility	2.78 (.53)
Family centeredness	2.76 (.49)
Coordination: medical records continuity	2.59 (.69)
Community orientation	2.34 (.40)
Cultural competence	2.09 (.53)

* n=134

PCAT—Primary Care Assessment Tool-Provider Edition
SD—standard deviation

A score of 4 is the maximum attainable.

patients weekly ($P<.001$) as did being in a practice where new patients were being accepted ($P=.023$). A self-reported culturally diverse practice population was found to be the characteristic most highly associated with improved "cultural competence" ($P=.001$). The results of *t* tests indicate the mean "cultural competence" score among culturally diverse practices (mean=2.28, SD=.51) differed significantly at the .001 level from those with uniform practices (mean=1.90, SD=.51). Cultural competence scores also tended to be slightly greater among practices where new patients were accepted ($P=.047$). These two characteristics account for more than 14% of the total variability in "cultural competence" scores.

The "coordination" sub-domains "integration of care" and "medical records continuity" were significantly associated with single characteristics. "Coordination: integration of care" scores tended to be greater among rural practices compared to those in urban centers ($P=.01$). Compared to preceptors in practice less than 5 years, lower "coordination: medical records continuity" scores were found among those in practice more than 20 years ($P=.009$).

Discussion

Our findings indicate that Maritime family medicine preceptors report providing quality primary care, particularly by coordinating and integrating primary care and specialist services, developing person-focused patient-physician relationships, and availing patients to comprehensive services. "Higher volume" preceptors scored as delivering better primary care, which is likely of benefit to medical students who may be exposed to more-active clinical practices. The exceptionally low scores in cultural competence are more reflective of ethnically homogeneous practices than inadequate service provision. Although visible minorities represent 11.2% of the Canadian population, only 2.3% of the total Maritime Canada population are members of minority groups.[17]

These findings are moderately comparable to those of Starfield,[15] who also reported highest average scores for US fee-for-service providers in "coordination: integration of care" and the lowest scores for "community orientation" and "cultural competence."

Table 4

Characteristics Associated With Sub-domain Scales and the Total Mean Score

Sub-domain	*Characteristics*	*Beta Coefficient*	P *Value*	R^2 *(Adjusted* R^2*)*
Total mean score	Number of patients seen per week (for every 20 patients seen)	.02	.014	.0489 (.0411)
First contact: accessibility	Gender (versus male)			
	Female	.26	.016	.2330 (.1927)
	Practice location (versus urban)			
	Rural	-.26	.837	
	Semirural	-.38	.001	
	Years as a preceptor (versus ≤10)			
	11–20	.33	.004	
	>20	.14	.505	
	Number of patients seen per week (for every 20 patients seen)	.05	<.001	
Longitudinality: relationship	Years in practice (versus <5)			.1168 (.0876)
	5–10	.17	.059	
	11–20	.21	.019	
	>20	.21	.016	
	Number of patients seen per week (for every 20 patients seen)	.102	<.001	
Community orientation	Accepting new patients (versus no)			.1152 (.0917)
	Yes	.20	.023	
	Sometimes	.04	.740	
	Number of patients seen per week (for every 20 patients seen)	.30	<.001	
Cultural competence	Accepting new patients (versus no)			.1800 (.1454)
	Yes	.33	.047	
	Sometimes	.26	.161	
	Cultural diversity (versus uniform)			
	Diverse	.44	.001	
Coordination: integration of care	Practice location (versus urban)			.0565 (.0406)
	Rural	.17	.010	
	Semirural	.10	.128	
Coordination: medical records continuity	Years in practice (versus <5)			.0639 (.0407)
	5–10	-.55	.070	
	11–20	-.54	.071	
	>20	-.78	.009	

Two areas warrant further attention: "community orientation" and "coordination of medical records." McWhinney[8] notes that although community-oriented primary care could usurp essential clinical skills, it is vital for students to become a new kind of "hybrid" physician. Such physicians would be competent not only in primary care but also in areas such as epidemiology, population health, and evaluation to identify community health problems and change practice activities based on evidence and feedback.

Coordinated medical records are important because they enhance physicians' abilities to recognize information about patients' problems and therapies.[12] Coordinating mechanisms may include the use of problem or medication lists, practice guidelines in patients' records, and computerized summaries. Our results indicate that this area is more of a concern with preceptors having more that 20 years in practice than those practicing for less than 5 years, suggesting that educational strategies should be aimed at more-experienced preceptors. The use of computers to manage practice might also be a factor with those physicians using computer information systems more likely to better coordinate their medical records.[18,19]

Faculty development sessions are recommended to examine the reasons why practitioners scored lower in

"community orientation" and "coordination: medical records continuity." Focus groups or other discussions could be held to determine what the outcomes mean to preceptors and about the health care system under which they practice. The discussion will also need to examine whether in fact the items that make up these scales reflect a model of care that is applicable to Maritime preceptors. For example, it has been suggested that the "community orientation" items are urban focused and reflect an explicit system of care rather than the type of informal one operating in the Maritimes.

Limitations

This study has several limitations. Scores for R^2 and adjusted R^2 were low, suggesting that other characteristics not measured in this study likely account for the variability in the regression equations. Such characteristics might include the attitude of providers toward these principles and being trained as a family physician or general practitioner.

The responses to the survey were self-reported and may not represent the actual practices of the physicians. We were also unable to assess students' or patients' opinions of preceptor practices or the quality of care they deliver. No associations were measured between preceptor practice quality and student outcomes. Further, we have limited ourselves to clinical and practice behaviors, and, obviously, preceptors model other things that were not studied, such as attitudes, values, and patterns of thinking and reasoning. Finally, Maritime preceptors may not be representative of family physicians nationwide. However, this is difficult to assess, since there are no data available to make these decisions. Each of the 16 medical schools in Canada has family medicine preceptors (range: 20–230 per school), most of which have a rural, suburban, and urban mix of practice locations (data extracted from the Undergraduate Family Medicine Education Survey conducted in 1999 by Dr Risa Freeman for the Vision 2000 Paper of the College of Family Physicians of Canada).

Conclusions

As the first study of its kind in Canada, we have demonstrated that the PCAT can be used to benchmark the levels of primary care provided by preceptors in Maritime Canada. It would be useful to have such benchmarks for preceptors across Canada for several reasons. First, preceptors devote a great deal of time and effort to educate and nurture the future physicians of this country, and they deserve ongoing educational assistance to be the best they can be. As Alpert and Charney[1] suggest, "Ideally, the education system and the practice system have something to offer each other—relevancy for the former and ongoing professional growth and development for the latter" (p. 9). Second, having national benchmarks for preceptors' practices would allow educators and researchers to evaluate the effectiveness of educational interventions over time and to make adjustments where needed.

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