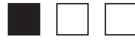

Medical Student Awareness of the Patient-centered Medical Home

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BACKGROUND AND OBJECTIVES: The Patient-centered Medical Home (PCMH) has come to the forefront of primary care practice redesign and can potentially improve health care outcomes and reduce costs. There are several initiatives in medical schools to teach concepts of the PCMH to students, but it is unknown what knowledge and attitudes medical students currently possess. We report students' awareness and opinions at two medical schools without comprehensive PCMH curricula.

METHODS: A total of 1,408 first- through fourth-year students at both schools were invited to participate. We distributed an electronic survey to all students via institutional e-mail listserves. Descriptive statistics were used.

RESULTS: A total of 359 students participated, for a response rate of 25.5%. Despite no comprehensive curricula, 40.9% students had still encountered the topic of the PCMH. Family medicine and primary care clerkships serve as the most frequent point of exposure for students. Although many students reported not understanding the overall PCMH concept, most cited "some" understanding when presented with individually defined PCMH principles with the one exception: Value-based Payment. A significant portion of first-, second-, and third-year students rated learning about the PCMH by graduation as "important," while most fourth-year students rated this as "somewhat important." Students performed well on one knowledge question about PCMH principles; however, 29.6% of respondents believed that primary care physicians function as gatekeepers in the PCMH model.

CONCLUSIONS: Medical students appear to have limited exposure and knowledge of the PCMH concept, suggesting the need to develop curricula about the PCMH in medical schools.

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One proposal to heal the fractured US health care system is the transformation of traditional primary care offices into Patient-centered Medical Homes (PCMHs). The hallmarks of the PCMH model include physician-led interdisciplinary teams, care directed at the whole person rather than a set of separate medical problems, coordinated care across medical disciplines and organizations, and support by electronic health records (EHRs).[1] Driven in part by financial incentives, practices across the country are already in various stages of implementation of the PCMH. Today's medical school graduates must be prepared to work in these settings as either PCMH physicians or as subspecialists interfacing with the PCMH.[2]

There are initiatives at several medical schools to teach elements of the PCMH;[3-5] however, there is a paucity of data regarding the adoption of comprehensive PCMH principles into current medical school curricula. To our knowledge, there is no standardized national PCMH curriculum for medical students.

Students could be learning about the PCMH from a variety of sources during medical school, including lectures, clinical practice, contact with faculty, group learning activities, and Web-based didactics. Each of these teaching methodologies pose challenges related to financial resources, faculty expertise and time, and clinical training site limitations. Modest federal funding has been made available in the last few years to support faculty and curriculum development

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related to the PCMH. Several medical schools have demonstrated that their students are exposed to certain aspects of PCMH practices in ambulatory clerkships, such as EHRs, chronic disease management, and practice improvement.[3] Because the Liaison Committee on Medical Education (LCME) now recommends that students learn the foundation of practice-based learning and improvement in medical school, many institutions have begun to develop curricula in this last area.[6] The key PCMH features that are likely underrepresented in traditional US medical school curricula include exposure to ongoing relationships between patient and personal physician, whole person-oriented care, inter-professional teamwork, coordination of care across the entire health care system, and quality and safety.[7] It has been proposed that the exposure medical students are having to PCMH-related elements in ambulatory clerkships are having an important effect on their education,[3] but student attitudes or knowledge regarding primary care and PCMHs has not been previously measured.

The basis for creating learner-centered objectives, educational strategies, evaluation, and feedback begins with a needs assessment.[8] Measuring student perceptions about the PCMH is an important first step in a process to develop a comprehensive PCMH curriculum. Both schools in this study are planning a coordinated curriculum to teach PCMH principles to medical students. A current PCMH-related session at School A is a Web-based module and clinical assignment to teach issues of quality improvement and systems-based practice during a primary care clerkship; School B refers to the PCMH during a family medicine clerkship orientation. It is unknown what baseline knowledge and attitudes students at these schools currently possess about the PCMH. A study was conducted to assess the student knowledge and attitudes regarding PCMH principles as a first step toward planning new PCMH curricula.

Methods

Study Design and Participants

This was a cross-sectional study of medical students regarding their understanding and exposure to the PCMH at Columbia University College of Physicians and Surgeons and the Albert Einstein College of Medicine of Yeshiva University. A total of 1,408 first- through fourth-year medical students from both medical schools were invited to complete the survey; 359 participated, for a response rate of 25.5%. The Institutional Review Board of each school approved the study as exempt.

Survey Instrument and Administration

The 10-minute survey with 31 questions was designed to assess medical students' exposure, attitudes, and knowledge about the concept and principles of the PCMH. The survey was developed by consensus of the authors and piloted by several medical students. Revisions were made to enhance readability. The survey instrument begins with a general question about the students' exposure to the PCMH, a 5-point self-assessment of how well they understand the PCMH model, and a question about where they heard about the PCMH. For each of the seven principles of the PCMH, a full text definition was provided as per reference #1. The survey asks the students to rate their understanding of each principle and the importance of learning about the principle before graduation. Finally, students were asked one knowledge question on the survey relating to principles of the PCMH.

A cover memo describing the survey and a link to the online instrument was e-mailed to all students at School A by the co-director of the primary care clerkship and to all students at School B by the director of the family medicine clerkship. To improve the response rate, a reminder e-mail was sent a week later. The survey was opened March 29, 2010, and closed April 12, 2010. The survey data were collected anonymously, and students received no incentives for participating. The survey data were collected online using common commercial software, and no internet protocol (IP) or e-mail addresses of survey participants were collected.

Data Analysis

Descriptive statistics were used to report the frequency distribution of the students' response to each question. We included 359 students who participated in the survey in the analysis. Only 233 (64.9%) of the 359 students completed the entire 31-question electronic survey; thus, some of the analyses did not include the entire study sample. SAS software version 9.2 was used to conduct statistical analysis.

Results

Characteristics of the Study Participants

A summary of the demographics of student participants is shown in Table 1. The representation per class was 27.9% first-year, 24.5% second-year, 22.8% third-year, and 22.8% fourth-year students, but few (1.9%) were graduate/research year students. Of the students, 40.7% had taken a family medicine or primary care clerkship.

Exposure to the Topic of the PCMH in Medical School

Students were asked if they had encountered the subject of the PCMH either formally (eg, didactics, oral or written presentations) or informally (eg, side conversations, attitudes) in medical school; 40.9% had encountered the topic of the PCMH, while 45.4% had not, and 13.7% were unsure. Table 2 indicates that of those who had heard of the PCMH, most encountered the topic in a primary care or family medicine clerkship. This was followed by small-group discussions, clinical practice settings, a preclinical year didactic,

Table 1: Participant Demographics

Participant Demographics, n=359	
Characteristic	**n (%)**
Two medical schools	
School A	171 (47.6)
School B	188 (52.4)
Class year	
First-year students	100 (27.9)
Second-year students	88 (24.5)
Third-year students	82 (22.8)
Fourth-year students	82 (22.8)
Types	
Graduate/research year students	7 (1.9)
Students who had taken a family medicine or primary care clerkship	146 (40.7)

Table 2: Exposure to the Topic of PCMH in Medical School

Question: As of today, have you encountered the subject of the PCMH either formally (eg, didactics, oral/written presentations) or informally (eg, side conversations, attitudes) in medical school? (n=335)	n (%)
No	152 (45.4)
Yes	137 (40.9)
Unsure	46 (13.7)
Question: If yes, where (check all that apply)?	**n**
Primary care or family medicine clerkship	69
Small-group discussion	51
Clinical practice setting	39
A lecture in the preclinical years	28
Student interest group	21
Other third-year clerkship	9
A fourth-year elective	6

student interest group sessions, another third-year clerkship, and/or a fourth-year elective, respectively.

Student Self-reported Understanding of the PCMH Model and Principles

The majority of students reported either not understanding (39%) or understanding little (23.8%) about the overall PCMH model (Table 3). Among the seven Joint Principles of the PCMH,[1] students (34.2%) least understood "Value-based Payment."

In contrast, students were more likely to report "somewhat" understanding the other six Joint Principles of the PCMH: A Personal Physician (33.2%), Physician Directed Medical Practice (35%), Whole Person Orientation (38.3%), Coordinated and Integrated Care (40.2%), Quality and Safety (33.9%), and Enhanced Access to Care (32%).

Importance of Learning About the PCMH by Graduation Compared by Class Level

Most students rated that it was either "important" (30.6%) or "somewhat important" (30.6%) to learn about the PCMH by the time they graduate medical school. When stratified by class level (Table 4), a significant proportion of first- (36.1%), second- (32.1%), and third- (36.1%) year students rated learning about the PCMH by graduation as "important," while fourth-year students (45.6%) were more likely to rate this as only "somewhat important."

Knowledge Item About PCMH Principles

When asked one knowledge question relating to the principles of the PCMH (Table 5), 56.2% of the participants were able to select the correct answer while 29.6% of students selected the incorrect distracter ("Primary care physicians function as gatekeepers regarding patient access to specialist care").

Table 3: Student Self-reported Understanding of the PCMH Model and Principles

Answers to Survey Questions	n (%)					
Question: As of today, how well do you feel you understand this model or principle?	**Not At All**	**A Little**	**Somewhat**	**A Great Deal**	**Completely**	**Can Not Judge**
The PCMH Model (n=336)	131 (39)	80 (23.8)	72 (21.4)	29 (8.6)	5 (1.5)	19 (5.7)
Principle 1: Personal Physician (n=301)	22 (7.3)	46 (15.3)	100 (33.2)	84 (27.9)	37 (12.3)	12 (4)
Principle 2: Physician-directed Medical Practice (n=266)	36 (13.5)	62 (23.3)	93 (35)	56 (21.1)	14 (5.3)	5 (1.9)
Principle 3: Whole Person Orientation (n=261)	23 (8.8)	58 (22.2)	100 (38.3)	62 (23.8)	13 (5)	5 (1.9)
Principle 4: Care Is Coordinated and/or Integrated (n=256)	22 (8.6)	66 (25.8)	103 (40.2)	53 (20.7)	8 (3.1)	4 (1.6)
Principle 5: Quality and Safety Are Hallmarks (n=254)	30 (11.8)	58 (22.8)	86 (33.9)	67 (26.4)	8 (3.2)	5 (2)
Principle 6: Enhanced Access to Care (n=250)	48 (19.2)	58 (23.2)	80 (32)	52 (20.8)	7 (2.8)	5 (2)
Principle 7: Value-based Payment (n=246)	84 (34.2)	73 (29.7)	55 (22.4)	20 (8.1)	8 (3.3)	6 (2.4)

PCMH—Patient-centered Medical Home

Table 4: Importance of Learning About PCMH by Graduation, Compared by Class Level

Answers to Survey Questions	n (%)				
Question: Rate the importance to you of learning about the PCMH by the time you graduate.	**Not at All**	**Somewhat Important**	**Important**	**Very Important**	**No Opinion**
All medical students (n=333)	19 (5.7)	102 (30.6)	102 (30.6)	73 (21.9)	37 (11.1)
First-year students (n=86)	3 (3.5)	21 (24.4)	31 (36.1)	16 (18.6)	15 (17.4)
Second-year students (n=84)	4 (4.8)	24 (28.6)	27 (32.1)	21 (25)	8 (9.5)
Third-year students (n=77)	6 (7.8)	19 (24.7)	27 (35.1)	20 (26)	5 (6.5)
Fourth-year students (n=79)	6 (7.6)	36 (45.6)	15 (19)	15 (19)	7 (8.9)

PCMH—Patient-centered Medical Home

Discussion

Although there is no formal curriculum at either school, our study found that four in 10 medical students had still encountered the topic of the PCMH. The most frequent place of exposure was the Family Medicine/Primary Care Clerkship, which is likely due to the ambulatory setting of these clerkships where PCMH transformation efforts are focused. In contrast, the rest of the third year of training is predominantly based in inpatient settings. There are other venues where PCMH concepts are encountered, such as small-group discussions, the clinical setting itself, preclinical didactics, and student interest group meetings. This suggests that there are opportunities to integrate teaching PCMH principles outside of the traditional family medicine/primary care clerkship, and the effect of PCMH transformation in primary care is being noticed by medical students irrespective of formal curricula.

The majority of medical students conveyed that they do not understand the overarching PCMH model, but when presented with the defined seven core features of the PCMH,[1] they tended to report at least "somewhat" understanding most of the individual principles. The six principles, for which they did have some understanding, may have been rooted in other concrete school experiences. For example, The Personal Physician and Coordinated and/or Integrated Care are defined similarly to the current role of a primary care physician. Elements of Whole Person Orientation are taught in communication and history taking

preclinical courses. However, these individual elements are not being taught or framed to students as contributing parts to a functioning PCMH. As in many medical schools, there is little emphasis on teaching health care economics and financing,[9] thus students may not have concrete experiences to link to the principle of Value-based Payment.

Our results found that the majority of students in the first 3 years of medical school reported that it was "important" to learn about the PCMH before graduation; however, most fourth-year students rated it as only "somewhat important." Many students have chosen their medical specialty by their fourth year, and most are not choosing primary care careers.[10] Fourth-year students may be receiving an inadvertent message that the PCMH will only impact primary care physicians and not specialists. There is also the possibility that fourth-year students may have enhanced self-confidence in their PCMH skills and knowledge through previous exposure and no longer perceive a need to learn about the PCMH. Further, if six out of 10 students have not encountered the PCMH topic in medical school, they may be unable to judge its importance properly.

In our one PCMH knowledge assessment question, most students were able to correctly identify that "Patients and their families can be part of the quality improvement process within a medical home." However, one in three students thought that primary care physicians function as gatekeepers of patient access to specialist care in the PCMH model. One main tenet of the PCMH is that primary care physicians coordinate care, which includes advocating for patient services while protecting from harmful use or overuse[1] and that they are not gatekeepers obstructing services for patients.[11] The implication here is that educators still have to work on changing student perceptions based on lingering attitudes about primary care physician roles in managed care models from the 1990s.

Our findings have important implications for medical student education. Despite our lack of comprehensive curricula at our schools, the movement of primary care toward the new model of the PCMH is well underway, and medical students are already becoming aware of several important aspects of this model. Because the overall PCMH concepts and principles are not clear to students, it is important to design a learner-centered curriculum. Family medicine and primary care clerkships can serve as one natural setting to teach these concepts. PCMH education should be linked to clinical experiences already familiar to students to build on what they already know. Teaching the Value-based Payment principle to students requires content about the current state of the health care system and reimbursement models. Our study also suggests that teaching PCMH initiatives in the preclinical years and family medicine/primary care clerkships may have the most receptive audiences. Educators must also design a PCMH curriculum that resonates with all medical students regardless of their specialty choice and dispels myths about obstructionist roles of primary care physicians in the new model. One resource is the 2010 American College of Physicians position paper recognizing the importance of collaboration with specialties and subspecialties with the PCMH to achieve goals of improved care coordination.[2] A successful PCMH curriculum will require integration of PCMH principles into population health, health system, and communication courses as well as other clinical clerkships, including pediatrics, medicine, geriatrics, and subspecialty rotations.

Our study provides valuable data on medical students' exposure to and experience with the concept and principles of the PCMH. However, there are some limitations. One is the low student response rate of 25.5%. Our one-time, 2-week anonymous survey was voluntary and not incentivized with gifts or prizes, which likely contributed to the low response rate. The length of the 31-question survey may have led to attrition; only 63% of students who initially participated in our survey actually completed the entire survey. We have no information on those students who chose not to participate or finish the entire survey. There could be differences between participants and non-participants such as their interest and knowledge about the PCMH, primary care, or health care delivery models, which could introduce self-selection bias. Students with more familiarity with the PCMH may be more likely to finish the survey.

Table 5: Student Knowledge Item About Patient-centered Medical Home Principles

Question: Which one of the following initiatives is consistent with the principles of the Patient-centered Medical Home? (n=233)	n (%)
Patients are responsible for communicating information between their health care providers.	8 (3.4)
Primary care physicians function as gatekeepers regarding patient access to specialist care.	69 (29.6)
Patients and families participate in quality improvement activities at the practice level.*	131 (56.2)
The appointment of a nurse practitioner to lead a team of individuals at the practice level who collectively take responsibility for the ongoing care of patients.	25 (10.7)

Another limitation is that this study only surveyed two schools from the metropolitan New York City area, thus our results may not be generalizable to all medical schools. In addition, our electronic questionnaire can only report quantitative results, and we are left to conjecture the possible significance of these numbers. Neither school has a formal curriculum map of where else the PCMH model may be currently taught across the continuum, and thus other influences may not be captured. Finally, we had one knowledge assessment question that cannot possibly reflect all aspects of the PCMH (for example, EHRs, group visits, patient registries). Because this question was at the end of our survey, giving students the defined joint principles of the PCMH earlier may have influenced how students performed on this item.

Despite these limitations, the information we obtained is still valuable for future curriculum development because of the current paucity in published studies on students' perspectives about the PCMH.

Areas for future consideration include conducting focus groups with students to get more qualitative information on these results and to elucidate any differences between survey participants and non-participants. Adding a question to the survey about specialty choice across the 4 years may help clarify if declining importance of learning about the PCMH for fourth-year students is correlated with increased preference for sub-specialty careers. This survey tool could be expanded to more medical schools to get a more extensive assessment in the prospect of designing a national PCMH curriculum for medical students. Schools without a PCMH curriculum could use this tool for a baseline assessment and, after implementation of a new educational initiative, utilize it to measure outcomes. Comparisons could also take place between schools with and without PCMH curricula.

In conclusion, medical students appear to have limited exposure and knowledge of the PCMH concept, suggesting the need to develop curricula about the PCMH in medical schools.

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