

Medical Student Training in Pediatric Hospital Medicine: A National Survey of Pediatric Clerkships

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BACKGROUND AND OBJECTIVES: Medical student electives offer opportunities for career exploration; it is unknown if electives exist for the newest pediatric subspecialty, pediatric hospital medicine (PHM), or how PHM competencies are already addressed in required medical student training. Our objectives for this study were (1) to determine the prevalence of exposure to PHM competencies in medical school and (2) to inform a needs assessment for a PHM elective.

METHODS: A 5-item survey was distributed to members of the Council on Medical Student Education in Pediatrics as part of a larger survey in 2018. Descriptive statistics were used to report responses as proportions. Responses to 1 open-ended question were coded and grouped into categories.

RESULTS: Of 152 total respondents, 118 (77.6%) answered at least 1 question. Respondents felt that quality improvement was addressed in preclinical years (40.4%), whereas systems-based practice was incorporated into core clerkships (32.1%). Although most indicated that leadership and education should be taught at the subinternship level (29.6% and 25%, respectively), those competencies are not currently integrated into subinternship rotations (7.4% and 4.8%, respectively). Approximately half ($n = 58$; 49.5% each) reported that their institution offers a PHM elective. Lack of a standardized curriculum (16%) was seen as a barrier, and in free-text responses ($n = 33$), respondents also noted concerns regarding saturation of inpatient settings and redundancy with required rotations.

CONCLUSIONS: How to become a good leader and how to become a good educator were identified as PHM competencies that should be, but are not currently, taught at the fourth-year medical student level. A standardized curriculum and strategies to mitigate redundancy with existing rotations may increase satisfaction of students.

ABSTRACT

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Dr Trost conceptualized and designed the study, performed the data analysis, and drafted the initial manuscript; Drs Barqadle, Rudnick, and Christman designed the survey questions, participated in the data analysis, and critically edited the article; and all authors approved the final manuscript as submitted.



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Pediatric hospital medicine (PHM) was recognized as the newest pediatric subspecialty by the American Board of Pediatrics in 2017. This was after the development of specialty-specific core competencies,¹ entrustable professional activities,² and a curricular framework for fellowship,³ which highlight the unique characteristics of PHM. Many specialties and subspecialties offer undergraduate medical electives or focused experiences to support recruitment of talented students,⁴ and at the resident level, exposure to practicing hospitalists is linked to increased interest in PHM as a career.⁵ Medical students likewise use elective time to explore potential career choices; the act of choosing electives enhances student autonomy and creates a potentially transformative experience.⁶⁻⁸ Electives may facilitate closer interactions between students and potential mentors because of smaller volumes of rotators and alternate educational activities. However, electives can also be seen as frivolous, with limited added educational value.⁹ Thoughtful evaluation and monitoring of electives are necessary to ensure that students receive professional development and educational benefits.

At our institution, electives are offered in multiple pediatric subspecialties, including, but not limited to, neurology, infectious disease, and emergency medicine. We began a PHM elective for fourth-year medical students in 2017, with a curriculum modified from a published PHM rotation for residents.¹⁰ The PHM elective is separate and different from a pediatric subinternship. Subinternships tend to be intense rotations focused on clinical care, with the goal of preparing medical students for internship, whereas a PHM elective includes both clinical care experiences and educational experiences in nonclinical aspects of hospital medicine, such as patient safety and being a good educator. In addition, there is no call on the PHM elective, and the focus is more on learning than assessment.

When starting our program, it was unclear how often PHM electives were offered to medical students nationwide and it was

unclear what opportunities or challenges might be associated with such experiences. Therefore, we sought to survey a national sampling of medical school pediatrics educational leaders regarding prevalence of PHM electives. We also sought to determine already existing exposure to PHM core components, both at the educational level at which they are taught as well as by the methodology, to inform a needs assessment of how PHM electives could best fill educational gaps and create a unique experience apart from core clinical rotations in pediatrics.

METHODS

A total of 348 individuals who were registered as Council on Medical Student Education in Pediatrics (COMSEP) members, representing 145 medical schools in the United States and Canada, were invited via e-mail to participate in the Web-based COMSEP annual survey. The COMSEP membership at large includes faculty, administrator, trainee, and emeritus groups. Because the annual survey is used to obtain accurate demographics of the COMSEP membership, demographics for nonrespondent members are not available. Past surveys (2016, 2017) have revealed that respondents have been predominantly women (61%, 69.5%) and physicians (96%, 88%). General pediatricians were more common than subspecialists (29.4%, 28%), most respondents were assistant professors (42.9%, 34%) or associate professors (33.1%, 32%), and the educational role was most commonly clerkship director (59%, 48%).

We submitted 5 questions related to PHM competencies and electives for inclusion in the 2018 COMSEP survey; questions were pilot tested by the COMSEP survey committee, revised, and ultimately included along with demographic questions and 3 other blocks of research (total of 32 questions). After the initial invitation to complete the survey, 3 reminder e-mails were sent to nonresponders until the survey closed on June 30, 2018. During the 8-week study period, 152 (44%) individuals representing 104 (72%) medical schools responded to at least 1 question. Survey data were de-identified by COMSEP, stored in

a confidential database, and made available to investigators for analysis. The study was considered exempt from approval by the Institutional Review Board at Children's Hospital Los Angeles.

To ascertain how PHM-based content may relate to other student pediatrics experiences, the authors designed questions to assess respondents' local practices and attitudes toward student education in a representative sampling of 5 nonclinical published PHM core competencies (quality improvement [QI], high-value care [HVC], systems-based practice [SBP], leadership, and educational theory [education]). Due to survey space and length constraints, these 5 competencies/domains were modified from a possible 54 PHM core competencies¹ by consensus of the authors based on those highlighted in our existing PHM elective, and a full definition was provided to survey participants (Supplemental Information). Resulting survey data were analyzed by using descriptive statistics to illustrate variability in practices related to PHM, educational methodologies used to teach these concepts, and the presence of or interest in a PHM elective. One open-response question was analyzed by using qualitative content analysis.¹¹ Two authors (M.J.T. and M.R.) individually reviewed responses to identify codes organized into categories, and a third author (G.C.) aided in resolving discrepancies.

RESULTS

Of 152 total respondents to the COMSEP survey, 104 (68.4%) answered all our questions; 121 (79.6%) answered at least 1 PHM-related question and were included in further analysis. The cohort predominantly consisted of women (66.9%), clerkship directors (54.5%), and assistant (39.7%) or associate (34.7%) professors, and 15 (12.4%) self-identified their specialty as hospital medicine. There were no statistically significant demographic differences between our cohort and the 31 respondents who did not complete any PHM-related question.

Our primary goal was to identify overall prevalence of PHM electives, interest in developing new PHM electives, and potential

barriers. Half of those who answered reported that a PHM elective already existed at their institution (58 of 116; 50%). Of those without an elective currently, the majority did not have an interest in starting one (39 of 58; 67.2%). Sixty-five participants selected barriers to PHM electives, with most choosing “lack of a standardized curriculum” (19 of 65; 29.2%) or “other” and writing in a response (33 of 65; 50.7%) (Table 1). Free-text responses to “other” barriers were reviewed by using qualitative content analysis and grouped into 2 major categories: (1) redundancy and (2) saturation. Respondents noted that PHM electives may overlap with required pediatric hospital-based experiences and also noted that there are already large numbers of student rotators with limited faculty and pediatric patients to go around. The following quote exemplifies both identified categories:

The current core clerkship in the 3rd year, as well as the sub-internship (taken by every student going into pediatrics) already focus on inpatient medicine, often on hospitalist-run services. As such, we have not considered adding another elective with students who would be populating a similar clinical service. We would not have additional spots for clinical learners.

Next we compared responses indicating at what level the chosen PHM competencies are currently being addressed or should be addressed during undergraduate medical school training. Respondents could choose only 1 answer for each competency, and proportional responses were significantly different across all categories (Fig 1; $P < .0001$ by χ^2 test). The largest proportion of those surveyed felt that QI is currently being addressed in preclinical years (44 of 109; 40.4%) and that SBP is incorporated into core clerkships (34 of 106; 32.1%). Respondents generally felt that HVC either is being addressed or should be addressed at all levels of training. Although the largest proportions indicated that leadership and education should be taught at the subinternship level (32 of 108 [29.6%] and 26 of 104 [25%], respectively), few reported

TABLE 1 PHM Elective Prevalence and Barriers

Question	Response (N = 118), n (%)
PHM elective offered	
Yes	58 (49.2)
No	58 (49.2)
Interested in starting	
Interested in starting	19 (32.7)
No interest	39 (67.2)
Barriers to PHM electives	
Student interest	4 (3.4)
Faculty interest	9 (7.6)
Lack of standard curriculum	19 (16.1)
Other (free text)	33 (27.9)

that those competencies are currently integrated into subinternship rotations at their institutions (8 of 108 [7.4%] and 5 of 104 [4.8%], respectively). Of note, a small proportion of respondents felt that education, leadership, or QI should not be taught at the medical student level.

We then sought to identify how our PHM competencies of interest were being taught, stratified by mode of educational delivery (Table 2). Across all responses, small group (93 of 451; 20.6%) or patient encounter (81 of 451; 17.9%) was the most used teaching methodology, and video (9 of 451;

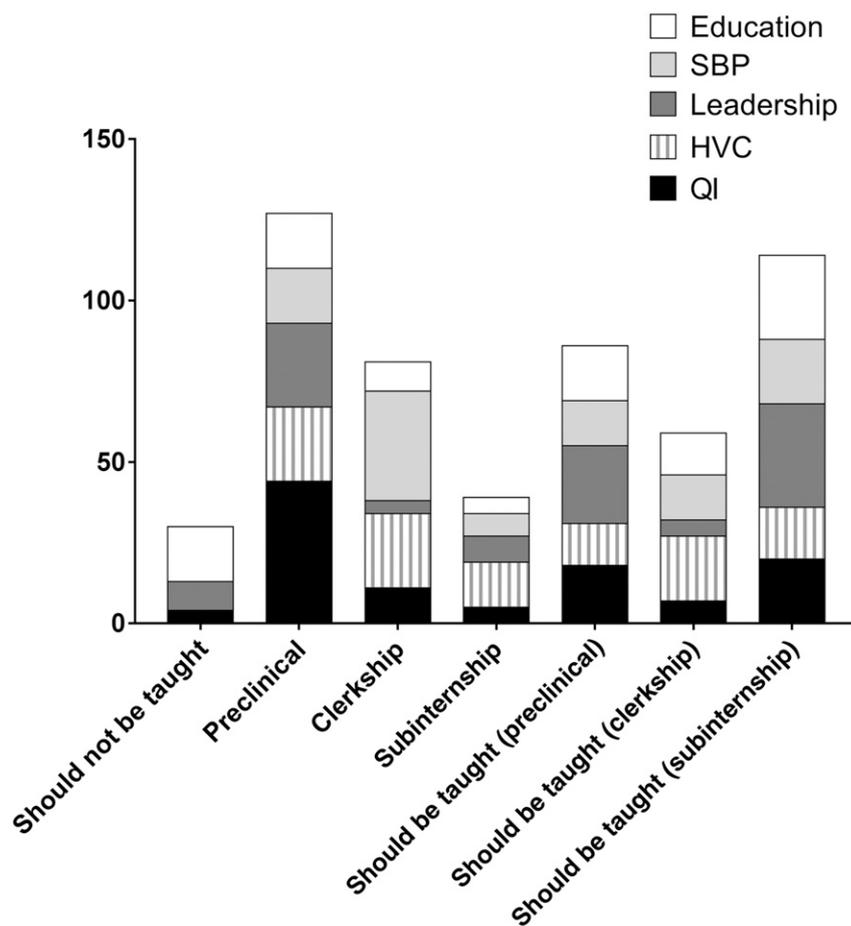


FIGURE 1 Level of training at which each component is or should be taught.

1.9%) was least commonly used. Within PHM competencies, patient encounter was the most commonly used method for HVC and SBP, whereas small group was most frequent for QI, leadership, and education. E-learning was used more frequently with QI or HVC than the other 3 competencies (11.8%–12.1% vs 2.9%–7.9%), and participating in a project as a learning experience was also more commonly associated with QI (14.5% vs 2.9%–5.9%). Overall, the PHM competencies of leadership and education had significantly fewer total responses than QI, HVC, and SBP (mean of 66 vs 106.3; $P = .0015$ by t test).

DISCUSSION

In this national survey of primarily clerkship directors and faculty-level COMSEP members, half of those who responded reported that a PHM elective experience is currently available at their institution. PHM competencies that are already being addressed in nonelective pediatric medical education appear to be QI and SBP, whereas training in leadership or training to be an educator is seen as needed but not frequently taught. More innovative teaching strategies (e-learning, longitudinal projects) are mostly used in teaching QI, and opportunity exists to apply these strategies to other domains during a PHM elective.

At our own institution, an elective was created primarily to enhance student interest in PHM by exposing them to our faculty, with an emphasis on nonclinical activities. Creating additional teaching

opportunities for our faculty was a secondary goal. We have large volumes of patients served by hospitalists with no learners on the teams and, therefore, did not suffer from the “saturation” barrier that was identified in the qualitative responses to this survey. However, for smaller programs or institutions competing for limited pediatric patients, this may be a seemingly insurmountable barrier. Possibly, this is why a high proportion of survey respondents who do not currently offer a PHM elective are also not interested in doing so.

One potential solution to this issue would be to focus more on nonclinical components integral to PHM (and inpatient medicine in general) without requiring direct patient interaction. In this way, redundancy with existing inpatient medical experiences could also be reduced. We chose to ask about prevalence of education tied to primarily nondirect patient care aspects of PHM: QI, HVC, SBPs, education, and leadership. Our results revealed that although many COMSEP members felt that these elements should be taught, they did not feel that they were currently being addressed. This was especially true for education and leadership, in which survey respondents primarily chose the subinternship level as the rotation in which the material should be delivered. Given the heavy clinical load of subinternship participants, a fourth-year elective may be an ideal place to fit in teaching on these important concepts

without competing as much with the important work of learning pathology and treatment of disease.

We also sought to gather some basic information about how our domains of interest are being taught to medical students nationwide. The flexibility of an elective allows for nontraditional learning methods and offers potential for innovation and disruption. However, more traditional methods, including patient encounters, were still the most commonly used teaching strategies. We are not advocating against using direct patient care to teach PHM competencies, but our results again reveal a potential gap for augmenting current practices with more in-depth experiences. For example, students participating in fourth-year electives could conduct rapid-cycle QI projects or be mentored in leading an educational conference. In these ways, students could have brief exposure to the “real world” of the practicing hospitalist, which may improve recruitment to this rapidly expanding workforce.

Our study had several limitations. Although our overall response rate was good, the total sample size for each question varied because some participants did not complete the full survey. Our definitions for PHM competencies of interest were drawn from the literature, but choosing these domains over other aspects of PHM training may have led to reporter bias. Similarly, the exact definition of a PHM elective may differ between institutions. In addition, our survey was created de novo, and although pilot testing was performed within a small group (the COMSEP survey committee), we do not have measures of internal consistency or other statistical validation. Our survey was sent to COMSEP, which has a diverse membership, but our respondents were predominantly clerkship directors or faculty, which may indicate sampling bias; other viewpoints, including those of medical students, would offer an interesting perspective. Finally, the need to create a short survey likely leads to unmeasured variables that influence the observed findings. Future work may include a multicenter evaluation of PHM electives to describe training practices and

TABLE 2 Educational Methods Used to Teach PHM Topic

Teaching Method	PHM Competency					Total
	QI, <i>n</i> (%)	HVC, <i>n</i> (%)	Leadership, <i>n</i> (%)	SBP, <i>n</i> (%)	Education, <i>n</i> (%)	
E-learning	13 (11.8)	14 (12.9)	2 (2.9)	8 (7.9)	4 (6.1)	41
Small group	22 (20)	21 (19.4)	16 (23.9)	17 (16.8)	17 (26.2)	93
Large group	18 (16.4)	20 (18.5)	13 (19.4)	10 (9.9)	8 (12.3)	69
Project	16 (14.5)	4 (3.7)	2 (2.9)	6 (5.9)	3 (4.6)	31
Video	3 (2.7)	0	2 (2.9)	2 (1.9)	2 (3.1)	9
Reading	17 (15.5)	19 (17.6)	13 (19.4)	11 (10.9)	8 (12.3)	68
Patient encounters	8 (7.2)	23 (21.3)	5 (7.5)	35 (34.7)	10 (15.4)	81
Simulation	5 (4.5)	3 (2.7)	10 (14.9)	10 (9.9)	8 (12.3)	36
Other	8 (7.2)	4 (3.7)	4 (5.9)	2 (1.9)	5 (7.7)	23
Total	110	108	67	101	65	451

“Other” did not have a free-text option.

student and/or faculty evaluations of success.

CONCLUSIONS

Leadership and education were PHM competencies identified that should be, but are not currently, taught at the fourth-year medical student level. A standardized curriculum and strategies to mitigate redundancy or competition with existing rotations may increase adoption of PHM electives and satisfaction of student participants.

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