When and How Pediatric History and Physical Diagnosis Are Taught in Medical School: A Survey of Pediatric Clerkship Directors

BACKGROUND: History and physical diagnosis skills (HPDS) are required curriculum in medical schools (MS) with pediatric HPDS (PHPDS) necessitating instruction in addition to adult HPDS. Perceived deficiencies in these skills on the pediatric clerkship prompted investigation of when and how other MS taught PHPDS. The concern of whether medical students are adequately taught PHPDS needed to be addressed.

METHODS: With the use of the Council on Medical Student Education in Pediatrics listserv, pediatric clerkship directors from 129 US, 15 Canadian, and 2 Puerto Rican MS were contacted via e-mail to complete an anonymous online questionnaire, focused on MS demographics, PHPDS timing, teaching methods, and barriers.

RESULTS: Seventy-two (49%) of 146 MS responded to the survey; 18.1% of MS responders did not offer PHPDS in the first 2 years. Methodologies used to educate students included didactic lectures, physician shadowing, hands-on with patients, pairing with preceptor, instructional video, and examination of newborns. Each teaching method had <3 hours dedicated to medical students during their first 2 years at a majority of the MS. Of the responders, 85.1% concurred that medical students should be exposed to PHPDS before starting the clerkship. Barriers to providing PHPDS included MS time allotment, preceptor availability, and total number of students to accommodate.

CONCLUSIONS: This study demonstrated striking variability among MS in how and when medical students were taught PHPDS. Clarification of the role of PHPDS instruction in preclinical years and standardized effective approaches to PHPDS instruction are both needed so that MS curriculum optimizes physician training.
internal medicine clerkship directors. Of note, pediatric physical diagnosis skills were not mentioned in this article. The 2005 Association of American Medical Colleges Recommendations for Clinical Skills Curricula for Undergraduate Medical Education list clinical skills for medical students to learn; however, it is at the discretion of the MS to determine when and how to teach the skills.13

We have identified 2 important outcomes of PHPDS in a medical curriculum. The first, as suggested by the literature and our observations during the pediatric clerkship, is the development of history and physical examination diagnostic skills to prepare students for their pediatric clerkship. The second is the subtle encouragement of students to select pediatrics as a career choice, because the PHPDS course may permit a more positive experience during the pediatric clerkship and may provide extra exposure to pediatrics and pediatricians. These important outcomes of a PHPDS course suggest the need for a more critical assessment of current practice to help make informed decisions about offering a PHPDS course. With a universally accepted curriculum for PHPDS lacking, this study sought to assess current content, duration, and timing of MS PHPDS to guide future efforts to establish national guidelines.

METHODS
Participants
With the use of the Council on Medical Student Education in Pediatrics list-serv, pediatric clerkship directors from 129 US, 15 Canadian, and 2 Puerto Rican MS were contacted via e-mail and asked to participate in the study. Respondents were sent an anonymous and confidential online survey seeking information about their institution’s instruction in pediatric history and physical diagnosis.

Survey Instrument
During the summer of 2007, an initial pilot phone survey of 19 pediatric clerkship directors from large, urban MS demonstrated that variability existed in how and when medical students are taught PHPDS. To further examine the extent of this variability, a survey was developed de novo. Based on feedback and information from clerkship directors and instructors, medical educators, and survey experts, the survey was reviewed by experts from the Medical Education Research Group of Cincinnati Children’s for content validity and modified as appropriate. Before distribution, the survey was piloted on a small group of faculty for clarity and time required to complete. The study was reviewed and approval by the institutional review board as exempt.

The 15-item survey consisted of 14 multiple choice questions and a final free text question. The multiple choice questions addressed several specific content domains as follows: (1) demographic inquiry requesting information about the MS class size, percentage of medical students choosing pediatrics, and length of pediatric clerkship; (2) PHPDS course instructors (when, where, and by whom); (3) setting and patient population used in PHPDS; (4) various teaching methods, including the number of hours for each method; (5) general opinions of the respondents regarding necessity and timing of PHPDS using a 5-point Likert scale (5 strongly agree, 4 agree, 3 neutral, 2 disagree, 1 strongly disagree); (6) perceived barriers to PHPDS using a 4-point Likert scale (4 very significant, 3 somewhat significant, 2 not significant, and 1 unsure); and (7) “other” category which allowed respondents to express other issues they felt provided a better understanding of their program’s PHPDS instruction.

Data Collection and Management
The survey was developed by using SurveyMonkey.com, an online professional survey instrument that distributes surveys electronically via e-mail, then collects and sorts responses. Responses were collected by the survey tool, analyzed for response count and percentage of the total respondents for each individual question, and displayed with graphs and charts. The free text responses were numbered, dated, and displayed as written by the individual answering the question. In February 2008, the survey was sent out twice in an attempt to maximize responders.

Data Analysis
The majority of information from the surveys was sorted into tabular form by using simple descriptive statistics. The free text responses were analyzed by 2 of the authors (A.G. and R.B.) using qualitative methods with coding and sorting for content and identification of categories and recurring themes.

RESULTS
Seventy-two of 146 MS (49%) responded to the survey; 76.4% of MS respondents had >100 medical students: 28 (38.9%) had between 101 and 150 students, 18 (25%) had 151 to 200 students, and 9 (12.5%) had >200 students. The national average MS class size is 127 students as per the Association of American Medical Colleges.14 The range for pediatric clerkship was between 4 and 8 weeks with 95% ≥6 weeks; 73.6% of MS clerkship directors claimed 10%
to 15% of their graduating class chose pediatrics as a specialty. Nationally, 10.7% chose pediatrics for residency according to the National Resident Matching Program. 13. Thirteen (18.1%) of the total responders did not offer PHPDS in the first 2 years.

The primary teachers of PHPDS were faculty attending physicians, pediatric residents, pediatric chief residents, and community physicians. The primary teaching settings were teaching hospitals followed by clinic settings and private practices. The age distribution of patients examined by medical students as part of the PHPDS course included all age groups from newborn to adolescents. Given overlap from multiple settings to obtain patients to teach PHPDS, 44 (67.6%) of the MS obtained patients from the inpatient setting, 35 (53.8%) from clinic setting, and the remainder of patients came from private practices, children of faculty and friends, standardized patients and mother, or daycare.

Methodologies used to educate students include didactic lectures, shadowing a physician, hands-on with patients, pair with preceptor, instructional video, and examination of newborns. Each teaching method accounted for <3 hours each of educational time dedicated to medical students during their first 2 years at a majority of the MS; 70.8% of MS had <3 hours of pediatric didactic lectures, and 38.1% of MS did not offer any hands-on experience with real patients, whereas 31.7% offered <3 hours hands-on experience. Therefore, almost 70% of medical students entering their third year pediatric clerkship have had ≤3 hours of hands-on pediatric skills. Similarly, 87.9% of medical students have had ≤3 hours of opportunities to learn newborn examination skills before starting the pediatric clerkship. Table 1 lists the different teaching methods of PHPDS used at various MS and the number of hours dedicated to each method.

Analyses of pediatric clerkship director responses to statements regarding PHPDS are demonstrated in Table 2. Of pediatric clerkship directors, 45.8% strongly agree and 36.1% agree that students should be exposed to PHPDS before starting the pediatric clerkship. Overall, 95.8% of pediatric clerkship directors disagree with the comment that “students with good adult HPDS do not need extra time in PHPDS.” According to the clerkship directors, the most significant barriers to the provision of PHPDS instruction were instructor time, availability of preceptors, number of willing/motivated preceptors, number of medical students to accommodate, and allotment of time in the MS curriculum for PHPDS. Availability of patients for medical students to learn PHPDS was not considered a significant barrier.

**DISCUSSION**

This study demonstrates that considerable variability exists among MS in how and when medical students are taught PHPDS. Even in those programs where PHPDS is offered, the effort is limited in time and scope.

The majority of programs offer <3 hours each of the various teaching methods, including attending didactic lectures, shadowing a physician, watching pediatric instructional videos, and participating with hands-on experience with real patients utilizing preceptors. It is likely that <3 hours of a given teaching method may not be appropriate to prepare medical students for the third year pediatric clerkship. It seems reasonable that exposure to some form of PHPDS will at least foster recognition of the subject matter as opposed to seeing it for the first time when beginning a pediatric experience.

Not surprisingly, the results of this survey demonstrate that the pediatric clerkship directors strongly agree that medical students should be exposed to PHPDS before starting their pediatric clerkship. Of note, this opinion may not be shared as strongly by clerkship directors from other medical specialties.

**TABLE 1 Percentage of Medical Schools Employing Specific Teaching Methods of PHPDS and Number of Hours Dedicated to Each Method**

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>0 Hours</th>
<th>&lt;3 Hours</th>
<th>4-10 Hours</th>
<th>11-20 Hours</th>
<th>&lt;21 Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Didactic lectures</td>
<td>12.3%</td>
<td>70.8%</td>
<td>13.8%</td>
<td>3.1%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>(8)</td>
<td>(46)</td>
<td>(9)</td>
<td>(2)</td>
<td>(0)</td>
</tr>
<tr>
<td>Clinical skills workshop with patient</td>
<td>69.5%</td>
<td>22%</td>
<td>6.8%</td>
<td>1.7%</td>
<td>0%</td>
</tr>
<tr>
<td>simulator</td>
<td>(41)</td>
<td>(13)</td>
<td>(4)</td>
<td>(1)</td>
<td>(0)</td>
</tr>
<tr>
<td>Shadow preceptor</td>
<td>29%</td>
<td>43.5%</td>
<td>17.7%</td>
<td>8.1%</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>(18)</td>
<td>(27)</td>
<td>(11)</td>
<td>(5)</td>
<td>(1)</td>
</tr>
<tr>
<td>Preceptor with hands-on experience</td>
<td>29.4%</td>
<td>42.6%</td>
<td>22.1%</td>
<td>4.4%</td>
<td>1.5%</td>
</tr>
<tr>
<td></td>
<td>(20)</td>
<td>(29)</td>
<td>(15)</td>
<td>(3)</td>
<td>(1)</td>
</tr>
<tr>
<td>Video demonstration</td>
<td>59%</td>
<td>39.3%</td>
<td>1.6%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>(36)</td>
<td>(24)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td>Real patient interaction</td>
<td>38.1%</td>
<td>31.7%</td>
<td>23.8%</td>
<td>4.8%</td>
<td>1.6%</td>
</tr>
<tr>
<td></td>
<td>(24)</td>
<td>(20)</td>
<td>(15)</td>
<td>(3)</td>
<td>(1)</td>
</tr>
<tr>
<td>Standardized patient</td>
<td>81%</td>
<td>15.5%</td>
<td>3.4%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>(47)</td>
<td>(9)</td>
<td>(2)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td>Newborn nursery</td>
<td>58.6%</td>
<td>29.3%</td>
<td>12.1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>(34)</td>
<td>(17)</td>
<td>(7)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
</tbody>
</table>

Actual number of medical schools is shown in parentheses.
Medical students learn very detailed adult HPDS as part of the overall MS curriculum. Why has PHPDS not been taught with the same conviction? Some might argue that pediatrics is a specialty and, like other specialties, does not need to be presented to all students but rather to only some of whom will enter the field of pediatrics. However, because pediatric patients occur in a spectrum of subspecialties, there is a unique need to learn PHPDS. Perhaps a greater challenge is the ability of MS to accommodate the number of medical students in the limited time that is available in the preclinical curriculum. MS must be willing and able to commit the necessary time and resources.

PHPDS has significant differences from adult HPDS and needs to be taught at some point during MS, because a pediatrics clerkship is a universal requirement. The challenge of PHPDS instruction is how and when it should be taught. According to Whipple et al,1 introducing clinical skills during the second year of MS improves the comfort level of medical students entering the third year clerkships. Should PHPDS be taught simultaneously with adult HPDS during the first 2 years of MS, taught as its own course sometime during the first 2 years of MS, or delayed until the third year pediatric clerkship when it will be put to immediate use? Perhaps more importantly, the educators on the inpatient and outpatient portions of the pediatric clerkship need to be aware of the limited PHPDS of the medical students and be prepared to teach accordingly. Although there was excellent response for 2 e-mail inquiries (72/146, 49%), the responders may have been more passionate regarding PHPDS than nonresponders. There also may have been a higher percentage of nonresponders from schools that do not offer PHPDS, possibly reflecting a lower priority for this kind of training, especially before the pediatric clerkship.

The fact that only pediatric clerkship directors were surveyed limits the ability to generalize the results to the larger venue of medical student education. Given the need to allocate time and resources to implement PHPDS, broader MS and clerkship director support will probably be necessary, and this survey does not address the attitudes of these larger groups.

Other limitations relate to lack of precise definitions for PHPDS, and methodologies such as shadowing, hands on, precepting, and didactic instruction. Although these terms are meant to be very general, they may be subjective to variability of interpretation and therefore how they are reported.

CONCLUSIONS
The results of the survey demonstrate that striking variability exists in PHPDS instruction in MS across the country with pediatric clerkship director’s perceived limitations in time, content, scope, and position in the curriculum. This variability suggests that the real value of PHPDS instruction is unknown. Clarification of the role of PHPDS instruction and a standardized approach to PHPDS instruction is needed so that the MS curriculum can best serve the needs of physician training.

REFERENCES
8. Haist SA, Wilson JF, Fosson SE, Brigham NL. Are fourth-year medical students effective...


