ABSTRACT

BACKGROUND: Pediatric residency programs must adapt their curriculum to meet evolving patient needs yet face limited resources to implement changes resulting in gaps. We performed a categorical pediatric residency program curriculum needs assessment to inform curriculum development efforts.

METHODS: We analyzed data from the 2017 American Academy of Pediatrics Annual Survey of Graduating Residents and pediatric program and associate program director polls conducted at a 2019 pediatric residency program director national meeting. We used conventional content analysis to code and categorize.

RESULTS: Participants included 528 (53%) graduating residents representing 88% of programs, 89 program directors, and 177 associate program directors representing at minimum 45% of programs. Participants demonstrated concordance on the top 4 needs—additional clinical experiences, career development, business of medicine, and health systems. Program leaders also identified wellness and resiliency; disparities; diversity, equity, and inclusion; and communication.

CONCLUSIONS: This is the first categorical pediatric program general curriculum needs assessment conducted of pediatric leadership and graduating residents in over a decade. While program leadership and resident data were collected 2 years apart, we found concordance on the top 4 categories and consistency with prior national needs assessments with the exception of career development. New curriculum development efforts are underway.

KEYWORDS: curriculum; medical education; needs assessment; pediatrics; residency

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WHAT'S NEW

This study is the first pediatric categorical residency program general curriculum needs assessment in over a decade, including graduating resident and program leadership perspectives. Career development is a newly identified need. Results have informed current curriculum identification and development efforts.

The overarching mission of institutions and organizations participating in pediatric graduate medical education, such as the Association of Pediatric Program Directors (APPD) the Academic Pediatric Association (APA) \(^1\) and the American Academy of Pediatrics (AAP), is to improve child health and well-being. \(^2,3\) Child health needs in communities across the United States vary and change over time. The Accreditation Council of Graduate Medical Education (ACGME) Program Requirements for Graduate Medical Education in Pediatrics state that residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioral sciences, as well as application of this knowledge to patient care. \(^4\) In order to train pediatric residents to meet patients’ evolving needs, those involved in pediatric graduate medical education must analyze and adapt educational programs. \(^5\) While the ACGME and American Board of Pediatrics periodically publish residency program curricular changes, programs have limited resources and time in which to design, adapt, individualize, and/or implement changes and may struggle to respond, resulting in curricular gaps.
The pediatric community has used different methods over the past 4 decades to understand pediatric residency education. The Future of Pediatric Education 1 and 2 and Residency Review and Redesign in Pediatrics reports involved representatives from major pediatric professional organizations, governing bodies, and residency programs who conducted extensive reviews and published visions and broad recommendations for restructuring residency education.6−8 These included themes like more flexible programming to meet individuals’ needs and a call for competency-based assessment. Previous national data from graduating pediatric residents and recently trained general pediatricians demonstrated overall satisfaction with training. However, 30% of graduating residents wanted more training in over half of ACGME-required procedures, practice management, or business of medicine elements, such as billing, coding, and payment, while large proportions of early practicing general pediatrics indicated they could have used additional training in mental health, sports medicine, oral health, and developmental/behavioral health.5,9−11 Approximately one third of subspecialists surveyed within 5 years of training completion would have liked additional outpatient and inpatient clinical experiences if given more flexible training.12 Finally, many content-specific pediatric residency needs assessments have been published on topics such as professionalism, behavioral health, and communication among others.13−15 However, limitations in existing studies include dated data or limited scope.

The purpose of this study was to perform a categorical pediatric residency program curriculum needs assessment by examining graduating pediatric resident, pediatric residency program director (PD), and associate PD (APD) perspectives.

**METHODS**

We used 2 data sources to assess program curriculum needs: 1) 2017 AAP Annual Survey of Graduating Residents and 2) 2019 APPD annual spring meeting PD and APD polls. Both were reviewed and considered exempt by the AAP Institutional Review Board.

**AAP Annual Survey of Graduating Residents**

The 2017 survey was the most recent to assess overall curricular gaps with the question: “Are there any areas or topics that would have helped you for practice or fellowship training that were not taught during residency?” Response options were no, unsure, and yes. Residents who responded yes were asked to specify the area or topic.

Participants were randomly selected from an AAP database that includes all pediatric residents in the United States. Residents from combined programs or who were not in their third year of a categorical pediatric residency were excluded, leaving 2940 eligible residents from 199 programs. A random sample of 1100 residents was selected using the randomization procedure from IBM SPSS Statistics 24 (Chicago, IL).

Following the development of questions by AAP researchers and subject matter experts and review by nonparticipating residents, a pilot version of the survey was sent to 100 of the selected residents in April 2017. The survey was revised based on responses (n = 20). The final survey was fielded to the remaining 1000 residents from May to September 2017. Requests alternated between mail and e-mail until response or 8 requests were made. E-mails included an online survey link. Mailings included a postage-paid return envelope and one-time $2.00 incentive.

The Annual Survey of Graduating Residents has been sent to graduates each year since 1997 and includes questions on demographics, training experiences, and career intentions including program size (small <30 residents, medium 31−60 residents, large >60 residents) and career goal (primary care, hospitalist, subspecialty, both primary and subspecialty practice, and nonclinical practice). We extracted residents’ program settings from American Medical Association’s Fellowship and Residency Electronic Interactive Database16

**APPD Poll of PDs and APDs**

During the March 2019 APPD national meeting respective Grassroots Forums, 2 authors (C.G. and S.H.) asked PDs and APDs to respond to the following Poll Everywhere question: “Other than a mental health curriculum for pediatrics, what additional topic does your residency program most need as a curriculum or educational activity? Mental health was excluded due to a well-established need in the literature with curriculum development underway.17−19 Participants also answered questions on their program setting (community-based; community-based, university-affiliated; university-based; military; and other) and size. A running list of individual PD responses was inadvertently visible to attendees on a screen at the front of the room; APD responses were blinded. APPD provided 2019 association membership data for program number, setting, and size.

**DATA ANALYSIS**

We used descriptive statistics to analyze participant characteristics and chi-square to compare: 1) resident responses about whether there were areas or topics that would have helped prepare them (yes, no, and unsure) and career goal, and 2) PD program size and setting distributions with APPD membership at large, using GraphPad (GraphPad Software Inc. San Diego, Calif) and IBM SPSS statistics 24 (Chicago, IL). Three authors (M.P.F., C.G., and S.H.) independently reviewed survey responses. As key topics emerged, we created a list of broad categories. Using a conventional content analysis approach,20 we tagged, assessed, and totaled all responses using these categories.

**RESULTS**

**AAP Annual Survey of Graduating Residents**

The overall response rate was 53% (n = 528/1000) representing 88% (n = 175/199) of programs. The majority of respondents were white, non-Hispanic (59%), and women
Table 1. Categorical Pediatric Graduating Resident, Residency Program Director, and Associate Program Director Self-Reported Program Size and Setting

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Frequencies (%)</th>
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<tbody>
<tr>
<td><strong>Graduating Residents</strong> (n = 528)*</td>
<td></td>
</tr>
<tr>
<td>Small (≤30 residents)</td>
<td>102 (19%)</td>
</tr>
<tr>
<td>Medium (31–60 residents)</td>
<td>204 (39%)</td>
</tr>
<tr>
<td>Large (&gt;60 residents)</td>
<td>219 (42%)</td>
</tr>
<tr>
<td><strong>APPD Program Membership</strong> (n = 200)†</td>
<td></td>
</tr>
<tr>
<td>Small (≤30 residents)</td>
<td>63 (31.5%)</td>
</tr>
<tr>
<td>Medium (31–60 residents)</td>
<td>81 (40.5%)</td>
</tr>
<tr>
<td>Large (&gt;60 residents)</td>
<td>56 (28%)</td>
</tr>
<tr>
<td><strong>Program Directors</strong> (n = 87)‡</td>
<td></td>
</tr>
<tr>
<td>Small (≤30 residents)</td>
<td>31 (36%)</td>
</tr>
<tr>
<td>Medium (31–60 residents)</td>
<td>35 (40%)</td>
</tr>
<tr>
<td>Large (&gt;60 residents)</td>
<td>21 (24%)</td>
</tr>
<tr>
<td><strong>Associate Program Directors</strong> (n = 182)§</td>
<td></td>
</tr>
<tr>
<td>Small (≤30 residents)</td>
<td>44 (24%)</td>
</tr>
<tr>
<td>Medium (31–60 residents)</td>
<td>69 (38%)</td>
</tr>
<tr>
<td>Large (&gt;60 residents)</td>
<td>69 (38%)</td>
</tr>
</tbody>
</table>

*Five hundred twenty-five residents responded to the program size question; program setting data for 528 residents were able to be pulled from American Medical Association’s FREIDA database.
†Data provided by APPD.
‡Eighty-seven PDs responded to the program size question; 82 PDs responded to the program setting question.
§One hundred eighty-two APDs responded to these questions.

(75%). These characteristics are similar to American Board of Pediatrics and Association of American Medical Colleges national data on residents and physicians.21,22 Resident respondents represented a variety of program sizes and settings (Table 1). Regarding career goals, 42% responded yes (n = 89/200) of residents represented a variety of program sizes and settings (Table 1). Compared to APPD membership, there was no significant difference in PD program size distribution (P = .54). There was a significant difference in PD program setting distribution with more university-based and community-based and less community-based/university-affiliated program representation (P = .002).

Among PDs and APDs in aggregate, from most to least frequent, major categories included 1) career development (26%); 2) additional clinical experience (21%); 3) health systems (13%); 4) business of medicine (11%); 5) wellness and resiliency (11%); 6) advocacy (10%); 7) disparities (9%); 8) diversity, equity, and inclusion (6%); 9) communication (4%); and 10) other (5%; Table 2).

**APPD Poll of PDs and ADPs**

Our poll resulted in 89 valid, unique responses from PDs, representing at minimum 45% (n = 89/200) of programs, and 177 from APDs. Some provided more than 1 topic; multiple responses were coded separately resulting in 309 responses. Program leadership participants represented a variety of program sizes and settings (Table 1). Compared to APPD membership, there was no significant difference in PD program size distribution (P = .54). There was a significant difference in PD program setting distribution with more university-based and community-based and less community-based/university-affiliated program representation (P = .002).

**DISCUSSION**

This is the first national needs assessment in over a decade to examine graduating pediatric resident, PD and APD perspectives on categorical pediatric residency program general curriculum needs. While the data were collected 2 years apart, we found participant concordance on the top 4 categories—additional clinical experience, career development, business of medicine, and health systems—though in different orders. Thereafter, graduating resident and program leadership needs diverge. Participants were well represented across different program sites and sizes. Many of our results are consistent with prior national pediatric program needs assessments highlighting gaps in clinical experiences and business of medicine.5,9–12 Career development is a newly identified need.

In subanalyses by program leadership type and graduating resident career choice, category frequencies differed in order among the top 4 most frequent categories. These
differences among program leadership may reflect their respective job duties or more simply a response bias in that PDs could see other PD poll responses, many of which were business of medicine initially, so PDs may have been influenced to answer similarly. Differences among graduating residents observed by career choice likely reflect the needs facing each in their next steps; those going into primary care and hospital medicine identified additional clinical experience and business of medicine as more frequent needs than those going into subspecialty who identified career development as most frequent. Of note, respondents identified a wide range of clinical experiences, from additional procedural training to both broad and specific topics within primary and subspecialty care.

Limitations of our study include that graduating resident and program leadership questions were different and asked 2 years apart. However, the top 4 categories were the same, perhaps strengthening these findings. PDs may have been influenced by nonblinded peers. We could not account for PD and APD overlap from the same program. Many graduating residents responded “I don’t know” to their question possibly because they had not entered the next career phase and felt unequipped to respond. Including recent graduates in the next needs assessment could be helpful. Further, our main findings are limited to 1 question. We do not know whether answers to Poll Everywhere differ from other survey methods, and we do not have more specific detail than that provided. This work only captures resident, PD, and APD perspectives and may not represent all stakeholders, such as other educational leaders. Lastly, we want to acknowledge that our world, perspectives, and patients’ health has potentially considerably changed since we conducted our work, in terms of impacts of a global pandemic, racism, and natural disasters, so curricular needs may have changed. We suspect that diversity, equity, inclusion, wellness and resilience, disparities, advocacy, and environmental health curricular needs are rising and necessitate further attention.

Interestingly, some pediatric program curricula already exist in multiple identified realms, such as high-value care and advocacy, among others.23,24 Future research needs to explore if program leadership is unaware of these curricula, desire different curricula, or experience other access barriers. For some content that does not have a published curriculum, multiple needs assessments have been published which can guide future curriculum development.13–15 National efforts are currently ongoing to develop new pediatric program curricula. As a result of our poll, an APPD-AAP group convened to create a business of medicine curriculum. We are also aware of collaborative efforts in behavioral and mental health and inpatient medicine. Finally, an APPD group is working to identify and compile recommended existing curricula. Our new finding of career development needs further exploration.

Table 2. Frequency of Key Topic Areas That Emerged From a Needs Assessment of Categorical Pediatric Residency Programs

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequencies (%)</th>
<th>Graduating Resident Responses† by Resident-Reported Career Goal</th>
<th>Program Director Responses‡</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary Care (n = 68)</td>
<td>Subspecialty (n = 55)</td>
<td>Hospital Medicine (n = 15)</td>
</tr>
<tr>
<td>Clinical experience (eg, general pediatrics, subspecialties, and procedures)</td>
<td>40 (59%)</td>
<td>27 (49%)</td>
<td>10 (67%)</td>
</tr>
<tr>
<td>Business of medicine (eg, billing and coding, practice management, and contracts)</td>
<td>29 (43%)</td>
<td>12 (22%)</td>
<td>5 (33%)</td>
</tr>
<tr>
<td>Career development (eg, leadership, professionalism, board prep, residents as leaders/teachers, and research)</td>
<td>5 (7%)</td>
<td>17 (31%)</td>
<td>2 (13%)</td>
</tr>
<tr>
<td>Health systems (eg, high-value care and quality improvement)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Wellness and resiliency</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Advocacy</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Disparities</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Diversity, equity, and inclusion</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Communication</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>

*Some responses were assigned more than 1 code. Percentages provided for n ≥ 5.
†Survey question: “Are there any areas or topics that would have helped to prepare you for practice or fellowship training that were not taught during residency?” Response options were no, unsure, and yes. Residents who responded “yes” were asked to specify the area or topic. Total responses reported for by career goal = 138; 11 responses are not included in the table because the resident respondent did not report a career goal or reported not going into clinical practice.
‡Poll question: “Other than a mental health curriculum for pediatrics, what additional topic does your residency program most need as a curriculum or educational activity?”
§Number of programs represented by APDs is unknown; there is often >1 APD/program.
CONCLUSIONS

Our categorical pediatric graduating resident, residency PD, and APD overall curriculum needs assessment highlighted several concordant areas including additional clinical experiences, business of medicine, and health systems and a new category of career development. Collaborative curriculum identification and development efforts are underway in several of these content areas to help address these needs.

REFERENCES