A National General Pediatric Clerkship Curriculum: The Process of Development and Implementation

Ardis L. Olson, MD*; Jerold Woodhead, MD†; Roger Berkow, MD§; Nancy M. Kaufman, MD∥; and Susan G. Marshall, MD¶

Abstract. Objective. To describe a new national general pediatrics clerkship curriculum, the development process that built national support for its use, and current progress in implementing the curriculum in pediatric clerkships at US allopathic medical schools.

Curriculum Development. A curriculum project team of pediatric clerkship directors and an advisory committee representing professional organizations invested in pediatric student education developed the format and content in collaboration with pediatric educators from the Council on Medical Student Education in Pediatrics (COMSEP) and the Ambulatory Pediatric Association (APA). An iterative process or review by clerkship directors, pediatric departmental chairs, and students finalized the content and built support for the final product. The national dissemination process resulted in consensus among pediatric educators that this curriculum should be used as the national curricular guideline for clerkships.

Monitoring Implementation. Surveys were mailed to all pediatric clerkship directors before dissemination (November 1994), and in the first and third academic years after national dissemination (March 1996 and September 1997). The 3 surveys assessed schools' implementation of specific components of the curriculum. The final survey also assessed ways the curriculum was used and barriers to implementation.

Outcomes. The final curriculum provided objectives and competencies for attitudes, skills, and 18 knowledge areas of general pediatrics. A total of 216 short clinical cases were also provided as an alternative learning method. An accompanying resource manual provided suggested strategies for implementation, teaching, and evaluation. A total of 103 schools responded to survey 1; 84 schools to survey 2; and 85 schools responded to survey 3 from the 125 medical schools surveyed. Before dissemination, 16% of schools were already using the clinical cases. In the 1995–1996 academic year, 70% of schools used the cases and competencies, 66% were using the clinical cases. The extent of curriculum use also increased. Schools using 11 or more of the 18 curriculum's knowledge areas increased from 50% (1995–1996) to 73% (1996–1997).

Conclusion. This new national general pediatric clerkship curriculum developed broad support during its development and has been implemented very rapidly nationwide. During this period the COMSEP and the APA have strongly supported its implementation with a variety of activities. This development and implementation process can be a model for other national curricula.

ABBREVIATIONS. APA, Ambulatory Pediatric Association; COMSEP, Council on Medical Student Education in Pediatrics; AMSPDC, Association of Medical School Pediatric Department Chairmen.

Nationally accepted curricular guidelines for the core clinical clerkship exist in obstetrics and gynecology, surgery, and family medicine. However, a nationally accepted core clerkship curriculum has previously been lacking in pediatrics. Although there has been increasing emphasis in medical schools on providing strong training for generalist physicians, these principles often had not been operationalized into pediatric clerkship objectives. Pediatric clerkship curricula in many schools evolved over time and reflected the subspecialty faculty resources of the tertiary medical center. In 1991 89% of pediatric clerkships self-reported they conveyed specific objectives to students in verbal or written form. However, in 1990 a detailed review of course materials from 44 pediatric clerkships showed that curricular objectives were seldom used to guide student learning and only 6% of programs provided students with specific written learning objectives. In addition, the topics taught in formal didactic sessions were highly variable with inconsistent coverage of generalist topics or more common aspects of diseases. In 1993 a similar review of curricular objectives provided by pediatric department chairs showed the number of course objectives ranged from 4 to 750.

The first efforts at developing pediatric curricular guidelines had focused on both students and...
residents and were published by the Education Committee of the Ambulatory Pediatric Association (APA). The guideline development process did not include steps to develop broad consensus about the curricular content among educators and lacked a plan for implementation. One year after dissemination in 1986 the guidelines were known to only 37% of clerkship directors and implemented by only 6%. Therefore, in 1992–1993 the new national pediatric clerkship directors organization, the Council on Medical Student Education in Pediatrics (COMSEP), focused on the development of a national core curriculum for the pediatric clerkship that could give individual medical schools a curricular framework from which to build. Clerkship directors agreed that a student level curriculum should focus on general pediatrics. Previous experience with the APA pediatric curricular guidelines had demonstrated that successful curricular implementation would require more careful attention to collaboration, dissemination, and assistance in implementation. A curriculum task force of approximately 30 clerkship directors began the process of developing a national curriculum.

The federal Bureau of Health Professions also recognized that core clerkship teaching needed to emphasize generalism and ambulatory-based teaching as a basis for developing generalist physicians. It provided support for the development and implementation of this generalist clerkship curriculum in pediatrics, as well as internal medicine. From 1993 to 1995 the COMSEP, in collaboration with the APA, developed a general pediatrics clerkship curriculum and supporting resource manual to aid implementation.

This report presents: 1) the approach used in the development of the curriculum and supporting resource materials; 2) how acceptance of the curriculum was built during development; 3) the process used to achieve national consensus that this curriculum should guide departmental pediatric clerkship curricula; and 4) national progress by clerkship programs in implementing the new curriculum.

### METHODS

#### Curriculum Design

The curriculum project included a core team and an advisory committee. The project director and 3 additional clerkship directors from the COMSEP Curriculum Task Force formed the curriculum development core team. A 10-member advisory committee, in accordance with the contract guidelines, was formed with COMSEP leaders and representatives of key pediatric and primary care professional organizations. Because most pediatric clerkship programs are administered at the department level and rely on the department chairman's support for change, the chairman of the education committee of the pediatric department chairmen's organization (Association of Medical School Pediatric Department Chairmen [AMSPDC]) was included. The committee included a PhD educator as well as considerable expertise in educational methodology by the physician members. The core team worked closely with the advisory committee members, consultants, and members of the COMSEP Curriculum Task Force. The advisory committee met 4 times during the 18 months of curriculum development and reviewed components between meetings as well.

The development of the pediatric clerkship curriculum had 5 phases: 1) review of existing curricula and literature; 2) development of curricular learning objectives and competencies; 3) development of supporting materials in a resource manual that included specific strategies for implementation, teaching, and evaluation; 4) establishment of national support and acceptance of the curriculum among pediatric educators and leaders during its development; and 5) national dissemination of curriculum and resource manual. The methodology for each phase is described below.

#### Review of Existing Curricula and Literature

The project core team reviewed the medical literature since 1975 on pediatric undergraduate and ambulatory education. Our search found comprehensive pediatric clerkship curricula were not described in the medical literature except for the previously described curricular guidelines published by the APA. Thus, the core team also obtained curricula in current use by 30 US medical schools. These curricula and the earlier APA curricular guidelines were examined in detail. Our review showed that both the format and type and amount of content included in curricula were key elements in curriculum design. This background was used by the core team and the advisory committee as a common foundation in developing the curriculum.

#### Development of Learning Objectives and Competencies

The curricular plan developed by the project team for developing learning objectives and competencies used the following unique approaches for producing the content, determining content included, and organizing the curriculum.

1. Method of producing the curricular content: The core team developed the initial content outline for the objectives and competencies. The curriculum was then written by the core team and selected members of the advisory committee who had expertise in particular content areas. During the process of revision additional content was provided by the COMSEP Curriculum Task Force. The project limited authorship to pediatric clerkship directors because they understood best the learning level of students in clerkships as well as the need for basic content and learning approaches to clinical problems. Throughout process of multiple revisions the core team was responsible for ensuring consistency of presentation, development of clinical cases, and prerequisites.

2. Determining content: The curriculum project members felt it was crucial when developing the specific objectives and competencies to avoid an encyclopedic, all-inclusive approach to curricular content. Otherwise, the new curriculum would not be realistic and risked being relegated to the bookshelf. The curriculum was built on 2 national surveys and discussions of the COMSEP Curriculum Task Force that had occurred in 1990–1993. The first survey of 125 schools had responses from 61 clerkship programs. Clerkship directors were queried what they thought were the 10 essential pediatric content and skill areas students needed. From this data a list of the 20 top priority topics was generated. Through the Delphi method, using meetings of clerkship directors and a second survey of 105 clerkship directors, these topic areas were reduced to 14 broad knowledge and 4 skill areas that clerkship directors agreed were essential for the pediatric clerkship to teach.

Curriculum project members chose to base the curricular content on: 1) an approach to the common acute and chronic problems seen in general pediatric settings, 2) clinical topics that relevant to the care of both ill and well children, and 3) basic pediatric clinical skills and professional conduct. Thus,
common presenting problems/symptoms instead of specific diseases were used as the framework for learning about acute conditions. These common presenting problems and findings were selected from national and regional databases of common hospital and ambulatory diagnoses or presenting symptoms. Other significant, but less common diseases (eg, cystic fibrosis for the problem of cough), important problems of the poor and under-served (eg, lead poisoning), and important physical findings were included. Other important pediatric clinical topics from the core curricular content defined earlier by the COMSEP Curriculum Task Force were included. These non–disease-based general pediatric topics (eg, prevention, growth and development) selected are widely used in clinical care.

3. Organization and Format: Past efforts at pediatric curricula development have had difficulty with keeping objectives and competencies “user friendly.” The design of the curriculum supports a teaching approach to learning for students that initiates learning from the presenting symptom or sign rather than the condition or diagnosis. The curriculum also expects varying levels of learning for different conditions. For each presenting symptom or sign the curriculum presents common diagnoses to learn about in depth, and the less common or unusual conditions to learn about at a more basic level. In addition to learning objectives and competencies, the rationale for why a topic area should be learned as well as the recommended prerequisites are provided for each topic area.

The COMSEP Curriculum Task Force had determined that pediatric clinical educators are more likely to use a clinical case model than to teach mastery of specific objectives. Traditional detailed and terminal objectives that focus only on knowledge recall do not capture well the complex clinical problem solving processes being taught. Thus, objectives or competencies that involved more synthesis of information and clinical application were preferred. Considerable effort was made to limit the scope of the objectives and competencies for a third year student. Short clinical cases were also developed as an optional method of presenting key issues from the objectives and competencies.

Resource Manual Development

The 263-page resource manual is an important adjunct to the curriculum that provides practical supports that assist the clerkship director during implementation. It was produced using the expertise of a number of clinical pediatric educators from within COMSEP, the advisory committee, and the core team. In developing the manual, the project team utilized the feedback from the advisory committee and COMSEP’s Teaching Strategies and Evaluation Task Forces. The resource manual topics are listed in Table 1.

**TABLE 1.** Content of Resource Manual

<table>
<thead>
<tr>
<th>Implementation strategies</th>
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<tr>
<td>Promoting generalism in the pediatric clerkship</td>
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<td>Implementation of the new general pediatric core curriculum: possible barriers</td>
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<td>The implementation of a community-based pediatric ambulatory experience</td>
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<th>Teaching strategies</th>
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<td>Teaching and learning in the pediatric clerkship setting</td>
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<td>Recommendations for teaching strategies</td>
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<td>Student self-directed learning</td>
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<td>Strategies for inpatient generalist-focused teaching</td>
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<td>Strategies for pediatric subspecialists to teach a generalist student curriculum</td>
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<td>Developing a program to improve the teaching skills of faculty and residents housestaff as educators</td>
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<th>Evaluation strategies</th>
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<td>Basic principles of evaluation: an overview</td>
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<tr>
<td>The written examination</td>
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<td>The oral examination</td>
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<td>Performance based evaluation of clinical experience: OSCE</td>
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<td>Videotaping as an evaluation tool in the clinical setting</td>
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<td>Computer teaching for education and evaluation</td>
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<td>Clinical assessment of medical students</td>
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<td>Curriculum evaluation</td>
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<td>Evaluation of faculty teaching</td>
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Achieving National Support and Acceptance of the Curriculum

Throughout the project support of the final product was built by involving key stakeholders at 3 levels: educational leaders, clerkship directors, and students. The project team sought widespread review of the curriculum and gave ample opportunities for stakeholders to voice concerns during the development stage. Thirty-five clerkship directors on the Curriculum Task Force provided detailed review as well as the input of their students and departmental chair. The goal was to have diverse input throughout development as well as give every chair and clerkship director the opportunity to provide input before the final curriculum product was presented. As the curriculum progressed from content outline to detailed objectives with multiple revisions, the review process provided an opportunity for leaders and groups focused on education within COMSEP, APA, and AMSPDC to participate. The steps used and participant groups are listed in Table 2. The advisory committee’s full review of the curriculum occurred after each major change.

Project members recognized that the method of introducing the final curricular product would have significant impact on its acceptance and subsequent implementation. Presentation of the curriculum was planned as the lead topic for the tri-annual national joint meeting of COMSEP/AMSPDC focusing on pediatric student education issues. This combined group of over 125 pediatric clerkship directors and 125 chairmen had been selected as the best large forum for the discussion of implementation. This was because most pediatric curricular change happens at the department level and the key change agents are the chairman and clerkship director. The structure and content of the national meeting were carefully planned to enhance understanding of the complexity of educational change and the resources needed to effectively teach with the new curriculum, and to involve both departmental chairs and clerkship directors in the implementation process.


One of the curriculum/resource manuals was produced for each US and Canadian medical school as well as to leaders of national organizations invested in pediatric education (American Board of Pediatrics, National Board of Medical Examiners, American Academy of Pediatrics). Distribution occurred at the COMSEP/AMSPDC joint meeting to complement the discussion of implementation. Nonattending chairmen and requesting osteopathic school chairmen received copies by mail. To encourage utilization, COMSEP provided the support to have the curriculum and resource manual available to clerkship directors on computer disk and on the Internet. A variety of presentations and exhibits as well as information in newsletters were planned to increase awareness of the new curriculum. It was arranged to continue to have additional copies of the curriculum available for purchase by other pediatric educators through the APA’s office. In addition, later workshops were planned to provide support to schools in implementation.

National Assessment of Implementation

A series of 3 surveys of all US and Canadian pediatric clerkship directors were conducted to monitor national progress in curriculum implementation. Only the US clerkship data for surveys mailed to 125 US allopathic medical schools is included in this report. Osteopathic schools were not included because they are not members of COMSEP or AMSPDC. The first survey in November 1994 assessed use of any curricular components before national dissemination in 1995. This baseline survey was conducted because many clerkship directors had access to the curriculum as reviewers during its development. The second survey in March 1996 assessed usage of specific components in academic year 1995–1996, the first year after pediatric departments had been provided the national curriculum. The third survey in September 1997, 30 months after the curriculum had been introduced, assessed usage of the curriculum in the 1997–1998 academic year as well as the implementation process and barriers to implementation. Surveys 2 and 3 asked overall whether programs used the curricular components and specifically about
their use of each curriculum section. Respondents answering affirmatively might be using some or all the material in the section (“some or all”). Survey 3 also inquired if programs used “some or all” of the curriculum in section. Analysis compared the number of schools using “some or all” of the curriculum in survey 2 and 3 using χ². The influence of barriers on curricular implementation was examined in survey 3 by comparing the proportion of schools using each section for each of the perceived barriers using Student’s t-test.

OUTCOMES

The General Pediatric Clerkship Curriculum

The final general pediatric clerkship curriculum includes 3 sections: attitudes and professional conduct, pediatric clinical skills, and knowledge. Within each section a rationale for inclusion, prerequisites, learning objectives, and competencies are provided. The skills section includes interviewing, physical examination, communication, and critical thinking skills. The knowledge section is subdivided into topic areas that include: 1) 13 key general pediatrics topics that support general pediatric care (eg, health supervision, growth and development, fluid and electrolyte management), 2) separate topics for 2 key age groups in pediatrics (newborn and adolescent), 3) common pediatric symptoms and important physical findings, and 4) the principles of pediatric chronic illness care with an emphasis on common chronic illnesses. In addition, 216 brief clinical problems are provided as an alternate method of covering the specific knowledge objectives and competencies. These are available as triggers to discussion and learning either for group or individual purposes.

Curriculum Acceptance by Pediatric Educators and Leaders

The iterative process of curriculum review and input listed in Table 1 not only improved the curriculum but also resulted in widespread acceptance of this curriculum before national presentation. During the review process narrative comments as well as ongoing data regarding acceptability of the curriculum for use by them at the clerkship level were obtained. Reviewers rated the content in each curricular section using a Likert scale ranging from 1 (acceptable) to 5 (unacceptable). These were averaged into a total score for each reviewer. Draft 3, mailed to 42 chairpersons and 22 COMSEP Curriculum Task Force members, received an overall score of 1.75 from clerkship directors and 1.87 from departmental chairs (32 total reviewers). The full curriculum (draft 5) was sent to all schools and 60 schools provided feedback. Although many chairs’ feedback was incorporated into the clerkship director’s evaluation, 29 chairs separately gave an average rating of 1.2 and 52 clerkship directors gave an average rating of 1.4. This process of consensus building in the pediatric educational community was very important before national presentation and dissemination.

National Endorsement by Chairpersons and Clerkship Directors

The curriculum was presented at the 2-day national joint meeting of COMSEP/AMSPDC in March 1995 which was attended by 110 allopathic pediatric department chairs and 115 clerkship directors. Workshops with clerkship directors and department chairs each examined 3 to 4 specific content areas and determined how they would be taught, by whom, and with what clinical experiences. These ideas were shared in a final large group session of all chairpersons and clerkship directors. The goal was to involve the chairs in the change process and have them understand the issues involved in implementing a comprehensive curriculum. At this meeting there was strong support for the new curriculum. The need for pediatric clerkship curriculum reform was recognized and its complexity was acknowledged. Responsibility for this was felt to be at the pediatric departmental level. The chairpersons recognized clerkship directors as the logical leaders in their department in this change process. At the final session the president of AMSPDC asked COMSEP to report back to their organization in 3 years on the national progress made in implementing the curriculum. AMSPDC leaders directed COMSEP to support implementation and carefully evaluate the process of curriculum change and its outcomes.
Implementation Support Activities

Further activities supporting implementation have occurred since 1995. The curricular project provided workshops to support implementations through COMSEP, the APA, and the Association of American Medical Colleges. Because this curriculum recommends that 50% of clinical experiences occur in ambulatory settings, COMSEP’s 1996 annual meeting focused on developing community-based teaching experiences. At the COMSEP annual meetings and APA special interest group meetings clerkship directors have shared both specific educational innovations and evaluation methods addressing attitude, skills, and knowledge aspects of the new curriculum. The curriculum, clinical problems, and full resource manual have been made available on the Internet through efforts of COMSEP and the APA.\(^b\)

National Progress in Implementation

All 125 US medical schools represented in COMSEP were surveyed in the 3 surveys. A total of 103 schools responded to survey 1, 84 schools to survey 2, and 85 schools responded to survey 3. The 85 schools in survey 3 taught 10,336 third year medical students. Eight-four percent of the schools who responded to survey 2 also answered survey 3. At the time of survey 1, just before national presentation, 21% of schools were already using the clinical case but none were using other components. By March of 1996 (survey 2), 70% of schools surveyed were using some or all of the different curricular sections and 66% were using the clinical cases. The number of schools using the curriculum continued to increase. In the 1997–1998 academic year (survey 3) 90% of schools were using some or all of the curricular objectives. 88% were using some or all or the competencies, and 68% were using the clinical cases.

Over 2 years schools began to use more of the curriculum content as well. In the 1995–1996 academic year, 11 or more of the 18 content areas were used by 50% of schools. By 1997–1998 academic year, 11 or more of the 18 sections were used by 73% of schools. Table 3 provides data about curricular use by content area for surveys 2 and 3. Teaching of the curricular content varies within content areas from 88% of schools using the curriculum to teach about growth to 40% using it to teach about child abuse. In survey 3 we also determined the proportion of schools that were using all of a content area from the curriculum. When schools used the curriculum to teach a content area, between one fourth and one third of schools used the all of the topic’s competencies/objectives. Among these schools using the curriculum a few topic areas were more and less likely to be used. If using a content area, schools was more likely to teach using all of competencies/objectives for the content area for child abuse (57%), and less likely to for behavior (21%), medical genetics (22%), and pediatric emergencies (15%).

Survey 3 in 1997 also assessed more specifically how clerkship programs used the curriculum educationally. The curricular objectives and competencies were used to guide both faculty-directed discussions (65%), to design lecture or seminar series (64%), and for student self-learning (66%). The new curricular objectives were used by 62%, competencies by 53%, and clinical cases by 51% of clerkship directors in the evaluation of student clinical skills and knowledge.

Clerkship directors were queried in survey 3 about barriers perceived to implementing the national curriculum. Inadequate time (64%), faculty acceptance (38%), lack of adequate financial supports (25%), and lack of control of curriculum at affiliate sites (25%) were the commonest responses. However, there was no significant association between perceived barriers and whether a school had implemented any of the individual objective/competency sections.

DISCUSSION

The national general pediatrics clerkship curriculum project has been successful in developing, producing, and distributing widely its curriculum with the resource manual. As a national collaborative effort of key organizations involved in the pediatric education of medical students it has been able to initiate educational change that had not been possible by individual groups. The practical approach of this curriculum has occurred because of the central involvement of those most impacted by it, students, and those directly responsible for its implementation, clerkship directors and chairmen. The arduous steps in development have led to a well-respected product that has received national level endorsement by leaders in these organizations. It serves as a guide to the individual school in designing their curriculum and has been key in setting priorities and providing more balance about which topics are taught in the third year. Clerkship directors using the curriculum report that teaching is more oriented to presenting problems and less likely to be based on the subspecialty interest of the individual lecturer.

Although other curricula have been developed for other clerkships, this general pediatric clerkship curriculum is unique in that after extensive efforts to develop support and promote implementation the extent of implementation has been documented.

Because the curriculum is widely used, clerkship programs are now able to share creative teaching and evaluation approaches based on the commonality of the curriculum. This national pediatric curriculum also is stimulating collaboration among pediatric educators at a level not possible before. A student textbook has been published derived from the common clinical problems. Written, and Web-based or CD-ROM-based educational materials based on the curriculum are being planned by clerkship directors. These can be developed and

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shared between schools, thus reducing the cost and faculty time required for course material development. The curriculum has formed the basis for a dialogue between COMSEP with the National Board of Medical Examiners about the content of their pediatric student examinations. Pediatric evaluation materials developed for the new curriculum have also been developed by clerkship directors and shared within COMSEP.

Research exploring the impact on the new curriculum on performance is now being conducted. Kuo and Slavin\(^{13}\) have reported improved general pediatric knowledge and clinical problem-solving after implementing this curriculum at one site. Educators within COMSEP are also in the process of comparing student performance in schools with varying degrees of implementation of the curriculum. Continuing assessment of student outcomes for specific educational innovations based on the curriculum will be important.

What are the unique aspects of curriculum development, dissemination, and implementation in this project that can inform other groups preparing national curricula? Crucial to the process is a realistic approach to how much material can be taught in the limited time of a clerkship, and an understanding of the needs of the student and educator using the curriculum. Inclusion of the consumers and educational leaders at each stage of planning and review during development results in curricula appropriate for the audience and learning environment. This project’s extensive efforts at building consensus about the content were a key element in its success. We also found that the ample opportunities for comment and change by its consumers improved the quality of curriculum. However, it is important to allow sufficient time and resources for multiple revisions. During the revision and feedback process curriculum project leaders play an crucial role. They need to change the curriculum from initially being overly inclusive in content to covering core essential items, maintain a consistent format and integration, and seek ways to organize the curriculum to emphasize clinical problem-solving and key concepts. In this project, these efforts resulted in the inclusion of the widely used clinical cases and a focus on the common pediatric problems in acute care, emergencies, and the newborn setting.

Challenges and barriers remain to implementation. Ongoing efforts in each pediatric department are necessary with residents and faculty at main and affiliate sites in implementing the curriculum. Staff transitions are also important during implementation. Our final survey showed that only 60% of pediatric clerkship directors had been in the position 3 years before. Thus the chair has an important role in insuring that the curricular materials and resources for educational change continue to be available within each department. The Council on Medical Student Education and the APA can be important sources of support to these pediatric educators.

**CONCLUSION**

In summary, the National General Pediatrics Clerkship Curriculum developed with the support of the Bureau of Health Professions is not simply sitting on the shelf. It has received widespread acceptance and provides the national guidelines for chairmen and clerkship directors in partnership to provide their students a general pediatrics clerkship experience.

**ACKNOWLEDGMENTS**

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