Report of Colloquium I: The Future of Pediatric Health Care Delivery and Education—Pondering Imponderables to Create an Ideal Residency in a World of Critical Uncertainties

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**ABSTRACT**

Participants of the first colloquium of the Residency Review and Redesign in Pediatrics (R3P) Project considered possible scenarios affecting pediatric practice over the next 15 to 20 years and speculated about the knowledge and skills that pediatricians would need to care for children, adolescents, and young adults in the future. They concluded that the imponderables and complexity of that undertaking fell into the category of a “wicked problem” with no unique solutions. The specifics of the future cannot be predicted, but the themes important to thinking about the future are clear and must be incorporated into thinking about pediatric residency education. Pediatrics 2009;123:S12–S16

FROM THE OUTSET of the Residency Review and Redesign in Pediatrics (R3P) Project, participants understood the magnitude of a comprehensive assessment of pediatric residency training. They recognized the daunting nature of the task of redesigning the educational curriculum and experience so that pediatricians over the next 20 years would be prepared to provide the highest quality of care despite ever-changing health needs. The approach to the task was methodical. It included evaluation of pediatric graduate medical education in other countries1–2 and in-depth review of literature on health care, education, and innovation.

The first colloquium was designed to identify critical uncertainties regarding the health care of children in the future; to envision the perspectives of patients, parents, and providers; and to pose various models for the entire spectrum of medical education. It had 3 specific objectives. First, it was important for participants in this first colloquium to get to know one another. They came from different backgrounds with differing viewpoints and brought diverse experiences and expertise. The second goal was to imagine how society, health care in general, and pediatric health care in particular would evolve and change over the next 15 to 20 years. The third goal was to consider how pediatric education, including medical school, residency, and postresidency education, should respond to those changes.

**PROCESS**

Participants reviewed some of the current literature on the changing demographics and health care needs of children, adolescents, and families in the 21st century,1–10 paying particular attention to several articles (with subsequent updates11–13 for this summary) written by individuals who would be project advisors for all 3 colloquia.11–16 With this in mind, participants were asked to ponder interrelationships between current and projected health care needs of children and health care delivery and to consider implications for pediatric residency education.17 These activities were conducted within the framework of the “wicked problem,” a concept advanced by Rittel and Webber18 in a treatise on social planning. It describes problems with constantly changing requirements and intermediate solutions that only reveal or create other complex problems. Wicked problems come with no rules for solution.

The relevance of the concept of the wicked problem became apparent as participants conducted a series of visioning exercises in which they were asked to construct future scenarios for health care delivery based on a list of “critical uncertainties.” Critical uncertainties were defined as factors that will clearly be important to health care over the next 20 years but to uncertain degrees. Examples include the ability of science to address major health problems of children, the effect of aging of the population on expenditures for child health, the size of the demand for pediatric care, the size and demographics of the workforce of medical and nonmedical pediatric practitioners, the occurrence of epidemics, health care disparities in the population, the impact of the science of genomics, the organization of health services, the status of health care funding, and the pace of change in technology. Participants were then asked...
to consider the future of children’s health care from different vantage points: the child and family, the pediatrician, the nonpediatric health care provider, the public and payers, pediatric residents, the residency program director, those involved in education before residency, and pediatric practitioners immediately after initial certification. After that exercise, small groups were charged with using scenarios and ideas that emerged to create educational models to address a continuum of learning across the professional life of the physician from undergraduate education to continuing professional development in practice. Each of the following was considered: idealized redesign of the entire continuum of education, beginning with undergraduate premedical education, without reference to what currently exists; education and training for a “pediatric team” consisting of pediatricians, residents, and other health professionals; education in residency per se, with attention to what residents should know and how to do before entering residency and on leaving; learning after residency, throughout a professional career; and premedical and medical education with attention, once again, to what learners should know and how to do on entering and leaving medical school. Participants then moved to examine possible effects on residency education of changes in the scope of practice over 20 years, including changes in types of primary care providers. Participants also discussed possible consequences of changes in design and conduct of residency, in involvement of patients in redesign of residency, and in the depth of basic science required for residency education. Each of these rounds consisted of multiple iterations, each with reshuffled and reconstituted small groups. Finally, taking into account all that had been discussed at the colloquium, participants developed a list of knowledge and skills that would be needed for the future.

OUTCOMES
Participants quickly found that they indeed were dealing with a wicked problem. There are too many uncertainties to create a single, unified view of health care needs for children over the next 15 to 20 years. The effects of intense competition for health care resources (influenced substantially by aging of the population), rising health care costs, and organization of services are difficult to specify. Even when ignoring such crucial factors as immigration policy or reimbursement policies, it is difficult to derive a consistent picture of medical care of children in the distant future. It is also unclear what preferences families might have when presented with various choices (eg, convenience of care versus continuity of care). Future roles of pediatricians are likely to vary. Some will be directing a group of practitioners; others will be delivering primary care themselves. Regardless of the structure, it will be important to ensure that diverse medical services have a connection to pediatricians that is apparent to families, the community, and other providers.) It became obvious that pediatricians will need to be able to adapt to whatever evolves. They will need to practice in a system that provides the opportunity for lifelong learning, permits reentry for additional education to adapt to new career directions or interests, and minimizes bureaucratic burdens.

A list of new or expanded skills and knowledge for education of the next generation of pediatricians was developed at the colloquium and refined with subsequent e-mail questionnaires that asked participants to review and rank initial selections. Comparison of the results with what is now part of Accreditation Council for Graduate Medical Education (ACGME) requirements19 provided a list of topics that might be added or receive greater emphasis. Mental health management should receive greater emphasis. Residents feel that their education in this area is inadequate, and practitioners feel that they are often called on to diagnose or treat common, serious problems (eg, depression) that are beyond their expertise. Other items (as worded in the questionnaires) included ability to assess risk from genetic and environmental influences, ability to interpret genetic information for counseling, and ability to manage chronic illness in an ambulatory setting. Medical knowledge items that should be added or receive more emphasis included principles of patient safety and quality improvement, nutrition (especially regarding obesity), principles of public and population health, psychology of adherence to provider instructions and motivation, and pediatric antecedents of adult disease. Participants reemphasized the importance of several topics already in the program requirements. Education in the management of teams and systems-based practice, which requires attention regardless of the practice environment, was felt to be important. As practitioners, residents will need to acquire new skills to enrich their knowledge and to ensure ongoing improvement of practice in an environment in which knowledge and information management are constantly changing. That capability must be acquired during residency. There was also agreement that some of the time in residency now devoted to clerical work and developing certain technical skills should be reduced or eliminated. The notion that all residents should rotate through all areas of tertiary and subspecialty care must be reassessed. In summary, participants agreed that it is important to preserve what is currently effective, eliminate vestiges of the past that are less relevant, and introduce subject matter and training that will facilitate adaptation to an uncertain future.

Scope of practice is an important determinant of the competencies that a practitioner will require. Scope of practice may be entirely a matter of professional choice or may also be determined by geographic location and availability of consultation and support services. In considering the effects of scope of practice, participants wondered whether training should be different for generalists who restrict their scope of practice to ambulatory pediatrics, generalists who are hospitalists, and generalists who do both. Regardless of location or type of practice, roles of pediatricians, and thus the need for certain competencies, might vary. Pediatricians might be individual primary care providers providing comprehensive care or consultants involved in care only on an ad hoc basis, they might be leaders of teams of pediatric nurse
practitioners, physician assistants, and/or mental health professionals, with all participating as equals (player-coach model), or they might be directors of teams that are more hierarchically organized. Innovations in residency to accommodate these possibilities might include development of tracks, use of learning settings different from the conventional inpatient area, and movement away from traditional 1-month block rotations. Patients might be used more effectively in the design of residency education as councils of parents or advocacy groups to comment on the organization and delivery of care. Particular attention must be paid to aspects of biomedical science that are likely to affect physician practice (eg, genetics, genomics, and neurocognitive science).

REFLECTIONS
The colloquium accomplished a great deal. Constant shuffling of small groups promoted collegial interactions, commonness of purpose, and expression of ideas without individual ownership or rigid adherence to a point of view. The notion of uncertainty permeated all discussions in regard both to the state of health care for children and potential means to educate pediatricians to function in an uncertain health care environment. It became abundantly clear that no single model fits all needs for residency education. Moreover, the reality of a wicked problem emerged often as participants recognized that any “solution” to a “problem” with current educational structure brings new complexities and unintended consequences. Nonetheless, a number of concepts emerged that would take shape and mature in subsequent conversations and colloquia.

Several critical questions surfaced during this colloquium that would recur throughout the project.

1. Should a curriculum be structured to expose residents to all available clinical experiences or to focus on certain experiences according to residents’ interest? The former approach might provide a broad education and optimize the chance of an undifferentiated pediatrician finding an area that is personally attractive; however, many of those same experiences could be viewed as superfluous by individuals whose goals are already set. If, on the other hand, a program is designed to maximize residents’ personal choices, how will patients receive care when residents, a vital part of the workforce, are pursuing personal preferences and not predictably available to give care where they are needed?

2. Which is the more important outcome of a change in educational process: mastery of content or acquisition of the ability to adapt and use a constantly expanding and fluctuating body of information in changing situations? Mastery of content is relatively simple to measure, but content will inevitably evolve and become obsolete. Ability to develop new ideas and adapt to new challenges is difficult to assess, as is the influence of residency on that capability. Many interposed factors may be responsible for creating the nimble and adaptive learner.

3. If the purpose of improving the education of pediatricians is to improve the health of children, how can that be measured when there are so many uncontrolled variables influencing health care? If the effect of changes in education are not assessed, how can one determine if change is of value?

At its close, the first colloquium concluded that residents need to have a core education that serves as the basis for all subsequent career paths in pediatrics; indeed, it might be less than the current 36 months (or 33 months exclusive of vacation) of training. In fact, only 24 of the 36 months are specifically required by the Accreditation Council for Graduate Medical Education. Use of the remainder of time is often driven by some combination of local workforce needs and firmly held notions of what is needed to be a “complete” pediatrician. The necessity of lifelong learning was affirmed, with the possibility that experience in practice might be combined with more traditional training linked to a medical center.

Although the future of health care for children is uncertain, it is likely that there will be teams of practitioners who will do their best to provide a medical home. Teams will likely be led by a pediatrician or group of pediatricians who provide or direct more specialized aspects of care. This may be part of a regional network linked to an inpatient facility. The need for children to have access to health care was reaffirmed. Failure to provide access will only add to the cost of care, reduce the quality of care for the children who receive sporadic attention, and increase the burden to society. Moreover, there was consensus that a medical chart, which could be shared among caregivers and “owned” by the patients, would facilitate consistency of care.

Although there was agreement on the concepts above, there was also acceptance that substantive controversies persist. For example, it is not clear how continuity will be sustained with multiple providers of care. Will hospital care and nonhospital care be provided by the same individuals or groups? Who will provide mental health care for children and adolescents? How can the rapidly expanding body of knowledge critical to care of children be incorporated into a fixed time frame, especially when learners assimilate at different rates? Given the importance of providing work-life balance and the increase of part-time professional commitment, how do we sustain a workforce of pediatric practitioners? With these thoughts in mind, the first colloquium ended with a sense of the extraordinary challenge of educating pediatricians to optimize health care for children within an uncertain social environment and with an uncertain workforce and an ever-increasing body of information. Hence, a major theme that emerged was that residency must be considered as only one part of the continuum of lifelong learning and that it should provide the foundation and tools to pursue and sustain that learning in the most effective fashion.
Pretambule: Uncertainties about the future of pediatric health care, along with uncertainty as to the ability and willingness of the public to pay for that health care, argue for models of pediatric education that are flexible enough to provide for a variety of professional futures. The R/P Project recognizes that there are a number of factors that must be considered as part of a comprehensive evaluation of the current status of pediatric residency education and the necessary refinements for future pediatric residency education over the next 15–20 y. These include the following:

Changes in society and health care
A shift in the causes of health-related morbidity and mortality in children and adolescents from acute to chronic illnesses and disorders as well as greater appreciation of the importance of the prenatal period and childhood to the occurrence of disease throughout the life course;
Changes in families that may impede access to health care, especially more single-parent families and families in which both parents work;
Increasing cultural diversity of children and parents, with a corresponding need for effective ways of increasing cultural competence and cultural diversity of the pediatric workforce;
Changes in biomedical and psychosocial knowledge, as well as diagnostic and treatment methods;
Changes in information technologies that affect access to health care information by health professionals, patients, and families, and the exchange of information among them; and

Changes in the expectations of the pediatric workforce, with more individuals seeking part-time employment and, in general, a greater emphasis on family and personal priorities.

The current and future practice of pediatrics
General pediatricians will continue to be the experts in offering a comprehensive approach to health care for children and adolescents, especially those with chronic physical, mental, developmental, and behavioral disorders. Pediatric education must ensure that distinct pediatric expertise in this regard continues to be maintained and enhanced.

The professional practices of pediatricians in large cities with ready access to subspecialists tend to differ from practices in smaller cities or rural locations; roles also vary with the staffing structure of pediatric practices and local practice demographics. Pediatric education needs to acknowledge this diversity.

Pediatric health care is increasingly delivered by teams of professionals from health care and the community working in concert with patients and parents.

Pediatric education must foster the development and maintenance of the leadership, collaboration, and communication skills needed to function within such teams.

Flexibility for multiple career paths and child health needs
Education in pediatrics must be flexible, acknowledging the diversity of pediatric practice and the variety of practice settings that exist now and will exist in the future.

The current model of education must be compared with alternatives that allow for greater differentiation according to career goals.

Certification and maintenance of certification must be correspondingly flexible. Maintenance of certification must be able to accommodate reentry into practice after prolonged absences, as well as midcareer changes in type of practice.

Changes in the educational process
No single educational method will suffice for pediatric education. The general principle, however, is that education must facilitate active personal ownership of learning; the process of training must foster reflective practice and develop the skills of self-directed lifelong learning.

The expectations for pediatric education must be articulated and staged along the educational continuum, from medical school to resident education to continued, career-long professional development. Better use of the fourth year of medical school to enhance pediatric education should be explored.

The &quot;basic science&quot; requirements for the study of pediatrics should be reexamined and possibly modified in content and timing of learning.

Pediatric residents are closely supervised; opportunities for independent decision-making, even for advanced residents, are limited. The period of transition from residency to workplace or to the next phase of training and education has become progressively important and should be critically analyzed.

The principles of continuous quality improvement must be taught in such a way and by example. Patient care and education must both be based on evidence when evidence exists, and both must be reevaluated continuously according to measured outcomes.

Pediatric health care is patient and family centered. The advice and counsel of patients and parents must be used in the design of education programs for pediatricians.

Pediatricians must understand the principles of public health (ie, the health of populations as well as the health of individuals) to be effective care providers and advocates for children. This perspective must be incorporated across different stages of the educational process.

Evaluation of achievement of clinical competencies during residency requires appropriate mechanisms and competent evaluators. Programs to ensure competency in evaluation are urgently needed.

### Table 1

**Themes**

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### Distillation

In addition to the list of suggestions for revisions of the program requirements, participants of the colloquium created a list of themes that should be considered in the conduct of pediatric residency education. This important and lasting product of the colloquium was drafted at the first colloquium, reevaluated by using e-mail questionnaires, reviewed at the second colloquium, and put into final format by the R/P Committee (Table 1).

Colloquium participants struggled with important interactions or unintended consequences that would be unveiled by modifications in residency education. Among the most important outcomes of this first colloquium was that it set the stage for future discussions with the idea that residency is only part of an entire educational process to promote a fulfilling professional career for pediatricians as it supports the very best care for children.

### Acknowledgments

The R/P Committee thanks Drs Tina Cheng, Paul Miles, Ed Schor, and Paul Wise, who attended the first colloquium as guests. Their guidance was so important that we asked them to join the project and attend each subsequent colloquium as advisors. Dr Miles has participated in virtually all committee meetings as well and has been a continual source of wisdom and guidance.

### References


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