

# Pediatrics in the Year 2020 and Beyond: Preparing for Plausible Futures

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## KEY WORDS

pediatrics, future, leadership, innovation, change management

## ABBREVIATIONS

AAP—American Academy of Pediatrics

VOP—Vision of Pediatrics

HIT—health information technology

EHR—electronic health record

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## abstract

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Although the future of pediatrics is uncertain, the organizations that lead pediatrics, and the professionals who practice within it, have embraced the notion that the pediatric community must anticipate and lead change to ultimately improve the health of children and adolescents. In an attempt to proactively prepare for a variety of conceivable futures, the board of directors of the American Academy of Pediatrics established the Vision of Pediatrics 2020 Task Force in 2008. This group was charged to think broadly about the future of pediatrics, to gather input on key trends that are influencing the future, to create likely scenarios of the future, and to recommend strategies to best prepare pediatric clinicians and pediatric organizations for a range of potential futures. The work of this task force led to the development of 8 “megatrends” that were identified as highly likely to have a profound influence on the future of pediatrics. A separate list of “wild-card” scenarios was created of trends with the potential to have a substantial influence but are less likely to occur. The process of scenario-planning was used to consider the effects of the 8 megatrends on pediatrics in the year 2020 and beyond. Consideration of these possible scenarios affords the opportunity to determine potential future pediatric needs, to identify potential solutions to address those needs, and, ultimately, to proactively prepare the profession to thrive if these or other future scenarios become realities. *Pediatrics* 2010;126:971–981

As a profession, pediatrics finds itself at the brink of its next evolution. Forces of change that once drove the profession are giving way to new ones, and the speed of that change is accelerating rapidly. There is near consensus among pediatric leaders that preservation of the status quo is not an option and that proactive adaptation to the complex changing environment that surrounds and penetrates pediatrics is vital if it is to survive and thrive.<sup>1–3</sup> Pediatrics must change, and it must do so strategically.

The need to better prepare for the future resonated strongly with the American Academy of Pediatrics (AAP) Board of Directors, and in January 2008 it established the Vision of Pediatrics (VOP) 2020 project to catalyze an innovative visioning and planning process for the AAP. In this article we outline the VOP 2020 scope and methodology and present 8 “megatrends” that were identified by the task force as most likely to profoundly influence the future direction of the profession. The accompanying article in this issue of *Pediatrics*<sup>4</sup> offers a framework to assist the field of pediatrics in envisioning a range of possible futures with the hope of inspiring action that can lead to strategic change.

## SCOPE AND METHODOLOGY

In establishing the VOP 2020 the AAP Board of Directors appointed a task force with broad representation of the AAP membership and asked it to (1) identify the most critical forces likely to shape the future of the profession, (2) envision what the day-to-day specific results of these forces might be for pediatric clinicians, and (3) suggest opportunities to help individuals and organizations prepare for possible futures that might influence pediatrics.

To address the question of what forces are most likely to shape the future of pediatrics, the task force instigated 3 data-collection efforts. First, the VOP 2020 Task Force conducted an extensive literature review within and outside pediatrics and reviewed other recent visioning and planning efforts.<sup>5-7</sup> On the basis of this work, the task force identified 48 forces that were likely to influence pediatric health and practice. Second, the task force sent an electronic survey to all elected and appointed leaders of the AAP ( $n = 320$  [240 responded]) and asked them to rank these 48 trends along two 5-point scales that designated the overall importance of the trend in shaping the future and the likeliness that the trend would actually occur. The task force also submitted a similar survey to the entire AAP membership ( $n = 60\ 000$  [4555 responded]; demographics of the respondents closely approximated the overall demographics of the AAP membership). Third, members of the task force conducted qualitative interviews with thought leaders both within and outside the profession of pediatrics ( $n = 22$ ). Interviewees represented the perspectives of pediatric practice, academic pediatrics, board certification, family practice, public health, psychologists, pediatric nurses, child health researchers, industry, and parents. Task force members consoli-

**TABLE 1** Initial List of 19 Trends Generated by the VOP 2020

Domain	Trend
Population/society	The number of children with long-term chronic illnesses continues to increase An increasing number of families in the United States have health care insurance through 1 program or approach or another The number of children and parents from different cultures continues to increase
The public and health consumers	There is an increase in mental health concerns and conditions in children Consumer data and information will exert greater influence over health care choices Expectations of families to play a larger role in making health care decisions increases The public's growing desire for accountability and transparency continues to increase
Health issues	Focus on prevention increases The ability of science to effectively address major health problems of children increases The number of parents seeking exemptions from immunizations continues to increase The number of practices that provide family-centered, coordinated care (medical home) is increasing
Health finance/regulation	The US national policy- and decision-making culture is increasing its focus on families Fair compensation for pediatric health care services increases
Workforce	The number of potential career paths in pediatrics continues to expand Workforce shortages in pediatrics persist
Practice issues	The number of practices with EHRs continues to increase The number of practices working with community leaders/organizations continues to increase (public health, schools, etc) Number of alternative models and sites for children to receive care (retail based clinics, etc) is increasing. The number of practices implementing quality-improvement initiatives continues to increase (certification by National Committee for Quality Assurance, etc)

dated data from these 3 sources and identified 19 trends that were consistently endorsed as having the greatest potential influence on the future of the profession (see Table 1). A separate list of "wild cards" was developed to outline trends that could have a substantial influence but were deemed unlikely to occur (see Table 2).

The VOP 2020 then embarked on a process of envisioning the potential influence of these trends on pediatrics. The VOP 2020 chose to use scenario-planning to foster this process. Scenario-planning,<sup>8-13</sup> originally designed by the Royal Dutch-Shell company, is increasingly used by businesses, the military, and policy-makers to identify and plan for a range of potential, plausible futures. Scenario-planning is particularly effective when the goal is not to seek a single "answer" but to envi-

**TABLE 2** Wild-Card Trends Identified Through the VOP 2020

Domain	Example
Societal changes	Large pandemic or major disease World famine or drought A disaster necessitating resettlement War on US soil
Health advances	Gene therapy able to provide true and effective cures Change in birth rates Universal health insurance Cure for autism
Economics	US and global economies collapse Greater disparities between rich and poor Decline or exponential increase in cost of higher education
Work-life balance	Access to high-quality child care with job security Implementation of a 56-h week for residents Changes in family planning policies

**TABLE 3** Steps for Successful Scenario Planning

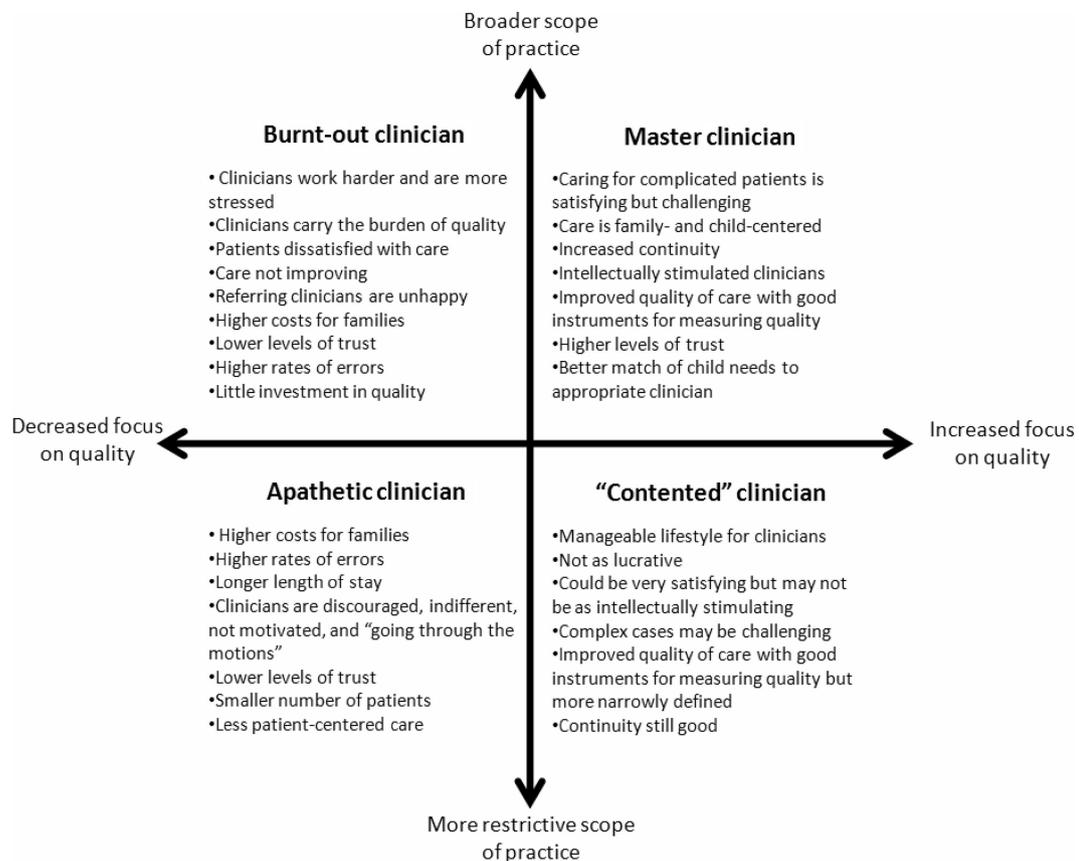
Step 1: Identify the focal issue or decision: What is keeping you up at night?
Step 2: Identify the key forces in the local environment: What will decision-makers want to know when making key choices? What will be seen as success or failure? What are the considerations that will shape these outcomes?
Step 3: Identify driving forces: What are the macro forces behind the forces listed in step 2?
Step 4: Rank by importance and uncertainty: To what degree is the success of the focal issue or decision identified in step 1 important? What is the degree of uncertainty surrounding factors and trends?
Step 5: Create scenario logic: Map plausible scenarios in a spectrum framework (an axis, matrix, or volume)
Step 6: Flesh out the scenarios: Who? What? Where? When? Why? How?
Step 7: Determine the implications: How does the decision look in each scenario? What vulnerabilities have been revealed?
Step 8: Conduct a strategic conversation to prepare for the future: Select leading indicators, signposts, and adjustment plans

Adapted from Schwartz P. *The Art of the Long View: Planning for the Future in an Uncertain World*. New York, NY: Doubleday; 1996.

sion and prepare for a variety of possibilities. In essence, scenario-planning parallels the thought process a neonatologist, for example, might follow when anticipating, planning, and preparing for the uncertain future of an extremely premature newborn infant. By applying the step-by-step process of scenario-planning (Table 3) to identify possible future realities, those using this process have the opportunity to be more prepared to “make strategic decisions that will be sound for all plausible futures.”<sup>10</sup>

One common method used to assess the potential influence of various factors in scenario-planning is to contrast 2 trends in a matrix (with 2 axes yielding a 2-by-2 table) in which 4 different future scenarios can be identified. As evidenced in the example provided in Fig 1, when crossing 2 trends, the 4

possible scenarios are described in detail and labeled in accordance with the overall themes they create. This process can be repeated as often as necessary to ensure that all the critical trend combinations are addressed. Using this methodology, the task force consolidated the 19 trends into 8 critical megatrends that were anticipated to have the most profound influence on the future of pediatrics (see Table 4). The task force then reviewed each of the megatrends on a unilateral axis to develop 3 possible futures: a “best-case,” a “worst-case,” and a “most plausible” scenario. It is important to note that the most plausible scenario represented the consensus of the group, given the known demographics and realities of the current time. In scenario-planning, it is essential to avoid considering the most plausible

**FIGURE 1**

Scenario-planning, crossing trends: the 4 scenarios defined by combination of the 2 trends “scope of practice” and “quality.”

**TABLE 4** Eight Megatrends Identified Through the Scenario Process of the VOP 2020

1. Changing demographic and clinical characteristics of children and families
2. Burgeoning HIT
3. Ongoing medical advances
4. Alterations in health care–delivery system(s)
5. Growth of consumer-driven health care
6. Dynamics of pediatric workforce
7. Disasters (environmental, infectious, man-made)
8. Globalism

scenario as a “single-point forecast,” because the advantages of having considered multiple scenarios would be lost.<sup>8,10</sup>

The 3 scenarios for each megatrend are outlined in Table 5. We present below a brief summary of each of the 8 megatrends, describe the contextual background related to the megatrend, and then highlight important themes within each scenario. For the sake of brevity, only a few key characteristics of the 3 scenarios are presented in the table and text for each megatrend; additional information is available on the VOP 2020 Web site ([www.aap.org/visionofpeds](http://www.aap.org/visionofpeds)). We particularly focus on the controversial questions that we as a profession need to ask ourselves if we are to anticipate and lead change. The accompanying article<sup>4</sup> provides a framework for this process and presents proposed future actions identified by the task force.

## FINDINGS

### Megatrend 1: Changing Demographic and Clinical Characteristics of Children and Families

#### Current Context

The clinical, social, and cultural demographic mix of children and adolescents (hereafter “children”) and their families is increasingly complex. Clinically, the prevalence of complex chronic health issues (eg, asthma, obesity, mental health and develop-

mental disorders) in children continues to increase,<sup>14,15</sup> and more children with previously fatal disorders are surviving into adulthood.<sup>16–21</sup> Socially and demographically, the child population is projected to be increasingly diverse by 2020.<sup>22,23</sup> There is also evidence for growing disparities in child health. Families and children of immigrant origin and people of color face significant barriers in accessing health care services including limited resources, poverty, language barriers, lack of insurance, poor access despite insurance, and discrimination.<sup>24</sup> At the same time, children living in poverty are especially vulnerable to poor health outcomes including violence, abuse, and physical and mental health problems.<sup>25</sup> Currently, more traditional models of practice are strained to provide innovative models of care that feature more team and community-based medical homes that focus broadly on these and other issues in child health.

#### Scenario Themes

The 3 scenarios presented in Table 5 raise a number of issues for the field to address in preparing for 2020. Specifically, we as a profession need to grapple with how we will redefine the roles of pediatricians, hospitalists, subspecialists, allied health professionals, families, and other child-serving professionals as well as the protocols, procedures, and settings in which we will care for children. As a profession, will we endorse new models of care for children with chronic disorders that are conducive to incorporating advances in medical care while permitting the vast majority of children to be managed from home? Will we adopt the AAP Mental Health Task Force’s call for increased management of mental health care in primary care settings and advocate for new models of reimbursement and care? How will we bal-

ance and distribute resources to ensure the availability of preventative care and the coordination of care for children with complex medical needs in a culturally sensitive and ethically fair way? The changing sociodemographics of children and families also raise issues as to whether pediatrics will increasingly address health problems that are rooted in sociodemographic determinants of health and, therefore, may require more population-based prevention and intervention strategies. The scope and extent to which pediatric clinicians take accountability for these health issues will, in part, define the long-term direction of the profession.

### Megatrend 2: Burgeoning Health Information Technology

#### Current Context

In 2010, health information technology (HIT) is being adopted at an accelerating pace.<sup>26</sup> Increased use is correlated with increasing pressure from government agencies and payers to require electronic health records (EHRs) to drive quality measurement and payment.<sup>27</sup> Concurrently, initiatives have been developed to advance patient-centered pediatric care through the increased exchange of information from multiple sources and personalized patient records.<sup>28</sup> Consumer demands are increasingly focused on personalized medicine, telehealth, and communication technologies. Despite these pressures, adoption and implementation of EHRs in pediatrics lag behind other medical fields,<sup>26</sup> and technology-based tools for shared decision-making and management are most often limited to local demonstration projects. The profession and the public also struggle with ethical questions surrounding health data and the implications of providing information security.

**TABLE 5** Best-Case, Worst-Case, and Most Plausible Scenarios Identified Through the VOP 2020

Megatrend	Worst-Case Scenario	Most Plausible Scenario	Best-Case Scenario
Changing demographic and clinical characteristics of patients and families in the United States	US societal health attitudes and behaviors unchanged; poor health outcomes; disparities increase	United States struggles to redefine priorities and philosophies related to societal health issue	United States experiences a mass societal attitude shift toward a focus on pediatric health
	Children lack preventive and comprehensive care	Without focus on prevention and adequate coordination, overall pediatric health outcomes worsen	All children receive preventive, comprehensive, well-coordinated health care
	Children with chronic conditions and mental health needs lack coordinated, accessible care	Innovative demonstration projects yield success for chronic conditions and mental health issues; mass dissemination remains elusive	Mental health prevention and treatment are integrated into primary care pediatrics
Burgeoning HIT	Exposure to environmental stress and toxins increases	Pediatric providers fail to adequately address the impact of environmental stress and toxins	Reduction of environmental stress and toxins integrated into primary care pediatrics
	Disparities exist among practices and systems regarding HIT adoption as the high cost of information-technology systems slows implementation	Government-funded mandates, practice, and system consolidation drive accelerated change in design, development, and use of HIT	All physician practices and hospital systems operate off an EHR
	Poor interoperability increases workload and error	HIT adoption efforts highlight interoperability and ethical considerations as critical challenges	Public and private alliances create the framework for EHR interoperability
Ongoing medical advances	HIT systems not designed with quality measurement in mind	Increased integration of HIT into quality measurement and continuing medical education	Every physician uses HIT regularly to measure quality
	Cost to access new medical technologies widens health disparities	Advances in medical knowledge, new diagnostic tools, and treatment options accelerate	Breakthroughs demonstrate that many life-threatening illnesses can be controlled or eliminated
	Breakthroughs stagnate	Providers struggle to validate, translate, and integrate new knowledge into practice	Alignment of federal funds with public and private alliances translates breakthroughs into practice
Alterations in health care–delivery systems	Practices unable to handle ethical considerations inherent to new technologies and treatments	Medical technologies expand scope of practice with emphasis on ethics of need to counsel patients regarding new treatment options	Discussions around medical ethics lead to transformational thinking and shifting societal attitudes
	Resistance to change widens gaps between health care delivery and societal needs	Prioritization of testing new care models	US health system invests heavily in primary care prevention and medical home infrastructure, aligning payment to preventive care
	Health care payment systems prioritize expensive episodic acute care management over preventive and chronic care coordination; providers unwilling to care for youth with chronic conditions	Innovative modeling and quality projects integrate critical components of the medical home model into practice	Rapid expansion and adoption of medical home models lead to lower costs, more providers, and improved outcomes
Growth of consumer-driven health care	Scope-of-practice battles increase mistrust within the health system and among consumers	Uncertainty remains regarding the appropriate scope of practice for various pediatric health care providers	Physicians, nurses, and allied health professionals work together seamlessly to provide high-quality cost-effective care
	Misinformation confuses consumers, resulting in poor decisions and health outcomes and decreased trust	Individual practices make an increasing investment in HIT to ensure that patients and families have access to accurate information	Families gain easy access to high-quality, valid health information and assume more responsibility for their child's health
	Practices and health systems fail to invest in consumer services, leading to dissatisfied patients and families	Individual practices increase investments in consumer services and facilitate communication, information exchange, reminders, and logistical access	Families connect with their providers through communication technology, improving quality of care
	Practice and service outcome data are manipulated as part of marketing campaigns to drive patient business	Hospitals and health systems require sharing of outcome data in the public domain	Publicly shared health systems data incentivize practices to improve quality

**TABLE 5** Continued

Megatrend	Worst-Case Scenario	Most Plausible Scenario	Best-Case Scenario
Dynamics of the pediatric workforce	Significant provider shortages and maldistribution contribute to poor health outcomes	Innovative solutions align resources to improve distribution of physicians in some areas	Primary care, medical subspecialty, and surgical specialty workforce meet growing patient needs, and roles for nonphysician providers are clearly defined to help meet these needs
	Training does not prepare graduates	Need for improved pediatric training, career development, and increased accountability drives some change	Pediatric training teaches future practice models and needs and is well funded
	Work/life challenges and high debt drive increasing number of pediatricians into alternative careers	New practice models are developed to address personal needs of pediatricians	Family, work, and work/life balance is achieved through debt-relief programs and innovative practice models
Disasters	The frequency and intensity of disasters exceed expectations and resources	More frequent and intense disasters physically and fiscally threaten practices and their patients and families	Societal and community preparation mitigate preventable disasters and minimize damage and loss caused by natural disasters
	Community response and resources are fragmented and isolated, leaving a vulnerable population at extreme risk	Disaster preparation, mental health counseling, and community service connections increase in demand for both pediatricians and patients	Children and families are prepared to respond to a disaster and have adequate access to support services
	Pediatricians disregard opportunities to increase community planning and response	Pediatricians play a greater role in the community disaster-response team and become an increasingly high priority for all levels of government	Pediatricians and families advise all levels of government in disaster-planning and use health infrastructure to promote preparation and safety
Globalism	US health system remains isolated and ignores global health delivery and outcomes	Social and political effects of globalism grow, and policy formulation remains slow	US establishes a clear vision and responsibilities as a cooperative member of the global health community
	US academic medical centers are relatively isolated from one another and the rest of the world's academic communities	Practices innovatively adapt to culturally diverse patient populations	Global communication networks and technologies expand health expertise and opportunities for consults and Web-medicine
	Pediatric clinicians encounter more rare diseases as cultural diversity and world travel increases	International sharing of pediatric research creates "centers of collaborative excellence"	Global, virtual research communities and centers of excellence are optimized, providing resources for treatment of rare diseases
	US citizens search abroad as payers incentivize patients to seek inexpensive, quality care out of the country	US hospitals have difficulty competing on global scale, improvement opportunities arise but are not always implemented	US health care reform makes hospitals' price and quality competitive to international care options

**Scenario Themes**

In all identified scenarios for the year 2020, significant pressure from governments, payers, and the public will accelerate integration of critical technologies into pediatric practice. Larger practices, in both academic and private settings, will develop strategic HIT-implementation plans and surge ahead of smaller practices, which will create enormous financial and time pressure to transform. With growing disparities across systems and networks, opportunities to link to

larger, coordinated systems of care may seem increasingly attractive to manage the ongoing burden of expense and personnel time to develop, improve, and maintain HIT systems. Yet, how will the profession balance this tension between interoperability and the need to allow healthy competition between heterogeneous systems? In the years ahead, will the increasing use of technology improve quality measurement and the ability to provide demonstrable evidence of a practice's ability to improve quality in a cost-

effective manner? Or, will the high cost of HIT systems widen disparities of quality among practices?

**Megatrend 3: Ongoing Medical Advances**

*Current Context*

Advances in medical knowledge, diagnostic tools, and treatment options are accelerating, creating entirely new fields of science, and fostering positive health outcomes.<sup>29</sup> Specifically, genomics, molecular biology, nano-

technology, computer simulation, artificial intelligence, and robotics are all emerging as fields that are increasingly present.<sup>30</sup> However, expenses to develop new medical technology are high, which leads to disparity in health outcomes between those who can and cannot afford to pay themselves.<sup>31</sup> In addition, access to medical information and diagnostic tools from a variety of media has a tendency to prompt patients to request diagnostic and treatment options regardless of whether they are medically appropriate and to shift some medical decision-making to patients themselves.<sup>32</sup>

Pediatric professionals are experiencing a dramatic change in scope of practice with a broader focus on patient counseling and the need to help families interpret information and test results.<sup>33</sup> Although increasing levels of evidence-based practice, outcomes research, and comparative effectiveness research exist, the implementation and acceptance of these findings is typically slower in coming.<sup>34</sup>

### *Scenario Themes*

Advances in medicine will have profound implications on the health care system and the pediatric professional's everyday life. As the pace of new breakthroughs accelerates, the extent to which these novel treatment options will ultimately lead to elimination of disease and reduction of disparity remains unclear. How much will the cost of new technologies widen the same health-disparity gaps that these new innovations are seeking to eliminate? Will the integration of these new breakthroughs stagnate as a result of inadequate funding and partnerships to allow incorporation of new technologies into practice? Although the use of new medical advances may be a differentiator for families in choosing a practice or provider, clinicians will struggle to determine the relative validity and

value of new treatments as they emerge without appropriate guidance. In this age of advancing technologies, pediatric providers will also increasingly encounter ethical dilemmas as they help patients determine what can and should be reliably known and as they work to ensure that clinical trials are structured in such a way that safety and efficacy evaluations are pediatric focused.

### **Megatrend 4: Alterations in the Health Care–Delivery System(s)**

#### *Current Context*

The US health care–delivery system is inefficient, lacks uniform quality, and is unsustainable in its current form.<sup>34</sup> Without change, many experts agree that the result would be disastrous on an economic and societal level.<sup>34,35</sup> Many believe that a new health care–delivery system should provide care that shares responsibility between individuals, integrated providers, and communities and that such a system should foster access to affordable, comprehensive, and high-quality coverage.<sup>2</sup> Discussion and implementation of a model to reshape the delivery system is challenging the values of our nation. Debate over these values and alignment to a new delivery system is forcing a slowing in implementation, because vast gaps exist between the status quo and the desired state. Children have traditionally been at particular risk in these discussions, because policies are most often developed with a focus on adults.<sup>36</sup>

#### *Scenario Themes*

The health care–delivery system as it currently stands is unsustainable. However, resistance to change may impede the widespread implementation of promising care-delivery systems such as the medical home model. The extent to which payment systems prioritize acute care management over

preventive services and care coordination may further hamper the extent to which providers are able to offer well-coordinated, high-quality care to children with chronic medical problems. As health care–delivery systems continue to evolve, so too will the roles of pediatric clinicians and subspecialists. Scope-of-practice and payment deliberations among pediatricians, subspecialists, and other health providers are critical but may threaten to slow transformation within pediatrics if consensus cannot be reached.

### **Megatrend 5: Growth of Consumer-Driven Health Care**

#### *Current Context*

Consumer involvement in health care is an expression of the growing public desire for a more accountable and transparent US health care system.<sup>37</sup> As consumers become involved in their own health care, they greatly influence the health care industry. Eight of 10 Americans regularly access online resources for health information.<sup>39</sup> Widespread use of the Internet allows consumers to compare, coordinate, and purchase health services. Many consumers with Internet access base their health decision-making on medical information available online.<sup>38</sup> Although the use of online resources may lead to better-educated consumers, Internet-acquired health knowledge is often not objective because it may be decontextualized and, therefore, easily misunderstood.<sup>39</sup> As a result of this available information, consumers may feel less confident in their medical providers,<sup>40</sup> who have few opportunities to challenge Internet-based information.

#### *Scenario Themes*

To remain competitive, pediatric clinicians of the future will need to respond to the needs of informed and connected consumers. Consumers of

health care will become more involved in their own health monitoring with new devices and will accept more responsibility for sharing health information and managing aspects of their care. Although some practices and health systems will serve as “trusted health communication and education centers” through Web sites and other advanced communication and messaging technologies, others may fail to invest in consumer services, thereby leading to dissatisfied patients and families. To what extent will the misinformation that stems from inaccurate or absent information result in poor patient and family health decisions and decreased trust? Will those practices that commit to ensuring that patients and families have easy access to high-quality, valid health information contribute to improved health outcomes and patient satisfaction? Patients and families will also increasingly seek outcomes data before selecting specific providers. Avoiding manipulation of these data while incentivizing practices to engage in healthy competition to improve quality may be a delicate balance.

## **Megatrend 6: Dynamics of the Pediatric Workforce**

### *Current Context*

The pediatric workforce faces significant change in the future. As medicine has evolved to be more inclusive of a broad demographic of physicians, there has been a corresponding evolution of the workforce demands for innovation, flexibility, work-life balance, and diversity in academic and practice options.<sup>41,42</sup> This evolution has also occurred in the context of remarkable advances in the science of medicine and technology, a focus on safety, and quality improvement. As new medical advances and technology emerge at record pace,<sup>30,43</sup> the need for specialization and subspecialization across all professions is more important

than ever. There is concern that pediatric residency training does not adequately prepare pediatricians for the significant diversity of practice settings.<sup>44</sup> In addition, despite evidence that suggests that medical students from minority backgrounds are more likely to care for underserved patient populations,<sup>45</sup> there have not been substantial increases in the proportion of medical school graduates from underrepresented minority groups over the past 30 years.<sup>46,47</sup> The challenge of increasing medical student debt load is a key factor that is affecting the ability to attract students from diverse backgrounds to medical school and pediatrics.<sup>48</sup> Also, there exists a poor geographic distribution and limited number of pediatricians, subspecialists, and surgeons.<sup>49–51</sup> In turn, an increasing variety of providers are giving care to children, most notably hospitalists and nurse practitioners.<sup>52,53</sup>

### *Scenario Themes*

The structure of the pediatric workforce will continue to adapt and evolve; however, these changes may not be aligned with the changing nature and needs of the health care—delivery system. Workforce shortages present a significant challenge. In the future, will these provider gaps lead to the development of innovative workforce models that leverage technology, long-distance medicine, and the use of allied health professionals to fill critical care gaps? Or, will there be a persistent maldistribution and shortage of pediatric providers that lead to worsening health outcomes for children? To meet the needs of patients and families, a team approach to care is widely accepted as the most viable solution. Yet, this is not an easy transition, because scope-of-practice issues and shifting roles and responsibilities create resistance to, and slow, change. Team models should be studied carefully to determine the extent to which

they positively influence quality of care, patient and family satisfaction, and satisfaction of the pediatric workforce. To attract and retain a primary care workforce, practices and systems of care may develop innovative staffing models that provide solutions for career and life balance such as job-sharing, off-hours e-medicine, use of allied health professionals with physician access and supervision, and debt management. Medical schools and pediatric training programs will also continue to evolve along multiple pathways of depth, scope, philosophy, and quality, which in turn will influence the degree to which pediatric providers are prepared to practice in the future.

## **Megatrend 7: Disasters (Environmental, Infectious, Man-made)**

### *Current Context*

An increasing frequency and severity of economic, nutritional, and environmental threats to the health of the world’s children exist as a result of natural, environmental, and man-made disasters caused by global climate change, deforestation, population growth, pollution, species extinction, and environmental toxins.<sup>50,54</sup> A near doubling of the percentage of people who live in urban areas has led to an increased potential influence of these disasters.<sup>55</sup>

Most of the world’s children are in the cross-path of the most common disasters, particularly in the developing world, and are extremely vulnerable to the long-term effects of toxic water, air, etc.<sup>56</sup> The physical and psychological influence of disasters has been identified as an increasing component of pediatric practice as providers teach prevention and survival skills and engage in emergency community responses.<sup>57</sup> Yet, systems are lacking to prepare families to address children’s health needs in disasters.<sup>58</sup>

### Scenario Themes

Over the next 10 years, disasters will continue to occur as a result of imbalances in the Earth's geophysical and geopolitical climate, even as attempts are made to correct these imbalances. In the future, the extent to which pediatricians, families, and government agencies prepare for and anticipate these disasters will likely have a dramatic influence on the ultimate response and outcome. Will community organizations and local governments be prepared to minimize the impact of natural disasters and mitigate preventable disasters? Or, will a lack coordination of community resources leave a vulnerable population at significant risk as the frequency and intensity of disasters exceed expectation? The role that pediatric clinicians will play in these responses will also be critical, because an increasing number of disasters will require that providers respond to ensuing medical and economic disparities as well as increasing mental health needs that result from each catastrophe.

### Megatrend 8: Globalism

#### Current Context

The vast majority of children in the world (90%) live outside the United States in developing nations where environmental hazards and infectious diseases are more common.<sup>59</sup> Children's health is increasingly influenced by globalization, industrial development, income growth and distribution, economic instability, availability of health resources, migration, and facilitation of travel. Key health gains occur in countries where globalization efforts are appropriately managed, whereas other countries in which globalization efforts remain random continue to be more affected by issues of poverty, food insecurity, and social environmental hazards.<sup>60</sup> Globalization fosters the spread of acute infectious diseases as well as

chronic diseases such as obesity and diabetes.<sup>30,61,62</sup>

### Scenario Themes

In the future, pediatric professionals possess an opportunity to determine the role that pediatrics will play in ensuring an adequate distribution and availability of global health resources and providers. Advances in communication, medical imaging, and robotic technologies will facilitate global medical consults with the world's experts. As new communication technologies create broader opportunities to link pediatrics in a global network, it will be important to assess ideal methods of delivery and to evaluate the social and political implications of globalism. Global centers of excellence and virtual global learning communities may be established more frequently in research and practice. Will the role of these centers be optimized in the future and prompt a better-coordinated response across nations to promote health improvement? As health reform pushes forward in the United States, it will be important to assess how US hospitals can best learn from global partners to offer high-quality, cost-effective care for all.

### CONCLUSIONS

The work of the VOP 2020 Task Force represents an innovative approach to proactive preparation for plausible futures. The 8 megatrends we have listed offer a description of several possible trends that were predicted to likely influence the future of pediatrics. With a knowledge and understanding of the above-described megatrends, pediatric clinicians have an opportunity and responsibility to play an important role in shaping the future of their careers and, collectively, of the pediatric health care—delivery system, as described in the accompanying article.<sup>4</sup>

It is important to note several limitations of this work and methodology. Al-

though the task force was selected with the aim of representing many viewpoints, all task force members inevitably have personal biases that may have affected the content of this work. Particularly, we are aware that the trends are heavily biased toward pediatric care in the United States. In addition, our identification of a most plausible future for each of the megatrends should not narrow the focus of discussion to the exclusion of other possible futures. In fact, over the course of the project, changes occurred related to both the megatrends and the wild-card trends that were not anticipated in the most plausible scenarios. Nevertheless, the VOP 2020 process served to catalyze changes in the AAP strategic planning process. We hope this article also prompts individuals and other groups within the pediatric community to begin their own planning process to shape our future. By applying the methodology and skill set described in the accompanying article,<sup>4</sup> those in the profession of pediatrics have the opportunity to collaborate in the creation of a new planning process for the future, for which the goal is not to determine “the end” but instead to anticipate, plan for, shape, and thrive in any end that may manifest itself as reality.

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