



**A HIGH-PERFORMING SYSTEM FOR WELL-CHILD CARE:  
A VISION FOR THE FUTURE**

David Bergman, Paul Plsek, and Mara Saunders

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**ABSTRACT:** Well-child care is a broken system. The “one-size-fits-all” approach of well-child care in the U.S. subjects many families to unnecessary visits, while many others do not receive needed services because of time or resource constraints. This report presents a vision for a high performing system of well-child care and a guide for future policy and research efforts. To develop the new framework, the authors reviewed prior research studies, posed discussion questions on listservs for general and academic pediatricians, and convened child health experts, including providers and parents, to discuss best practices and innovations. They conclude that an ideal system would include advanced access to services, team-based care, individualized developmental and behavioral screening, care coordination through a medical home, electronic health records, and tools for information and knowledge transfer. Some reforms are ready to be implemented, while others would require additional resources, new technology, and/or policy changes.

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## ABOUT THE AUTHORS

**David Bergman, M.D.**, is an associate professor at Stanford University School of Medicine. His research has been focused in the areas of practice guidelines and quality improvement, the redesign of clinical services, and the use of Web-based patient portals to treat chronic illnesses and the resulting impact on doctor-patient communication. Dr. Bergman serves as director of the board of the National Initiative of Child Health Quality and is a former chairman of the American Academy of Pediatrics Quality Improvement. He is also a member of the executive committee for Child and Adolescent Health Measurement. Dr. Bergman remains clinically active and is actively involved in providing well-child care to children. He received an M.D. from the University of Illinois School of Medicine.

**Paul Plsek, M.S.**, works as a consultant on improvement and innovation for complex organizations. His health care clients include the United Kingdoms' National Health Service, Kaiser-Permanente, the Veterans' Health Administration, the SSM Health Care System, the Virginia Mason Medical Center, and the Institute for Healthcare Improvement. He is the chair for innovation at the Virginia Mason Medical Center in Seattle; a former senior fellow at the Institute for Healthcare Improvement; an active investigator in research projects with the Vermont-Oxford Network, Agency for Healthcare Research and Quality, and the Institute of Medicine; and a conference speaker. Before starting his own firm, he was director of corporate quality planning at AT&T. He is the author of dozens of peer-reviewed journal articles and three books. Mr. Plsek received an M.S. in electrical engineering from the Polytechnic Institute of New York.

**Mara Saunders** is a registered nurse, working on the transplant unit at the University of California, San Francisco (UCSF) Medical Center. She has an undergraduate degree from the University of Pennsylvania, where her studies focused on health disparities in underserved communities. Ms. Saunders has conducted research on reproductive health among women in the Dominican Republic, and has worked previously with Dr. Bergman on the asthma telemedicine project, which examined the efficacy of using a telemedicine link in public elementary schools to increase health care access for children with asthma in an underserved neighborhood in San Francisco. She is currently completing her master's degree in advanced community health and international nursing at UCSF.

## EXECUTIVE SUMMARY

Current pediatric practice is inefficient and out of step with the expectations and needs of many families with young children. In particular, well-child care (WCC)—the primary means of providing developmental and preventive services—is a broken system. Because WCC follows a “one-size-fits-all” approach, many families are subject to unnecessary visits, while families with biopsychosocial risks often do not receive the services they need due to time or resource constraints. Much of physicians’ time is spent on providing services that could be better performed by other health professionals, infringing on time they have available to care for children with complex medical problems. Because of the poor design of WCC, providers often fail to adopt evidence-based practices, such as the use of standardized developmental screening. These conditions lead to waste, lower-quality care, and frustration for all parties.

We need a high-performing system of well-child care designed to optimize the development of young children. New technologies and innovative clinical practices can provide the tools needed to create it. This will require transformational change; we will not be successful through efforts at the margin. In this report, we articulate changes needed to realize a high-performance system for the delivery of well-child care. We intend for it to serve as a template for implementing changes in clinical practice and a guide for further policy and research efforts.

To develop key concepts and strategies, we relied on Berwick’s concept of a “change idea,” or an idea that can lead to improved performance but must be detailed and adapted for a given situation.<sup>1</sup> We used three approaches to develop change ideas:

- reviewing the current literature to assess key findings in WCC research and important trends affecting the future of WCC;
- posing discussion questions on listservs for general and academic pediatricians to generate new ways of providing WCC (i.e., pediatricians were asked to respond to scenarios such as: “How would you deliver WCC if there were no pediatric offices?” as a way to stimulate creative thinking); and
- convening family physicians, nurse practitioners, child health advocates, researchers, grantmakers, and parents at a conference to discuss best practices and innovations.

We then developed models of high-performing practice for various well-child care scenarios. The scenarios were:

1. an urban setting serving a racially and ethnically diverse population;
2. a rural setting with low- to moderate-income patients who travel long distances to office visits;
3. a suburban, middle-class setting;
4. a system serving children with special health care needs;
5. a health care system that provides reimbursement for home health visitors;
6. a system with lowest possible costs, while maintaining acceptable quality;
7. the most innovative system (i.e., if you did this, people would say “Wow!”);
8. the most technology-driven system, not centered on the physical office.

Then, drawing on the best change ideas developed for these eight scenarios, we created an overall vision for ideal well-child care. Table 1 organizes the change ideas according to those ready for immediate implementation; those requiring additional resources; and those requiring the use of new technology or policy development. The discussion below outlines the key elements of a high-performing system for WCC.

### **Advanced Access to Care**

In ideal well-child care, families would be able to access health services and consult with their providers in ways that work for them. Access to care could take many different forms, apart from office visits.

- Remote encounters would be used to enhance communication between families and health care teams for situations that do not require office visits. These encounters could be created through the use of secure messaging, Web-based virtual visits, videoconferencing, or other telehealth tools.
- Systems would be implemented to allow parents to make same-day appointments, or appointments at desired times in the future.
- Home visitors would be used to deliver WCC for high-risk children.
- Developmental and educational assessment could be performed in schools, day care centers, or community and religious centers. Telehealth encounters could be used in these settings to provide access to child development expertise.

### **Team-Based Care**

In a high-performing WCC system, a multidisciplinary team of health care professionals would offer a broad range of services to families.

- This team could include developmental and behavioral specialists, care coordinators, and home visitors. The membership of each team would be tailored to meet the specific needs of children and families. Some of the members could be shared resources among practices.
- Children with special health care needs would have access to a care coordinator. This individual would help families navigate complex systems, interface with payers, and develop a comprehensive plan that encompasses education and socialization as well as health care.
- Parents would be part of the health care team, helping to plan and deliver care and assess well-child care outcomes.

### **Individualized Developmental and Behavioral Screening**

Ideal well-child care would entail continuous developmental surveillance to detect and address physical, behavioral, or learning problems and optimize child health.

- Health care professionals would assess children's development and behavior using valid screening instruments. The results of the screening would be available to clinicians prior to WCC visits in order to identify children at risk and structure visits to meet families' expressed needs.
- Developmental and behavioral screening instruments that have been validated among different minority groups would be used for racially and ethnically diverse populations.
- Every newborn would be screened for biological, psychological, and social risk factors and stratified into groups according to risk. This could take place in the newborn nursery or during the first few WCC visits.
- The results from behavioral and developmental screenings would be used to customize the content of the WCC visit and include appropriate members of the health care team.

### **Cultural Beliefs and Practices of Racial and Ethnic Minority Groups**

An ideal well-child care system would accommodate patients' communication needs as well as their preferences, values, and expectations.

- Children and families would have access to language and other cultural interpretation services in cases where English is not the language spoken at home.
- Health care organizations would consider providing some components of WCC in sites such as day care centers, churches, or homes. Some families might find community settings more familiar or comfortable than health clinics or physician offices.
- Health care teams would include members who are familiar with the beliefs and practices of their patient populations.

### **Care Coordination in the Context of a Medical Home**

In an ideal well-child care system, each child would have a medical home to coordinate care among multiple pediatric specialists, schools, and community agencies.

- Pediatric clinicians would form partnerships with community and government agencies. Such partnerships could focus on population-based health initiatives, such as obesity prevention.
- For children with special health care needs, community pathways would be developed to bring together the health care system, schools, and other community agencies and provide a clear path for children who need a wide array of services.
- Videoconferencing would be used to enhance care coordination between families and health care providers.

### **Knowledge Transfer and Electronic Health Records**

To care for their children and participate in the medical decision-making process, families need access to accurate information and effective systems for knowledge transfer. In an ideal well-child care system:

- Health care organizations would commit to implementing electronic health records (EHRs) and eliminating costly and inefficient paper transactions.
- Each parent/child would have a personal health record (PHR) that is closely integrated with their electronic health record (EHR). Through the PHR, each family would be able to engage in secure electronic communications with their clinicians, view test results and visit summaries, input health information, and share information with other health care professionals.
- Families would have access to a repository of information about child development and behavior, health promotion, and illness that is evidence-based and up to date—

a “Bright Futures” for parents.<sup>2</sup> The repository would be appropriately indexed so that distinct modules could be linked to PHRs.

- Health care information would be integrated across communities, states, and the nation using common standards for electronic databases and tools.
- Creation of regional health information organizations (RHIOs) would be encouraged. RHIOs would be able to integrate information across providers to create a community health record and a regional and national database to facilitate disease surveillance and outcomes assessment.

### **Health Care Financing**

Effective well-child care would depend on a health care financing system that provides universal access to health care for children.

- Ideally, the United States would pass legislation to provide universal health care coverage for children. Because the health of the child is often dependent on the health of the family, this coverage should be extended to mothers and fathers.
- Short of universal health coverage, intermediate steps should be implemented to provide: 1) appropriate reimbursement for transactions other than face-to-face encounters; 2) levels of reimbursement based on the degree of risk of the child and family (i.e., tiered capitation); and 3) reimbursement for the work of non-physician members of health care teams, such as mental health professionals and child development specialists.

### **Conclusions**

WCC as it exists today is in need of transformational change. The current system does not meet the needs of families or the aspirations of providers. This report puts forth a template for the future direction of WCC. To move forward, we will need to engage in a stepwise process to bring about incremental and transformational change. We will not be successful unless we pair changes in practice with changes in reimbursement. In particular, provider incentives need to be aligned to promote best practices in preventive and developmental care. Effecting change will also require strong leadership from organizations and agencies such as the American Academy of Pediatrics, the American Academy of Family Practice, and the Maternal and Child Health Bureau.

Table ES-1. Well-Child Care Change Ideas:  
Readiness for Implementation

<b>Change Ideas Ready for Implementation</b>	<b>Change Ideas Requiring Additional Resources</b>	<b>Change Ideas Requiring New Technology or Policy Development</b>
Assign children into risk categories and customize their screening and developmental/preventive services	Provide advanced access; ensure that visits can take place on the day requested	Give parents access to vetted Web sites; automatically direct them to sites from electronic or personal health records
Focus well-child care visits with the help of structured assessments prior to the visits	Use public health nurses or other child health professionals to make home visits	Create interactive health care information programs to teach child development and health promotion skills; possible partnerships with media companies
Use of parents as consultants to answer questions and impart information	Use multidisciplinary teams to ensure families are offered broad range of services, including developmental and mental health services	Send group e-mails or text messages with health information, e.g., allergy alerts
Enable parents of children with special health care needs to partner with practices, participate in planning care	Deliver screening and developmental and preventive services at preschools and day care centers	Install kiosks at places of employment or other central locations to provide information about community resources
Pediatricians serve as consultants to schools, community agencies, and other settings	Forge partnerships between practices and communities agencies for population-based initiatives, such as obesity prevention	Create electronic health records linked to regional health information organizations to track outcomes and perform needs assessment
Give parents customized calendars with schedule and description of well-child visits (like tear-off tickets for mortgage payments or car maintenance)	Enable “one-stop shopping”: co-location of health, mental health, education, and social services	Use electronic prompts and reminders for clinicians and parents to ensure appropriate and timely well-child care
Set up specific office hours for behavioral and developmental problems	Perform population-based screening in schools, churches, or community agencies to identify health care needs	Set up Web-based tracking/monitoring systems linked to a child’s electronic health record, e.g., immunization registry, specialty referrals, and disease management
	Use a care coordinator in conjunction with team-directed care	Use a personal health record derived from an electronic health record

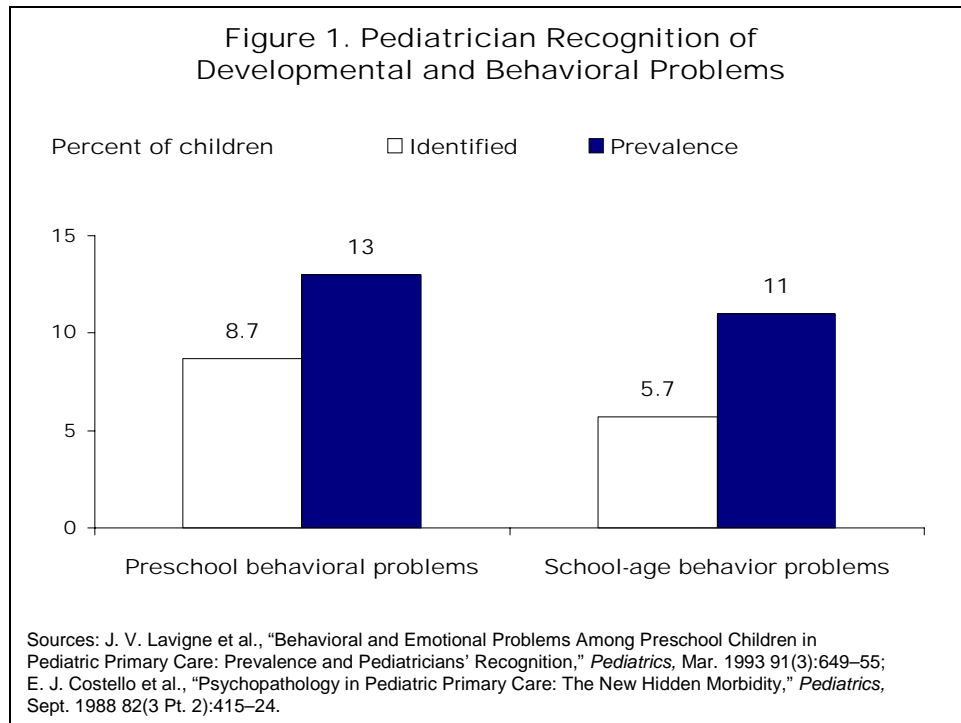


# A HIGH-PERFORMING SYSTEM FOR WELL-CHILD CARE: A VISION FOR THE FUTURE

## INTRODUCTION

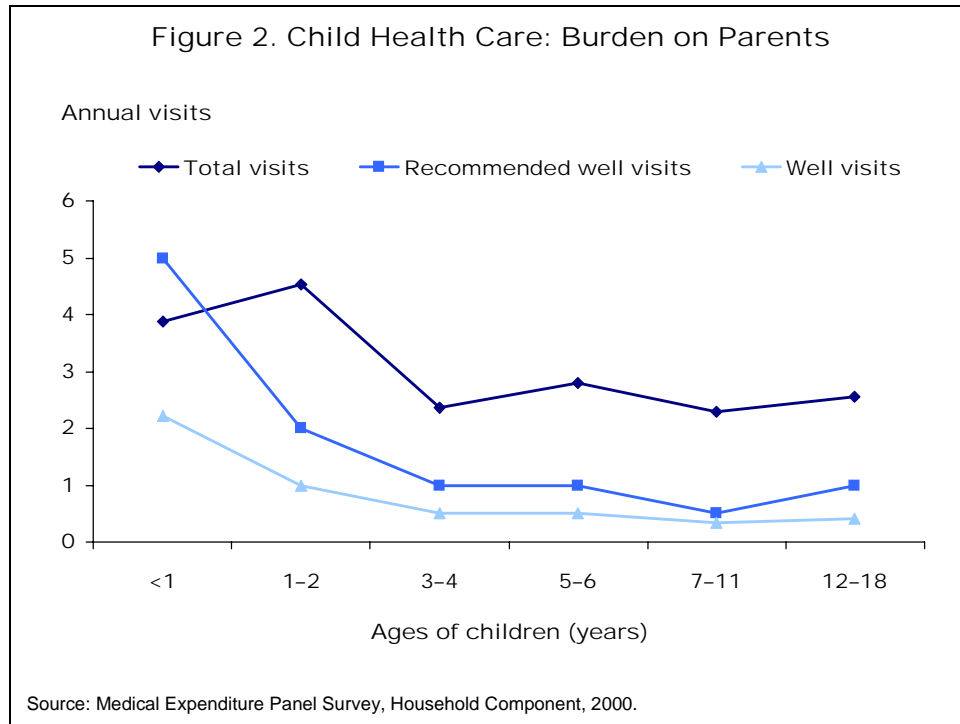
Current pediatric practice, especially the provision of developmental and preventive care services, is inefficient and out of step with the expectations and needs of many families with young children. In our current system, well-child care (WCC) is the primary means of providing developmental and preventive services to children. Well-child care accounts for nearly a quarter of pediatric visits, and more than half of all visits in the first year of life.<sup>3</sup>

In spite of this considerable allocation of time and resources, many children do not receive the care they need. Often, infants and children are not screened for conditions such as lead poisoning, iron deficiency anemia, and developmental and behavioral problems. Many children begin school at a disadvantage because they have unrecognized physical, behavioral, or learning problems (Figure 1).

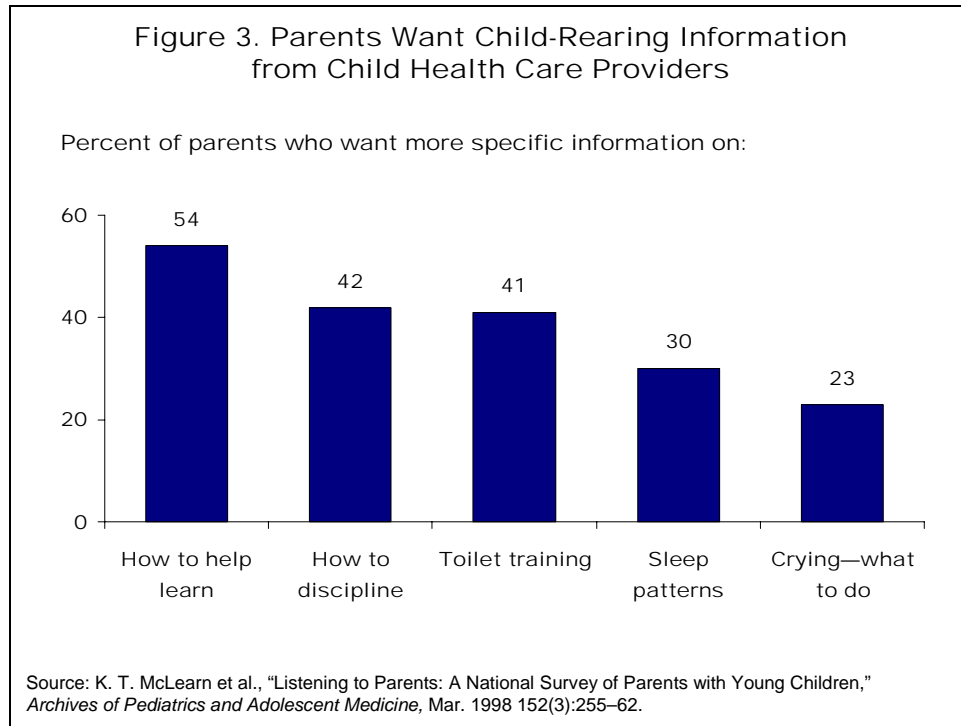


Pediatric practitioners frequently fail to provide services that are known to promote healthy development. While most families receive some health promotion and anticipatory guidance, evidence suggests that these services fail to address the concerns of more than half of parents, and poor and minority families are less likely than higher-income, white families to say their concerns have been addressed.<sup>4</sup> The shortcomings of

WCC delivery are compounded by the demanding schedule of WCC visits for young children, which can prove burdensome for families. Data from the Medical Expenditures Panel Survey show that, at best, only half of children complete the recommended number of visits by age 2 (Figure 2).<sup>5</sup>



Often, families are confronted with a confusing set of messages about their children’s health and development. Many parents turn to their child’s primary care physician to help them understand and cope with the challenges of parenthood (Figure 3). But is our system of WCC up to the task? While there has been mounting pressure to improve it, substantial change has eluded us to this point.<sup>6</sup> Clinicians are handicapped by an outdated WCC schedule, in which the frequency of visits is dictated by immunization and health screening instead of the developmental and psychosocial needs of the family. The rapid rise in the number of health promotion and disease prevention services has created greater responsibilities for clinicians, leaving them with insufficient time to provide the full range of WCC services.<sup>7</sup>



Because WCC follows a “one-size-fits-all” approach, many families are subject to unnecessary visits, while children with biological, psychological, or social risks do not receive the services they need due to time and resource constraints. Much of physicians’ time is spent on providing services that could be better performed by other health professionals, infringing on time they have available to care for children with complex medical problems. Because of the poor design of WCC, providers often fail to adopt evidence-based practices, such as the use of standardized developmental screening. These conditions lead to waste, lower-quality care, and frustration for all parties.

It is an opportune time for change. Recent research shows that interventions in the primary care office can have a significant impact on the effectiveness, patient-centeredness, timeliness, and efficiency of child development and health promotion practices.<sup>8</sup> Innovative new technologies can support health promotion and education and facilitate services that do not require face-to-face visits with providers.<sup>9</sup> The high penetration rate of home computers and Internet access facilitates e-mail communication between families and providers and Web-based educational programs that enable parents to be active participants in their child’s care.<sup>10</sup> Efforts to redesign physician practices have improved access to care, created shared group visits, and remodeled primary care offices into “medical homes” for children.<sup>11</sup> Collaboration with new health professionals in the areas of child development and health promotion has markedly increased parent knowledge and satisfaction with care and improved some of the key outcomes of WCC.<sup>12</sup>

Moreover, pediatricians are cognizant of the need for change in how WCC is delivered and who delivers it.<sup>13</sup>

Significant improvements in WCC will require a stepwise process that builds on the current infrastructure of pediatric practice.<sup>14</sup> Effecting change also will require strong leadership and the involvement of organizations and agencies such as the American Academy of Pediatrics, the American Academy of Family Practice, and the Maternal and Child Health Bureau.

In this report, we articulate changes needed to realize a high-performing system for the delivery of well-child care, drawing on the ideas of leaders in child health care, including pediatric practitioners and family advocates. We intend for the report to serve as a template for implementing and evaluating change in clinical practice and a guide for further policy and research efforts.

The report is divided into four sections. In the first, we discuss the methodology we used to develop our recommendations. In the second, we outline important trends affecting preventive and developmental services. In the third section, we present a template for ideal well-child care and in the final section we offer recommendations to the field, presented from the perspectives of families, the microsystem, the health care organization, and the broader environment.

## **METHODOLOGY**

The project aimed to consolidate information on the best office practices in well-child care. To generate key concepts and strategies, we relied on Berwick's concept of a "change idea," or an idea that can lead to improved performance but must be detailed and adapted for a given situation.<sup>15</sup> For example, "use group visits" is a testable change idea. The details for applying it to a particular context and patient population can be determined, and the outcomes of applying it can be measured.

We used three approaches to develop a set of change ideas:

- reviewing the current literature to assess key findings in WCC research and important trends affecting the future of WCC;
- posing discussion questions on listservs for general and academic pediatricians to generate new ways of providing WCC (i.e., pediatricians were asked to respond to scenarios such as: "How would you deliver WCC if there were no pediatric offices?" as a way to stimulate creative thinking); and

- convening child health experts and parents at a conference to discuss best practices and innovations.

For the literature review, we used a structured Medline search as well as a manual review of key articles and monographs to identify important findings in WCC. The articles reviewed are listed in Appendix A-1 and summarized by topic area in Appendix A-2.

To initiate discussion of new ways of providing WCC among a diverse group of clinicians and other professionals, we joined the Ambulatory Pediatric Association and the Pediatric Research in Office Settings (PROS) listservs. We posted the following scenario to the listserv discussions: “A strange disease had shut down all but one pediatric practice in New York City and the pediatrician was challenged to create a health care system that would continue to provide services to children.” Such scenarios, called “stepping stone” provocations, follow the principle that innovative approaches are often born out of crisis situations.<sup>16</sup> Members of the listservs were asked to respond by suggesting changes or innovations that would address the hypothetical crisis.

Finally, we convened WCC experts at a two-day conference in Chicago in March 2005. The diverse group of 29 participants included physicians, nurse practitioners and nurses, leaders from child advocacy groups and national programs, researchers, grantmakers, and parents. The meeting was used to generate consensus on a set of change ideas that would begin to define ideal well-child care.

The meeting agenda was designed to review the current approach to WCC, provoke original thinking, harvest the best ideas, and identify key themes for further development.<sup>17</sup> An expert on creative problem-solving led a series of exercises. Participants were asked to consider how things are traditionally done in health care and other industries. They were then asked to set aside tradition as well as technological or resource constraints in order to generate innovative change ideas. Participants were given 10 votes each and asked to nominate ideas they thought would have the most positive impact on WCC. A list of the change ideas that received at least five votes can be found in Appendix C.

Participants were asked to choose from a selection of eight scenarios. All those choosing the same scenario formed a small group and were asked to describe an ideal well-child care system for one of the following scenarios:

1. an urban setting serving a racially and ethnically diverse population;
2. a rural setting with low- to moderate-income patients who travel long distances to office visits;
3. a suburban, middle-class setting;
4. a system serving children with special health care needs;
5. a health care system that provides reimbursement for home health visitors;
6. a system with lowest possible costs, while maintaining acceptable quality;
7. the most innovative system (i.e., if you did this, people would say “Wow!”);
8. the most technology-driven system, utilizing an electronic health record, remote sites accessed through telehealth, and Web-based interactions between providers and families.

To encourage innovation, groups were instructed to avoid premature judgment and set aside constraints of practicality or costs.<sup>18</sup> Each group presented their ideal system for a particular scenario, and the presentations were videotaped and transcribed for later analysis. Participants then reviewed the videotapes to identify common change ideas and recurring themes. The well-child care systems for each of the eight scenarios are described in Appendix B.

## **ISSUES AND TRENDS IN PEDIATRIC PRACTICE AND WELL-CHILD CARE**

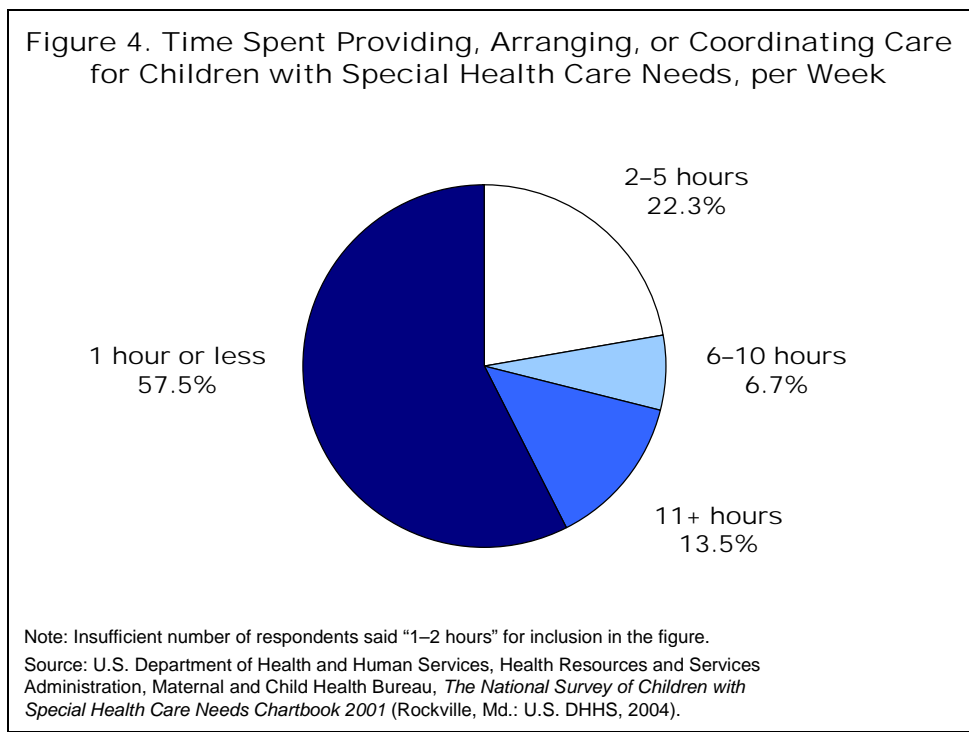
To conceptualize a high-performing WCC, we considered six trends that will affect the future of well-child care. These include: the changing epidemiology of pediatric practice; emergence of new technology; impact of racial and ethnic disparities; greater prevalence of women in pediatric practice; changes in health care financing; and international models.

### **Changing Epidemiology**

The past 50 years have seen marked change in the epidemiology of pediatric practice. There has been a significant decrease in hospitalizations for acute conditions and a concomitant rise in the prevalence of chronic conditions.<sup>19</sup> In part, this shift is due to advances in disease prevention, increased survival rates of children with chronic conditions, and the growing prevalence of children with disabilities secondary to increased rates of very low birth weight infants and the associated neonatal morbidity.<sup>20</sup> Today, approximately 75 percent of total health expenditures are designated for children with chronic and disabling conditions.<sup>21</sup>

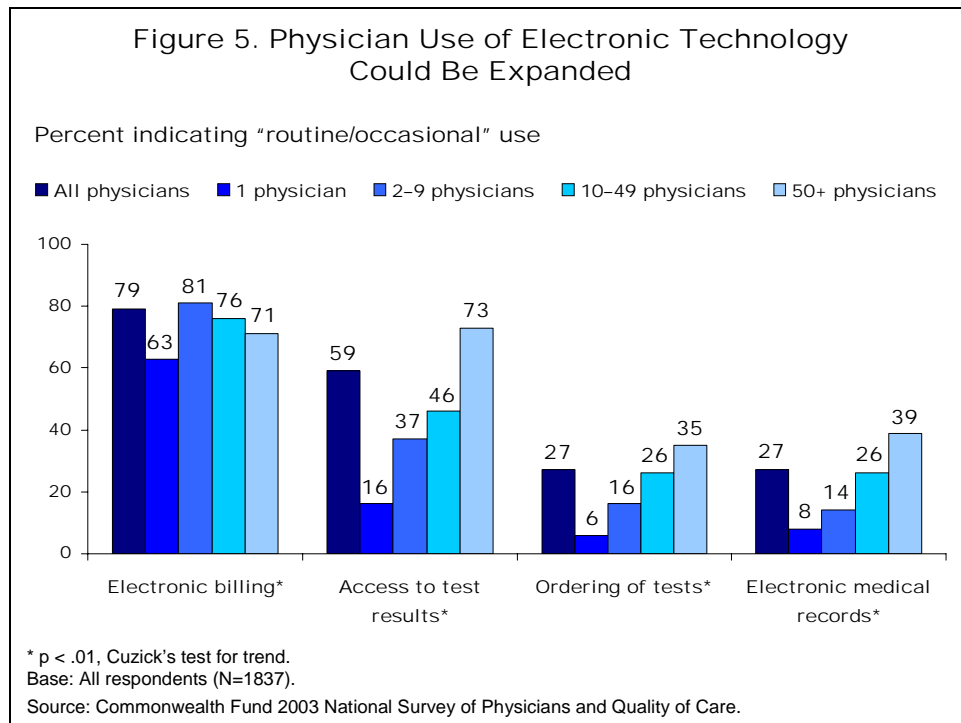
A recently published survey found that children with special health care needs (CSHCN) comprise 12.8 percent of the population under the age of 18.<sup>22</sup> Yet, a significant proportion of these children do not receive the care they need: 57 percent of parents of CSHCN do not feel they are partners with their health care providers in important medical decisions and 48 percent feel they do not receive coordinated and comprehensive care. Just more than half (51.6%) report that their children are consistently screened for special health care needs in a timely manner.<sup>23</sup>

Today's pediatric patients are divided into children who are essentially well and those who have special health care needs.<sup>24</sup> This dichotomization must, by necessity, lead to changes in the way WCC is delivered. Many children are not "well" in the traditional sense, but still require services to ensure optimal development and disease prevention. Some surveys have shown that nearly one-third of CSHCN have significant behavioral problems and over two-thirds do not receive appropriate care.<sup>25</sup> Meeting the needs of CSHCN will require a robust health care team, including nurse practitioners and child development specialists. Increasingly, physicians will devote more time to the care of CSHCN with much of WCC for "well children" done by other members of the health care team. The increased number of CSHCN will pose challenges as these children make the transition into adulthood. Child health care specialists will need to work with their adult medicine colleagues as well as families to ensure appropriate living and working conditions for young adults with special health care needs.



## Technology and Innovation

New and emerging technologies offer opportunities to improve care delivery systems and, ultimately, health outcomes. The digital capture of patient records, Web-based access to health care information, and electronic communications between families and medical experts will enable children and families to better care for themselves and allow health care providers to be proactive and efficient in providing individualized care.<sup>26</sup> The adoption of EHRs, however, remains slow because of cost and lack of incentives for practitioners.<sup>27</sup> The current model of EHR adoption predicts that if current level of commitment remains the same, it could take up to 18 years before EHRs achieve significant market penetration.<sup>28</sup>



Currently, there are about 9,750,000 pediatric-related Web sites.<sup>29</sup> Finding information that is relevant to an individual child can be a daunting task. The development of electronic health records (EHRs) will give every child an individualized database, or personal health record (PHR). Parents will be able to readily access medical information about their child and pass on up-to-date information to their providers. Specific issues in a child's PHR, such as normal behavior or developmental milestones, could be linked to online resources that have been vetted for accuracy, giving families state-of-the-art information customized to their child's needs.<sup>30</sup> The Pew Report on the Internet and American Life found that 80 percent of adult Internet users, or almost half of Americans over the age of 18, say they have researched at least one of those specific health topics at some point.<sup>31</sup>

Figure 6. Percent of People Who Have Searched Online for Health Information

Demographic group	Percent
Women	82
Men	75
Ages 18-29	77
Ages 30-49	81
Ages 50-64	82
Age 65+ (n=51)	66
High school diploma	67
Some college	80
College degree	86
2-3 years online experience (n=66)	66
6+ years online experience	86
Dial-up connection at home	72
Broadband connection at home	87

Notes: N=537. Margin of error for the entire sample of Internet users is +/- 4%; margins of error for comparison of subgroups are higher.  
Source: Pew Internet & American Life Project November 2004 Survey.

Web-based secure messaging is becoming an increasingly important way to provide families with information about developmental and preventive care issues. The asynchronous nature of the communication means that families can reach out when it is convenient for them, and providers can respond in a timely manner.<sup>32</sup> With secure messaging, physicians will be able to share questions with other health care providers who may be able to offer additional expertise.<sup>33</sup> For adolescents, the use of secure messaging provides a means of communicating confidential information to health care providers.<sup>34</sup> Web-based programs can help families with CHSCN monitor chronic conditions and receive timely feedback about their child’s development.<sup>35</sup>

Telehealth—the use of electronic and telecommunications technologies to provide health information and to diagnose, treat, or follow up with patients at a distance—holds promise to improve access to WCC. It can, for example, be used to conduct developmental assessments in day care centers or preschools and provide access to expert care during WCC office visits.<sup>36</sup> Telehealth tools also could be used to improve access to primary care for children in inner-city schools.<sup>37</sup>

The use of a shared EHR that is accessible to all health care providers, as well as children and families, has the potential to greatly improve care coordination.<sup>38</sup> On a local level, having EHRs open to all health care providers makes it possible for them to access relevant health information and treatment plans. The membership of this “virtual health care team” could change to meet children’s particular and evolving needs.

## **Racial and Ethnic Disparities**

There is evidence that accommodating patients' communication needs as well as their preferences, values, and expectations—providing what has been called culturally competent care—can increase the likelihood that families will seek care, adhere to medical regimens, and use emergency departments appropriately.<sup>39</sup> Currently, children from racial and ethnic minority groups are less likely than white children to have a usual source of care or to see the same provider each visit.<sup>40</sup> In addition, these children have fewer doctor visits, in spite of worse health status, and are less likely to receive preventive services.<sup>41</sup> Cultural factors may also influence differences in expectations for aspects of care such as waiting time and negative perceptions of the quality of care, accounting for disparities in the primary care experience.<sup>42</sup> While these findings can be explained in part by language barriers, this factor alone does not explain all of the variance in patient experience.<sup>43</sup>

With growing racial and ethnic diversity among U.S. children, such disparities will become more common without effective interventions. Efforts to reduce disparities will need to focus on:

- **Language:** One of the most significant barriers in access to care and provider-patient communication is lack of language concordance with the primary care provider. Many families do not speak the same primary language as their providers; many other families share a common language with their providers but have low health literacy. Providing language services is thus an important way to address racial and ethnic disparities in the WCC experience.
- **Cultural Factors:** Cultural factors in the preference and expectations for WCC can influence the clinical experience. For example, Asian Americans have higher expectations for receiving timely care and as a consequence may perceive this aspect of care more negatively. It remains to be seen whether incorporating elements of cultural competency—such as provider knowledge of the health belief of different ethnicities—into the delivery of primary care will significantly reduce racial and ethnic health disparities. It is, however, an important avenue of work to pursue.
- **Health Systems Factors:** Innovations such as being able to provide appointments when requested (i.e., open access) or cultural competency training for providers may improve the quality of primary care for minority children. It will be important to pay close attention to changes in health care financing, such as health savings accounts, to see if they adversely affect ethnic and minority children.

## **The Increasing Prevalence of Women**

Over the last 25 years, there has been a dramatic change in the gender distribution of the pediatric workforce. In 1980, 28 percent of pediatricians were women; by 2004, the proportion had risen to 55 percent.<sup>44</sup> This trend is likely to continue, since 61 percent of current pediatric residents and fellows are women.<sup>45</sup> These changes have contributed to an increase in the percentage of pediatricians working part time. In 1993, 24 percent of female all pediatricians worked part time; by 2004, the percentage of all female pediatricians working part time had increased to 43 percent.<sup>46</sup>

Compared with their male counterparts, female pediatricians are less likely to be Caucasian and more likely to be Asian or African American.<sup>47</sup> They also are more likely to spend their clinical time in general pediatrics. In 2004, 76 percent of female pediatricians were in general pediatrics, compared with 65 percent of male pediatricians. Conversely, 35 percent of male pediatricians were sub-specialists, while only 24 percent of women were in sub-specialty care.<sup>48</sup> Female pediatricians are also more likely than male pediatricians to work in suburban settings and less likely to work in rural or urban communities.<sup>49</sup>

To accommodate the growing number of pediatricians working part time, as well as the diminishing numbers of pediatricians in rural or urban settings, there will be need to be new systems to encourage the use of partnerships and pediatric health care teams to ensure continuous care. It might be possible to use information-sharing technology to enable pediatricians to work together to provide care. Health care teams might offer useful diversity of experience and expertise and lead to more comprehensive care, particularly in the areas of child development and mental health. The use of videoconferencing and other telehealth tools might lead to more effective use of pediatric sub-specialty care and improve access to such care for families who live far away from major medical centers.

## **Trends in Financing**

The United States has experienced double-digit growth in health care costs over the past several years. Unless there are substantial changes to health care financing, this growth rate is likely to increase over the next 10 years. Employers are unwilling to pay more for their employees' health plans. State governments, which fund Medicaid and State Children's Health Insurance Programs, already spend more than 20 percent of their budgets on health care.

Cost pressures are driving employers and insurance companies to consider new insurance products, including health savings accounts (HSAs).<sup>50</sup> HSAs provide individuals or families with a defined contribution that goes into a savings account. Withdrawals are

made from this account to pay for health care services. HSAs are usually sold in conjunction with a high-deductible health plan.

With HSAs, consumers are able to choose from a wide range of providers and institutions, using available information on quality performance and costs. HSAs in effect switch the accountability and financial risk from the health plan or insurer to the consumer, while keeping premiums at affordable rates. HSAs assume that the consumer will act rationally to choose only needed care from the best provider. Research, however, has shown that this often not the case.<sup>51</sup> Consumers frequently make poor choices and often do not receive needed, evidence-based care. Arrangements such as HSAs combined with high-deductible health plans, which offer a defined contribution instead of a defined benefit, may lead families to defer well-child care in order to pay for sick care or chronic illness. Families may forgo aspects of WCC to have more money to carry over to the next year or cover acute care visits.

The current system of fee-for-service reimbursement for WCC may work against innovation in clinical practice. When physicians are reimbursed for each WCC visit, they may be reluctant to shift some aspects of WCC to other health care professionals, even though these professionals may be better trained to perform certain tasks. Certain innovations, such as Web-based interactions between providers and families, are not reimbursed under such a system. Fee-for-service also does not account for the additional work needed for CSHCN, such as coordinating their care with medical specialists and community agencies.

In order to realize cost savings through practice redesign, it will be necessary to develop payment models that support innovation while preserving physician income. Tiered capitation rates based on the biological and psychosocial risk status of a child is one possible model for reimbursement.

### **International Models**

The United States is one of a small number of countries that uses board-certified pediatricians to deliver WCC.<sup>52</sup> In Australia, the United Kingdom, and Sweden, “health visitors”—usually nurses with public health training—make home visits to deliver WCC. In the Netherlands, WCC is provided by physicians who complete an internship and three weeks of training in WCC. In many other European countries, preventive and developmental services are delivered in public clinics and through the use of home visits. If a child needs acute care, they are taken to an assigned practicing physician.

Across developed countries, the periodicity schedules for WCC vary greatly. In the U.K., experts have questioned the evidence supporting regular developmental screening or surveillance, suggesting that there be only three physician visits in the first year of life (newborn, eight weeks, and one year).<sup>53</sup> In the U.K., health visitors currently provide much of the developmental and preventive care for children. Behavioral and developmental concerns are addressed through regular physician office hours. The Netherlands is at the other end of the spectrum, with 18 WCC visits in the first three years of life.

The concept of the pediatric or family physician office as the “medical home” is not widely embraced in European countries. Instead, many systems seek to integrate health care and preschool services. Continuity of care is monitored through nationwide tracking systems. In many European countries, families may choose to go to a specialist, bypassing a referral from the primary care physician. In Sweden, for example, most parents understand that they go to a general practitioner if their child is acutely ill, a public health nurse for developmental services, and a pediatrician for complex medical problems. This system provides comprehensive, continuous care, without coordinating services in a pediatric practice or medical home.

The international experience in WCC may offer a window into the future of WCC in the United States. As in many European countries, WCC may eventually be provided by non-physician health professionals in a variety of sites, such as health clinics or schools. All health information might be linked through a community health record. The greater use of other health care professionals to provide WCC might mean that physicians will need to assume different roles, such as attending to the care of the growing population of CSHCN. The wide variability in the periodicity schedule among different countries underscores the lack of a strong evidence base for this, or any visit, schedule. In the future, we will most likely see a range of periodicity schedules. Schedules might indicate which health care professionals should deliver care, and might be tailored to the biological and psychosocial risks of children and their special health care needs.

Many countries, including the U.K. and Sweden, have designed their child care systems with the assumption that it takes more than good health to ensure optimal child development. In these countries, education, health, and social services are often co-located in order to provide integrated and accessible services. The community is seen as the “child development” home for children and families. The U.K. has developed models, or pathways, of care to identify children at risk and ensure they receive the complete spectrum of needed services. In this way, the medical home expands beyond the clinical

office and becomes integrated with other services in the community. In the United States, information technology could enable “virtual medical homes” that exist at the levels of the physician office, the community, and the country and coordinate care, surveillance, and outcomes assessment.

### **A HIGH-PERFORMING SYSTEM FOR WELL-CHILD CARE**

The authors reviewed videotapes of the group presentations of what would constitute a high-performing systems of well-child under the different prescribed scenarios (e.g., a rural practice). They then used this information to construct written descriptions of high-performance care. Each of the scenarios describes a system of care that would best serve a particular patient population, geographic location, or condition for care provision. Using these different perspectives enabled the authors to view the change ideas through different lenses. The scenarios were built from the “bottom-up,” starting with the change ideas developed during the conference. The scenarios are described in Appendix B and the change ideas are described in Appendix C.

The following discussion presents an ideal system of well-child care, drawing on the shared change ideas and common themes from the scenarios.

#### **Access to Needed Services**

In the ideal WCC system, families would have access to care when and where they need it. Families would be able to schedule same-day appointments, or name desired times. Aspects of WCC could be provided in locations other than clinicians’ offices, including schools, day care centers, community centers, and even shopping malls. For many families, WCC would be delivered in the home by home care visitors or public health nurses. This would improve access to care for families and enable health care providers to learn about children’s home environments (e.g., Who lives at home? What are the sleeping arrangements? Is it a safe environment?) and suggest opportunities for improvements.

For some families, important advice, anticipatory guidance, and knowledge transfer could take place through secure messaging, videoconferencing, and other types of telehealth technology. Although care may be geographically fragmented in such a system, all relevant information would be accessible in a comprehensive electronic health record.

#### **Team Approach**

In the ideal WCC system, physicians would be part of multidisciplinary teams that provide a full spectrum of needed services. There would be flexibility in terms of the teams’ composition and size, depending on the needs of children, families, and communities. For

example, a health care team might need to include a pediatric specialist, school counselor, or community health worker to meet the needs of a particular child. The use of health care teams would give physicians more time to focus on children with special needs and complex medical conditions. Here again, teams would use electronic health records to coordinate care and share information among members.

For CSHCN, much of WCC could be accomplished through the use of health visitors or public health nurses. There could also be mental health professionals or child development specialists working at physicians' offices to help address developmental and behavioral concerns. E-mail, videoconferencing, and telehealth visits could improve access to care.

### **Individualized Developmental and Behavioral Services**

One size does not fill all in the ideal WCC system. The services provided to each family would depend on the presence of biological and psychosocial risks, family experiences, the age of the child, and many other factors. Each child would be assessed at birth and stratified into different groups, according to their need. Low-risk infants with parents who had other children would receive a visit schedule that required less face-to-face time in the physician's office; for many visits, they might see a nurse, rather than a physician, for immunizations and screening tests. Much of the needed anticipatory guidance would be accomplished via Web-based communications. High-risk infants and families would receive more intensive services and utilize an expanded team that might include social workers, developmental specialists, and community health workers. Pre-visit surveys that assessed the child's development or psychosocial health would provide information that will help health care teams to tailor the visit and schedule the appropriate team members.

### **Care Coordination and the Medical Home**

In the ideal WCC system, each child would have a medical home that would coordinate care among multiple pediatric specialists, schools, and community agencies. Each family would have a written, comprehensive care plan that outlined medications, treatments, needed monitoring, and conditions for which they should call or see their physician. The medical home would use community pathways as an important tool to help families navigate through a complex health care system. These pathways would articulate the sequence of needed services within the pediatric office, from pediatric specialists, and from community agencies or programs. All this information would be recorded or uploaded into the EHR to provide a central repository of clinical information for the child. The creation and update of the pathways would also bring together different constituencies from the community to advocate for improved children's services and health care financing.

### **Electronic Health Records**

Technology would be an important part of the ideal WCC system, especially given the high penetration rate of computers in homes and the growing number of physician offices that are using an electronic health record.<sup>54</sup> However there are still a significant number of minority families who do not have computers in the home.<sup>55</sup> This raises concerns that the digital divide will only get wider, as more access to health care is offered over the internet. This trend has been somewhat mitigated through access to computers at work, community centers, churches, and schools. Each child's EHR would be accessible to all treating health professionals. In addition, each family would have a personal health record, which would be closely integrated into the electronic health record. The personal health record would be based online, enabling families to review the results of diagnostic tests and specialty visits and input information, such as pulmonary function tests for children with asthma. The EHR would also be linked to a regional health information network that would allow the anonymous collection of health outcome data for quality reporting and public health initiatives and facilitate access to other data repositories. The EHR would send reminders to clinicians and families about needed preventive care. Finally, EHRs could provide decision support at the point of care to ensure access to evidence-based medical information.

### **Information and Knowledge Transfer**

In an high-performing WCC system, families would be empowered through rapid access to needed information. Practices would direct parents to vetted Web sites for information about a range of topics, from child-rearing to disease management. Each child's PHR would provide a robust view of parts of his or her EHR that would provide up-to-date information about diagnostic studies, growth and development, medications, and health promotion and treatment plans. Unique aspects of a child's stage of development or health status would be linked to online information and interactive health care programs. Parents would also be able to communicate with a multidisciplinary health team through secure messaging and/or a telephone information line.

Families with limited English proficiency would have access to interpreter services. These service could be made available through video-conferencing technology that could provide access in a broad array of languages. Members of the health care team will familiarize themselves with cultural values and traditions using Web-based interactive programs that show how these values and traditions interact with clinical care.

## RECOMMENDATIONS TO THE FIELD

The following recommendations for key strategies for achieving a high-performing well-child care system are organized according to four levels in patient care, as described by Berwick:<sup>56</sup>

- the experience of the patient;
- the microsystem, or the functioning of small units of care delivery;
- health care organizations that support microsystems; and
- the environment of policy, payment, accreditation, and regulation that shapes the behavior, interests, and opportunities of health care organizations.

We have grouped the recommendations according to the level of patient care in which they would have the greatest impact. We recognize, however, that many of the recommendations cross multiple levels and affect multiple levels of patient care.

### **The Experience of the Patient**

The child and family are at the center of the health care system. Transformational change in WCC ultimately must support families in their efforts to promote healthy behaviors, optimize child development, and care for themselves.

*Knowledge transfer.* To care for their children and participate in the medical decision-making process, families need access to accurate information and effective systems for knowledge transfer. A significant percentage of families feel their physician does not adequately communicate with them about important behavioral or developmental issues; additionally, more than half of families of CSHCN feel that their doctors do not communicate well with them.<sup>57</sup> This report highlights the importance of information technology as a means to improve communications between providers and families. We recommend that:

- Every family has access to a personal health record that contains all of their child's health information. Families should be able to input information about their child into the personal health record and review the electronic health record.
- Families have access to a Web-based repository of information about child development and behavior, health promotion, and illness that is that is evidence-based and up to date—a Bright Futures for families.<sup>58</sup> This repository should be indexed so that distinct modules of information can be linked to personal health records. The American Academy of Pediatrics, American Academy of Family Physicians, and/or the federal government could undertake the development and maintenance of the repository.

- Families have access to Web-based interactive health programs that support their efforts to foster optimal development of their child. These programs have proven effective in managing children’s chronic conditions.<sup>59</sup> For example, some programs use a videogame format to teach children about asthma or diabetes. Such tools can also enable clinicians to monitor health indicators, continuously adjusting and improving management plans.<sup>60</sup>

*Team-based care.* Best practices in well-child care call for the family to play a greater role in the design and management of services. We recommend that:

- Parents are included in the health care team to aid in planning and delivering care.
- All change ideas be considered from the perspective of the patient and family.

### **The Microsystem**

A significant number of these recommendations occur at the level of the microsystem and can be implemented by office or clinic teams. While some depend on the development of new technologies or the identification of new sources of funding, many could be implemented immediately.

*Advanced access to care.* We recommend that practices caring for children increase contact between families and health care teams through the use of encounters that do not require office visits. In particular, we recommend use of:

- secure messaging;
- Web-based visits; and
- videoconferencing and telehealth encounters.

*Team-based care.* We recommend that:

- WCC be provided to each child by a multidisciplinary team of health care professionals. This team might include developmental and behavioral specialists, care coordinators, and home visitors. Each team would be customized to meet the needs of a particular child and family. Some of these professionals could be shared among practices.
- Children with special health care needs have access to a care coordinator. This individual would help families navigate complex systems, interface with payers, and develop a comprehensive plan that encompasses education and socialization as well as health care.

*Individualized developmental and behavioral screening.* Best practices in WCC require continuous developmental surveillance for children. We recommend that:

- Health care professionals assess children’s development and behavior using valid screening instruments. The results of the screening would be available to clinicians prior to WCC visits in order to identify children at risk and best meet the expressed needs of families.
- Health care professionals who care for racially and ethnically diverse populations use developmental and behavioral screening instruments that have been validated among different minority groups.
- Every newborn be screened for biological and psychosocial risk factors and stratified into different groups according to risk. This could take place in the newborn nursery or during the first few WCC visits.
- The WCC encounter is customized to family’s needs and children’s risk levels.

*Care coordination in the context of a medical home.* We recommend that:

- Families have access to a care coordinator to provide help in navigating the health care system and coordinating care across different providers and agencies.
- CSHCN have written treatment plans for the family and other providers outside of the medical home.

### **The Health Care Organization**

In making recommendations for health care organizations, we have focused on change ideas that are applicable to all health care settings.

*Advanced access to care.* We recommend that:

- Health care organizations allow parents to make same-day appointments or appointments at desired times in the future.
- The appointment system is available online as well as by telephone.

*Cultural beliefs and practices of racial and ethnic minority groups.* We recommend that:

- Children and families have access to language and other cultural interpretation services in cases where English is not the language spoken at home.

- Health care organizations consider providing some components of WCC in sites such as day care centers, churches, or homes. Some families might find such settings more familiar or comfortable than health clinics or physician offices.
- Health care teams include members who are familiar with the beliefs and practices of their patient populations.

*Electronic health records.* We recommend that:

- Health care organizations commit to the implementation of electronic health records and elimination of paper-based transactions.
- Each child has a personal health record that provides a view into their electronic health record. Families could engage in secure messaging with their clinicians; view results of diagnostic tests, visit summaries, or consultations; input details of their children's health status; and share information with other health care professionals.

### **The Environment**

The following recommended changes to the health care environment would involve interaction or integration with other agencies (e.g., schools, day care, or community programs) in the community and/or policy changes.

*Advanced access to care.* We recommend that:

- Greater use is made of home visits to deliver much of the content of WCC.
- Where feasible, developmental and educational assessments are performed in schools and day care centers, and telehealth encounters are used to bring expert care to children and families.

*Care coordination in the context of a medical home.* Effective and comprehensive WCC will require pediatric clinicians to partner with community and government agencies. It will also require population-based health initiatives, such as obesity prevention. We recommend:

- Development of community pathways that bring together the health care system, schools, and other community agencies to provide a clear path for children who need a wide array of services.
- The use of technology to provide real-time videoconferencing between families, health care providers, and community agencies.

*Electronic health records.* High-quality care coordination will require that the records of hospitals, clinics, schools, and community agencies are integrated into an electronic community health record that is accessible to all health care professionals. We recommend that:

- The integration of health care information across the community, state, and country using common standards.
- The creation of regional health information organizations (RHIOs). RHIOs would be able to integrate information across providers to create a community health record as well as regional and national databases to facilitate disease surveillance and outcomes assessment.

*Health care financing.* Many of the suggested reforms in well-child care would depend on a health care financing system that provides universal access to health care for children. We recommend:

- The enactment of universal health care coverage legislation for children. Because the health of the child is often dependent on the health of the family, this coverage should be extended to mothers and fathers.
- Short of universal coverage, intermediate steps should be taken to expand access to care, including: appropriate reimbursement for health interactions other than face-to-face encounters; a level of reimbursement based on the degree of biological and psychosocial risk of the child and family; and reimbursement for the activities of non-physician members of the health care team such as mental health professionals and child development specialists.

## **CONCLUSIONS**

WCC as it exists today is in need of transformational change. The current system does not meet the needs of families or the aspirations of providers.

The change ideas presented in this report are intended to serve as a template for the future direction of WCC. But the articulation of system changes alone is not sufficient. If we are to bridge the considerable gap between what is and what could be in WCC, we will need to begin a stepwise process to bring about transformational change. We will not be successful unless we pair changes in practice with changes in reimbursement. In particular, provider incentives need to be designed to promote best practices in preventive and developmental care. Effecting change will also require strong

leadership from organizations and agencies such as the American Academy of Pediatrics, the American Academy of Family Practice, and the Maternal and Child Health Bureau.

It is essential that we embark on the first steps of this change process as quickly as possible. Current trends in pediatric practice foretell daunting challenges for the provision of WCC. As child health care providers, researchers, advocates, and policymakers, it is our responsibility to take the lead in responding to the changing epidemiology of pediatric practice, the gaps in our current system of WCC, and the evolving needs of families. The opportunity exists to move beyond a vision of what can be done to the creation of a high-performing system of well-child care.

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**APPENDIX A-1. LIST OF JOURNAL ARTICLES REVIEWED**

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
1	Rethinking Well-Child Care	Schor EL	<i>Pediatrics</i>	114	1	Jul-04	210(7)
2	A Clinical Trial of Tailored Office Systems for Preventive Service Delivery: The Study to Enhance Prevention by Understanding Practice (STEP-UP)	Goodwin MA, Zyzanski SJ, Zronek S et al.	<i>American Journal of Preventive Medicine</i>	21	1	Jul-01	20-28
3	Continuity of Primary Care Clinician in Early Childhood	Inkelas M, Schuster MA, Olson LM et al.	<i>Pediatrics</i>	113	6	Jun-04	1917(9)
4	Assessing Development in the Pediatric Office	Halfon N, Regalado M, Sareen H et al.	<i>Pediatrics</i>	113	6	Jun-04	1926(8)
5	Satisfaction with Health Care for Young Children	Halfon N, Inkelas M, Mistry R et al.	<i>Pediatrics</i>	113	(6 Suppl)	Jun-04	1965-72
6	More Evidence for Reach Out and Read: A Home-Based Study	Weitzman CC, Roy L, Walls T et al.	<i>Pediatrics</i>	113	5	May-04	1248(6)
7	A Randomized Controlled Trial of an Information Prescription for Pediatric Patient Education on the Internet	D'Alessandro DM, Kreiter CD, Kinzer SL et al.	<i>Arch Pediatr Adolesc Med</i>	158		2004	857-862
8	Practical Principals for Primary Care	Pommerenke FA, Dietrich A	<i>Journal of Family Practice</i>	34		1992	92-97
9	The Delivery of Clinical Preventive Services	Hahn DL, Olson N	<i>Journal of Family Practice</i>	48	10	1999	785-789
10	How Much Time Is Spent on Well-Child Care and Vaccinations?	LeBaron CW, Rodewald L, Humiston S	<i>Arch Pediatr Adolesc Med</i>	153	11	Nov-99	1154-1159
11	Applying the Patient Model	Pommerenke FA, Dietrich A	<i>Journal of Family Practice</i>	34	1	Jan-92	86(6)
12	Understanding Change in Primary Care Practice Using Complexity Theory	Miller WL, Crabtree BF, McDaniel R et al.	<i>Journal of Family Practice</i>	46	5	May-98	369(8)
13	Primary Care Practice Organization and Preventive Services Delivery: A Qualitative Analysis	Crabtree BF, Miller WL, Aita VA et al.	<i>Journal of Family Practice</i>	46	5	May-98	403(7)
14	Reducing Missed Opportunities to Vaccinate During Child Health Visits: How Effective Are Parent Education and Case Management?	Wood DW, Schuster M, Donald-Sherbourne C et al.	<i>Arch Pediatr Adolesc Med</i>	152	3	Mar-98	238-243
15	Getting The Incentives Right for Children. (Improving the Quality of Healthcare for Children: An Agenda for Research)	Glied S	<i>Health Services Research</i>	33	4	Oct-98	1143(18)
16	Delivery of Preventive Health Services for Breast Cancer Control: A Longitudinal View of a Randomized Controlled Trial	Ginnotty PA, Burack RC, George JA	<i>Health Serv Res.</i>	37	1	Feb-02	65-85
17	Usual Source of Care in Preventive Service Use: A Regular Doctor Versus a Regular Site	Xu KT	<i>Health Serv Res.</i>	37	6	Dec-02	1509-1529
18	Primary Care: Is There Enough Time for Prevention?	Yarnall KSH, Pollak KI, Ostbye T et al.	<i>Am J Public Health</i>	93	4	Apr-03	635-641
19	Nonfinancial Barriers to Care for Children and Youth	Halfon N, Inkelas M, Wood D	<i>Annual Review of Public Health</i>	16		1995	447-72

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
20	Injury Prevention Counseling in an Urban Pediatric Clinic	Gielen AC, McDonald EM, Forrest CB et al.	<i>Arch Pediatr Adolesc Med</i>	151	2	Feb-97	146-151
21	Introduction of a Recorded Health Information Line into a Pediatric Practice	Kempe A, Dempsey C, Poole SR	<i>Arch Pediatr Adolesc Med</i>	153	6	Jun-99	604-610
22	Children's Bicycle Helmet Attitudes and Use	Miller PA, Binns HJ, Christoffel KK	<i>Arch Pediatr Adolesc Med</i>	150	12	Dec-96	1259-1264
23	Short-Term Effectiveness of Anticipatory Guidance to Reduce Early Childhood Risks for Subsequent Violence	Sege RD, Perry C, Stigol L et al.	<i>Arch Pediatr Adolesc Med</i>	151	4	Apr-97	392-397
24	Predicting Clinician Injury Prevention Counseling for Young Children	Barkin S, Fink A, Gelberg L	<i>Arch Pediatr Adolesc Med</i>	153	12	Dec-99	1226-1231
25	Use of the Pediatric Symptom Checklist to Screen for Psychosocial Problems in Pediatric Primary Care	Jellinek MS, Murphy JM, Little M et al.	<i>Arch Pediatr Adolesc Med</i>	153	3	Mar-99	254-260
26	Changes in the Daily Practice of Primary Care for Children	Ferris TG, Saglam D, Stafford RS et al.	<i>Arch Pediatr Adolesc Med</i>	152	3	Mar-98	227-233
27	Group Well Child Care for High-Risk Families: Maternal Outcomes	Taylor JA, Kemper KJ	<i>Arch Pediatr Adolesc Med</i>	152	6	Jun-98	579-84
28	Determinants of Counseling in Primary Care Pediatric Practice: Physician Attitudes About Time, Money, and Health Issues	Cheng TL, DeWitt TG, Savageau JA et al.	<i>Arch Pediatr Adolesc Med</i>	153	6	Jun-99	629-635
29	Poison Prevention Counseling	Gerard JM, Klasner AE, Madhok M et al.	<i>Arch Pediatr Adolesc Med</i>	154	1	Jan-00	65-70
30	Early Effects of the Healthy Steps for Young Children Program	Minkovitz C, Strobino D, Hughart N et al.	<i>Arch Pediatr Adolesc Med</i>	155	4	Apr-01	470-479
31	Primary Care Services Promoting Optimal Child Development from Birth to Age 3 Years: Review of the Literature	Regalado M, Halfon N	<i>Arch Pediatr Adolesc Med</i>	155	12	Dec-01	1311-1322
32	A Randomized Controlled Trial of General Practitioner Safety Advice for Families with Children Under 5 Years	Clamp M, Kendrick D	<i>BMJ</i>	316	7144	May-98	1576-1579
33	Evidence Based Well Child Care. (Evidence Based Paediatrics, Part 1)	Dinkevich E, Hupert J, Moyer VA	<i>BMJ</i>	323	7317	13-Oct-01	846-849
34	The Mother-Infant Relationship and Infant Development: The Effect of Pediatric Intervention	Whitt JK, Casey PH	<i>Child Dev</i>	53	4	Aug-82	948-956
35	The Effectiveness of Health Education On Home Use of Ipecac	Dershewitz RA, Posner MK, Paichel W	<i>Clin Pediatr</i>	22		Apr-83	268-270
36	Listening Carefully. Improving Communication About Behavior and Development. Recognizing Parental Concerns	Triggs EG, Perrin E	<i>Clin Pediatr</i>	28		Apr-89	185-192
37	A Practice Based Intervention to Enhance Quality of Care in the First 3 Years of Life: The Healthy Steps for Young Children Program	Minkovitz CS, Hughart N, Strobino D et al.	<i>JAMA</i>	290	23	17-Dec-03	3081-3091
38	Optimizing the Health and Development of Children	Halfon N, Inkelas M	<i>JAMA</i>	290	23	17-Dec-03	3136-3138

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
39	Resolving the Gatekeeper Conundrum: What Patients Value in Primary Care and Referrals to Specialists	Grumbach K, Selby JV, Damberg C et al.	<i>JAMA</i>	282	3	21-Jul-99	261–266
40	Long-Term Effects of Nurse Home Visitation on Children's Criminal and Antisocial Behavior: 15-Year Follow-Up of a Randomized Controlled Trial	Olds DL, Henderson CR, Cole R et al.	<i>JAMA</i>	280	14	14-Oct-98	1238–1244
41	Increasing Immunization Rates Among Inner-City, African-American Children: A Randomized Trial of Case Management	Wood D, Halfon N, Donald-Sherbourne C et al.	<i>JAMA</i>	279	1	7-Jan-98	29–34
42	Long-Term Effects of Home Visitation on Maternal Life Course and Child Abuse and Neglect: Fifteen-Year Follow-Up of a Randomized Trial	Olds DL, Eckenrode J, Henderson CR et al.	<i>JAMA</i>	278	8	27-Aug-97	637–643
43	Effect of Prenatal and Infancy Home Visitation by Nurses on Pregnancy Outcomes, Childhood Injuries, and Repeated Childbearing: A Randomized Controlled Trial	Kitzman H, Olds DL, Henderson CR, Jr et al.	<i>JAMA</i>	278	8	27-Aug-97	644–652
44	Protecting Children with Chronic Illness in a Competitive Marketplace	Neff JM, Anderson G	<i>JAMA</i>	274	23	20-Dec-95	1866–69
45	Developmental Services in Primary Care for Low-Income Children: Clinicians' Perceptions of the Healthy Steps for Young Children Program	McLearn KT, Strobino DM, Hughart N et al.	<i>Journal of Urban Health</i>	81	2	Jun-04	206–221
46	How Do I Judge the "Medical Homeness" of My Practice?	Schulz EG, Buchanan G, Ochoa E	<i>Clin Pediatr</i>	43	5	Jun-04	431–5
47	Exploring the Business Case for Improving the Quality of Health Care for Children	Homer C, Child Health Business Case Working Group	<i>Health Affairs</i>	23	4	Jul-Aug-04	159–66
48	Consumer Satisfaction with Child Health Clinics	Sheridan A, Hegarty I, Flanagan E et al.	<i>Irish Medical Journal</i>	97	5	May-04	143–5
49	Measuring the Quality of Preventive and Developmental Services for Young Children: National Estimates and Patterns of Clinicians' Performance	Bethell C, Reuland CH, Halfon N et al.	<i>Pediatrics</i>	113	(6 Suppl)	Jun-04	1973–83
50	Routine Assessment of Family and Community Health Risks: Parent Views and What they Receive	Kogan MD, Schuster MA, Yu SM et al.	<i>Pediatrics</i>	113	(6 Suppl)	Jun-04	1934–43
51	The Prevention Index: Using Technology to Improve Quality Assessment	Vogt TM, Aickin M, Ahmed F et al.	<i>Health Services Research</i>	39	3	Jun-04	511–30
52	Measure of Processes of Care (MPOC) Applied to Measure Parent's Perception of the Habilitation Process in Sweden	Bjerre IM, Larsson M, Franzon AM et al.	<i>Child: Care, Health &amp; Development</i>	30	2	Mar-04	123–30
53	Health Care for Children and Youth in the United States: 2002 Report on Trends in Access, Utilization, Quality, and Expenditures	Simpson L, Zodet MW, Chevarley FM et al.	<i>Ambulatory Pediatrics</i>	4	2	Mar/Apr-04	131–53

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
	Providing a Medical Home: The Cost of Care Coordination Services in a Community-Based, General Pediatric Practice	Antonelli RC, Antonelli DM	<i>Pediatrics</i>	113	(5 Suppl)	May-04	1522-8
54	The Pediatric Alliance for Coordinated Care: Evaluation of a Medical Home Model	Palfrey JS, Sofis LA, Davidson EJ et al., Pediatric Alliance for Coordinated Care	<i>Pediatrics</i>	113	(5 Suppl)	May-04	1507-1516
55	Continuity of Medical Care, Health Insurance, and Nonmedical Advice in the First 3 Years of Life	Bradford WD, Kaste LM, Nietert PJ	<i>Medical Care</i>	42	1	Jan-04	91-8
56	Implementing and Using Quality Measures for Children's Health Care: Perspectives on the State of the Practice	Shaller D	<i>Pediatrics</i>	113	(1 Pt 2)	Jan-04	217-27
57	Parents' Perceptions of Pediatric Primary Care Quality: Effects of Race/Ethnicity, Language, and Access	Seid M, Stevens GD, Varni JW	<i>Health Services Research &amp; Medical Care Research &amp; Review</i>	38	4	Aug-03	1009-31
58	Racial and Ethnic Disparities in the Primary Care Experiences of Children: A Review of the Literature	Stevens GD, Shi L	<i>Ambulatory Pediatrics</i>	60	1	Mar-03	3-30
59	Continuity of Care Is Associated with Well-Coordinated Care	Christakis DA, Wright JA, Zimmerman FJ et al.	<i>Ambulatory Pediatrics</i>	3	2	Mar-Apr-03	82-6
60	Use of an Electronic Medical Record Improves the Quality of Urban Pediatric Primary Care	Adams WG, Mann AM, Bauchner H	<i>Pediatrics</i>	111	3	Mar-03	626-32
61	Recognition and Treatment of Mental Disorders in Children: Considerations for Pediatric Health Systems	Ringeisen H, Oliver KA, Menvielle E	<i>Paediatric Drugs</i>	4	11	2002	697-703
62	Health Services Research for Children with Disabilities	Perrin JM	<i>Milbank Quarterly</i>	80	2	2002	303-24
63	Racial and Ethnic Disparities in the Quality of Primary Care for Children	Stevens GD, Shi L	<i>Journal of Family Practice</i>	51	6	Jun-02	573
64	Assessing the Quality of Preschool Child Health Surveillance in Primary Care: A Pilot Study in One Health District	Hampshire AJ, Blair ME, Crown NS et al.	<i>Child: Care, Health &amp; Development</i>	28	3	May-02	239-49
65	Improving the Health of Infants on Medicaid by Collocating Special Supplemental Nutrition Clinics with Managed Care Provider Sites	Kendal AP, Peterson A, Manning C et al.	<i>American Journal of Public Health</i>	92	3	Mar-02	399-403
66	Challenges in Long-Term Health Care for Children	Stein RE	<i>Ambulatory Pediatrics</i>	1	5	Sept-Oct-01	280-8
67	Evidence-Based Health Care Coverage for Children: Proceed with Caution	Wehr E	<i>Ambulatory Pediatrics</i>	1	1	Jan-Feb-01	23-7
68	Quality Improvement in Pediatric Well Care with an Electronic Record	Gioia PC	<i>Proceedings / AMIA ... Annual Symposium</i>			2001	209-13
69	From Concept to Application: The Impact of a Community-Wide Intervention to Improve the Delivery of Preventive Services to Children	Margolis PA, Stevens R, Bordley WC et al.	<i>Pediatrics</i>	108	3	Sep-01	E42
70	Improving Preventive Service Delivery Through Office Systems	Bordley WC, Margolis PA, Stuart J et al.	<i>Pediatrics</i>	108	3	Sep-01	E41

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
72	Racial and Ethnic Differences in Parents' Assessments of Pediatric Care in Medicaid Managed Care	Weech-Maldonado R, Morales LS, Spritzer K et al.	<i>Health Services Research</i>	36	3	Jul-01	575-94
73	Parents: The Best Experts in Child Health Care? Viewpoints from Parents and Staff Concerning Child Health Services	Hallberg AC, Lindblad E, Rastam L et al.	<i>Patient Education &amp; Counseling</i>	44	2	Aug-01	151-9
74	Effects of Structured Encounter Forms on Pediatric House Staff Knowledge, Parent Satisfaction, and Quality of Care. A Randomized, Controlled Trial	Zenni EA, Robinson TN	<i>Archives of Pediatrics &amp; Adolescent Medicine</i>	150	9	Sep-96	975-80
75	Clinical Management. Where Medicine Meets Management. Crib Notes	Lewis C	<i>Health Service Journal</i>	114	5891	5-Feb-04	28-9
76	Information Technology and The Future of Child Health Care: A Revolution Is Occurring	Weitzman M, Shiffman RN	<i>Archives of Pediatrics &amp; Adolescent Medicine</i>	155	9	Sep-01	990-1
77	Home Visits: Necessary But Not Sufficient	Weiss HB	<i>The Future of Children</i>	3	3	Winter 1993	113-128
78	What Constitutes Adequate Well-Baby Care?	Hoekelman RA	<i>Pediatrics</i>	55	3	1975	313-26
79	Anticipatory Guidance in Pediatric Practice	Reisinger KS, Bires JA	<i>Pediatrics</i>	66	6	1980	889-892
80	Preventive Care Use by School-Aged Children: Differences by Socioeconomic Status	Newacheck PW, Halfon N	<i>Pediatrics</i>	82	3	Sep-88	462-468
81	Psychosocial Problems During Child Health Supervision Visits: Eliciting, Then What?	Sharp L, Pantell RH, Murphy LO et al.	<i>Pediatrics</i>	89	4	Apr-92	619-623
82	Reducing Night Waking in Infancy: A Primary Care Intervention	Adair R, Zuckerman B, Bauchner H et al.	<i>Pediatrics</i>	89	4	Apr-92	585-588
83	Group Health Supervision Visits More Effective Than Individual Visits in Delivering Health Care Information	Dodds M, Nicholson L, Muse B et al.	<i>Pediatrics</i>	91	3	Mar-93	668-670
84	Childhood Injury Prevention Counseling in Primary Care Settings: Critical Review of the Literature	Bass JL, Christoffel KK, Widome M et al.	<i>Pediatrics</i>	92	4	Oct-93	544-550
85	Does Prenatal and Infancy Home Visitation Have Enduring Effects on Qualities of Parental Caregiving and Child Health at 25 to 50 Months of Life?	Olds DL, Henderson CR, Jr, Kitzman H	<i>Pediatrics</i>	93	1	Jan-94	89-98
86	Excessive Infant Crying: A Controlled Study of Mothers Helping Mothers.	Wolke D, Gray P, Meyer R	<i>Pediatrics</i>	94	3	Sep-94	322-332
87	Preventive Pediatrics: New Models of Providing Needed Services	Zuckerman B, Parker S	<i>Pediatrics</i>	95	5	May-95	758-762
88	The Role of Parents in the Detection of Developmental and Behavioral Problems	Glascoe FP, Dworkin PH	<i>Pediatrics</i>	95	6	Jun-95	829-836
89	Pediatric Office-Based Smoking Intervention: Impact on Maternal Smoking and Relapse	Wall MA, Severson HH, Andrews JA et al.	<i>Pediatrics</i>	96	4	Oct-95	622-628
90	Capitation Adjustment for Pediatric Populations	Fowler EJ, Anderson GF	<i>Pediatrics</i>	98	1	Jul-96	10-17
91	Assuring Quality of Care for Children With Special Needs in Managed Care Organizations: Roles for Pediatricians	Ireys HT, Grason HA, Guyer B	<i>Pediatrics</i>	98	2	Aug-96	178-85

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
92	Utilization of Well-Child Care Services for African-American Infants in a Low-Income Community: Results of a Randomized, Controlled Case Management/Home Visitation Intervention	Schuster MA, Wood DL, Duan N et al.	<i>Pediatrics</i>	101	6	Jun-98	999(7)
93	Screening, Early Identification, and Office-Based Intervention with Children and Youth Living in Substance-Abusing Families	Werner MJ, Joffe A, Graham AV	<i>Pediatrics</i>	103	5	May-99	1099-1112
94	Instruction, Timeliness, and Medical Influences Affecting Toilet Training	Brazelton TB, Christophersen ER, Frauman AC et al.	<i>Pediatrics</i>	103	6	Jun-99	1353-1358
95	The Scope of Unmet Maternal Health Needs in Pediatric Settings	Kahn RS, Wise PH, Finkelstein JA et al.	<i>Pediatrics</i>	103	3	Mar-99	576-581
96	Screening for Domestic Violence in the Community Pediatric Setting	Siegel RM, Hill TD, Henderson VA et al.	<i>Pediatrics</i>	104	4	Oct-99	874-877
97	The Use of Physician Financial Incentives and Feedback to Improve Pediatric Preventive Care in Medicaid Managed Care	Hillman AL, Ripley K, Goldfarb N et al.	<i>Pediatrics</i>	104	4	Oct-99	931-934
98	Increasing Identification of Psychosocial Problems: 1979-1996	Kelleher KJ, McInemy TK, Gardner WP et al.	<i>Pediatrics</i>	105	6	Jun-00	1313-1321
99	The Medical Home. (Policy Statement)		<i>Pediatrics</i>	110	1	Jul-02	184-186
100	Building Medical Homes: Improvement Strategies in Primary Care for Children with Special Health Care Needs	Cooley WC, McAllister J	<i>Pediatrics</i>	113	(5 suppl)	May-04	1499-1506
101	Overview of the Content of Health Supervision for Young Children: Reports From Parents and Pediatricians	Olson LM, Inkelas M, Halfon N et al.	<i>Pediatrics</i>	113	6	Jun-04	1907-1916
102	Financing Childhood Health Supervision Services in the 21st Century	Berman S	<i>Pediatrics</i>	113	(6 Suppl)	Jun-04	1984-5
103	Small Steps and Big Leaps: Implications of the National Survey of Early Childhood Health for Improving the Quality of Preventive and Developmental Care for Young Children	Margolis PA	<i>Pediatrics</i>	113	(6 Suppl)	Jun-04	1988-90
104	The Medical Home, Access to Care, and Insurance: A Review of Evidence	Starfield B, Shi L	<i>Pediatrics</i>	113	(5 suppl)	May-04	1493-1498
105	Pediatrician Counseling About Preventive Health Topics: Results from the Physicians' Practices Survey, 1998-1999	Galuska DA, Fulton JE, Powell KE et al.	<i>Pediatrics</i>	109	5	May-02	951(1)
106	Improving Physicians' Preventive Health Care Behavior Through Peer Review and Financial Incentives	Morrow RW, Gooding AD, Clark C	<i>Archives of Family Medicine</i>	4	2	Feb-95	165-69
107	Office Education by Pediatricians to Increase Seat Belt Use	Mackinn ML, Gustafson C, Gassman J et al.	<i>Am Journal of Diseases of Children</i>	141	12	Dec-87	1305-1307

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
108	Identifying Children with Special Health Care Needs: Development and Evaluation of a Short Screening Instrument	Bethell CD, Read D, Stein RE et al.	<i>Ambulatory Pediatrics</i>	2	1	Jan-Feb-02	38-48
109	Evidence-Based Well-Baby Care. Part I: Overview of the Next Generation of the Rourke Baby Record	Panagiotou L, Rourke LL, Rourke JTB et al.	<i>Can Fam Physician</i>	44		Mar-98	558-67
110	How Many Well-Baby Visits Are Necessary in the First 2 Years of Life?	Gilbert JR, Feldman W, Siegel LS et al.	<i>Can Med Assoc J</i>	130	1	1-Apr-84	857-61
111	Patient-Specific Reminder Letters and Pediatric Well-Child-Care Show Rates	Campbell JR, Szilagyi PG, Rodewald LE et al.	<i>Clin Pediatr</i>	33	5	May-94	268(5)
112	Expectations, Goals, and Perceived Effectiveness of Child Health Supervision: A Study of Mothers in a Pediatric Practice	Cheng TL, Savageau JA, DeWitt TG et al.	<i>Clin Pediatr</i>	35	3	Mar-96	129(9)
113	An Analysis of Group Versus Individual Child Health Supervision	Rice RL, Slater CJ	<i>Clin Pediatr</i>	36	12	Dec-97	685-9
114	Well-Child Care: Effectiveness of Current Recommendations	Dinkevich E, Ozuah PO	<i>Clin Pediatr</i>	41	4	May-02	211(7)
115	The Effectiveness of Waiting Room Notice-Boards As a Vehicle for Health Education	Wicke DM, Lorge RE, Coppin RJ et al.	<i>Fam Pract</i>	11	3	Sep-94	292-295
116	Payment Mechanisms, Nonprice Incentives, and Organizational Innovation in Health Care	Robinson JC	<i>Inquiry</i>	30	3	Fall 1993	328-33
117	Reducing Sleep Disruptions in Young Children: Evaluation of Therapist Guided and Written Information Approaches: A Brief Report	Seymour FW, Brock P, Durning M et al.	<i>J Child Psychol Psychiatry</i>	30	6	Nov-89	913-918
118	Effects of Parent Training on Infant Sleeping Patterns, Parents' Stress, and Perceived Parental Competence	Wolfson A, Lacks P, Futterman A	<i>J Consult Clin Psychol</i>	60	1	Feb-92	41-48
119	Family Psychosocial Screening: Should We Focus on High-Risk Settings?	Kemper KJ, Osborn LM, Hansen DF et al.	<i>J Dev Behav Pediatr</i>	15	5	Oct-94	336-341
120	Improving Access to Clinical Offices	Kilo CM, Triffletti P, Tantau C et al.	<i>J Med Pract Manage.</i>	16	3	Nov-Dec-00	126-132
121	Family Support and Parenting Education in the Home: An Effective Extension of Clinic-Based Preventive Health Care Services for Poor Children	Hardy JB, Streett R	<i>J Pediatr</i>	115	6	Dec-89	927-931
122	Patient-Doctor Agreement About Problems Needing Follow-Up Visit	Starfield F, Steinwachs D, Morris I et al.	<i>JAMA</i>	242	4	27-Jul-79	344-346
123	Population-Based Study of the Adequacy of Well-Child Care Services: A Rural County's Report Card	Gadomsky AM	<i>JAMA</i>	152	8	Aug-98	745-748
124	The Association of Attributes of Primary Care with the Delivery of Clinical Preventive Services	Flocke SA, Stange KC, Zyzanski SJ	<i>Medical Care</i>	36	8(suppl)	Aug-98	AS21-AS30
125	What Have HMOs Learned About Clinical Prevention Services? An Examination of the Experience at Group Health Cooperative of Puget Sound	Thompson RS	<i>Milbank Quarterly</i>	74	4	1996	469-511

#	Title	Authors	Journal/Publication	Vol.	Iss.	Date	Pages
126	Baby, Be Safe: The Effect of Tailored Communications for Pediatric Injury Prevention Provided in a Primary Care Setting	Nansel TR, Weaver N, Donlin M et al.	<i>Patient Education and Counseling</i>	46	3	Mar-02	175(16)
127	A Randomized Controlled Trial of Group Versus Individual Well Child Care for High-Risk Children: Maternal-Child Interaction and Developmental Outcomes	Taylor JA, Davis RL, Kemper KJ	<i>Pediatrics</i>	99	6	Jun-97	E9
128	Health Care Utilization and Health Status in High-Risk Children Randomized to Receive Group or Individual Well Child Care	Taylor JA, Davis RL, Kemper KJ	<i>Pediatrics</i>	100	3	Sep-97	E1
129	Case Management and Preventive Services Among Infants from Low-Income Families	Erkel EA, Morgan EP, Staples MA et al.	<i>Public Health Nurs</i>	11	5	Oct-94	352-360
130	Defining the Future of Primary Care: What Can We Learn from Patients?	Safran DG	<i>Annals of Internal Medicine</i>	138	3	4-Feb-03	248-255
131	Anticipatory Guidance: What Information Do Parents Receive? What Information Do They Want?	Schuster MA, Regalado M, Duan N et al.	<i>Archives of Pediatrics &amp; Adolescent Medicine</i>	154	12	Dec-00	1191
132	Continuity of Care Is Associated with High-Quality Care by Parental Report	Christakis DA, Wright JA, Zimmerman FJ et al.	<i>Pediatrics</i>	109	4	Apr-02	694(2)
133	How to Prevent Exposure to Tobacco Smoke Among Small Children: A Literature Review	Arborelius E, Hallberg AC, Hakansson A	<i>Acta Paediatr Suppl</i>	89	5	May-00	65-70
134	Systematic Review of the School Entry Medical Examination	Barlow J, Stewart-Brown S, Fletcher J	<i>Arch Dis Child.</i>	78		Apr-98	301-311
135	Is Routine Growth Monitoring Effective? A Systematic Review of Trials	Garner P, Panpanich R, Logan S	<i>Arch Dis Child.</i>	82		Mar-00	197-201
136	Randomized Trial of Enhanced Anticipatory Guidance for Injury Prevention	Gielen AC, Wilson ME, McDonald EM et al.	<i>Arch Pediatr Adolesc Med</i>	155	1	Jan-01	42-49
137	Interventions to Reduce Unintended Pregnancies Among Adolescents: Systematic Review of Randomized Controlled Trials	DiCenso A, Guyatt G, Willan A et al.	<i>BMJ</i>	324	7351	15-Jun-02	1426
138	Advising Parents of Asthmatic Children on Passive Smoking: Randomised Controlled Trial	Irvine L, Crombie IK, Clark RA et al.	<i>BMJ</i>	318	7196	29-May-99	1456-1459
139	Neonatal Examination and Screening Trial (NEST): A Randomised, Controlled, Switchback Trial of Alternative Policies for Low Risk Infants	Glazener CM, Ramsay CR, Campbell MK et al.	<i>BMJ</i>	318	7184	6-Mar-99	627-631
140	Individual-Level Injury Prevention Strategies in the Clinical Setting	DiGuiseppi C, Roberts IG	<i>Future Child</i>	10		2000	53-82
141	Factors Affecting Physician Provision of Preventive Care to Medicaid Children	Adams EK	<i>Health Care Financ Rev.</i>	22	4	Summer 2001	9-26
142	Are Yearly Physical Examinations in Adolescents Necessary?	Stickler GB	<i>J Am Board Fam Pract</i>	13	3	May-June-00	172-177

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143	Review of Primary Care-Based Physical Activity Intervention Studies: Effectiveness and Implications for Practice and Future Research	Eakin EG, Glasgow RE, Riley KM	<i>J Fam Pract.</i>	49	2	Feb-00	158-168
144	Users' Guides to the Medical Literature. XVII. How to Use Guidelines and Recommendations About Screening: Evidence-Based Medicine Working Group	Barratt A, Irwig L, Glasziou P et al.	<i>JAMA</i>	281	21	2-Jun-99	2029-2034
145	Pacifier Use, Early Weaning, and Cry/Fuss Behavior: A Randomized Controlled Trial	Kramer MS, Barr RG, Dagenais S et al.	<i>JAMA</i>	286	3	18-Jul-01	322-326
146	A STD/HIV Prevention Trial Among Adolescents in Managed Care	Boekeloo BO, Schamus LA, Simmens SJ et al.	<i>Pediatrics</i>	103	1	Jan-99	107-115
147	The Role of the Pediatrician in Youth Violence Prevention in Clinical Practice and at the Community Level	American Academy of Pediatrics, Task Force on Violence	<i>Pediatrics</i>	103	1	Jan-99	173-181
148	A Systematic Review of Vision Screening Tests for the Detection of Amblyopia	Kemper AR, Margolis PA, Downs SM et al.	<i>Pediatrics</i>	104	5 (suppl)	Nov-99	1220-1222
149	Assessing Health System Provision of Well-Child Care: The Promoting Healthy Development Survey	Bethell C, Peck C, Schor EL	<i>Pediatrics</i>	107	5	May-01	1084-1094
150	A Pediatric, Practice-Based, Randomized Trial of Drinking and Smoking Prevention and Bicycle Helmet, Gun, and Seatbelt Safety Promotion	Stevens MM, Olson AL, Gaffney CA et al.	<i>Pediatrics</i>	109	3	Mar-02	490-497
151	Gaps in the Evidence for Well-Child Care: A Challenge to Our Profession	Moyer VA, Butler M	<i>Pediatrics</i>	114	6	Dec-04	1511-1521
152	Preschool Vision Screening Frequency After an Office-Based Training Session for Primary Care Staff	Hered RW, Rothstein M	<i>Pediatrics</i>	112	1	Jul-03	170-172
153	Effectiveness of Health Promotion Programs to Increase Motor Vehicle Occupant Restraint Use Among Young Children	Grossman DC, Garcia CC	<i>Am J Prev Med.</i>	16	1(Suppl 1)	Jan-99	12-22
154	Tailored Advice on Exercise: Does It Make A Difference?	Bull FC, Jamrozik K, Blanksby BA	<i>Am J Prev Med.</i>	16	3	Apr-99	230-239
155	American College of Preventive Medicine Practice Policy Statement: Screening for Elevated Blood Lead Levels in Children	Lane WG, Kemper AR	<i>Am J Prev Med.</i>	20	1	Jan-01	78-82
156	Evaluating Primary Care Behavioral Counseling Interventions: An Evidence-Based Approach	Whitlock EP, Orleans CT, Pender N et al.	<i>Am J Prev Med.</i>	22	4	May-02	267-284
157	A Study of Periodic School Medical Examinations: Part II: The Annual Increment of New "Defects"	Yankauer A, Lawrence RA	<i>Am J Public Health</i>	46		1956	1553-1562
158	Well Child Care Revisited	Hoekelman RA	<i>Am Journal of Diseases of Children</i>	137		1983	1057-60
159	Anticipatory Guidance in Pediatric Practice: Are We Doing More Or Less?	Goldstein EN, Dworkin PH, Berstein B	<i>Ambulatory Child Health</i>	3		1997	159

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160	Sun Protection Counseling for Children: Primary Care Practice Patterns and Effect of In Intervention on Clinicians	Dietrich AJ, Olson AL, Sox CH et al.	<i>Arch Fam Med.</i>	9		2000	155-159
161	Iron Therapy for Improving Psychomotor Development and Cognitive Function in Children Under the Age of Three with Iron Deficiency Anaemia	Martins S, Logan S, Gilbert R	<i>Cochrane Review: The Cochrane Library. Oxford, United Kingdom: Update Software</i>			2002	
162	A Systematic Review of the Effectiveness of Health Promotion Aimed at Improving Oral Health	Kay E, Locker D	<i>Community Dent Health.</i>	15		1998	132-144
163	Parent Handouts: Cornerstone of a Health Education Program	Schmitt BD, Brayden RM, Kempe A	<i>Contemp Pediatr.</i>	14		1997	120-143
164	Teachable Moments: Assessment As Intervention	Zuckerman BS, Parker S	<i>Contemp Pediatr.</i>	14		1997	41-53
165	Reorganizing Health Systems to Promote Best Practice Medical Care, Patient Self-Management, and Family-Centered Care for Childhood Asthma	Hyman D	<i>Ethnicity &amp; Disease</i>	13	(3 Suppl 3)	Summer 2003	S3-94-8
166	A Systematic Review to Evaluate the Effectiveness of Interventions To Promote the Initiation of Breastfeeding	Fairbank L, O'Meara S, Renfrew MJ et al.	<i>Health Technol Assess.</i>	4		2000	1-171
167	A Systematic Review of the Effectiveness of Primary Prevention Programs to Prevent Sexually Transmitted Diseases in Adolescents	Yamada J, DiCenso A, Feldman L et al.	<i>In: Effective Public Health. Ontario, Canada: Ontario Ministry of Health</i>			1999	1-73
168	Screening	Gray JAM	<i>In: Evidence-Based Healthcare: How to Make Health Policy and Management Decisions. London, United Kingdom: Churchill Livingstone</i>			1997	46-53
169	Iron Supplementation for Improving Psychomotor Development and Cognitive Function in Infants Under the Age of One	Martins S, Logan S, Gilbert R	<i>In: Protocol for a Cochrane Review: The Cochrane Library</i>				
170	Can We Prevent Accidental Injury to Adolescents? A Systematic Review of the Evidence	Munro J, Coleman P, Nicholl J et al.	<i>Inj Prev.</i>	1		1995	249-255
171	Effectiveness of the 40 Adolescent AIDS-Risk Reduction Interventions: A Quantitative Review	Kim N, Stanton B, Li X et al.	<i>J Adolesc Health</i>	20		1997	204-215
172	"Prudence" in Disease Prevention	Froom J, Froom P	<i>J Clin Epidemiol.</i>	44		1991	1127-1130
173	A Critical Review of Periodic Health Screening Using Specific Screening Criteria	Frame PS, Carlson SJ	<i>J Fam Pract.</i>	2		1975	283-289
174	Health Screening for Our Children	O'Neill K	<i>Journal of Family Health Care</i>	14	1	2004	24
175	Early Childhood Screening by Primary Care Physicians	Fussell JJ	<i>Journal of the Arkansas Medical Society</i>	100	7	Jan-04	233-8

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176	Partnering with Parents to Promote The Healthy Development of Young Children Enrolled in Medicaid	Bethell C, Peck C, Abrams M et al.	New York, NY: The Commonwealth Fund			2002	
177	Effectiveness of Brief Interventions to Reduce Alcohol Intake in Primary Health Care Populations: A Meta-Analysis	Poikolainen K	Prev Med.	28		1999	503-509
178	Vision Screening in the Preschool Child: Proceedings of a Conference Held September 1998	Hartmann E, ed.	Washington, DC: US Department of Health and Human Services			1999	
179	Preschool Vision Screening: Results of a Systematic Review	Snowden SK, Stewart-Brown SL	York, United Kingdom: National Health Service Centre for Reviews and Dissemination, University of York			1997	

## APPENDIX A-2. SUMMARY OF LITERATURE REVIEW

*General Note: Numbers in parentheses refer to article numbers in Appendix A-1.*

### **1. Anticipatory Guidance and Patient Education**

#### **Simple, cost-effective anticipatory guidance can reduce developmental risks when provided during pediatric visits.**

Physicians, by their collective positions in society and their individual interactions with patients, can be facilitators in helping families adopt more healthful ways of living (79). Trial interventions have shown that inclusion of brief, targeted counseling sessions during routine pediatric visits can increase safety practices in the home and reduce harmful behaviors, such as violence and smoking (22, 23, 32, 89).

#### **Services provided during pediatric visits are not consistent, and recommended preventive services are often not provided.**

Providers often miss opportunities to provide recommended services, such as immunizations, injury counseling, and anticipatory guidance on psychosocial, behavioral, and safety topics during child health visits (14, 20, 28, 79). Many physicians selectively counsel only on specific topics, and the amount of time spent discussing each topic often varies (79, 105, 131). Physician attitudes regarding the importance of a health issue, their confidence and effectiveness in counseling, and their degree of training largely determine their practice (28, 29, 79). Patient's age also affects the frequency with which specific preventive health topics were discussed (79,105). Parents who had discussed more of these topics with a clinician were more likely to report excellent care. Parents who could use more information on a larger number of topics were much more willing to pay for additional care. Many parents could use more information on these topics (131).

#### **Anticipatory guidance should be evidence-based and targeted to address specific population-based needs.**

Well-child care incorporates many screening tests (history and physical examination) and therapeutic interventions (e.g., anticipatory guidance). Unfortunately, almost no evidence is available to validate most of what makes up the health supervision visit (33, 110). The practitioner should limit safety counseling to selected areas that are most problematic at each age level, and within each topic, and should concentrate on the most salient points (35). Standardized guidelines for the provision of anticipatory guidance during routine visits increase the effectiveness of primary preventive care (24, 109).

## **2. Preventive Services**

### **Families that lack insurance receive fewer clinical preventive services.**

Evidence-based clinical preventive services are underutilized. Having insurance to pay for preventive services is an important factor in the delivery of such care (9). Children in families with incomes below the poverty level, especially those without Medicaid insurance, are much less likely to receive routine preventive care on a timely basis. Poor school-age children with Medicaid coverage are much more likely to receive timely preventive care than their counterparts without such coverage (80).

### **Integrating screening, case management, and counseling into pediatric clinical care provision can increase preventive service delivery.**

Time constraints limit the ability of physicians to comply with preventive services recommendations (18). Parents' desire to discuss topics such as smoking in the household, financial difficulties, injury prevention, and emotional support with pediatric providers support is often unmet (50, 84). Current literature supports more universal surveillance of parents with young children as a way to increase preventive service delivery (50). Studies have shown that offering assessment, counseling, and case management services as part of routine or acute clinical visits increases preventive service delivery (9, 84, 93, 125, 129). Proposed methods for achieving this integration include establishing population- and evidence-based systems for provision of care, and increasing provider training in the areas of identification and management (9, 84, 93, 114). Another promising way to increase provision of preventive services is to take advantage of case managers either within an HMO or through public health nurses who, because of their close integration with the family and their ability to provide continuous care, are uniquely positioned to facilitate the delivery of preventive services (125, 129).

## **3. Developmental and Behavioral Pediatrics**

### **There is an increased demand for identification and treatment of pediatric psychosocial problems in primary care settings.**

Demographic changes in the pediatric population over the last three decades, including increases in the proportions of single-parent families and Medicaid enrollment, have created a substantial increase in the number of clinician-identified psychosocial problems. This has led to a subsequent increase in the use of psychotropic medications, counseling, and referral (98). Primary care settings currently play an active role in the identification and treatment of children with mental disorders. As many as one-third of children identified and treated for mental health problems receive outpatient mental health care from primary care providers. The quality of current pediatric mental health care could be

enhanced through increased opportunities for physician training, restructuring of current training efforts, increased focus on patient engagement strategies, equitable care incentives and reimbursement, and an integrated view of physical and mental health (62).

**Many children who need developmental and behavioral assessment do not receive them.**

Although guidelines endorse the provision of routine provision of developmental assessments, parents report that this does not often occur. When children do receive assessments, parents report greater satisfaction with care (4). Although parents and children are often given or frequently take opportunities to express psychosocial concerns, physicians do not consistently respond with information, reassurance, guidance, or referral (81). Many pediatricians report that time barriers and problems with reimbursement affect their ability to provide developmental services (45). Similarly, children who have psychosocial concerns or need mental health services frequently do not receive needed care. This stems from a failure to identify these children during primary care visits, problems with reimbursement, and insufficient treatment capacity (62, 81).

**Pediatric visits may be an optimal setting for screening of maternal health needs.**

Evidence suggests that many mothers of young children may have unmet personal health needs. A significant percentage of mothers screened during pediatric visits report alcohol abuse, emotional or physical abuse, or depression (95). There is some question as to whether maternal screening should be limited to only “high risk” clinical settings. However, studies have shown that mothers seen in “low-risk” settings commonly report alcoholism and psychosocial problems (119). Recently, the American Academy of Pediatrics recommended that all pediatricians incorporate screening for domestic violence as a part of anticipatory guidance. Preliminary results suggest that many women will reveal domestic violence when screened in the pediatric office setting. Also, a subgroup of women, those with young children who have recently separated from their partners, may particularly benefit from screening for domestic violence (96).

**Good screening tools exist for identifying children with developmental and psychosocial problems.**

Research has demonstrated that easy-to-use screening instruments can be successfully utilized in pediatric practice to identify children with special health care needs and psychosocial concerns (25, 108). The use of simple checklists about behavioral and developmental concerns also improved the communication between parents and physicians (36). This is important, given that assessment of parental concerns has been shown to be more accurate in identifying children with developmental problems than

clinicians' appraisals (31). Using parent-provided information may save pediatricians' time and improve early diagnosis of behavioral and developmental problems (88).

**Effective primary care services exist to address behavioral and developmental concerns and promote optimal development.**

A growing evidence base has led policymakers and clinicians to recognize the critical need not just to maintain, but to optimize, the health of children. Recent proposed changes in the health system, such as the Healthy Steps program, emphasize an integrated and population-based strategy to improving early childhood health, and have proven to be successful in universally increasing developmental services (38, 45). Research has demonstrated that educational interventions, offered to parents in the context of pediatric well-child visits, can be effective in enhancing parent-child interaction and targeting issues such as sleep, toilet training, discipline, and infant crying (34, 82, 117, 118). Such interventions have also been shown to promote children's learning and increase parental competence (118). There is evidence to show that application of developmental research findings may significantly influence childhood growth and development through pediatric practice and training programs (34).

**Greater involvement of parents in the pediatric assessment and treatment process leads to more effective and efficient care.**

More patient involvement and enhanced patient-provider communications result in improved follow-up of problems and better outcomes, as perceived by patients (122). Research has shown that simple tools designed to improve communication about behavioral and developmental issues can improve the quality of care (36), and lead to more accurate identification of children with developmental problems (31, 88). Further efforts are needed to improve the ability of physicians to respond effectively to patients' psychosocial concerns (81). Using parent-provided information may save pediatricians' time and improve early diagnosis of behavioral and developmental problems (88). Even when considering normal developmental milestones, such as toilet training, many practical considerations from family, social, cultural, and economic perspectives significantly affect the treatment outcome for these problems. The health care professional needs to consider these different perspectives when providing advice for developmental milestones (94).

#### **4. Primary Care Systems**

**Recent demands for change in pediatric primary care, which call for more emphasis on preventive services, necessitate a deeper understanding of practice dynamics.**

Rapid developments within the health care environment have led to increased pressures for change among primary care physicians and their practices (13). There is a widespread call to improve the quality of preventive and developmental services. Nevertheless, a lack of understanding of practice organization and function has limited the effectiveness of attempts to change practice behaviors (13, 49). Practices are much more complex than present strategies for change assume. Understanding the organization of primary care practices is essential for implementing changes related to delivery of preventive or other health care services (12). Physicians who wish to emphasize preventive medicine more in their practices should have an understanding of how practice characteristics (e.g. as clarity of staff roles), office systems (e.g., office efficiency) and habits (e.g. communication patterns between physicians and staff) affect the quality and patient use of the preventive services that they provide (11). An awareness of these factors is an important prerequisite for improving preventive services and maintaining these improvements permanently (11).

**In determining the appropriate number and duration of well-child visits, physicians must consider a number of conflicting factors.**

Increased ethnic diversity and provision of preventive services have been associated with an increased mean duration of child health visits. This may cause conflict with the managed care emphasis on physician productivity (26). Evidence suggests that physicians can reduce the number or duration of well-child visits for healthy, low-risk populations without detriment to the children's health or the adequacy of care (78, 110). High-risk children, however, make half as many well-child care visits as other children, thus a slight increase in encounter time is insufficient to provide them with the same level of care as other children (10). Moreover, shorter length of well-child visits is consistently associated with lower parent satisfaction (5).

**Physicians and practices can increase quality-of-care scores by providing more preventive care and developmental services.**

Parental reports and consumer satisfaction surveys are often used to assess the quality of health care service delivery (5, 48, 49, 78). Parents consistently cite unmet needs in the areas of preventive care and developmental counseling. Evidence suggests that improvement of services in these areas is associated with increased parent satisfaction, quality of care, and greater cost-effectiveness (48, 49, 101, 124). For physicians and practices seeking to improve delivery of preventive services, it is important to maintain a focus on reasonable and measurable goals (8). Fostering specific tenets of primary care, such as interpersonal communication and coordination of care, may have an impact on the delivery of preventive services and possibly other important health outcomes (124).

## **5. Innovations in Primary Care Practice**

### **Home visitation programs can reduce childhood risk factors and improve health status.**

Critics of the traditional approaches to well-child care call for a broader view of care that goes beyond well-child visits (1, 70, 103). A number of studies have experimented with different formats for extending well-child care beyond the traditional office visit. One of the most commonly utilized methods is home visitation, which is often used to provide case management, social support, and educational counseling on developmental, behavioral, and safety issues. This type of outreach has been shown to be effective at reducing a number of risk factors and negative outcomes, including antisocial behavior, substance abuse, household hazards, emergency department visits, subsequent pregnancies, use of welfare, child abuse and neglect, criminal behavior, pregnancy-induced hypertension, and childhood injuries (40, 42, 43, 85, 121). However, more extensive reviews of the practice of home visitation suggest that home visiting in and of itself is not sufficient to address the complicated needs of families (77). Services that address the psychosocial concerns of families are essential to effective care. Moreover, targeted home visitation programs aimed at increasing immunization rates and well-child visits for high-risk populations have often proven ineffective or not cost-effective in achieving the desired outcome (41, 92). Poor mothers, especially, may require help to resolve personal crises and survival problems before they are able to focus on efforts to improve the health of their children (121).

### **Physicians can utilize new technologies and modes of personal communication to aid in delivery of care and improve health outcomes.**

Common technologies, such as telephones and the Internet, can be efficient and cost-effective tools for physicians to communicate with patients and improve delivery of care. The phone has commonly been used for adults with chronic illnesses as a way to triage patient needs, deliver health education, monitor health status, and provide case-management services (21). Phone counseling has been used to reduce infant behavioral problems (86), and a phone-based system of recorded health messages was effective in providing information about behavioral and developmental issues to parents of preschool children (21). These interventions were associated with increased parent satisfaction and decreased need for calls or physician visits. The Internet can also be a cost-effective means of providing important health information to parents, though it may be necessary for physicians to provide parents with additional guidance in order for them to access this information effectively (7). Evidence suggests simple modes of communication, such as waiting room notice boards, can be improved by incorporating new technologies (115).

**Group well-child visits are a viable alternative to individual visits.**

The model of the one-to-one health supervision visit has been adopted with little evidence that it is the most effective format for providing well-child care (27). Evidence from a number of recent studies suggests that populations receiving group well-child visits were no worse off than those receiving individual visits (27, 113, 127, 128), and, in some cases, the group visits yielded preferable results, including greater coverage of the recommended health topics (83), faster recovery from postpartum depression, and improved coping skills (113). While there is no significant evidence that group well-child visits are a better method of delivering care, they are a pleasant and effective alternative (113) that does not require an increase in expenditure of time or money (27, 127).

**Coordination of clinical care with services provided by other community-based organizations can improve child health outcomes.**

More effective organization of preventive services within primary care practices and more coordination between practices and community-based agencies have been recommended as ways to improve health outcomes of children (1, 70). Studies have demonstrated that greater coordination can lead to concrete improvements in health outcomes, such as immunization rates and age-appropriate weight (66). These studies have also increased the general recognition that clinical interventions in the medical office are not the only or necessarily the most effective way to address the health and development needs of young children (103). For example, assessment and intervention in pre-schools or day care centers may offer a better venue for addressing the developmental needs of children. Despite the inherent complexities in this type of multilevel coordination, it is important for physicians who wish to improve delivery of preventive services and fully realize their potential to aid in children's healthy development (70, 103).

**The current model of well-child care does not provide for an adequate level of preventive and developmental services.**

High rates of childhood developmental problems and their associated morbidities place a heavy burden on families. Pediatricians are uniquely poised to help families address these and other preventive issues at an early age in order to prevent or ameliorate future problems (1, 2). A number of office-based tools and guidance programs have been designed to help physicians increase delivery of important preventive and developmental services. Office-based systems, such as improvement teams and structured encounter forms, can increase house staff knowledge of developmental milestones and anticipatory guidance/preventive care, increase preventive service delivery, and improve compliance with recommended guidelines for developmental assessment (71, 74). Comprehensive guidance programs, such as the Healthy Steps for Young Children Program, incorporate early child

development specialists and enhanced developmental services into routine pediatric care (30, 37). Other developmental and preventive services, such as literacy training and home/car safety counseling, can be delivered as part of routine well-child visits (6, 126).

## **6. Financing Primary Care**

### **Certain models of health care financing may serve as impediments to the provision of high-quality pediatric care.**

Managed care contracts often depend on the existence of valid, applicable research data and positive cost-effectiveness analyses. This is problematic, because research challenges specific to children have led to a dearth of requisite evidence, thus entitling a managed care organization or other decision maker to deny coverage on the basis of unproven, negative assumptions about an intervention (68). Capitation models have been shown to inadequately compensate physicians for children with chronic illnesses (90). Conversely, private fee-for-service insurance models have been associated with an increased likelihood that a child will receive continuous care and, as a result, a greater probability that physicians will provide mothers with dental, nutritional, and developmental advice (56).

### **A system of peer review and feedback, combined with financial incentives, can improve service delivery in pediatric practices.**

The findings of the National Survey of Early Childhood Health indicate marked variability in the topics and amount of time devoted to counseling or anticipatory guidance, and the types and overall quality of services provided during health supervision visits (102). One proposal to improve the functioning of the child health care system is the use of periodic peer review and feedback, combined with financial incentives. Such systems have shown mixed success in increasing delivery of various recommended preventive services, such as immunizations, cholesterol screening, and charting adequacy (15, 97, 106).

### **Special considerations are necessary to protect children with special health care needs from the inherent disadvantages of a competitive health care market.**

Children with chronic illnesses are especially vulnerable in a competitive health care environment because of the higher ongoing costs associated with treating them and the inherent pressures to reduce services to manage within the capitated rate (44, 90). More children with chronic conditions are surviving than in previous times, and many have serious and significant ongoing health care needs (67). Further research is needed, as are efforts to develop a system of care that minimizes the adverse impact a competitive market has on this population. Current proposals on the table include a different form of insurance for specific medical conditions, a capitation pricing system that reflects their higher costs, as well as a delivery system that is focused on their needs (44).

## **7. Medical Home**

### **The nature of the patient-physician relationship can exert a strong influence on the quality of care provided.**

The role of the primary care physician (PCP) has become more central to health care with the advent of managed care. Most patients in managed care systems value their PCP as a source of first-contact care and a coordinator of referrals, and prefer to seek care from them initially. However, managed care models that emphasize the role of PCP as gatekeepers who can impede patient access to specialty care may undermine patients' trust and confidence in their PCPs (39). The stability of the patient-physician relationship is important. Many health care settings have low rates of continuity, despite the fact that continuity of care has been associated with increased delivery of anticipatory guidance during well-child visits (3), more timely receipt of preventive services (17), better care coordination (60), and overall improvements in patient satisfaction and quality of care ratings (132).

### **The medical home model has the potential to improve delivery of care to children.**

Gaps in what health care children need and what they receive highlight the lack of an integrated system of health care in the United States. Barriers to adequate care include fragmented public and private delivery systems, lack of comprehensive, developmentally appropriate services, and shortages of accessible sites, delivery systems, and appropriately trained providers. Universal access to appropriate care for children requires affordable, available continuums of care that integrate personal medical services, community-based health services with education and social programs, and agencies from both public and private sectors (19). A medical home provides care to infants, children, and adolescents that is accessible, continuous, comprehensive, family-centered, coordinated, compassionate, and culturally effective (46). A relationship with a medical home is associated with better health, on both the individual and population levels; with lower overall costs of care; and with reductions in health disparities between socially disadvantaged subpopulations and more socially advantaged populations. A medical home provides better effectiveness as well as more efficient and more equitable care to individuals and populations (104). Efforts are under way to establish access to community-based medical homes for all children and to use the medical home as a model for quality improvement in primary care practices (46, 55, 99,100, 104).

### **Children with special health care needs benefit greatly from the incorporation of a medical home into their framework of care.**

Although managed care may improve service coordination and use of primary care, it may also threaten health outcomes for children with special health care needs (CSHCN) by

potentially decreasing access to the range of needed services, eroding progress in developing community-based service systems, and failing to ensure quality of care (91). There is a lack of investigation into epidemiology, clinical care and its improvement, organization, and financing of care for children with disabilities (63). As a result, few frameworks have been proposed to assess quality of care for this population of children in managed care organizations (91). The American Academy of Pediatrics, families, and other health care professionals agree that access to a medical home is necessary for CSHCN (55, 100). CSHCN benefit from care that is integrated with well-child and acute care; coordinated among specialists, therapists, and educators; and offered in a planned, anticipatory manner. Primary care practices that serve CSHCN require a practical and effective improvement method to become fully realized medical homes (100).

## **8. Technology for Primary Care**

### **Use of new technologies should be incorporated in the redesign of child health care.**

Pilot studies aimed at redesigning and improving the quality of child health care delivery have benefited from the incorporation of new technology into routine care. The electronic health record (EHR) has been introduced into a number of pediatric primary care offices and has proven effective in improving quality of care, especially in the area of preventive service delivery (51, 61, 69). Use of information technology is also proposed to help improve patient safety and reduce medical errors (76).

## **9. Disparities in Health Outcomes in Primary Care**

### **Substantial racial and ethnic disparities persist in children's health and use of health services in the United States.**

Most efforts aimed at reducing racial and ethnic disparities in children's health care have focused primarily on achieving equal access to primary care services. Little attention has been paid to the qualitative experience of primary care for children of different races and ethnicities (59, 64). There is evidence that racial and ethnic disparities in quality persist in many aspects of primary care delivery, and that these disparities are not simply reflections of ability to pay, health disparities, sociodemographics, or racial variations in expectations for care. Parents of minority children, in particular Asian Americans, report lower quality of primary care (64). Efforts to improve access and provide more linguistically appropriate services may help to reduce this gap. However, health plans need to pay increased attention to racial/ethnic differences in assessments of care (58, 72).

## **APPENDIX B. WELL-CHILD CARE SCENARIOS**

This section describes ideal models of well-child care (WCC). We have chosen eight scenarios that best describe how systems of WCC vary according to patient populations, geographic locations, or conditions for providing care. These scenarios reflect the conclusions for each of the assigned settings (e.g. rural well child care). There is considerable overlap between the different scenarios and many of the ideas represented in one scenario are applicable to other settings. Because the scenarios were developed by independent groups, there may be overlap in some of the suggested changes between scenarios. Additionally changes suggested in one scenario may be applicable in other scenarios. For example if the use of the online forums for parents is presented in the suburban care scenario this does not mean it is not applicable to rural or urban care.

### **Urban Well-Child Care**

An ideal WCC system for large urban practices would include universal coverage, standardized screening, and the use of developmental specialists and behavioral counselors. Universal coverage would ensure that all children are able to access care at all levels. Standardized screening would be performed in a number of settings, including homes, churches, schools, or day care centers. Children would be screened and stratified by level of risk, helping to customize their care. Children identified as “at risk” would be seen by the appropriate health care professionals.

Urban practices would allow same-day appointments, implement extended visiting hours, and provide transportation for families when needed. Educational outreach, like screening, would be delivered in settings that would be accessible to families. For example, there could be “parents’ nights” at schools on anticipatory guidance, safety, and other important developmental issues. Such outreach programs would be developed through partnerships between pediatric practices and local schools and include teachers and other non-medical caregivers as educators.

Parents would be encouraged to become involved in their child’s care. Larger practices would implement electronic health records and enable both health professionals and community agencies to access them. Each family would have access to their child’s personal health record through a patient portal or a portable disk. Pediatric practices would solicit feedback through parent questionnaires. Parent advisory boards would work collaboratively with practices to monitor and improve the quality of care.

Urban practices would extend the system of WCC to include a broad network of medical and non-medical providers. Primary care providers would track specialist referrals within and outside of their own system to ensure that there are no barriers to access, and specialists would be expected to provide a full report to the child's primary care provider following each visit. Social workers would be readily available in pediatric offices to provide guidance and help families connect with community-based services, focusing on those identified as high risk. Interpreters would facilitate communication with families with limited English proficiency. Practices would have staff interpreters around the clock for languages that are common among their patient population and interpreters on call for less common languages.

### **Rural Well-Child Care**

The small, rural WCC system would rely on the use of media (print, radio, and television) and community partnerships to facilitate access to care among geographically dispersed patient populations. These linkages would provide information and ease transitions between different aspects of WCC. For example, local newspapers could serve as valuable tools for providing health information and reminders about interventions, such as annual flu shots.

It would be important for rural practices to share technology and other resources. While individual practices might not be able to hire developmental specialists, they might be able to share the costs with other practices. Similarly, new technologies could be shared among practices, creating economies of scale as well as interconnectivity. Rural practices could expand access to specialty care through the use of shared resources that would allow for telehealth visits with specialists.

Rural practices would recognize that attending regular visits poses challenges to families who live far from offices. They would enable parents to schedule same-day appointments, and make the most of visits by gathering extensive health information through pre-visit questionnaires. They would develop a complexity scale to assess each family's potential needs and plan accordingly to offer them pertinent tools and information. Because pediatricians would work as part of collaborative health care teams, they could use each family's questionnaires to determine who should be present at the visit. For instance, care coordinators could take part in office visits for families who have children with special health care needs.

Primary care offices would commonly develop service contracts with local specialists and acute care institutions to ensure that information is shared among care

settings. Pediatric office staff would have extensive knowledge of local resources, and make referrals based on their appropriateness to each family's needs. For example, children with chronic illnesses, such as asthma, are likely to benefit from continuous monitoring in a community-based care setting. In this situation, the pediatrician could refer the family to a local school nurse who has expertise in asthma management. Pediatricians would also make off-site visits to schools and other community locations to accommodate families who have a hard time keeping regular office visits.

Parents would be involved in the development of a customized calendar and recall/reminder system to help them become active participants in their child's care plan. The care team would reinforce to parents the importance of continuous monitoring and management of conditions outside of the office. Parents with a high degree of knowledge about certain aspects of child health would be invited to become partners in the health care team and asked to provide education and guidance to other parents.

### **Suburban Well-Child Care**

As with the ideal WCC models for urban and rural scenarios, ideal WCC in suburban settings would maximize families' access to office-based care and develop systems for ongoing monitoring and communication. Access to office-based care is improved by revising visiting schedules to include drop-in hours for acute care and extended hours to meet the needs of working families.

Social marketing would play an important role in this system, with television marketing campaigns used to attract potential families and transmit information to existing patients. Pediatric practices could use e-mail to send visit reminders to families, along with pre-visit questionnaires that would enable pediatricians to customize well-child visits according to families' needs. The pre-visit questionnaires would enable families to tailor their visit by choosing a group visit, where appropriate, or requesting the presence of staff specialists, such as psychologists and social workers.

Pediatricians would facilitate ongoing communication with families by using secure online messaging for follow-up questions and monitoring. Practices could set up Web sites with links to screened educational health resources and online forums for special interest groups. This would enable parents to learn from and support one another. Group well-child visits divided by children's ages could encourage the formation of parent networks and information sharing.

Each child would have a personal health record, available online and updated at each visit to include new health information and links to relevant sites. This would enable parents to research their child's health information from home and formulate questions or identify concerns to address with their care provider.

### **Well-Child Care for Children with Special Health Care Needs**

An ideal WCC system for children with special health care needs (CSHCN) would be designed on the medical home model, the gold standard of care for such children. This system would uphold a commitment to providing care that is easily accessible, coordinated, continuous, comprehensive, culturally appropriate, family-centered, and compassionate. Care would be delivered by a health care team, with public health nurses (PHNs) at the core. Each regional primary care office would oversee a team of five PHNs, and each PHN would be responsible for the care of 40 CSHCN and their families. The PHNs would provide all of the basic WCC services, including developmental assessments, education, and immunizations. They could provide these services in schools, homes, or other community sites. The health care team would maintain a high level of communication with the overseeing primary care office, as well as with multiple subspecialty providers. In this way, PHNs would be able to act as care coordinators, making referrals in accordance with children's health care needs.

The PHNs in each team would work collaboratively, frequently calling on one another for advice and information. Telehealth technologies would provide convenient means for "virtual consults" among PHNs, facilitating communication and the transmittal of health information, such as test results. Technology would enable physicians to provide live consultations and assessments, even for offsite visits. All team members would have online access to their patients' electronic medical records.

By depending on PHNs to provide the basic aspects of WCC, physicians would be able to devote more time to children's acute care needs. Physicians could also focus on other areas of care for CSHCN, providing consultation and training for teachers and child care providers on systems issues and working with parents and others to address issues that arise as CSHCN interact with other health care providers as well as schools and community programs.

Parents' active involvement in their child's care would be vital. To facilitate communication and support networks among parents, each health care team would create a parent advocacy group. All families would be given a laptop computer, which they could use to communicate with the health care team or parent group, access their child's

electronic medical record, and look up Web-based health information. Although the cost of providing families with laptops as durable medical equipment would be considerable, this technology would be likely to result in savings as part of an integrated system of WCC.

### **Well-Child Care Using Home Visits**

The home health visit system, like many of the scenarios for WCC, would use a team-based model of care that includes multiple specialists. While office-based care would remain important, this system would make home visits by PHNs the cornerstones of care, both for healthy and at-risk children.

A nurse's role would begin before the child is born, with a home visit after the 20-week ultrasound. This initial visit would be arranged by the primary care physician, in conjunction with other members of the health care team, and would focus on anticipatory guidance for parents, based on the results of the ultrasound. For instance, if the ultrasound suggests a developmental abnormality (e.g., spina bifida), then the visiting nurse would be prepared to discuss the implications of this diagnosis, design a plan for the child's care, and answer any questions the parents might have about their child's condition.

The prenatal visit also would provide an opportunity for the health care team to learn about the family. The nurse would assess environmental and psychosocial factors for the health care team to consider in determining the child's level of risk and developing a customized care plan. Finally, the prenatal visit would help to establish a trusting and comfortable relationship between the nurse and family. Since the visiting nurse would play a central role in this system, the strength of this relationship would be fundamental to the successful delivery of future WCC. If families feel apprehensive about inviting nurses into their homes, visiting nurses would make it clear that their role is to be helpful and supportive, rather than judgmental.

The visiting nurse would maintain a link with the family throughout the child's childhood and through adolescence, providing assistance during key developmental milestones. For instance, the nurse would make a home visit before the anticipated birth date to offer guidance on the birthing process and the transition from hospital to home. Other visits would address toilet training and entry to preschool. At each visit, the nurse would perform assessments, provide needed education and training, and help the family to identify necessary resources. The nurse also would provide basic well-child services, such as immunizations and screenings, and coordinate visits with the primary care physician and other members of the health care team.

In this way, the visiting nurse would facilitate WCC as well as care for children with acute or chronic health care needs. Physicians would be better able to perform their role because of the relationship that exists between the visiting nurse and the family. The nurse would be a valuable source of information for all members of the health care team. Practices could hold weekly office meetings with home visitors and other providers to discuss positive developments in each child's condition and stay informed about the progress of their care.

Providers would also strive to involve parents as members of the health care team. Practices would design campaigns aimed at involving families, particularly targeting those at risk or with CSHCN. Direct communication between parents and providers would be facilitated by phone and e-mail, and the internet would be used to connect parents and providers with community-based resources. Other technological tools, such as electronic monitoring devices and Web-based tracking programs, would be used in day care centers, schools, and other community sites to allow the nurse and other members of the health care team to continuously monitor children's health and development.

### **Lowest-Cost Well-Child Care**

The ideal model for low-cost WCC would begin with universal coverage. Universal coverage would lower overall costs by ensuring access to basic medical and preventive services for all children and reducing the need for high-cost critical care. Further cost reductions would be achieved by breaking away from the face-to-face clinical office visit and increasing the efficiency of care provision.

Certain aspects of WCC, such as developmental screenings, anticipatory guidance, and risk identification, would move out of the clinical office into malls, schools, libraries, or other community settings. The low-cost model would also make use of alternative providers, such as pediatric nurse practitioners, and medical assistants, and to deliver some of the basic well-child services. This would broaden the spectrum of care available to families, as each provider contributes a unique point of view and skill set. Moreover, dividing responsibilities for WCC among a team of providers would take the onus off of physicians to deliver a complete package of well-child services during office visits. This would allow them to use visit time more efficiently and focus on critical care. The overall cost of WCC would be lowered due to increased efficiency and the use of lower-cost providers.

Parents would be involved as active partners with their providers through practice-based discussion groups, stratified by children's age. These groups would give parents with

children at similar developmental stages a forum in which to discuss WCC and anticipatory guidance and speak with providers about these issues. Individual parents could volunteer to be trained as peer educators, providing information and guidance to other parents. These groups could take the form of group visits for WCC or discussion groups with parents and child experts.

Providers would work with parents to develop customized visit schedules, based on their expressed needs and determined level of risk. These schedules would eliminate unnecessary visits from the general periodicity schedule for “low-risk” families, and help physicians target additional services for families with special needs. In both cases, the customized schedules would enable providers to deliver more efficient and effective care.

Providers would use information technology to achieve a number of cost savings. Common formats, such as CD-ROMs, DVDs, and e-mail, would be used to transmit educational information to a large number of families at minimal costs. Cellular phones and e-mail would provide ways for parents and providers to communicate and send visit reminders. Such simple and inexpensive tools would obviate the need for some office visits and significantly reduce the number of missed visits, thus lowering costs for individual practices. The cost benefit of more widely disseminated educational and preventive information would be immeasurable.

Collaborative partnerships would be another important facet of low-cost WCC. As discussed above, providers would use a variety of community sites to deliver well-child services. Commercial entities could be involved: Wal-Mart could offer subsidies for parent education and even provides space in their stores for parent classes. Health care providers could partner with public access and commercial television stations to develop and broadcast programs aimed at informing parents. Such programs could provide parents with general information about child development and help them prepare for visits by highlighting key issues and questions. These partnerships would be mutually beneficial for all parties: they would generate positive publicity for the commercial entities, increase access and “buy-in” among parents, and lower operating costs for providers.

### **Innovative Well-Child Care**

This model would cast aside many of the old standards for WCC, replacing them with innovative systems that appeal to parents, children, and providers. Perhaps one of the most innovative proposals would be the relocation and redesign of the clinical office. Physicians’ offices would be located in malls, making them more convenient for families. Offices would cater to patients, with office “greeters” welcoming families, forming personal bonds

with them, and providing education. Healthy refreshments and ample entertainment would be available to children. For example, games could be played which are educational with children being rewarded with redeemable coupons for healthy foods. Practices that serve multicultural populations would celebrate this diversity by decorating their offices with a “United Nations” theme. All practices would strive to create a “pain-free” office, using new technologies to make medical procedures as pleasant and non-invasive as possible.

Technological tools would be used to monitor children’s health status. The medical industry has developed a line of wearable sensors that can continuously monitor health data such as heart rate, pulse, and even substance use. Such “smartware” sensors are advanced enough to monitor important markers of illness that typically require a blood sample, and could thus form an integral part of the “pain-free” medical system.

Technology could also create links between patients, providers, and payers in order to make the medical insurance system pain-free for both patients and providers. All medical offices use a coding system for patient symptoms and illnesses. This information would go directly into patients’ electronic health records (EHRs), which would be accessible to their insurer. These informational linkages would allow insurers to operate on a “one-bank” system, in which patients use debit cards to pay for each office visit and payers transfer the appropriate funds to the patient’s personal account almost immediately. Payment amounts would be determined by the codes input by providers and the indicated patient copayments. The ICPC system could also use updated patient information to identify important “teachable” moments and topics for anticipatory guidance. Simple video access using a computer and webcam or a low cost videophone enabling providers to schedule “virtual visits” and regular check-ins with patients. This audio and video access would also be the basis for an advanced care coordination system that providers would use to schedule referral appointments during patients’ visits.

Innovative WCC would introduce the concept of the primary care provider as a multidisciplinary team, including professionals from many different specialties. The provider team would be held to a high standard of excellence, supported by continuous staff training and adequate reimbursement for services. The multidisciplinary nature of the team would enable members to learn from one another, simply by working in tandem. Knowledge sharing would be furthered through continuous medical education, which would take place in the form of monthly staff meetings to discuss different topics in WCC.

Providers would also learn from their patients by taking cues from practice-based family panels. The provider team would work closely with parents and other community

members to improve WCC and extend services beyond the clinical office. Local schools would be integrated into the spectrum of care through, for example, developmental screenings in kindergarten classrooms or use of high school students as peer educators for younger students. Providers would work collaboratively with local newspapers and public access television stations to disseminate educational information to the community.

### **High-Tech Well-Child Care**

Technology could be used in many ways to improve WCC. Technology would expand access to care, create platforms for information transfer between parents and providers, and offer new formats for education and service delivery.

Pediatricians would make ample use of the Internet as a teaching resource because it is easily accessible and familiar to many parents. Of course, not all Web sites include reliable information, so pediatricians would offer lists of vetted Web sites to families. Practices could set up online “baby books” for each child, including personalized information about their medical history and developmental milestones. These baby books would contain links to vetted Web sites, which parents could follow to learn more about specific issues or developmental changes. Baby books could follow children throughout their lifespan from infancy through adolescence, tracking their personal growth and development and supporting parents with information and reminders.

Parents could use e-mail to communicate questions or concerns to their physicians, and physicians could reply with specific answers or requests for more information. Parents could provide physicians with details about their child’s health and development through online profiles, which could be linked to their baby books. For instance, if parents are concerned about their child’s sleep patterns, their pediatrician might request that they use the profile to track their child’s sleep hours and temperament over a designated period. The profile could also prompt parents to input information about issues that might be affecting the child’s sleep. Often, physicians would be able to make a detailed recommendation based solely on such information—reducing the need for office visits. Web-based monitoring and feedback systems would also be valuable tools for dealing with ongoing health problems.

Technology would make WCC visits as convenient and comfortable as possible. In non-critical cases, families who have computers with webcams or videophones could opt for a telehealth visit, allowing them to consult with their physician from the comfort of their own home. Both telehealth visits and office visits could be scheduled using online systems.

All pre- and post-visit information would be entered into a child's electronic health record, which could be accessed by the primary care physician and a number of other providers. This type of access would be particularly useful in situations where primary care physicians decide to call on specialists for help. Primary care providers would utilize an advanced decision-support system to garner expert knowledge from a variety of specialists, enabling them to offer parents the best and most up-to-date care. Electronic health records would be linked with other databases, such as school records, so that pediatricians could communicate with key contacts and ensure that children receive all necessary screenings and services. School faculty and other community members would play an important role in making sure each child is healthy and thriving. Public sites, such as schools, libraries, churches, and day care centers, would offer community kiosks that provide internet access to online health resources and tools. Such kiosks would be particularly useful for families who do not have Internet access at home.

**APPENDIX C. WELL-CHILD CARE CHANGE IDEAS:  
READINESS FOR IMPLEMENTATION**

<b>Change Ideas Ready for Implementation</b>	<b>Change Ideas Requiring Additional Resources</b>	<b>Change Ideas Requiring New Technology or Policy Development</b>
Assign children into risk categories and customize their screening and developmental/preventive services	Provide advanced access; ensure that visits can take place on the day requested	Give parents access to vetted Web sites; automatically direct them to sites from electronic or personal health records
Focus well-child care visits with the help of structured assessments prior to the visits	Use public health nurses or other child health professionals to make home visits	Create interactive health care information programs to teach child development and health promotion skills; possible partnerships with media companies
Use of parents as consultants to answer questions and impart information	Use multidisciplinary teams to ensure families are offered broad range of services, including developmental and mental health services	Send group e-mails or text messages with health information, e.g., allergy alerts
Enable parents of children with special health care needs to partner with practices, participate in planning care	Deliver screening and developmental and preventive services at preschools and day care centers	Install kiosks at places of employment or other central locations to provide information about community resources
Pediatricians serve as consultants to schools, community agencies, and other settings	Forge partnerships between practices and communities agencies for population-based initiatives, such as obesity prevention	Create electronic health records linked to regional health information organizations to track outcomes and perform needs assessment
Give parents customized calendars with schedule and description of well-child visits (like tear-off tickets for mortgage payments or car maintenance)	Enable “one-stop shopping”: co-location of health, mental health, education, and social services	Use electronic prompts and reminders for clinicians and parents to ensure appropriate and timely well-child care
Set up specific office hours for behavioral and developmental problems	Perform population-based screening in schools, churches, or community agencies to identify health care needs	Set up Web-based tracking/monitoring systems linked to a child’s electronic health record, e.g., immunization registry, specialty referrals, and disease management
	Use a care coordinator in conjunction with team-directed care	Use a personal health record derived from an electronic health record

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