

# Does Well-Child Care Have a Future in Pediatrics?

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## KEY WORDS

chronic disease, health economics, primary care, well-child care

## ABBREVIATIONS

ACO—Accountable Care Organization

SES—Socioeconomic Status

WCC—well-child care

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## abstract

The most common adult chronic diseases affect 1 in 3 adults and account for more than three-quarters of US health care spending. The major childhood drivers of adult disease are distinctly nonmedical: poverty, poor educational outcomes, unhealthy social and physical environments, and unhealthy lifestyle choices. Ideally, well-child care (WCC) would address these drivers and help create healthier adults with more productive lives and lower health care costs. For children without serious acute and chronic medical problems, however, traditional pediatric preventive services may be largely ineffective in addressing the outcomes that really matter; that is, improving lifelong health and reducing the burden of adult chronic disease. In this article, we examine what role WCC has in addressing the major childhood drivers of adult disease and consider various models for the future of WCC within pediatrics. *Pediatrics* 2013;131:S149–S159

Well-child care (WCC) is the foundation of pediatric primary care for most children in the United States. Pediatricians provide the vast majority of this care to children from infancy through adolescence across more than 20 WCC visits. Through these visits, pediatricians have a unique opportunity to identify and address important social, developmental, behavioral, and health issues that could have significant and long-lasting effects on children's lives as adults. In this article, we discuss how this opportunity is routinely squandered, not because pediatricians are inadequate, but because WCC is not designed to address the most critical prevention goals that can affect child health and well-being over a lifetime. First, we review the adult chronic diseases that dominate the overall health care landscape. Next, we discuss the modifiable childhood drivers of these adult chronic diseases that any meaningfully effective WCC system must aim to address. Finally, we discuss the shortcomings of today's WCC in addressing these childhood drivers and present alternative models that may represent WCC's best hope for the 21st century. Although adult health care expenditures already dwarf health care expenditures for children, the potential for child health and well-being to alter adult trajectories presents a tantalizing return on investment that has yet to be fully realized.

In 2011, health care expenditures totaled nearly 18% of the nation's gross domestic product, up from 12% in 1990 and 7% in 1970.<sup>1,2</sup> It is unclear whether the United States can sustain indefinite growth in health care expenditures as a percentage of gross domestic product; such a trend potentially endangers nonhealth government expenditures; reduces nonhealth private sector growth; and undermines our ability to control state and federal budgets. The ability of the Affordable Care Act to

restrain health care expenditures long-term is equally unclear, and increases in expenditures may accelerate at least temporarily as uninsured Americans gain access.<sup>3</sup>

Two long-term changes have been cited as key culprits of health care spending growth: the increases in adult obesity and chronic disease.<sup>4</sup> The proportion of obese adults has more than doubled since 1980, and with that sharp rise, the proportions of adults with related chronic conditions including heart disease, hypertension, and diabetes have increased.<sup>5–7</sup> Other chronic diseases affecting adult morbidity and mortality, including cancer and mental disorders, have also risen.<sup>4</sup> Chronic disease management and treatment currently account for 78% of US health care expenditures.<sup>8</sup>

Pediatricians generally assume that they are uniquely positioned to affect a child's lifelong health trajectory. Under their care, children could enter adulthood with a greatly reduced risk of developing many chronic diseases, thus not only reducing the expenditures needed to manage those conditions but also creating a healthier, more productive workforce.

But is this assumption correct? Are pediatricians actually equipped to make a substantial difference in the lives of most children? For the relatively few children who have serious acute or chronic illnesses, pediatricians obviously serve an important role. For the majority of children, however, most of the major drivers of adult disease are distinctly nonmedical (poverty, poor educational outcomes, unhealthy social and physical environments, and unhealthy lifestyle choices).<sup>9</sup> Physicians and policy makers in the health care system often consider such children to be "healthy," but given the high prevalence of these conditions and their potentially devastating lifelong health impact, it could be argued that these

healthy but at-risk children constitute a population of equal or greater importance for aggressive systematic intervention.

Of course, that is why we have WCC: to improve the health and well-being of children and their families, to give families tools to help children reach their full potential, and to increase the likelihood that children will grow into healthy, happy, and productive adults. Although improving health and well-being means more than reducing the risk of adult chronic disease, it is difficult to conceive of improving health and well-being without reducing this risk.

In this article, we argue that, as currently structured and delivered, WCC, for most at-risk children, does not effectively address these key determinants of child health and well-being that eventually determine adult health. The question, therefore, may not be whether pediatricians can tweak an existing WCC system to maximize benefits. The question may be whether the system, as currently structured, should exist at all.

## MODIFIABLE CHILDHOOD DRIVERS OF ADULT CHRONIC DISEASE

Most morbidity and mortality in US adults are directly related to just a handful of chronic diseases. The top 5 causes of death for US adults have been fairly stable over the past 30 years; heart disease, cancer, chronic lower respiratory disease, stroke, and accidents have been the leading causes of death since 1979.<sup>10</sup> The 7 most common chronic diseases are cancer, diabetes, hypertension, stroke, heart disease, pulmonary conditions, and mental illness. More than 1 in 3 US adults report having at least 1 of these conditions, and the combined lost productivity and treatment costs of these diseases have been estimated at \$1.3 trillion annually. These costs are projected to rise

rapidly and steeply as our population continues to age.<sup>11</sup>

Many of these chronic diseases have their roots in childhood. The main modifiable childhood drivers of these diseases, however, seem not to be childhood illnesses but nonmedical factors such as socioeconomic status (SES), especially poverty and educational attainment; environmental exposures; and health-related behaviors.<sup>9,12</sup>

### Socioeconomic Status: Poverty and Educational Attainment

Poverty and educational attainment are closely related to health; many studies have demonstrated a socioeconomic gradient for health outcomes in childhood and adulthood.<sup>12–14</sup>

There is compelling evidence linking childhood and adolescent SES with adult health.<sup>15–18</sup> Childhood poverty and low parental educational attainment are associated with higher risk of death and disease in adulthood,<sup>15,16</sup> including increased cardiovascular morbidity and mortality, respiratory disease, diabetes, cancers, and poor health-related behaviors such as smoking.<sup>19</sup> College graduates have fewer risky health-related behaviors and other risk factors for the most common adult chronic diseases.<sup>20,21</sup> Adults with greater educational attainment are less likely to be obese, less likely to be current smokers, and more likely to report vigorous physical activity.<sup>21</sup> Studies also link educational attainment to lower risk of coronary heart disease and all-cause mortality in adults.<sup>22–25</sup>

Although the association between childhood SES and adult health is well established, the mechanisms behind this association are complex and poorly understood. In the United States, children in lower SES families often have poorer access to quality health care, resulting in more unmet needs and foregone services that might place

these children at greater risk for health problems as adults.<sup>26–28</sup> However, SES health disparities persist stubbornly in the face of improvements to health care quality and access.<sup>17,29</sup> The link between childhood SES and adult health remains robust even in countries with universal access to health care.<sup>30</sup>

This link points to a more insidious explanation for the childhood SES–adult health association: children in lower SES families are exposed to different neighborhood influences, family environments, housing conditions, educational opportunities, and food choices, which, taken together, may have an impact on future adult health through unhealthy exposures, cumulative stress, and adverse developmental trajectories. A recent study demonstrated a link between the proportion of childhood spent in poverty through age 9 years and elevated allostatic load (a marker of physiologic stress that includes blood pressure, BMI, and epinephrine, norepinephrine, and cortisol levels) at age 17 years.<sup>31</sup> Lower childhood SES also puts children at risk for exposures in both the physical environment (eg, air pollution) and the social environment (eg, child abuse and neglect)<sup>9</sup> that can lead to poorer adult health.

### Environmental Exposures

Convincing evidence links adult morbidity and premature mortality from chronic disease to adverse physical and social environmental exposures early in life.<sup>32</sup> With respect to the social environment, repeated exposure to childhood traumatic events has been associated with chronic disease and cardiovascular risk factors in adulthood. These adverse childhood exposures include child abuse and neglect; domestic violence; and parental substance abuse, mental health disorder, and imprisonment.<sup>33,34</sup>

There is also growing evidence that exposure to adverse physical environments, both prenatally and postnatally, can contribute to chronic disease risk in adulthood. Fetal growth retardation, low birth weight, and poor weight gain postnatally have been linked to cardiovascular disease and related chronic diseases (ie, stroke, hypertension, type 2 diabetes) in adults.<sup>35–37</sup> Childhood lead exposure has been associated with central nervous system deficits that persist into adulthood, and childhood environmental tobacco exposure can lead to cardiovascular changes that mirror those found in smokers.<sup>38–42</sup>

The “built environment” (the constructed indoor and outdoor spaces in the child’s community<sup>43</sup>) may be another important childhood determinant of adult health. Built environments can confer a number of advantages during childhood, including availability of parks, fresh fruits and vegetables, quality schools, good air quality, safe areas to play, and social support. Low neighborhood-level poverty and other indicators of neighborhood advantage have been linked to child and adult health.<sup>44–46</sup> A 38-year longitudinal study of neighborhood quality during childhood indicated a positive association with self-reported health during adulthood.<sup>47</sup> Other elements of the built environment, including design (eg, close proximity of homes, schools, business, and parks to each other; the presence of sidewalks), can increase physical activity among residents.<sup>43,48</sup> Although there has been no thorough examination of the relationship between the childhood built environment and adult health, the relationship of the built environment with physical activity, social capital, positive mental health outcomes, and lower levels of obesity suggests its potential for long-term impact on health.<sup>48–50</sup>

### Health-Related Behaviors

Four health-related behaviors are major culprits of population-level morbidity

and mortality among US adults: (1) tobacco use; (2) excessive alcohol consumption, (3) poor nutrition; and (4) physical inactivity.<sup>51</sup> These health risk behaviors can start in childhood and are often firmly established by the end of adolescence. Approximately 90% of adult smokers started smoking before the age of 18 years. Reducing the number of adolescents that enter adulthood as smokers has led to a dramatic decrease in the proportion of US adults who smoke.<sup>52</sup> Still, 10.7% of US teenagers reported tobacco use in 2010; additionally, 13.6% reported alcohol use.<sup>53</sup> Both of these risk behaviors often establish themselves before adulthood. Early initiation of alcohol drinking and problem drinking not only poses immediate health risks to adolescents and to society (eg, binge drinking, drunk driving) but also dramatically increases the risk of alcohol dependence during adulthood.<sup>54</sup>

The statistics of the obesity epidemic in this country are well-known; the proportion of obese adults in the United States has doubled in the past 30 years and has tripled among children. Analyses of birth cohorts indicate that the age at which any cohort can expect to have a 20% obesity rate is continually getting younger. The 1976–1985 birth cohort reached an obesity prevalence of 20% by age 20 to 29 years, whereas that proportion was not reached until ages 50 to 59 years for the 1926–1935 birth cohort.<sup>55</sup> Data also suggest that overweight and obese children are much more likely to become obese adults than normal-weight children.<sup>56</sup> There is evidence that healthy eating habits and high levels of physical activity established during childhood and early adolescence predict healthy eating and physical activity during adulthood.<sup>57</sup>

## HOW DOES TODAY'S WCC MEASURE UP?

Ideally, WCC would directly address these major childhood drivers of adult

disease. From birth to age 21 years, American Academy of Pediatrics guidelines for preventive care recommend that children receive 29 well-child visits. Eleven of these visits are scheduled in the first 3 years of life.<sup>58</sup> These visits present an opportunity to address these childhood drivers of adult disease and to bring healthier, more productive individuals into adulthood. However, in actual practice, WCC seldom addresses these childhood drivers of adult disease, and the evidence suggests that typical WCC visits do not substantially improve outcomes in these areas.

### Poverty

Twenty-two percent of US children live in poverty.<sup>59</sup> WCC may be able to identify families that have additional needs because of poverty, but there are few WCC services that aim to reduce the negative consequences of poverty on child health and well-being. Inquiries into poverty-related family risk factors, such as homelessness and food insecurity, demonstrate that WCC can identify some families living in poverty. In addition, psychosocial assessment, recommended at every WCC visit from 2 months to 21 years of age, may allow clinicians to recognize stressors associated with poverty and the resultant health-related needs. Some pediatricians may direct families to programs that reduce the impact of poverty on child and maternal nutrition and health care, and connect parents with social services and community resources to address family needs related to poverty, such as housing, employment, and affordable child care.<sup>58</sup>

Parent-reported screening tools for assessment and referral of poverty-related concerns have been developed and tested for use in WCC,<sup>60,61</sup> but none have been widely adopted, and studies suggest that these social

concerns are usually not elicited during WCC visits. A study of parents in 2 urban pediatric clinics found that, although 82% of families reported having at least 1 psychosocial family concern (eg, housing, food, income insecurity), nearly one-half also reported having at least 1 unmet referral need.<sup>61</sup>

### Educational Attainment

Developmental surveillance and screening of children throughout infancy, childhood, and adolescence is a well-accepted WCC guideline. Well-child visits present opportunities to identify younger children who may be at risk for developmental delay and older children who may be at risk for poor educational outcomes due to learning disabilities, attention-deficit/hyperactivity disorder, or other developmental, behavioral, and social problems. Despite this, many children at risk for poor educational outcomes are not identified at well-visits. Just one-half of parents nationwide report that their physicians ask about their developmental concerns, and less than one-fifth of children receive standardized screening for developmental delay.<sup>62,63</sup> There are significant delays in the diagnosis of developmental delay and in the receipt of early-intervention services for many young children.<sup>64–67</sup> Furthermore, data suggest that children at risk for developmental, behavioral, and social delays may actually receive a lower quality of preventive care services than children who are not at risk.<sup>68</sup>

Comprehensive WCC services may also include screening and intervention for school failure, as well as a general surveillance for achievement at every visit. More than two-thirds of eighth-graders test below proficiency level for math or reading, and 40% of US high school seniors have less than a basic level of achievement on national science examinations.<sup>69,70</sup> Successful interventions for school failure require more than simply asking how a child is

doing in school or providing brief counseling; successful interventions generally require multiple visits and close communication with school personnel.<sup>71</sup> WCC may have the potential to improve educational outcomes in children, but as currently provided, there is often little systematic or intensive collaboration or integration with schools or school services.

### Environmental Exposures

Physical environmental exposures that WCC addresses include lead and tobacco exposure. Bright Futures guidelines recommend lead screening at 12 and 24 months of age, or in accordance with state law.<sup>58</sup> Tobacco exposure screening is recommended at every visit. A meta-analysis of parent smoking cessation interventions reported a modest 4% increase in the parental quit rate among intervention group parents; moreover, physician-delivered and clinic-based interventions were generally even less effective.<sup>72</sup>

WCC likewise generally fails to undertake broader assessments of the physical environment, such as addressing the built environment. Pediatricians may be able to help parents understand how the built environment can affect their child's health and can advocate for improvements to the built environment in their local community.<sup>43</sup> However, the level of community knowledge, engagement, and participation necessary for a pediatrician to intervene successfully on behalf of their patients may be out of reach for some, and perhaps many, pediatric practices.

The level of pediatrician engagement with community organizations needed to address social environmental exposures can be just as challenging. Many families leave well-child visits without needed strategies or referrals for critical psychosocial family problems ranging from parental intimate partner violence to maternal depression.

Problem-specific tools to screen for these exposures have been developed and tested; research indicates that these problem-specific tools may be more effective than global psychosocial screeners for sensitive family psychosocial issues.<sup>73</sup> The resources needed to maintain consistent surveillance, standardized screenings, and targeted intervention for a range of family psychosocial problems, however, extend well beyond the capacities of most pediatric practices.

### Health-Related Behaviors

One of the key challenges to addressing concerns related to poverty, educational attainment, and environmental exposures through WCC is that, even with time and incentives to screen children for these important concerns, most pediatricians do not have the training, skill, or capacity to provide intensive services on an ongoing basis and are mainly reliant on referrals. In contrast, health-related behavior change has been more traditionally viewed as within the domain of the pediatrician. Standard recommendations for WCC include screening and counseling on a range of health behaviors, including those linked to chronic diseases in adulthood. As described earlier, the health-related behaviors during childhood that could have the greatest impact on the leading causes of adult morbidity and mortality are: (1) tobacco use; (2) excessive alcohol consumption; (3) poor nutrition; and (4) physical inactivity. The evidence, however, that office-based counseling or guidance during ordinary WCC reduces or prevents these health-related behaviors is weak.

#### *Adolescent Smoking Prevention and Cessation*

There are few data to suggest that including simple, brief counseling in WCC visits is beneficial in smoking

prevention or cessation among adolescents. In a randomized controlled trial of a pediatric practice-based adolescent smoking prevention and cessation intervention, the intervention was modestly successful in preventing smoking initiation but was not successful in increasing smoking cessation after a 12-month period.<sup>74</sup> Moreover, the intervention required a significant amount of clinic time, including counseling by the pediatric provider, followed by a 15- to 30-minute counseling session by a peer counselor, and 4 follow-up telephone counseling sessions. In a systematic review of smoking prevention interventions delivered by health care providers, only 1 of 4 articles meeting inclusion criteria showed a significant difference between the intervention and control groups.<sup>75</sup> A more recent review examined 24 trials that included >5000 adolescents.<sup>76</sup> Interventions deemed effective were generally complex and not easily performed in a typical primary care visit with a physician.

#### *Alcohol Use*

Successful interventions for the prevention of alcohol use in adolescents generally also require a much more comprehensive approach than would be practical in a typical well-child visit.<sup>77–79</sup> Universal screening and counseling/guidance for alcohol use is often recommended during adolescent preventive visits, but data suggest that most pediatricians do not screen or counsel adequately, and there are few trials evaluating the effectiveness of alcohol-use screening and intervention during preventive visits.<sup>80,81</sup> One recent study tested an alcohol screening and brief primary care office intervention (2–3 minutes of physician counseling) that used a nonrandomized, asynchronous study design.<sup>82</sup> At 12-month follow-up, there was no difference in cessation between the intervention and control groups. The nondrinkers in the intervention group, however, did have

a modestly lower risk of initiation at 12-month follow-up, with a 6% difference between the 2 groups in percentage of adolescents reporting initiating alcohol use.

### *Obesity, Unhealthy Eating, and Physical Inactivity*

Similarly, successful obesity prevention and treatment strategies are generally not simple, office-based interventions that can be easily included in a well-child visit. Systematic reviews identify successful interventions as programs that have substantial intensity, incorporate healthy eating at school, provide sessions for physical activity, include parent support and family-focused activities, and encourage community practices regarding healthy eating and physical activity.<sup>83</sup> Although pediatricians may have an important role in obesity prevention and treatment, traditional WCC may not be a particularly useful venue except as an opportunity to screen and refer to an intensive program. Success requires a multidisciplinary approach that includes multiple community settings (eg, home, school, clinic) and in general will reach well beyond WCC.<sup>84,85</sup>

### **WHAT IS THE FUTURE FOR WCC?**

It is admittedly unfair to argue that WCC does not adequately address fundamental societal problems when, in many respects, other components of society have not done any better. But understanding the value of health care services today is critical, and gauging the value of WCC has always been undermined by uncertainty regarding which outcomes are important. If we believe that preventing or reducing the impact of poverty, poor educational outcomes, unhealthy social and physical environments, and unhealthy lifestyle choices is critically important for lifelong health, then we should evaluate

WCC, in part, by its ability to contribute to that end.

WCC, as currently provided for most children, is a time-compressed, resource-poor, often superficial tour through haphazardly selected topics, led by pediatricians with highly variable levels of expertise in addressing the major childhood drivers of adult disease. The question that remains unanswered is whether pediatricians are willing or able to redesign their practice of health care enough to change this reality. High-quality WCC may be able to play a role in preventing the negative impact of childhood poverty on children's health and well-being, enhancing educational outcomes for children, improving social and physical environments, and encouraging healthy behaviors, but can WCC ever be as central a hub for health promotion as our field has wanted it to be?

There may be several options for the future of WCC, but they likely fit into 1 of 2 basic choices: (1) radically change the model of WCC within the field of pediatrics so that it can actually address the critical nonmedical childhood drivers of adult health; or (2) rethink whether pediatrician-provided WCC should exist at all. Different models of care may be more efficient or effective in addressing the major childhood drivers of adult disease than current common practices; a few are summarized in the following discussion.<sup>86–89</sup>

### **One-Stop Shopping Approach**

In this model of care, the pediatrician's office or clinic remains the major location for WCC, but a number of other professionals participate to provide services that are not in the area of the clinician's expertise. For example, at a well-child visit, families would have ready access to nonphysicians who could more directly address concerns related to each of the childhood drivers

of adult disease, perhaps including a social worker (childhood poverty and environmental exposures), early childhood development and school specialists (educational attainment), and a health educator (health-related behaviors). This 1-stop shopping approach could bring various professionals under 1 roof, within the framework of a unified team. There might also be other members of the team to supplement these services, such as a nutritionist, family counselor, and a legal aid specialist. Such a model would require fundamental changes in financing to accommodate multiple specialists and services, which poses a serious barrier. Moreover, the model brings into sharp relief the question of what exactly would be left for pediatricians to do.

### **Community Connections Approach**

This approach changes the pediatrician's role in WCC from the central provider to the key coordinator in an integrated community care system for WCC. Children and families would have access to social services, developmental screening and intervention, educational support services, health education, and other services through a network that includes community-based organizations, schools, clinics, social service agencies, recreation centers, parks, and others. This suite of resources may not be under 1 roof, but its components would be linked to each other through the pediatrician in a patient-centered medical home previously characterized in the literature but substantially more expansive than in most current practices.<sup>90,91</sup> Although financing might not be as directly problematic in this model (assuming that each organization in the network could continue to tap its existing funding streams), its success would depend on the richness of the community network. Moreover, financing concerns might be replaced

by equally problematic communication and data-sharing issues.

Either of these systems (1-stop shopping or community connections) might create a WCC system that could address the major childhood drivers of adult disease. In these models, however, the pediatrician remains the central provider, gatekeeper, coordinator, or organizer of WCC services. Successful examples in limited domains do exist. In Healthy Steps for Young Children, the pediatrician and a child developmental specialist (a nurse, social worker, or early childhood educator) provide WCC in partnership, leading to more positive parenting practices and improved parent experiences with care.<sup>88,92,93</sup> Medical–legal partnerships link legal services with primary care to identify and intervene when families require legal services for poverty or social environment concerns, such as housing or food insecurity.<sup>94–96</sup> The Reach Out and Read program has become a basic staple of WCC; this modest intervention improves the home learning environment for children by promoting early literacy habits, particularly for children who might otherwise not have an optimal home learning environment.<sup>97–99</sup> Proven comprehensive models, however, remain elusive. Promise Neighborhoods, based on the success of the Harlem Children's Zone, integrates and coordinates social, community, educational, and health support for children, using effective schools as the central hub. These types of shared, integrated models may be necessary to fully address the childhood drivers of adult health.<sup>100,101</sup>

What breadth and depth of training are required to equip a generation of pediatricians not only to provide comprehensive, high-quality, and coordinated care addressing the sometimes complex medical needs of acutely or chronically ill children but also to coordinate effective preventive care

addressing the nonmedical risks related to poverty, low educational achievement, adverse social and physical environmental exposures, and unhealthy lifestyle choices? That these 2 equally important and equally difficult areas of need often coexist within individual patients does not alter the fact that the required skill sets are highly disparate. The recognition that the current image of a high-quality pediatrician requires these divergent skill sets is not new; it has been discussed in the pediatric literature for years and has been an explicit goal of pediatric residency education.<sup>102,103</sup> As a profession, however, we have not yet addressed the distinct possibility that, for many pediatricians, such an aspiration may be unrealistic.

### Pediatricians as Medical Specialists

In several other developed nations, pediatricians are not the primary providers of routine prevention and health promotion services for children. Most children and their families receive health education, anticipatory guidance, developmental screening and surveillance, immunizations, and psychosocial screening and services from public health nurses and general practitioners, working alone or in collaboration with pediatricians. Pediatricians generally are used for consultation or referral for children with acute or chronic medical and developmental/behavioral needs<sup>87,104,105</sup>; developed nations that use this or a similar model of child health rank higher than the United States on several measures of child health and well-being.<sup>106,107</sup> In this model, WCC would no longer remain in the purview of primary care pediatrics; currently, however, it is not clear that any other single professional field (eg, public health nursing) has or will have the capacity to manage comprehensive WCC in the

United States substantially better. Therefore, regardless of who serves as the primary contact, a multidisciplinary, largely nonmedical approach would seem necessary.

In this model of care, WCC “centers” would replace the preventive care function of the pediatrician's office or clinic. These centers would be staffed by the same type of multidisciplinary team described earlier in the pediatrics-based WCC models but without the pediatrician. Parents would receive preventive health services from a team of child professionals that might include a public health nurse, child health education specialist, and an education/school specialist (eg, early childhood educator). Similar models have been used in other developed nations,<sup>87</sup> but such a model's success in the United States would be dependent on restructured reimbursement systems for WCC, redesigned professional education and training around child health for nonphysicians, and a reimagined role for pediatricians as a substantially smaller field of medical care providers. Finally, it would require a strategically designed, multiyear workforce and cultural transition for both families and pediatricians from pediatric-based WCC to pediatric-supervised WCC centers and then finally to team-based, nonphysician-coordinated WCC at WCC centers. Whether this is an effective or viable model for the United States remains unclear. Equally unclear is whether pulling away from direct involvement in major childhood determinants of lifelong health is a defeat that pediatricians should even accept.

In any of these possible models, a new system for reimbursement would be needed to encourage linkages with and utilization of various providers and community-based organizations to address these nonmedical drivers of health. One potentially viable option would be a pediatric-specific accountable care

organization (ACO). An ACO is an integrated system that uses a network of providers, including primary care physicians, subspecialists, and hospitals, to provide care to its patients. This provider network is responsible for the quality, costs, and overall care of its members, and it shares in the savings accrued from improvements in the quality and efficiency of care.<sup>108</sup> Although much of the recent action around ACOs has been focused on Medicare beneficiaries, some pediatric Medicaid-focused ACOs have emerged.<sup>109</sup> To support the key elements of WCC discussed earlier, and to address these 4 main childhood determinants of adult health, a pediatric ACO would have to explicitly include incentives, or even requirements, for provider networks to provide families with access to providers and programs related to education, social, and other related community-level services that may not typically be considered in the usual medical model of pediatric WCC. For example, a pediatric ACO could require that a social worker, legal aid partner, and early childhood education specialist be part of the network for any ACO that serves some minimum number of Medicaid-insured children, and that these additional providers would bill the ACO for services provided. A pediatric ACO could be structured for use in any of the 3 models for pediatric WCC described earlier. Given the additional resources

and lengthy time horizons entailed in preventing adult disease, larger initial investments would likely be necessary, and shared savings might need to be based on achievement of intermediate outcomes and expected, rather than realized, savings due to downstream improvements in adult health. How these savings would be estimated and how payers would be incentivized to provide such payments remain unclear, but some type of integration with adult care payment systems might be necessary.

## CONCLUSIONS

Effective prevention and health promotion for children will need to address the critical “nonmedical” childhood drivers of adult health. Few approaches would keep the pediatrician as a central player in these promotion efforts, and all of them would require major restructuring at all levels. Pediatric residency training programs, for instance, are not presently equipped to train young pediatricians to effectively address major nonmedical issues, with the possible exception of health-related behaviors. Much of pediatric primary care training is appropriately dedicated to ensuring that pediatricians are ready to tackle the complex acute and chronic concerns of children with special health care needs. Changing the training paradigm

to cover both medical and nonmedical issues would most likely require a substantially longer training period, new teachers, and new investments in resident education. In addition, WCC reimbursement would have to be completely redesigned to incentivize payers and providers to address these nonmedical concerns in a way that is effective and patient centered, a change that would undoubtedly cost more than usual WCC and require considerable investment in community organizations, many of which may already be under-resourced and overburdened. A real opportunity to reverse the rising costs of adult chronic disease, however, presents an undeniably attractive long-term return on investment that pediatrics currently does not offer.

Primary care pediatrics must radically change if it hopes to serve a central role in prevention and health promotion for children. If pediatrics fails to take up this challenge to redesign our current child preventive health care system, our specialty may find itself losing relevance and influence in the lives of the children and families we serve. That is a possibility that pediatricians will have to assess (or will ultimately have assessed for them) before anyone can determine what the future of pediatrics really is.

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