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## COMMENTARY

# The Changing Nature Of Children's Health Development: New Challenges Require Major Policy Solutions

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**ABSTRACT** The epidemiology and social context of American childhood are rapidly changing. Adverse social, economic, and child-rearing conditions are loading children down with preventable illness, physical and behavioral disability, and dysfunction. This new epidemiology of childhood is swamping the capacity of the nation's health care system, schools, juvenile justice facilities, and child protective services to respond to the needs of those they serve. This low-performing system not only jeopardizes the health of children, it also jeopardizes the health of the adults they will become. In this article we review the science of life-course health development, a new field that provides a powerful explanatory framework for understanding how poor health and social adversity during childhood can affect lifelong health. We then present five ambitious policy recommendations to integrate educational, health, social, and economic initiatives designed to enhance health. Our bold but pragmatic goal is that by 2025, US children will have the highest levels of health among industrialized nations, instead of where US children currently rank—among the worst.

**T**he fact that more than 10 percent of children will be maltreated during their childhood<sup>1</sup> is probably no surprise to child protective workers in many local child welfare systems.

The fact that at least 30 percent of young children have behavioral and developmental problems is not lost on pediatric providers who see these children walking through their doors each day.<sup>2</sup> Nor is it surprising for most elementary school principals in low-income communities to learn that 40 percent of children showing up for kindergarten are not prepared to be there, are likely to fall behind, and won't be reading by grade three.<sup>3</sup> And a county probation department worker would not be shocked to learn that more than 40 percent of his charges have long-

standing, undiagnosed and untreated, learning, behavior, and development problems.<sup>4,5</sup>

What each of these service sectors and providers has in common is that they are responding to the symptoms of the same adverse social, economic, and child-rearing conditions that are loading children down with preventable illness, disability, and dysfunction. This new epidemiology of childhood is swamping the capacity of the nation's health care system, schools, juvenile justice facilities, and child protective services to respond to the needs of those they serve. Each of these sectors operates in isolation, with narrowly targeted funding, in its own administrative silo, with its own congressional committee demanding accountability.

Even though the capacity of the United States

to optimize the health of the country's children has never been greater, the health care system is not adapting to the changing context of children's lives and needs. A variety of highly effective technical interventions, such as antibiotics, immunizations, and neonatal intensive care, have reduced the traditional threats to child health. However, changes in the social and political contexts of children and young families in the United States are generating new challenges to child health. These new challenges are not merely health problems. They are *health development* problems, which are produced by continuous and developmentally significant interactions between children and the environments where they grow, play, learn, and mature into adults.<sup>6,7</sup> Current programs and policies that are focused primarily on acute medical conditions are not addressing many of the biological, behavioral, social, and environmental factors that influence a child's health development, which result in the emergence of preventable chronic medical and behavioral health problems. This major shortcoming in the child health system is in need of major reform.

The urgency of reform has been underscored by the new science of life-course health development, which provides a powerful explanatory framework for understanding how poor health and social adversity during childhood can affect lifelong health.<sup>8,9</sup> Recent advances in the field have uncovered complex relationships between processes occurring in early life and patterns of capabilities and disease in adulthood. This new science articulates a far more effective vision for the commitment to childhood and, in so doing, helps ensure a healthier and more productive future.

In this article we briefly review the science of life-course health development and present a set of ambitious policy recommendations that are based on the health development needs of all American children. These recommendations are designed to jolt the child health system to a higher, more responsive, and ultimately more efficient level. The article concludes by outlining the political will that is necessary to achieve this bold new vision of child health policy.

## The Science Of Life-Course Health Development

By connecting exposures in the womb, such as toxic chemicals or inadequate nutrition, and early childhood experiences of stress and adversity to adult chronic disease, researchers began to establish the developmental origins of these adult diseases.<sup>7,10,11</sup> For example, longitudinal epidemiological studies established the associa-

tions between abuse and neglect in early childhood and mood disorders and chronic diseases in adults.<sup>12</sup> Recent work has shown that early childhood adversity can alter gene regulation of the stress response and the function of the immune system in ways that predispose people to many adult chronic diseases and mood disorders.<sup>13-16</sup>

The science of life-course health development is particularly focused on phenomena that are time specific. There are sensitive periods of a child's life when the impact of certain exposures can be greater than during other periods.<sup>7</sup> Because childhood is a phase of life when biological and behavioral systems are shaped by environmental exposures and social experiences, life-course health development emphasizes the importance of nurturing children when they are most sensitive to these influences.<sup>17</sup> For example, exposure to a rich set of words during the early years of life can greatly improve a child's subsequent language development, with cascading effects on subsequent school performance, health behaviors, and future health status.<sup>18,19</sup>

The implications of life-course health development for health policy are influenced by several considerations. Most adult health disorders have a complex, multifactorial etiology. Childhood experiences and exposures play a contributory but not a deterministic role. The social structuring and varied impact of adversity (such as poor schools, risky environments, and under-resourced families) present both opportunities and challenges for early intervention. High-quality preschool and home visiting programs (programs that help pregnant women and families with young children gain resources and skills to raise healthy children) can uncouple the influence of adversity on health development, and medical and social interventions can also act as protective factors, modulating the impact of early-life processes.<sup>20,21</sup> Studying life-course health development has left little doubt that a nurturing and materially sufficient early life is an essential component of a healthy society.

## The Changing Reality Of American Childhood

Child mortality and serious morbidity rates from acute infectious disease have fallen during the past several decades. However, over this same interval, rates of a number of chronic conditions have steadily increased. At present, more than 30 percent of US children have chronic health problems or special health needs.<sup>22</sup> Of growing concern is the mounting number of children with chronic mental and behavioral health conditions, with long-term implications for their

well-being as children and the anticipated burden of costly chronic health problems when they are adults. Recent estimates suggest that more than 22 percent of adolescents have mental and behavioral health disorders that affect their ability to perform well in school or participate in desired activities.<sup>23</sup> This burden of disability steadily increased from 2 percent in 1960 to 11 percent in 2011 with a shift from the medical and physical conditions of previous generations to the behavioral and developmental conditions of today.<sup>24</sup>

Changes in the context of children's lives mirror these changing health profiles. Family structure in the United States has altered dramatically, with more children raised by single parents—a situation that is at odds with economic realities that demand two salaries to raise a family at a basic subsistence level.<sup>25</sup> With virtually no wage growth over several decades, many of today's parents have a lower earning capacity than their parents had and face growing child-rearing costs for the basics: food, housing, health care, child care, and education.<sup>25</sup> Child-rearing pressures and resource constraints are being felt across the full income spectrum, as more families are squeezed for time, and many struggle to afford high-quality services such as preschool, child care, and after-school care, not to mention behavioral health care.<sup>26,27</sup> Recent studies also show that families are spending more on child-rearing services, with growing gaps between lower- and higher-income families, and costs are projected to dramatically increase over the next decade.<sup>28</sup>

### Social Gradients Of Health

Social gradients of health begin early in life, being well established and measurable among infants and young children.<sup>29</sup> The gradients can initially be viewed through inequalities in women's health, with differential reproductive outcomes, including an inverse relationship between income and risk of premature birth.<sup>30</sup> Before birth, inequality takes its toll on the developing fetus. The intrauterine environment of low-income women, compared to that of women with higher incomes, is more likely to be poorly nourished, exposed to toxic chemicals, and subject to higher levels of circulating stress hormones.<sup>31</sup>

Using data from the National Survey of Children's Health (2011–12), we examined the association between family income and several common child health, school, and adverse family experience outcomes (see Exhibit 1 and the online Appendix for an expanded version of the exhibit).<sup>32</sup> Each income group is like a rung on

## Many of today's parents face growing child-rearing costs for the basics, including health care.

the social gradient ladder; as one climbs the ladder, health development outcomes improve. Across all the indicators, the social gradient is apparent; the biggest gradient was observed for adverse childhood experiences (for example, witnessing domestic violence or family financial strain). Nearly 67 percent of children with family incomes below 100 percent of the federal poverty level reportedly had an adverse childhood experience, compared to 27 percent of children with family incomes above 400 percent of poverty.

These findings are significant not only for children but also for the adults they will become. Recent life-course health development studies have also suggested that the effects of exposure to social adversity can be latent and may not appear until adulthood; this further exacerbates disparities in health.<sup>7,9</sup>

### Child Health Policy Through The Lens Of Life-Course Health Development

There is a fundamental need to address the underlying social causes and economic conditions of poor and deteriorating child health. However, this article is focused on the opportunities generated by the science of life-course health development and the implementation of the Affordable Care Act (ACA) to improve the delivery and financing of children's health care. We propose a child health transformation agenda designed to sustain an ambitious, multiyear, multilevel (national, state, local) redesign campaign, both within the traditional child health care system (pediatric offices, clinics, children's hospitals) and across the health, social service, and education systems in states and communities across the United States.

The need for reform is based on four fundamental assumptions. First, health continuously develops across the lifespan, with early experiences and exposures resulting in long-lasting health impacts. Therefore, interventions early in life and during critical periods of health de-

67%

#### Of children

Nearly 67 percent of children in families below 100 percent of poverty reported an adverse childhood experience compared to 27 percent for nonpoor children.

**EXHIBIT 1**

**Social Gradients In US Children’s Health Outcomes, School Outcomes, And Adverse Family Experiences, 2011-12**

	Percent of federal poverty level			
	<100	100-199	200-399	400+
<b>HEALTH OUTCOMES</b>				
Children in fair or poor overall health	7.1	3.5	2.0	0.8
Children ages 0-17 with a special health care need	20.8	19.9	19.6	19.2
Children ages 0-17 with asthma	11.6	8.7	8.1	7.3
Children ages 1-17 with an oral health problem	25.9	23.1	16.7	11.8
Children ages 10-17 who are overweight or obese by parent report	44.7	37.3	28.7	21.9
Children ages 2-17 with attention deficit hyperactivity disorder	9.5	8.4	7.5	6.7
Children ages 2-17 with behavioral or conduct problems	5.9	3.8	2.6	1.3
Children ages 2-17 with depression	3.5	2.5	2.0	1.0
Children ages 2-17 with developmental delay	4.7	3.9	3.4	2.6
Children ages 3-17 with learning disability	12.2	7.9	7.4	5.6
<b>SCHOOL OUTCOMES</b>				
Children ages 6-17 who missed 11 or more school days in past year	8.2	6.8	6.1	4.4
Children ages 6-17 who have an individualized education program	14.4	11.0	11.5	9.2
Children ages 6-17 who have repeated a grade	18.0	10.8	6.5	4.0
<b>ADVERSE CHILDHOOD EXPERIENCES</b>				
Children with one or more adverse childhood experiences <sup>a</sup>	66.6	59.0	45.1	27.0

**SOURCE** National Survey of Children’s Health, 2011–12. **NOTES** The authors used the web browser from the Data Resource Center for Child and Adolescent Health, available from <http://www.childhealthdata.org/browse/survey/>, to compute the percentages. The rate ratios are computed by dividing each income group percentage by the 400%+ reference group. A rate ratio of 1.5 for a given income group can be interpreted as a percentage that is 50 percent higher than the reference group, and a rate ratio of 2.0 is twice as high as the reference group. The gradient slope is the average percentage decline across the income groups. Thus, a gradient slope of –2.0 indicates that, on average, there is a 2 percent decline in the absolute level of the measure between the income groups. <sup>a</sup>Adverse family experiences included nine items: socioeconomic hardship; divorce or separation of parent; death of parent; parent served time in jail; witness to domestic violence; victim of neighborhood violence; lived with someone who was mentally ill or suicidal; lived with someone with alcohol or drug problem; and treated or judged unfairly due to race or ethnicity.

velopment (birth to late adolescence and early adulthood) can be highly effective and potentially more cost-effective than managing the costly long-term impacts of chronic health conditions for decades to come. Second, the epidemiologic predominance of complex, chronic health development problems demands cross-sector integration of prevention, early intervention, and treatment services. Third, the provision of early health, education, and social services is critical in assuring the equitable distribution of childhood developmental capabilities—a key strategy in reducing health disparities and providing an essential foundation for long-term social mobility. Fourth, there is an urgent need to implement effective programmatic and policy-based tools to address complex, chronic conditions in childhood.<sup>33-35</sup>

**Recommendations**

Our recommended policy strategies are designed to transform child health in the United States over the next decade. First, a national strategic action plan is needed to provide the overall vision, goals, momentum, and roadmap for the future. To advance this agenda, and to ensure

the wide-scale adoption and spread of significantly upgraded child health systems, ambitious communitywide child health transformation initiatives are needed to connect and integrate health care and nonmedical health-enabling services (such as preschools, child care, and food assistance programs) in innovative and more effective ways. To address the changing epidemiology of children’s health needs and advance communitywide health development goals, the pediatric health care delivery system needs to be redesigned from one focused on acute needs to one focused on optimizing health. Redesign of this system will be informed by a child health development research agenda that translates the science of life-course health development into effective strategies and interventions. Finally, the effectiveness of these efforts would be guided by a robust child health development information and monitoring system, providing real-time data to guide the transformation process.

**A NATIONAL ACTION PLAN** It is unacceptable that the richest nation in the world has children with the worst health outcomes among industrialized nations.<sup>36</sup> We propose a bold but pragmatic goal: By 2025, US children will have the



highest levels of health in the world. To achieve this goal, a national action plan must integrate educational, health, social, and economic initiatives designed to enhance health. The plan must include recommendations for the public, private, philanthropic, and faith-based sectors, as no one entity can achieve this transformation alone. An initiative of this size, scope, and importance needs a long-term roadmap that transcends current political gridlock, can be sustained across administrations, and involves the commitment of leaders and organizations from the local to the national level.

The White House should convene a bipartisan leadership group to develop the goals, objectives, and specific action steps for the plan and then broadly disseminate the plan to obtain citizens' input and buy-in. The plan must honor and build on the Healthy People 2020 health promotion and disease prevention goals and objectives for children set by the Department of Health and Human Service;<sup>37</sup> identify intra-agency and interagency activities that can advance children's health; address economic policy and private-sector opportunities for participating in the development and implementation of strategic goals; include a public awareness and engagement strategy; and address each of the additional policy recommendations made below.

Because the plan is about fundamental investments in the current and future health and well-being of the nation, it should be monitored by the Maternal and Child Health Bureau and the Federal Reserve. These agencies should be given joint authority and necessary funds for updating the plan, reallocating resources, and convening working groups to periodically review and upgrade the plan based on progress achieved and lessons learned.

#### **COMMUNITY-BASED SYSTEM TRANSFORMATION**

While national and state health policy can be important facilitators for improving children's health development, real change is needed in local systems, where children live, grow, learn, and receive health care. We envision a decade-long national child health innovation campaign so that by 2025, 1,000 or more communities (cities, counties, and regions) would be working together on cross-sectorial (that is, across health, education, business, public health, social services, housing, and food) initiatives to transform health development. This ambitious effort would unleash the creative power of local regions to innovate and transform their child health systems. Beginning with an intensive phase involving 100 vanguard communities, this effort would be organized as a collaborative learning network, in which system transformation strategies could be tested, refined, shared, and scaled.

## **Real change is needed in local systems, where children live, grow, learn, and receive health care.**

Local and regional partnerships would link child health care providers, city and county governments, payers, employers, and schools, all coalescing around health development transformation goals.

We recommend that the Centers for Medicare and Medicaid Services (CMS) and its Center for Medicare and Medicaid Innovation, which has the authority and funds to sponsor this work, take the lead in designing and launching the vanguard phase. In this effort, we recommend that CMS work with other Health and Human Services agencies—the Maternal and Child Health Bureau, the Centers for Disease Control and Prevention (CDC), and the Agency for Healthcare Research and Quality (AHRQ)—to maintain and scale up the national collaborative learning network.

The goal of this vanguard phase would be to produce sustainable prototypes whose innovative approaches can spread and inform other communities. Each participating community would commit to transforming its health and health-related systems to promote optimal health development and to be part of a national learning, innovation, and improvement system. This would include local financial support for the cross-sector integration of health systems and other community resources; pooled funding and other payment reforms; ongoing local health development reporting mechanisms; and strategies to spread these innovations widely to other communities.

The ability of such local systems transformation efforts will depend on state-level innovations and supports. Thus, we recommend that the Center for Medicare and Medicaid Innovation also adapt its current State Innovation Model strategy to simultaneously create a Kids State Innovation Model, which would explicitly recognize the special requirements of child health development. The Kids State Innovation Model would enable states to make significant changes to financing, delivery, and organization of children's health services. It would also catalyze

# Current child health monitoring systems are haphazard and antiquated.

the coordination of state-level policies across health, social service, education, and other sectors. Given the important role that Medicaid plays in funding services for low-income children, state Medicaid programs as well as state health insurance Marketplaces will need to play an important role in formulating and implementing statewide strategies.

**TRANSFORM THE PEDIATRIC HEALTH CARE DELIVERY SYSTEM** The current child health care delivery system is poorly positioned to respond to the misalignment between the delivery of pediatric care and what is known about child health development needs.<sup>20,21,38</sup> The financial and delivery infrastructure of American pediatrics has generated major disincentives for provision of high-quality care to children with chronic conditions—particularly care encompassing strong developmental and behavioral health components. Built in the 1950s and 1960s, this pediatric infrastructure was designed to confront the historic challenge of acute, infectious illness in young children. As this threat has receded, the structure of pediatric care has been slow to respond, creating a profound mismatch between the structure of child health care and epidemiology of children's health needs.<sup>39</sup>

Redesigning the delivery of child health care means moving beyond 1.0 models focused on treatment for acute conditions and infectious diseases, or even 2.0 care, focused on chronic disease management, to a 3.0 orientation, focused on optimizing health development over the entire lifespan.<sup>40</sup> The ACA is stimulating the creation of 2.0 accountable care organizations (ACOs) that distribute responsibility and financial risk across providers to better manage chronic disease care. At the same time, several communities are pushing their ACO models toward 3.0 accountable community health systems, with a greater emphasis on broad-based prevention efforts and cross-sector approaches to health promotion.<sup>40</sup> For these emerging 3.0 delivery system models, expenditures on child health prevention can have greater value if near-term costs associated with special education and juvenile justice as well as long-term

costs associated with chronic disease can be reduced.

We propose that the child health care community lead the charge for the creation of community accountable health development systems that focus on optimizing children's health. Children's community accountable health development systems could be designed as integrated service networks, linking pediatric medical homes, early childhood programs, school health centers, children's hospitals, and other community health services. Elements of such systems are beginning to emerge in many parts of the United States.

We recommend that in partnership with the Maternal and Child Health Bureau, CMS, the CDC, and other federal agencies, the American Academy of Pediatrics and the Children's Hospital Association join forces with parent organizations and other essential providers and stakeholders to develop regional children's community accountable health development systems. This partnership would have responsibility for a geographically defined population of children, with a particular focus on leveraging the benefits of health care to mitigate the harmful effects of steepening social gradients that affect all children.

**A CHILD HEALTH DEVELOPMENT RESEARCH AGENDA** As described above, the science of life-course health development provides the theoretical framework and a range of approaches for furthering the understanding of children's health development and for understanding enormously challenging questions of how health develops over the lifespan. We recommend that the National Institutes of Health (NIH) be charged with developing a cross-institute, cross-sponsor strategy focused on promoting child health development for improving health across the lifespan and decreasing long-term costs. The agenda can prioritize essential research on child health development and well-being and link with the Maternal and Child Health Bureau, the Patient-Centered Outcomes Research Institute, AHRQ, the National Science Foundation, foundations, and private industry. These research and development activities need to leverage the investments and infrastructure of the National Children's Study (a multiyear research study that examines the effects of environmental influences on the health and development of more than 100,000 children across the United States, following them from before birth until age twenty-one).<sup>41</sup> They also need to be aligned with local community innovation and improvement efforts so that better information about the health development of local populations of children can be used to inform policy, practice, and

the next wave of research funding.

**ESTABLISH A CHILD HEALTH DEVELOPMENT INFORMATION AND MONITORING SYSTEM** Despite remarkable advances in data collection and analysis in many other fields, current child health monitoring systems are haphazard and antiquated.<sup>42</sup> New technologic strategies are needed to measure the dynamic contexts of modern childhood and monitor child health development.<sup>43</sup> Such a national strategy would provide the information and analytic infrastructure to assess and disseminate the innovations being generated by communities and organizations working to create the essential elements of a twenty-first-century child health system.

We propose a federal consortium of agencies, including CMS, the Maternal and Child Health Bureau, the CDC, AHRQ, the Department of Education, and others, working with local and state child health data experts, to formulate and implement a strategy to create local child health development “sensing” systems. Such sensing systems can take advantage of a variety of data sources, develop appropriate linkages, partner with regional health information exchanges, and collect supplementing data. The proposed sensing systems would provide integrated information to guide the effectiveness of child health development systems across the country. Mechanisms that ensure confidentiality could be coupled with community-based data, linked electronic health records, insurance information, bio-repositories, public health data, and other resources within an integrated data system.

### Political Will

The failure to address the promise of childhood speaks not only to the inadequacies of current health strategies but also to the inadequacies of the nation's fundamental commitment to the future of childhood in an aging America. Moreover, the deteriorating position of children has been made even more complex and challenging by the growing political clout of the elderly.<sup>44</sup> While the interests of children and the elderly have far more in common than in conflict, the growing percentage of the American electorate ages sixty-five and older, coupled with their greater likelihood of voting than younger adults, has served to enhance and protect public programs designed to provide security in old age.<sup>17,45</sup> While public sentiment has generally been supportive of children's programs, the functional political will to actually implement them has proved elusive. Demography is colliding with democracy, and the feasibility of any major reform in child health development will require a new political dynamic.

## The feasibility of any major reform in child health development will require a new political dynamic.

Health policy's continued preoccupation with cost reduction has also marginalized child health system reform. The great bulk of near-term health expenditures in the United States is generated by older adults. It is no surprise, therefore, that policy deliberations and CMS funds earmarked for health system innovation have focused on this population group.

While Medicaid remains the largest health insurance program for children and CMS is supporting important state and local innovations of relevance to child health, its focus remains on adult health and rarely engages other sectors of critical importance to an integrated system for children. Simply put, CMS is critical to children, but children are not critical to CMS.

There is currently no mechanism at the federal or state level that is capable of ensuring that the requirements for children's health and social services are protected; that policies for promoting optimal health and development are aligned; that siloed funding can be pooled or linked; and that different health, education, child development, and child welfare programs are integrated in more efficient and impactful ways. While a detailed description of needed administrative reforms is beyond the scope of this discussion, we strongly recommend strengthening the federal Maternal and Child Health Bureau to protect children's interests and implement a reformed maternal and child health system. The policy agenda proposed above purposely elevates the bureau's role and seeks to create enduring strategic partnerships with more powerful agencies such as CMS, the Federal Reserve, and the NIH.

Building political will for children's programs and policies will also require significant changes in the child advocacy arena, which has primarily relied on the elevation of child needs amid competing social interests. This strategy has resulted in many important social and health programs for the young. However, many of the most prominent of these programs, including Head Start, Medicaid, and the Children's Health Insurance Program, were created as part of much larger



societal reforms or in response to political impulses not directly related to children's interests. Crafting a reformed child health system will require broad coalitions, many of which need to cross traditional discipline and political boundaries.

## Conclusion

There can be no denying that the current US child health system is among the worst in the industrialized world. The current patchwork of child health services are responding too slowly to the complex challenges that children now face in the United States. This low-performing system is not only jeopardizing the health of children, it is also jeopardizing the health of the adults they will become.

We have suggested that as the ACA expands health insurance coverage and introduces other delivery system reforms and payment innovation, it would be an effective strategy to use the science of life-course health development to advance a coherent portfolio of health devel-

opment policies. Our child health development agenda will provide the essential twenty-first-century scaffolding that families and communities need to ensure that children thrive.

In an era when the modern competitive global economy requires at least 60 percent of workers to be skilled and well educated, the United States cannot afford to have close to 30 percent or more of its children burdened with debilitating health problems when they enter the workforce. In the globalized world, where economic success and social well-being are dependent on optimizing human capital development, high and growing levels of unhealthy children translates into a handicap that compromises US global power and burdens the nation with levels of disease, disability, and dependency that will prove unsustainable. The complex interlocking problems that are driving child health trends in the wrong direction must be confronted by a consolidated effort to transform the child health system. The policy prescription that we have proposed is designed to provide a roadmap for the way forward. ■

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## NOTES

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