

*100 PERCENT OF
OUR FUTURE:*

Improving the health of
America's children

Working Paper 10
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TABLE OF CONTENTS

Preface	2
Executive Summary	3
Part A – THE CHILDREN’S STATE OF THE UNION	
Chapter 1: How healthy are America’s children?	6
Chapter 2: Are children getting high quality health care?	11
Chapter 3: Why has the cost of children’s health care been rising?	21
Part B – SOME PRACTICAL OPPORTUNITIES FOR IMPROVEMENT	
Chapter 4: Healthy pregnancy – giving children the best possible start in life	26
Chapter 5: Addressing childhood obesity	31
Chapter 6: Children’s chronic health conditions	37
Chapter 7: Children’s mental health	42
Chapter 8: Improving care coordination for children	48
Chapter 9: Opportunities in research, care delivery, and quality for children	53
Part C – CONCLUSION	56
Practical opportunities for improving child health	57
Appendix A: Analysis of UnitedHealthcare claims data	58
Appendix B: Statistics on child health status and delivery of care by state	59
Appendix C: Approach to analyses in the report	61
References	64

PREFACE

Demography is destiny. So says a popular bumper sticker. We've chosen a different title for this report. Children may be a quarter of the American population – but they're unarguably '100% of our future'.

Like most clichés, this statement points to an important truth. So how is the nation responding? For every dollar spent on an older American, the federal government spends under 15 cents per child. But there is some good news. Infant mortality is a quarter of its level half a century ago. For some childhood cancers, what was previously near certain death is instead survival. There are some early – if equivocal – signs of progress on childhood obesity. And over the past 15 years the percentage of children without health insurance has been cut in half, with further coverage expansions in the offing.

Juxtaposed against that somewhat upbeat narrative lies the fact that too many children are still having their health needs ignored. Prenatal care for women with Medicaid is often lacking. Up to a quarter of American children now have some type of chronic health condition. What used to be called adult onset diabetes – aka type 2 diabetes – is increasingly prevalent amongst children. New evidence-based models to prevent childhood obesity are only just being scaled nationally. And despite the call for better care coordination, data in this paper show that American children still receive care that is often too siloed, too expensive, and too late.

Those of us who have the privilege of being parents know that children are not just 'small adults.' So this report is informed by UnitedHealth Group's experience and data as America's largest private payer for children's health care, as America's largest Medicaid health plan serving low income families and their children, and as a longstanding innovator in new models for children's care and prevention. We welcome your reactions, your advice and your partnership.

Within the UnitedHealth Center for Health Reform & Modernization, particular thanks go to Brantley Carlson and Jeanne De Sa for their work on this report, to Deb Sundal, Deneen Vojta, Tom Beauregard, and Ted Prospect – amongst others – for their work on developing a number of the new children's preventive health models described herein, and to Brett Edelson in UnitedHealthcare Community & State. Our aim is not only to articulate some of the main challenges ahead, but also to sound a note of optimism about some of the new approaches that we and others are now seeking to implement, so as to make a genuine difference for America's children.

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EXECUTIVE SUMMARY

Obesity, chronic disease, disability, and other health-related concerns are changing the demand for services and the nature of care delivery for children. This is occurring within a health care system already facing many challenges. As children represent a quarter of America's population – and 100 percent of our future – several questions arise:

- Do our nation's health investments appropriately prioritize children?
- Is the country's health care system optimally configured to support children as disease burden increases and the delivery system evolves?
- Are we taking advantage of the new science of prevention, medical advances, new delivery models, and information technology to address those challenges?
- Are wider efforts to modernize the health care system sufficiently tailored to children's health?

This tenth paper from UnitedHealth's Center for Health Reform & Modernization explores major challenges in children's health and offers practical ideas for improvement. In doing so, we provide new data and analysis on quality, costs and geographic variation, and offer estimates of the impact of interventions to address obesity and preterm births.

Chapter 1 describes the **significant pressures affecting the health of children**, the imperative to take action now, and the evidence base available to guide efforts.

- **Chronic health conditions are on the rise, now affecting up to a quarter of children.** Children are developing obesity at very young ages and are increasingly diagnosed with a range of mental health conditions. Obesity and poor health in childhood can lead to lifelong health problems and have an enduring medical and social impact.
- **Children are not "small adults."** Better evidence is needed so that treatment approaches, use of new medical technologies, and prescription drug therapies are appropriately designed for children.

Chapter 2 describes how care delivery may not be fully optimized to provide the care that children need. It analyzes **the quality of children's care**, using data from UnitedHealthcare's provider quality assessment program, known as Premium Designation, and a comparison of UnitedHealthcare claims for adults and children across U.S. communities. It finds:

- Our data show that while **provision of evidence-based care for children occurs 86 percent of the time**, opportunities exist to improve care for children with asthma, improve treatment for complex conditions, screen for childhood diabetes, support adolescent health, and improve medication adherence for chronic conditions.

- Our analysis of rates of **preventable hospitalizations** for children show substantial differences across the country and suggest opportunities for stronger primary care for conditions like children’s asthma.
- **Specialty care** may not be oriented to address new types of illnesses affecting children. Primary care physicians face barriers when seeking referrals for specialized care, particularly for Medicaid enrollees.

Chapter 3 explores the **rising costs of care for children**, and uses UnitedHealthcare data to analyze the contribution of age, gender, and condition and differences between employer-sponsored and Medicaid health plan populations.

- **Health care costs are growing at a faster rate for children than for adults.** According to the Health Care Cost Institute (HCCI), rates of growth per child with employer-sponsored coverage accelerated in 2011, growing by 7.7 percent in just one year, compared to 3.6 percent for adults under age 45. In UnitedHealthcare’s Medicaid health plans, per child spending growth was about 3 percent between 2010 and 2011.
- A comparison of a sample of spending and utilization in 11 states shows that per child spending is 1.8 times higher for children with employer-sponsored coverage compared to Medicaid. It also shows that: utilization of services is generally higher for children enrolled in Medicaid than those with employer-sponsored coverage; private plan reimbursement rates are higher than those in state Medicaid programs across service categories; and children with employer-sponsored coverage appear to make more use of physician visits and ancillary services.

- Our analysis also finds that, consistent with existing research, costs per child in the first year of life are substantially higher than the average cost for all children, six times and four times the average, respectively, in UnitedHealthcare employer-sponsored insurance and Medicaid health plans. Young children make significant use of the emergency room, particularly for asthma. Boys tend to be more costly than girls for both medical services and prescription drugs. The onset of chronic conditions and mental health services typically starts in the pre-teen years.

Chapters 4 through 7 offer in-depth analysis of challenges in children’s health (such as preterm births, obesity, chronic conditions, mental health) and the effectiveness of current approaches, then present targeted **opportunities for the future**, in many cases drawing on UnitedHealth Group’s real world experience.

Chapter 4 examines how **engaging women early in pregnancy** can help to reduce preterm births. Approaches using mobile technology applications and behavioral interventions, such as group prenatal care, offer innovative ways to engage pregnant women. Based on new research, we estimate that **if half of pregnant women enrolled in Medicaid received care through evidence-based group prenatal models, net savings could be about \$12 billion over the next decade, primarily through healthier babies and reduced days in neonatal intensive care.** Additional savings to the health system might be about \$4 billion over the next decade if about 200,000 pregnant women with employer-based coverage received prenatal care this way.

In Chapter 5, we address the issue of **childhood obesity** and quantify the economic imperative to address it. Based on new research using UnitedHealthcare claims data merged with clinical data, we estimate that **if childhood obesity rates had remained at 1990 levels, there would be about nine million fewer obese or overweight children today (about one-third fewer) and about three million fewer obese adults (a 5 percent overall reduction, primarily among young adults). That would translate into lower health spending. We estimate that the 10-year outlook for health care spending for children would be about \$54 billion lower than it is today** (\$24 billion lower for children and \$30 billion lower for adults).

We discuss the impact of efforts to prevent and reduce childhood obesity, finding that:

- Clinically meaningful changes in weight and quality of life can be realized with behavioral, community-based interventions like UnitedHealth Group's JOIN for ME, which was able to achieve an average 3.5 to 4.5 percentage point reduction in percentage overweight, depending on age.
- We estimate that **an evidence-based behavioral intervention program that reduces rates of child obesity and overweight by 5 percentage points over five years could reduce the number of obese and overweight children by about 10 million and the number of obese adults by 2 million by 2023. Over 10 years, gross health care spending might be \$25 billion lower than it is today (\$18 billion lower for children and \$7 billion lower for adults).** Savings would continue to grow as the impact of lower childhood obesity reduces future growth in the number of obese adults; over 25 years, the number of obese adults might decrease by about 5 million.

Chapter 6 offers a discussion of the **impact of chronic conditions on children** (including asthma, diabetes, hypertension, and high cholesterol and challenges to self-care). Effective management of these conditions requires engagement with children, their parents, and the community through a variety of approaches, including education and training. Emerging technologies provide new opportunities to help children manage their chronic conditions. These include portable medical devices and tracking tools using smartphones that incorporate engagement strategies (i.e., "gamification") with proven appeal for children.

In **Chapter 7**, we highlight the importance and challenges of **early intervention for mental health services** and **appropriate use of prescription drug therapies**. We discuss how effective approaches can include new tools and interfaces for providers, including provider-directed tools that support management of therapies for children and efforts to link children with appropriate services.

Chapters 8 and 9 present a comprehensive approach for improving care for children. **Chapter 8** makes the case for greater use of **coordinated care** plans for children to address rates of avoidable emergency room rates and preventable hospitalizations, while facilitating improved care for children with chronic conditions. **Chapter 9** offers insights into ways to improve outcomes **research and information** dissemination, to bolster the **linkages between specialty and primary care** for children, promote **new care delivery and reimbursement models**, and to pursue **quality initiatives that engage parents and communities** in the range of care needs required for their children.

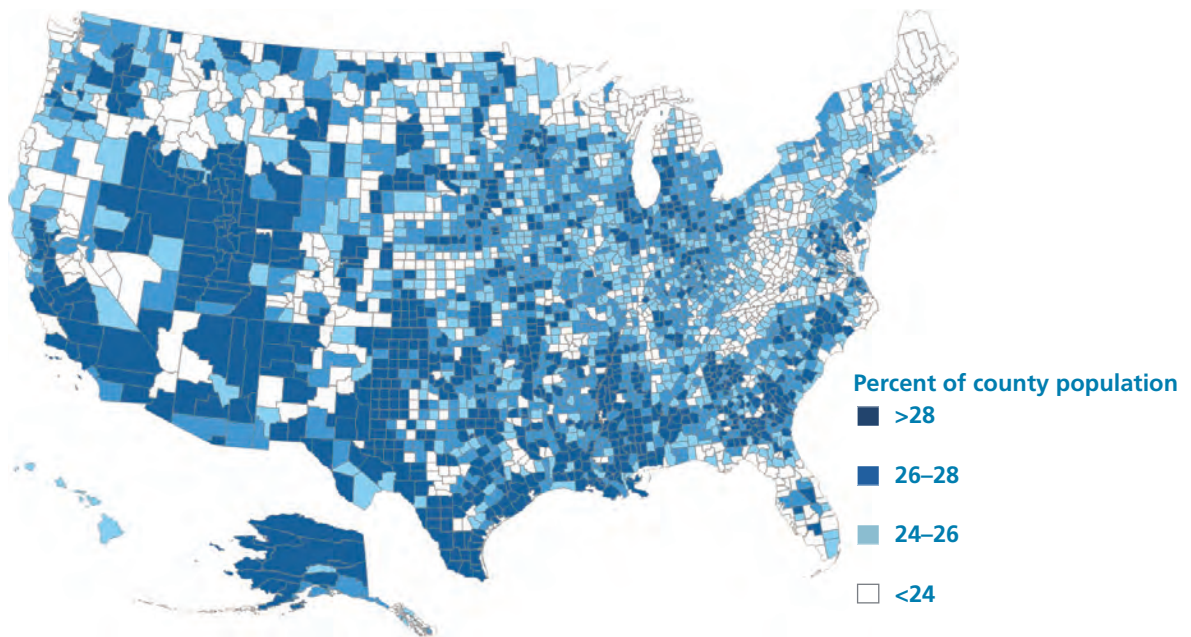
PART A – THE CHILDREN’S STATE OF THE UNION

CHAPTER 1: How healthy are America’s children?

Children represent a quarter of America’s population – but 100 percent of our future. Do our nation’s health investments reflect that priority? Is the country’s health care system optimally configured to support children? And are we taking advantage of the new science of prevention with our children?

Today, children account for 7 to 8 percent of national health spending. Federal spending on children’s health is about \$100 billion. Overall, the federal government spends an estimated \$7 per senior for every \$1 spent per child.^{1,2} Although the population is aging, children make up a relatively high share of the population in the South and West and in urban areas in the Northeast and Midwest (see Exhibit 1.1).

Exhibit 1.1; Children as a share of the total population by county, 2010



Source: UnitedHealth Center for Health Reform & Modernization analysis of Health Resources and Services Administration Area Resource File.

The twentieth century brought major improvements in children's health. A century ago, children often died of diseases that today are easily cured or prevented with antibiotics or vaccinations. Many children did not survive to adulthood, and many were undernourished.

Compared to their peers of the early twentieth century, America's 80 million children age 18 and under now have a much brighter outlook. Infant mortality is down and survival rates for major childhood diseases are high. Vaccinations prevent the ravages of previously fatal or disabling conditions. Along with the nation's rising standard of living, nutrition, and income support programs have improved children's family circumstances.³ Advances in genetics are providing new solutions for metabolic and other types of conditions affecting newborns, and innovations in surgeries are helping infants live until adulthood. Improved approaches to public safety, such as bike helmets and seatbelts, have helped reduce death and traumatic injuries.

As a result, most families (about 84 percent) report their children as having very good or excellent health, although there are notable disparities by income.⁴ Most (about 80 percent) of children see a family physician or pediatrician each year - usually for health and wellness visits or treatment for common conditions, such as colds and respiratory infections.

Children's access to medical care is supported by high levels of health insurance coverage (higher than exists for adults), bolstered by decades of incremental coverage expansions in public programs and implementation of targeted outreach and simplified enrollment strategies. Although most children have health insurance through a working parent (approximately 55 percent), Medicaid and the Children's Health Insurance Program (CHIP) pick up most of the balance.^{5,6} Together, those programs cover about 40 million children at some point during the year.⁷

Challenges for child health

Despite these achievements, challenges clearly remain. Of the roughly 10 million children uninsured for a time during the year, approximately two-thirds are eligible for public coverage, but not enrolled. Those children and others without coverage receive lower levels of preventive and primary care than those with either public or private coverage. Advances will depend on continued efforts in outreach, program implementation, affordability, and access to providers and services.^{8,9} Participation rates in Medicaid among those eligible are likely to increase as the Affordable Care Act (ACA) goes into effect. At the same time, options for private health coverage in state health insurance exchanges will offer new coverage options for children and their families.

But, there are significant pressures affecting the health of children and the services they receive. Children are developing obesity at very young ages and are increasingly diagnosed with a range of mental health conditions. Chronic health conditions are on the rise, now affecting up to a quarter of children at a point in time.¹⁰ About 20 percent of children have special health care needs, meaning they have ongoing health conditions and functional difficulties that require health and related services to a greater extent than other children.¹¹ And disparities persist: only 70 percent of poor children are reported to be in very good or excellent health, compared with 93 percent of children from higher-income families.¹² Specific challenges include the following:

Acquired chronic conditions. For many decades, asthma, a chronic respiratory condition, was the primary chronic condition acquired in childhood. Prevalence has grown by over 10 percent in the last decade and affects almost 9.5 percent of children (or approximately 7 million), with a disproportionate impact on children living in poor communities.¹³ Other conditions (described below) have emerged over the last decade.

- **Type 2 diabetes.** Historically, most children with diabetes have type 1 diabetes, a condition in which they have too little or none of the insulin needed to absorb glucose and produce energy.¹⁴ However, diagnosis of type 2 diabetes in children has risen in recent decades.¹⁵ Type 2 diabetes is an acquired resistance to insulin that develops more commonly in adulthood. Obesity predisposes individuals to the development of type 2 diabetes now affecting approximately 8.5 per 100,000 (or 150,000 children).¹⁶

- **Hypertension (high blood pressure).**

The prevalence rate for prehypertension and hypertension in adolescents ages 12 to 19 is 14 percent and has been increasing.¹⁷ Primary or essential hypertension has multiple risk factors, including obesity and a family history of hypertension, and is more common in adolescents than children. Secondary hypertension is more common in preadolescents, with most caused by renal disease.

- **Cardiovascular health.** Only 38 percent of children ages 12 to 19 meet all four standards for ideal cardiovascular health (cholesterol, blood pressure, smoker status, and blood glucose). About eight percent of adolescents have elevated total cholesterol (above 200). Problems associated with risk factors such as high cholesterol generally do not show up for years, so making the connection between children's health and cholesterol can be difficult. Emerging cases of cardiovascular disease (including left ventricular hypertrophy and early development of atherosclerosis) stem from health behaviors and environmental factors, such as poor diet and lack of exercise.¹⁸

Mental health. Approximately 20 percent of children and adolescents in the United States are thought to be affected by mental health conditions.^{19,20} Those include: anxiety, attention deficit hyperactivity disorder (ADHD), and mood disorders, including depression and bipolar disease. Approximately 40 percent of children with these mental health conditions have more than one. Mental

health conditions are the fifth most commonly treated condition among children, and spending in this area ranks the highest among common childhood health conditions.²¹

Developmental disabilities. Recent surveys estimate that approximately 10 million children (about 14 percent) have been diagnosed with a developmental disability, which are groups of conditions that cause impairment in physical abilities, learning, language, or behavior areas, such as autism spectrum disorders, cerebral palsy, fetal alcohol spectrum disorders, and speech impediments.²² Those conditions may be present at birth or appear during childhood. Between 1997 and 2008, the prevalence of developmental disabilities rose by 17 percent. This was partially due to increased awareness and diagnosis of certain conditions, such as autism.²³

Oral health. Oral health is important for children's overall health and poor care can lead to other health problems. Dental caries disproportionately affect racial and ethnic minority groups, individuals with special needs, and low-income populations, and yet can be prevented through effective care in childhood.^{24,25} Nearly one in five children, ages 2 to 19, has an untreated cavity.²⁶

Public health concerns. Risky health behaviors negatively impact the health of children. Smoking rates continue to persist among adolescents (about 20 percent of high school students smoke) leading to significant health problems related to respiratory function and physical fitness.²⁷ Substance abuse impacts the health of pre-teens and adolescents, leading to long-term physical and mental health problems from alcohol and illicit drugs. Other risky behaviors leave teens at risk for sexually-transmitted infections (STIs), and about half of new STIs each year are among young people ages 15 to 24. Although rates of teen births have declined over the last two decades, they are still high and impact the health of teen mothers and their newborns, particularly when the mother smokes or has a STI. Child abuse and neglect, affects about 700,000 children annually.²⁹ The environment, socio-economic factors, and the availability of community resources also affect children's health.

Implications for the future

Research links the state of children's health to education, employment, and income outcomes in adulthood. Good health status reported in childhood is associated with higher income and wealth later in life.³⁰ By contrast, low birth weight is linked to lower educational attainment and poorer health in adulthood. Chronic conditions in early childhood negatively impact educational attainment and the probability of future employment. Obesity in childhood is associated with obesity in adulthood. Similarly, children with blood pressure above the 80th percentile reported 3.6 times greater risk of hypertension in adulthood than those with normal childhood blood pressure.³¹ Though many children "age out" of asthma, studies find that having asthma as a child is correlated with certain conditions and complications in adults such as reduced health status, increased rates of obesity, and increases in absenteeism.³² Mental health conditions in childhood are also linked to increased risk of those conditions persisting in adulthood and may lead to fewer years of schooling, lower participation rates in the labor force, and decreased family income.³³ Moreover, developmental disabilities have a substantial influence on the lives of children, and treatment approaches in childhood can impact future health.³⁴

Because so many children receive care today through public programs such as Medicaid (and are likely to do so to a greater extent in the future), those programs' approaches to addressing the health of children will have implications on the overall health of the population.

The research challenge

Children are not small adults and differ from adults in several ways that impact outcomes research: development, dependency, differential epidemiology, and demographics (called the four Ds). Children are developing; their bodies change and react in different ways to treatments and therapies depending on their age. Young children are dependent on their families to make decisions about their health and care; their health is influenced by socio-economic factors in their communities, particularly if they are among the 20 percent of children who grow up in poverty. Chronic illnesses in childhood are more dynamic than in adults, with conditions changing or, in some cases, resolving themselves over time. This makes it difficult to separate the effects of disease interventions from normal growth and development.³⁵

Some treatments for conditions that commonly occur in both children and adults, such as arthritis or hypertension, are expressed differently in children, and there is a need for clinical research in those areas.³⁶ Standard prescription drug therapies for adults are often unproven in children through clinical trials and there is limited information regarding effectiveness, dosing, and side effects. Many drugs are metabolized differently by a child's developing liver or kidneys. To some extent, prescription therapies for children may be used off-label, suggesting the need for better research on effective treatments. Evidence is also needed for changing practice patterns and their impact on children. For example, use of computed tomography (CT) scans doubled for children under the age of five and tripled for children ages 5 to 14 between 1995 and 2005, without evidence of the long-term impact and risks.³⁷ Other conditions occur predominantly in children and have had limited investigation by the research community.

Structural and funding issues impede advances in child health research, including the decline in the number of physician scientists dedicated to this field.³⁸ Limited data and outcomes indicators are available for conditions affecting children, and government surveys are done infrequently and rely on parent-reported data. Child-relevant outcomes data may reside in multiple nonclinical data sets including immunization registries, early intervention services and nutrition programs, and other hospital and public health data sets. Traditional study designs used for adult research often do not work in children due to small sample sizes.

Furthermore, children participate in medical research at half the rate as adults due to a variety of factors including fewer opportunities, poor recruitment efforts, and parental concerns.³⁹ A study of drug trials for the 10 most burdensome conditions registered in a clinical trial database found that while nearly 60 percent of the disease burden for high-priority conditions is experienced by children, only 12 percent of clinical drug trials are focused on children. Funding tends to be targeted to adult research; the enrollment of many children in government programs may limit resources.⁴⁰

There are some grounds for optimism. An expanded focus on some well-known knowledge gaps in child health research is leading to improved outcomes, particularly in the area of drug therapy, where the correct dosage is critical to prevent harm or under/over-treatment. Researchers with the National Institutes of Health found that infants required higher doses of an antibiotic than older children to get rid of an infection.⁴¹ Concerns over the increasing prevalence of chronic conditions in children are stimulating research in specific areas, such as asthma, where new efforts seek to identify the signs of asthma earlier, alter its progression, and effectively implement best practices. Additionally, researchers are starting to investigate the long-term risks of increased utilization of radiation dosing for children.⁴²

Efforts to organize and structure child health outcomes research are growing. Government support for comparative effectiveness research focused on children is prompting greater attention to this area. Advances may arise from closer examination of the origins of disease in childhood and focus on child development, mental health, weight, safety, injury prevention, and well-child care. Measure development and reporting efforts are underway as well at the federal and state levels. They will help to support and augment research initiatives.

CHAPTER 2: Are children getting high quality health care?

How children receive care

Most children use the medical system only for primary and routine care needs, though the need for specialty care is growing as disease burden increases and the delivery system evolves. A key question is how child health care will adapt.

Primary care. About 80 percent of children will see a family physician or pediatrician for well-child care and treatment for common illnesses, such as colds and respiratory infections.^{43,44} Children from low-income families and those without a source of insurance coverage are less likely than children with coverage to have seen a physician or other health care professional over the course of a year and as a result may delay care. Although uninsured rates for children have remained stable at about 10 percent, that masks state-level variation where in some cases one-in-five children is uninsured.^{45,46} Finding ways to link those children to appropriate health care services remains a challenge, and will continue to be as newly insured individuals seek services starting in 2014.

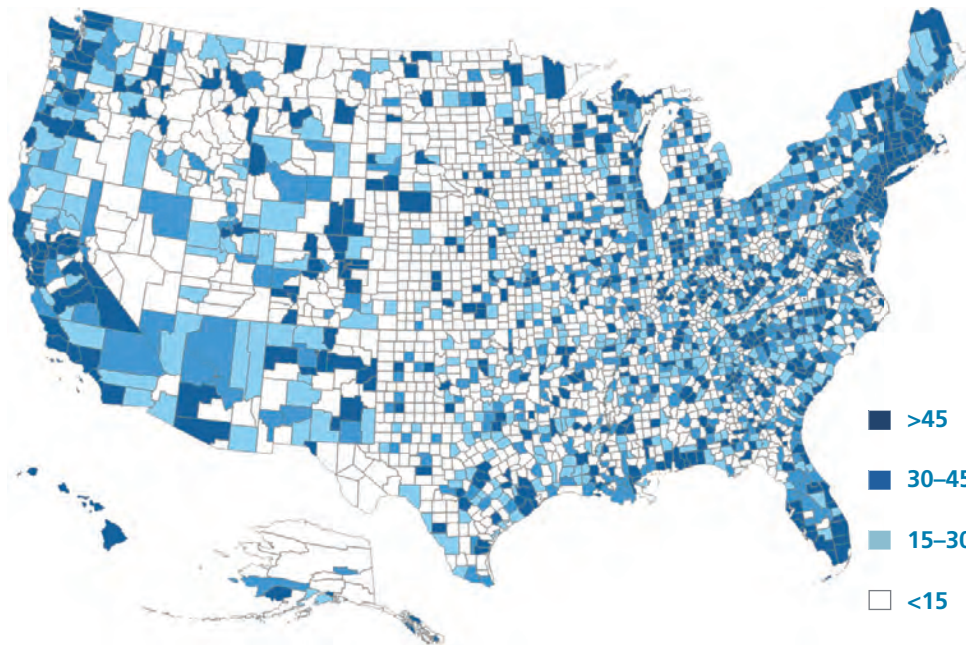
The current maldistribution of children's care providers across the country compounds those pressures.^{47,48} The supply of pediatricians to address children's needs has more than doubled since 1975; today, there are about 67 pediatricians per 100,000 children on average, though significant geographic variation exists. Still, that number is lower than the number of primary care physicians per 100,000 people in the general population (about 120).^{49,50,51} Consistent with broader concerns about the supply of primary care providers for the population, an uneven distribution of pediatricians

may be an indication of access problems for children, although in some areas of the country, such as the Midwest, family physicians tend to provide primary care for children. Exhibit 2.1 shows the relatively high supply of pediatricians on the coasts and in urban areas and lower supply in the South and the Midwest. Areas in the South still face relative constraints when all primary care physicians are considered. (Appendix B provides data on overall primary care physician supply for children by state.)

Relatively low reimbursement rates from public payers (a major form of coverage for children) limits access to care for children in much of the country. As described in UnitedHealth Group's *Working Paper 3: Coverage for Consumers, Savings for States*, many physicians express concern about accepting new Medicaid patients, particularly in states with low reimbursement. In some rural states, however, Medicaid payment rates exceed Medicare rates and the majority of providers accept Medicaid patients.⁵² Higher Medicaid reimbursement for primary care services under the ACA (including to pediatricians) may help to address those issues while in effect, although the payment increases are only for two years.

Confronted with access challenges, parents also seek care for their children at community health centers, retail clinics, or urgent care facilities for immediate health concerns; in other cases, they may delay care.⁵³ Difficulty in obtaining primary care is cited as a contributing factor for children seeking care at the emergency room.⁵⁴ This may strain the delivery system, as children's health becomes more complex and chronic conditions and mental health conditions become more prevalent.

Exhibit 2.1; Distribution of pediatricians per 100,000 children by county, 2010



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2012-2013 Health Resources and Services Administration Area Health Resource File.

Note: Analysis includes data for counties with no pediatricians.

Specialty care. While scientific advances have led to improved treatment for many congenital and genetic conditions and complex and rare diseases, challenges remain for the specialized needs of many children. Specialty care for children tends to be concentrated in certain areas of the country – and around teaching facilities – and certain practice and clinical areas lack adequate supply.^{55,56,57,58} Contributing to this trend are preferences among pediatricians to practice primary care, alternative choices for subspecialists, relatively low reimbursement compared to specialist care for adults, and the limited numbers of children with complex conditions.^{59,60} However, recent estimates suggest that there has been an increase in the number of pediatric subspecialists due to reimbursement incentives for those providers.⁶¹

In some parts of the country, primary care physicians may find it difficult to get advice about diagnosis and treatment and to make referrals for specialized care. As a result, accessing pediatric specialty services can

be a challenge, particularly for Medicaid patients who experience more difficulties compared to children with private coverage. In one study, 60 percent of children enrolled in Medicaid could not get a specialist appointment compared to 11 percent of privately insured children. The length of waiting time for appointments for specialists was more than double for children covered by Medicaid compared to those who are privately insured.⁶² Some primary care physicians refer children enrolled in Medicaid to the emergency room or urgent care center as a more expedient way to obtain referrals.⁶³

Children's hospitals are specialized providers with a research-based mission and have evolved to care for children with the most clinically complex conditions and care needs, including cancer, cardiac surgery, neurosurgery, and organ transplantation. There are approximately 250 freestanding children's hospitals and account for 45 percent of all child inpatient admissions.⁶⁴ About half of their revenue comes from Medicaid.

Children with severe illnesses increasingly receive care at children’s hospitals while those with less complex conditions (and private coverage) visit acute-care inpatient facilities for their treatment.⁶⁵ Admissions for chronic diseases are outpacing those for non-chronic conditions and contributing to admissions growth of close to 19 percent over the last five years.⁶⁶

Because children’s hospitals often provide services unavailable elsewhere and have child-specific technology, they are important components of provider networks, yet care in those settings may be costly and there are few alternatives. For example, there are a limited number of child-focused “step-down” units, lower-intensity settings for surgical recovery and rehabilitation.

This current pediatric specialty model may not be optimally designed to address the new types of illnesses affecting children. For example, cardiac clinics for children historically addressed congenital heart issues; today, the rapid increase in acquired health issues is leading to changes in interventions both at the primary care level and in subspecialty clinics. Newer health challenges related to emerging chronic care needs, obesity, and mental health are arguably not yet receiving the systematic focus and support they require. Care for the increasing number of chronically ill children and those with mental health conditions requires coordinated, ongoing care from both primary and specialty providers, as opposed to a transfer of care which often happens with serious conditions (such as orthopedics).

Assessing the quality of children’s health care

Children receive less than half of preventive and well-child care recommended by the medical and public health community, according to research from RAND.⁶⁷ This is primarily the case for access-related measures of quality: those that assess whether healthy children receive recommended immunizations, screenings, preventive services, and well-child visits. Notable challenges exist for adolescents, with low screening rates for chlamydia in adolescent girls and low rates of

vaccinations, such as those for meningitis and human papillomavirus (HPV).⁶⁸ Other research showing variability across the nation in those measures and others, such as developmental screening, suggests improvements can be made.⁶⁹

In the Medicaid program, screening and preventive care for children has historically been a challenge with children receiving less than the recommended number of well-child visits, particularly adolescents. In a study of state Medicaid programs, only about half of infants received six or more well-child visits; the proportion of adolescent Medicaid enrollees receiving at least one well-child visit is below 50 percent.⁷⁰ Although a “quality gap” previously existed between children enrolled in Medicaid and those with private coverage, today there are many areas where Medicaid enrollees are as likely to receive quality care as those with private insurance coverage.^{71,72} Recent government research notes that quality of care in Medicaid is similar to that provided through employer-sponsored coverage on five of eight measures tracked by National Committee for Quality Assurance (NCQA), including a primary care visit in the past year, well-child visit rates for adolescents, child and adolescent immunization status, and chlamydia screening rates, although the absolute level of recommended care provided may still be poor.⁷³

Assessments of the quality of treatments children receive for acute or mild-chronic conditions suggest room for improvement. Children receive about two-thirds of indicated care for acute medical problems and about half for chronic medical conditions.^{74,75} According to the RAND research, those conditions include asthma, diarrhea, and urinary tract infections. Other research findings suggest that variability exists across communities in the provision of recommended treatment for acute or mild-chronic conditions.^{76,77}

Research on outcomes measures for children’s health underscores the gaps in appropriate treatment and preventive care:

- **Preventable (avoidable) hospital admissions** occur for children with conditions, such as short-term diabetes complications, asthma, urinary tract infections, and gastroenteritis. Children diagnosed with those conditions may have missed recommended well-child visits or did not have a longstanding relationship with a single provider, leading to delays in care.⁷⁸ Improvements in this area have been made since 2005, with substantial decreases in preventable admissions for gastroenteritis in children and urinary tract infections. However, rates for diabetes and asthma have remained steady, suggesting opportunities for improvement in those areas.⁷⁹
- **Avoidable hospital readmissions.** High rates of avoidable readmissions for children with asthma, pneumonia and seizures suggest gaps in the quality of ambulatory care or care provided at the hospital.
- **Avoidable emergency room visits** reflect lack of adherence to evidence-based, recommended care or lapses in the primary care system. One in three emergency room visits by children are for conditions considered treatable in a primary care setting and children are more likely to visit the emergency room than adults for certain conditions, such as asthma.⁸⁰
- **Medication adherence rates** are about 50 percent for children, depending on the type of condition, age, and level of parental engagement.⁸¹ Medication adherence is lower in children than in adults and adolescents have lower adherence rates than younger children.⁸² Adherence is higher for medications for acute illnesses and lower for maintenance medications, particularly for children with chronic conditions.⁸³

Overall, existing research points to multiple quality gaps in care for children, notably for those with common acute conditions for which there are evidence-based

standards of care. In general, concerns emerge from the research that providers are sometimes missing the “easy wins,” the clear opportunities to provide high quality care to children regardless of their source of coverage. A more specific problem is poor results on quality of care measures for adolescents, which is reflected in low rates of preventive visits, recommended screenings, and adherence to medication programs. Evidence about treatment for children with asthma and diabetes also suggests a need for improvement and raises broader concerns about quality for children with chronic conditions.

Strategies and infrastructure for quality measurement for children are still under development. There are about 400 individual measures of quality of care in use that come from about 20 different data sources, including public, private, and non-profit sources, such as the Agency for Healthcare Research and Quality (AHRQ), Health Plan Employer Data and Information Set (HEDIS), and the Medical Expenditure Panel Survey (MEPS).⁸⁴ Many of those measures are process measures as opposed to outcomes measures.⁸⁵ New measures have been developed to look at several critical service areas: prenatal and postpartum care, blood pressure screening, immunizations, dental visits, well-child visits, depression screening, and oral health quality.^{86,87} However, there are concerns that the existing measures still may not adequately describe the health status or quality of care delivered to children. In particular, measures may not address the health needs faced by low-income and Medicaid children, provision of inpatient care, mental health care, and dental health.⁸⁸

New data on quality of care

Evidence-based care for children with employer-sponsored coverage. Analysis of UnitedHealthcare's Premium Designation program identified areas of success and gaps in the provision of evidence-based care for children. For this working paper, we analyzed the most recent data available. In total, we identified over 100,000 providers rendering care to children, located across 306 markets. For this analysis, markets were defined as Hospital Referral Regions (HRR), a widely-used approach that was developed by researchers at the Dartmouth Institute (see Appendix C for methodology).

Overall, we identified over 1.1 million clinical "opportunities" for physicians to provide evidence-based medicine to children, in some instances with multiple opportunities for a given patient. Almost all (98 percent) of those opportunities were for screening tests and treatments for eight conditions (see Exhibit 2.2).

The success rates for providers delivering child health care for the conditions included in the analysis was consistent with previous research focused on common conditions for adults.⁸⁹ In aggregate, providers who participated in the program were successful in providing evidence-based care for their child patients nearly 86 percent of the time across all measured conditions. The conditions where providers of child health care were most successful in providing that care were acute sinusitis, migraine headache, and pregnancy management for pregnant teens. Acute sinusitis not only had the greatest number of opportunities, but also had one of the highest rates of success.

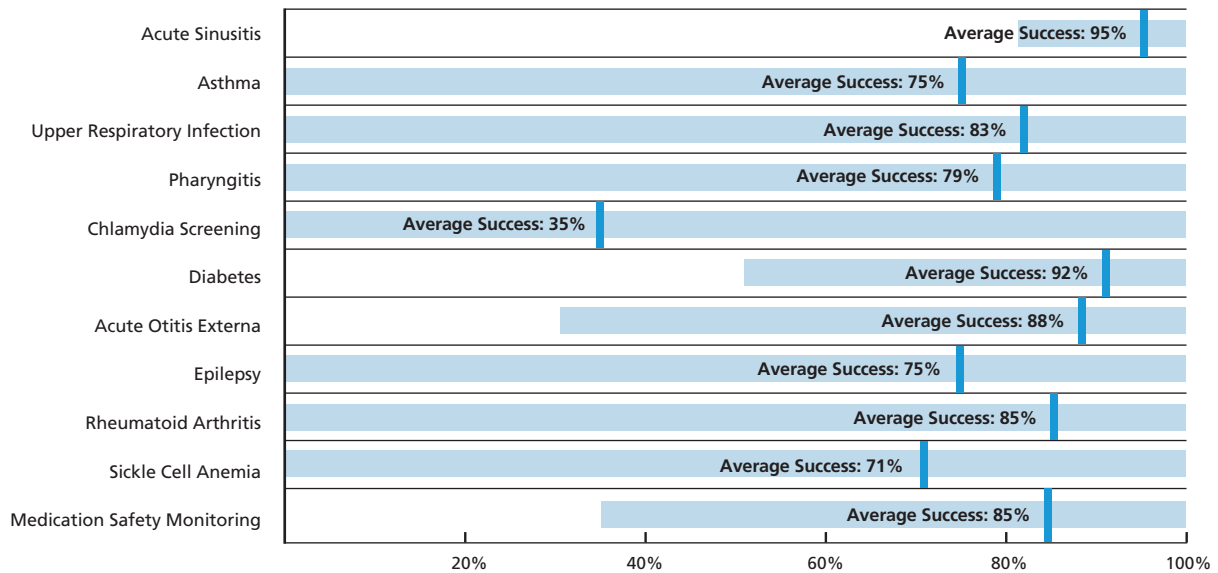
Success rates, however, were lower for certain conditions. Specifically, providers of health care to children demonstrated lower success rates for treating children with asthma (consistent with past research), epilepsy, and sickle cell anemia. The poorer performance on the latter two conditions may be due to the specialized knowledge and training required to effectively manage these conditions. Also, consistent with existing research, is a much lower success rate for chlamydia screening – 35 percent nationwide – which may be heavily influenced by socio-economic factors as well as subpar care for adolescents more generally.

Exhibit 2.2; Physicians' performance in delivering quality care to children by condition, 2006-2008

Opportunities and successes by condition

Condition	Number of Providers	Opportunities	Successes	Success Ratio	10th Percentile	90th Percentile
Acute Sinusitis	40,484	543,577	517,791	95.3%	82%	100%
Asthma	33,642	157,628	118,010	74.9%	0%	100%
Upper Respiratory Infection	33,184	143,506	119,480	83.3%	0%	100%
Pharyngitis	30,470	107,779	85,292	79.1%	0%	100%
Chlamydia Screening	37,594	71,867	25,140	35.0%	0%	100%
Diabetes	7,546	30,983	28,406	91.7%	50%	100%
Acute Otitis Externa	13,778	26,259	23,067	87.8%	30%	100%
Epilepsy	3,559	11,809	8,876	75.2%	0%	100%
Rheumatoid Arthritis	1,178	3,171	2,688	84.8%	0%	100%
Sickle Cell Anemia	785	2,998	2,134	71.2%	0%	100%
Medication Safety Monitoring	619	1,857	1,578	85.0%	33%	100%

Distribution of success rates by condition



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealth Premium Designation program data.
 Note: Range bands in the graph represent success rates for physicians at the 10th and 90th percentiles for each condition.

Success rates varied among the individual physicians participating in the program, more widely for some conditions than for others (see Exhibit 2.2). The success rate among lower-performing physicians (i.e., those in the bottom 10th percentile) is very low for many of the conditions we analyzed. For example, the lowest-performing providers appropriately screened for diabetes

only 50 percent of the time, assessed appropriate medication adherence only one-third of the time, and provided recommended care for ear infections only 30 percent of the time. Low-performing physicians performed even worse on providing appropriate care for children with asthma.

Our research supports the view that greater opportunities exist to improve the care that children with asthma receive and to improve treatment approaches for complex conditions, such as sickle cell anemia and epilepsy; screen for the growing number of children with diabetes; support adolescent health screening; and improve medication adherence for chronic conditions.

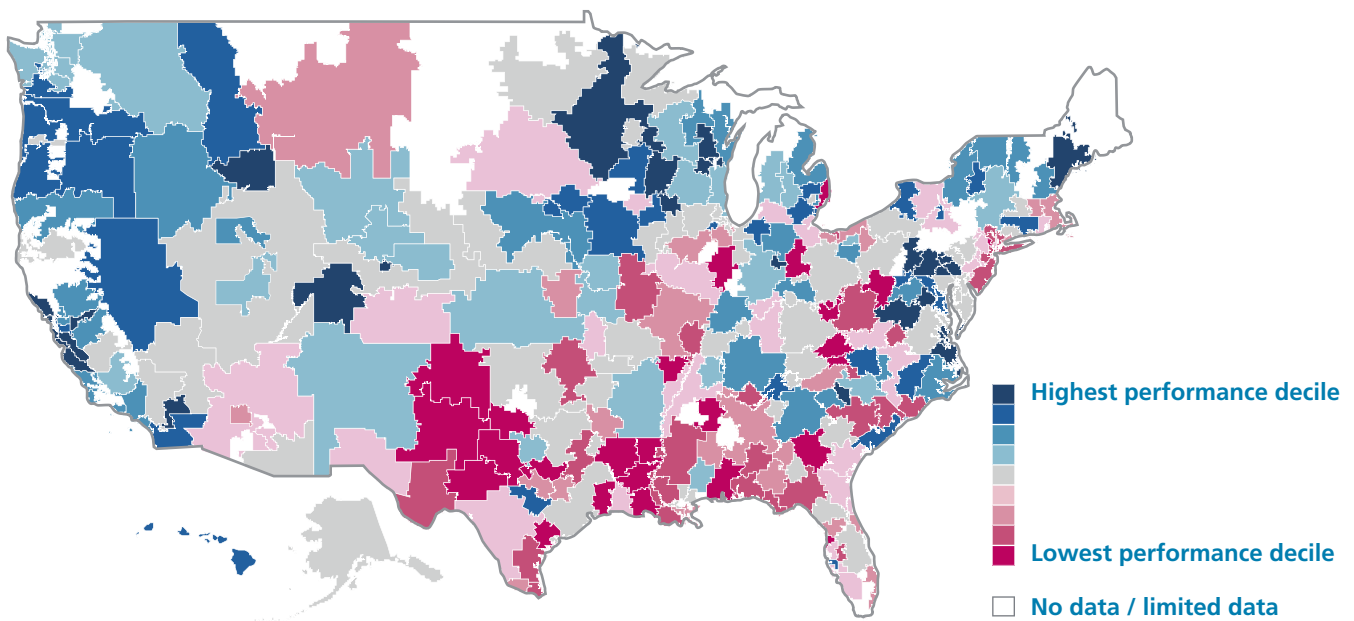
The following analysis looks more closely at the areas of the country that may have gaps in quality for child health:

Geographic variation for individuals with employer-sponsored coverage. Additional research on variation in quality across HRRs shows wide variation with respect to avoidable hospitalizations, avoidable emergency room visits, and medication adherence for children. Our analysis of UnitedHealthcare employer-sponsored claims data used age and gender-adjusted rates of avoidable utilization for both children and

adults by HRR to identify the following: 1) geographic areas with low and high performance for children, and 2) relative performance across geographic areas between children and adults. Measures of analysis were primarily based on AHRQ methodology (see Appendix C for detail). We analyzed the extent to which the rates of avoidable utilization observed in each community compared to expected rates based on the national population.

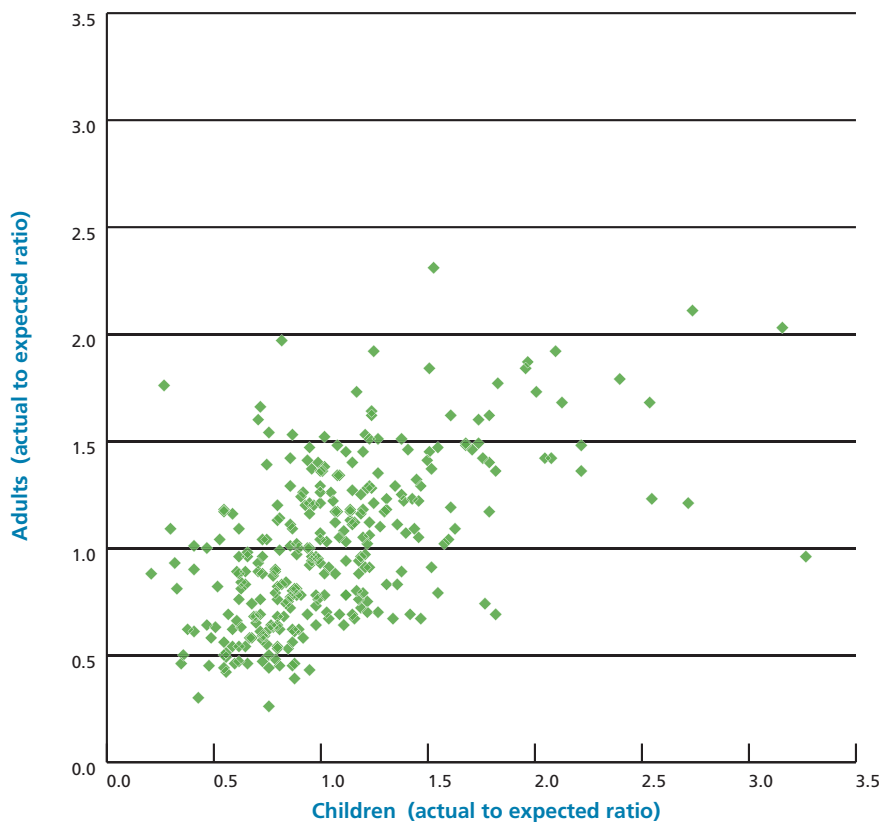
As shown in Exhibit 2.3, rates of avoidable admissions for children with employer-sponsored coverage vary substantially across the country. The lowest-performing areas of the country (those with the highest rates of avoidable admissions) for children tend to be in the South, Appalachia, and urban centers in the Northeast (New York and New Jersey). The highest-performing areas tend to be on the West Coast, in the Midwest, and in the mid-Atlantic region.

Exhibit 2.3; Avoidable hospital admissions for children, relative performance by HRR, 2012



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored claims data. Note: "High performance" means relatively low rates of avoidable admissions compared to expected rates. "Low performance" means relatively high rates of avoidable admissions compared to expected rates.

Exhibit 2.4; Relationship between performance on avoidable admissions for adults and children by HRR, 2012



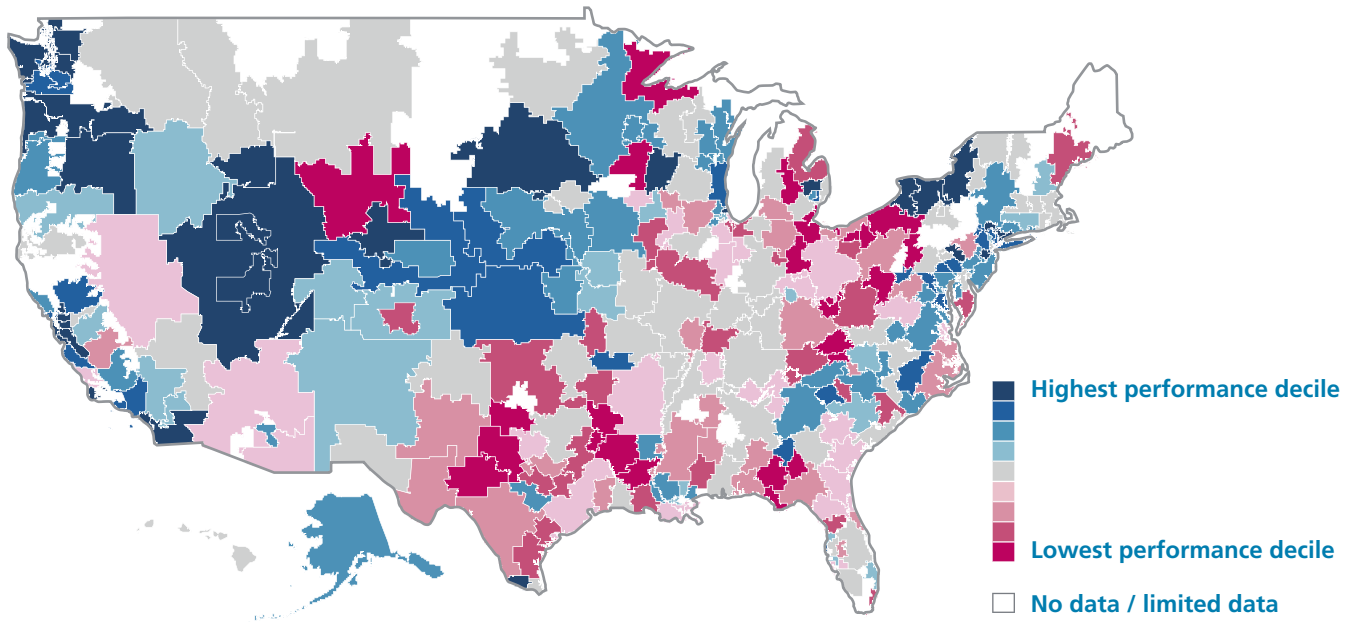
Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored claims data.

Exhibit 2.4 shows how performance on avoidable admissions for children and adults is generally related across communities, suggesting that similar structural and primary care characteristics impact all patients in a given market. However, it also shows that in some HRRs, performance on avoidable admissions for children is worse than that for adults. This may indicate specific deficiencies in child health preventive care or community supports, such as those that might lead to asthma-related hospitalizations.

Variation in avoidable emergency visits for children points to challenges in ensuring children get appropriate primary care or have an access point for after-hours care or urgent visits (see Exhibit 2.5). Poor performing communities tend to be located in the South and the Rust Belt. Communities with the lowest rates for avoidable emergency visits for children tend to be in the western part of the country.

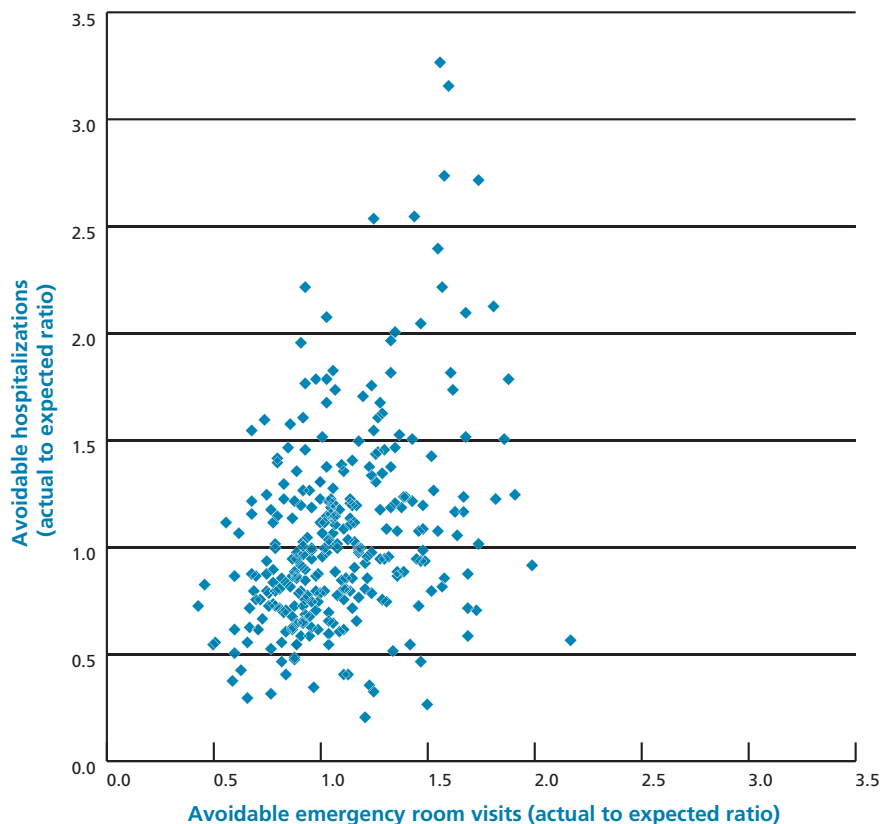
As shown in Exhibit 2.6, performance on avoidable emergency visits (measured by actual to expected rates by HRR) for children is related to performance for avoidable admissions, suggesting that similar factors may influence performance on those measures of quality. Yet, in some communities, performance on those measures varies dramatically. Performance for avoidable admissions in HRRs in parts of the upper Midwest is low while performance for avoidable emergency visits is high. Conversely, HRRs located in the Rust Belt perform poorly on avoidable emergency visits but better on avoidable admissions. Additional research is needed to better understand the factors that influence why avoidable utilization occurs.

Exhibit 2.5; Avoidable emergency room visits for children, relative performance by HRR, 2012



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored claims data.
Note: "High performance" means relatively low rates of avoidable ER visits compared to expected rates. "Low performance" means relatively high rates of avoidable ER visits compared to expected rates.

Exhibit 2.6; Relationship between performance on avoidable emergency room visits and avoidable hospital admissions for children by HRR, 2012

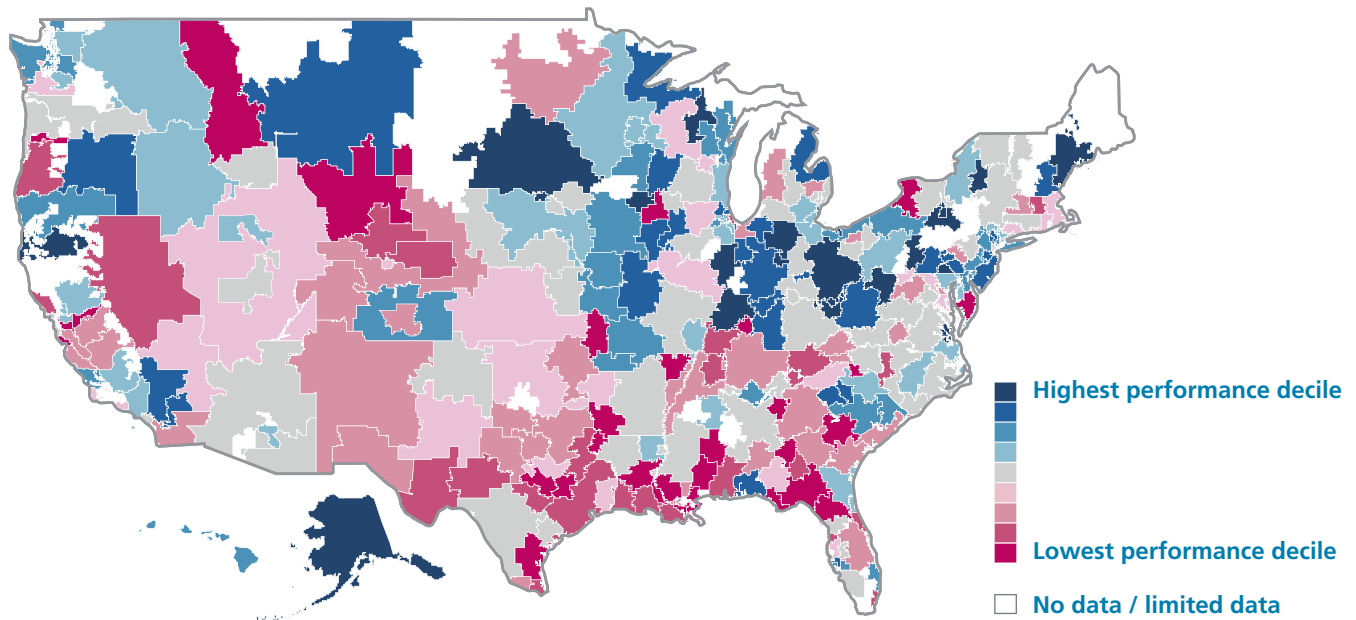


Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored claims data.

The areas of the country that perform the most poorly on avoidable emergency room visits for children also tend to have high rates of avoidable emergency room visits for adults, though not as high as for children. Conversely, in some communities with relatively low performance on this measure for children, performance is better for children than for adults. Those communities are mainly in the South.

Medication adherence rates for children are notably below those for adults (50 percent compared to 62 percent) and those rates are low across the nation. Exceptions include communities in Western Pennsylvania and several others (e.g., California, Hawaii, Illinois, and Maine). The lowest-performing communities for children's medication adherence are in the South and West mainly, but not exclusively.

Exhibit 2.7; Medication adherence rates for children, relative performance by HRR, 2012



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored claims data. Note: "High performance" means relatively high rates of medication adherence. "Low performance" means relatively low rates of medication adherence.

CHAPTER 3: Why has the cost of children’s health care been rising?

Although per capita spending for children’s health care is about half that of adults (in both employer-sponsored and Medicaid populations), health care costs are growing at a faster rate for children than for adults.⁹⁰ Between 2007 and 2010, average annual per capita growth in health spending for all children age 18 and under and enrolled in employer-based coverage was approximately 5.9 percent, and for teenagers was 6.9 percent, according to the Health Care Cost Institute (HCCI).⁹¹ More recent data suggests per capita cost growth rates for children accelerated in 2011, growing by 7.7 percent in just one year, compared to 3.6 percent for adults under age 45.⁹²

Similarly in the Medicaid program, average annual rates of growth for children under age 19 were twice as high as those for adults over the 2007 to 2010 period. More recent data for UnitedHealthcare Medicaid members shows per person spending growth of about 3 percent

for children under age 19 between 2010 and 2011.⁹³

Recent spending growth for children with employer-sponsored coverage primarily has been driven by hospital price increases. In particular, the costs for emergency room visits grew at 10.5 percent a year on average, making that setting particularly expensive. More recent trends suggest that inpatient admission rates and visits to emergency rooms are on the rise for those children.⁹⁴

Exhibit 3.1 offers a comparison of spending and utilization in 11 states where UnitedHealthcare has membership in both employer-sponsored and Medicaid health plans, for five broad categories of service. We found that spending per child in employer-sponsored plans is 1.8 times the spending per child in Medicaid health plans on average. That ratio varies across the states, from 1.2 to 2.5 in the states with the highest and lowest ratios, respectively.

Exhibit 3.1; Comparison of spending and utilization in employer-sponsored insurance to Medicaid health plans, children ages 1 to 18 in 11 states, 2011

	Inpatient Admissions	Outpatient Visits	Outpatient Procedures	Professional Procedures	Prescription Drug Scripts	Total
All 11 States						
Spending per service	2.1	6.3	1.8	1.6	2.1	1.8
Units per 1,000	0.8	0.6	0.4	1.4	0.8	
PMPM	1.7	3.3	0.8	2.2	1.7	
Three states with highest ratios of PMPM costs¹						
Spending per service	2.4	7.4	2.3	2.1	2.9	2.5
Units per 1,000	1.0	0.6	0.4	1.2	1.2	
PMPM	2.3	4.3	1.0	2.6	3.1	
Three states with lowest ratios of PMPM costs¹						
Spending per service	1.3	3.8	1.4	1.2	1.9	1.2
Units per 1,000	0.8	0.6	0.4	1.4	0.7	
PMPM	1.0	2.2	0.5	1.7	1.3	

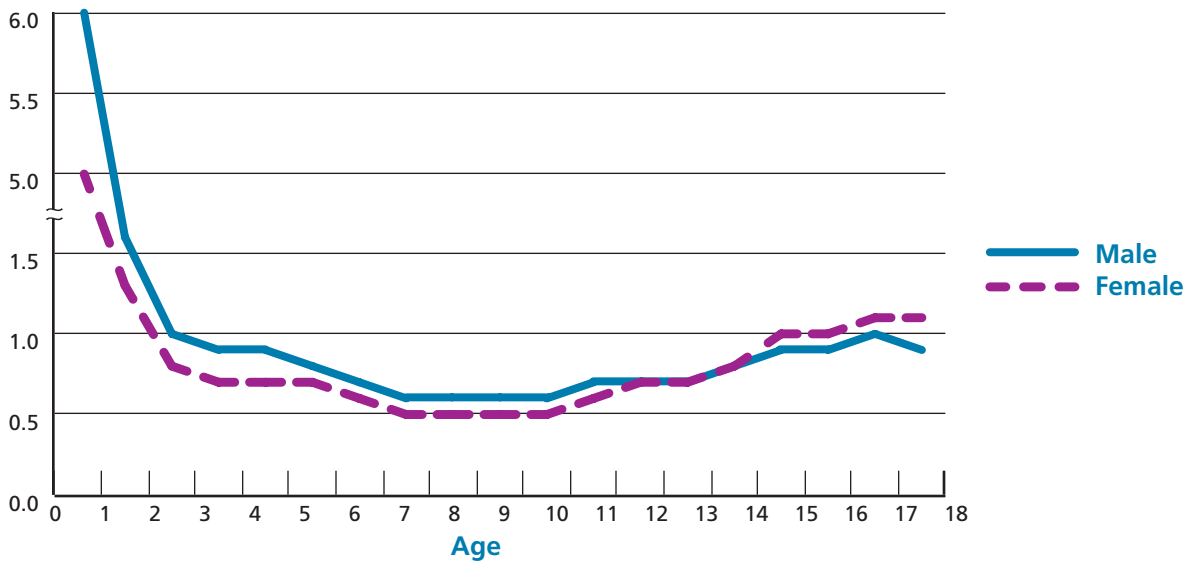
Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare employer-sponsored and Medicaid health plan 2011 claims in selected states. “Allowed” (i.e., actual) costs are used and include both payer and insured share. Figures represent a weighted average of 11 states.

Note: All figures are ratios of employer-sponsored insurance to Medicaid. Values greater than 1.0 imply higher relative cost or utilization in employer-based coverage compared to Medicaid.

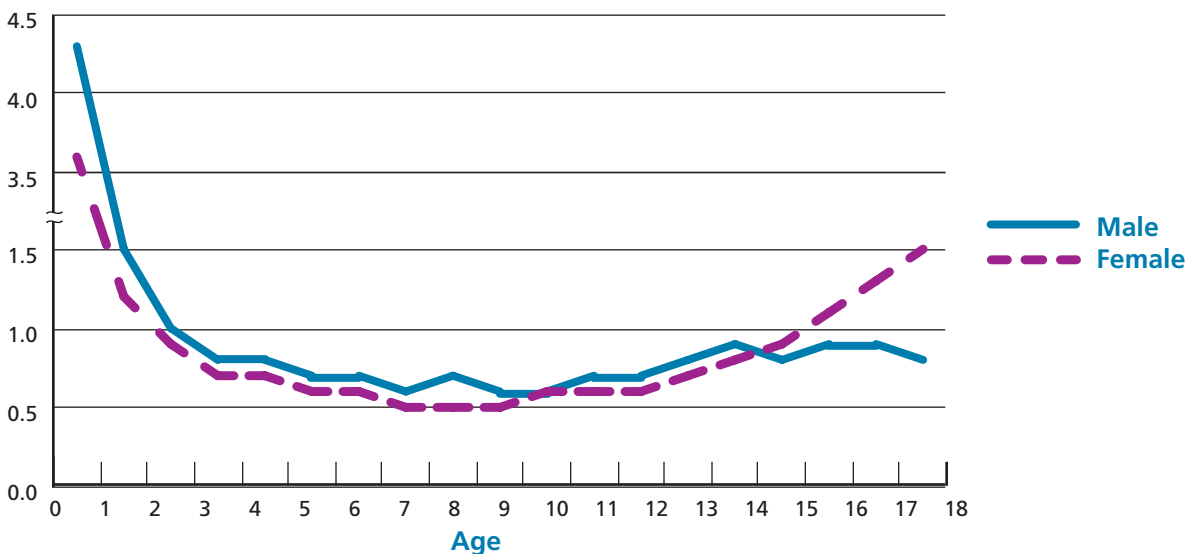
1) We rank ordered the study states by commercial to Medicaid ratios for per member per month (PMPM) costs and developed two subset groups of states – those with high and low ratios.

Exhibit 3.2; Ratio of medical costs by age and gender to average costs for children ages 0 to 18 in UnitedHealthcare’s employer-sponsored insurance and Medicaid health plans, 2011

Employer-sponsored insurance



Medicaid health plans



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 UnitedHealthcare employer-sponsored and Medicaid health plan claims.

Note: Some Medicaid costs for newborns is not included; instead, those costs are captured separately on maternal claims.

(See Appendix B for for more details on the analysis.) Utilization of services is generally higher for children enrolled in Medicaid than for those with employer-sponsored coverage, although children with employer coverage appear to make more use of professional services including physician visits and ancillary services.

In contrast, spending per unit of service tends to be higher for children with employer-sponsored coverage. In part, this is because providers typically receive lower reimbursements from state Medicaid programs. The intensity of services provided and prices of facility and professional services in those states may also be a factor.

Variation by age, gender, and condition. Exhibit 3.2 shows the ratio of spending by age and gender to average medical costs for children ages 0 to 18 enrolled in employer-based coverage and Medicaid plans. The U-shaped curve shows that costs fall after the first several years of life, then increase again during teenage years.

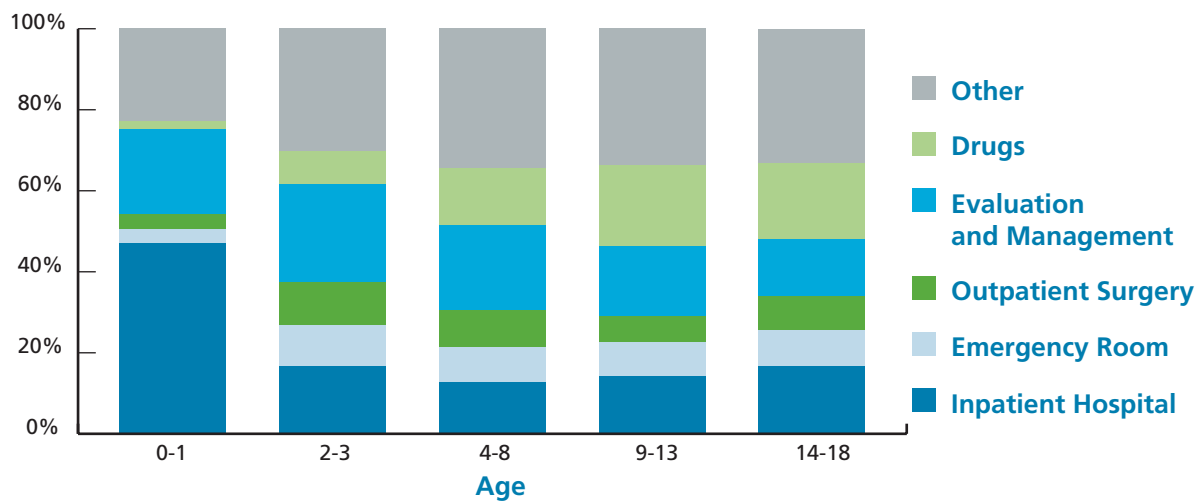
Exhibit 3.3 shows the mix of services provided to children in UnitedHealthcare’s employer-sponsored and Medicaid

health plan population – and illustrates the use by young children of inpatient and outpatient care, and the use of prescription drugs for teens in both populations.

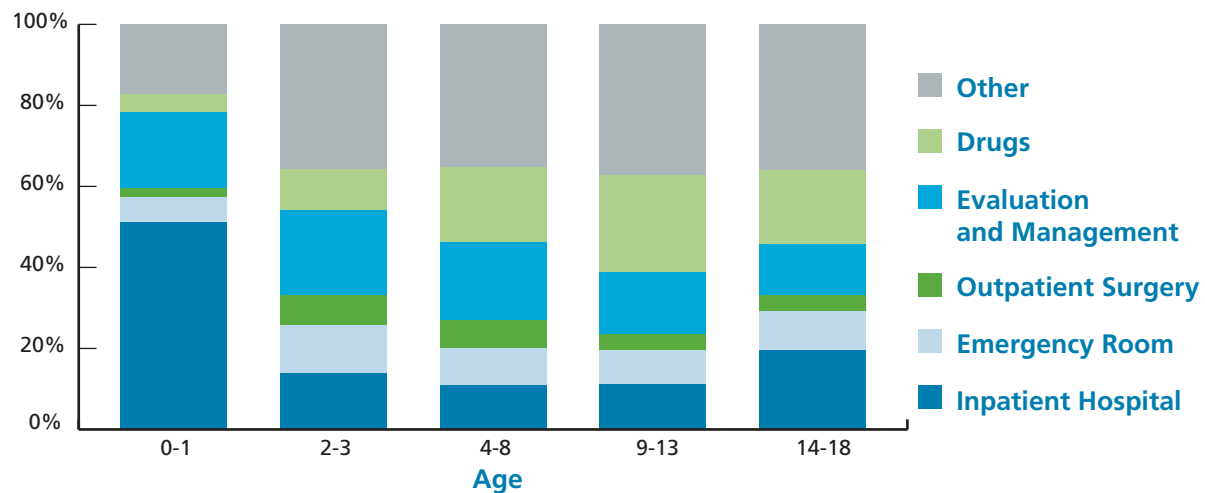
We analyzed UnitedHealthcare claims data to gain insights into those patterns and trends and to identify areas where there may be opportunities to improve child health and the affordability of children’s care.

Exhibit 3.3; Share of per capita spending by service and age for children ages 0 to 18 in UnitedHealthcare’s employer-sponsored insurance and Medicaid health plans, 2011

Employer-sponsored insurance



Medicaid health plans

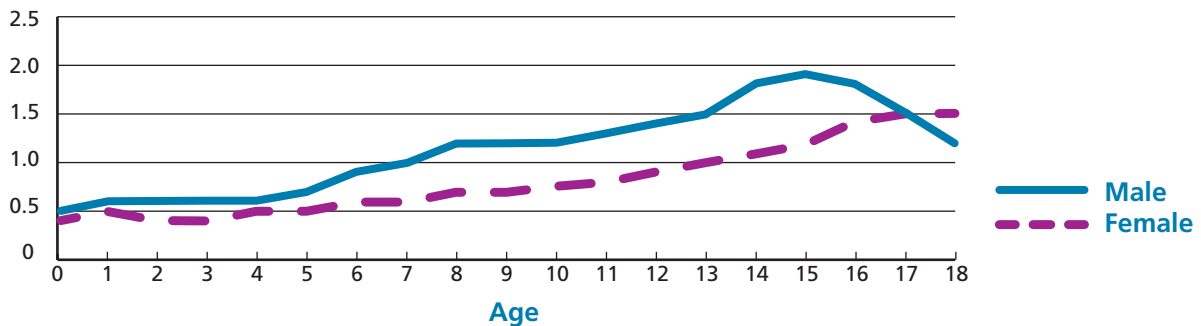


Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 UnitedHealthcare employer-sponsored insurance and Medicaid health plan claims.

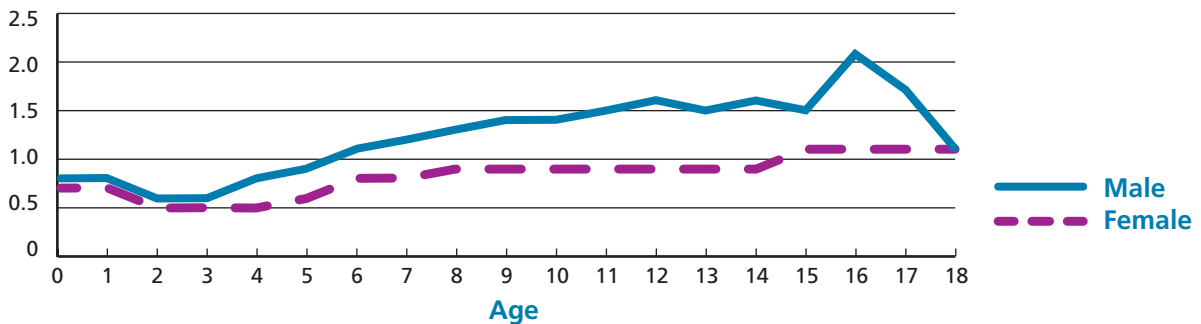
Note: The share of total per capita spending for prescription drugs is based on claims for children with both medical and prescription drug benefits provided by UnitedHealthcare plans.

Exhibit 3.4; Ratio of pharmacy costs by age and gender to average costs for children ages 0 to 18 in UnitedHealthcare’s employer-sponsored insurance and Medicaid health plans, 2011

Employer-sponsored insurance



Medicaid health plans



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 UnitedHealthcare employer-sponsored and Medicaid health plan claims.

- Costs in the first year of life.** Costs per child in the first year of life are substantially higher than the average cost for all children, six times and four times the average, respectively, in UnitedHealthcare employer-sponsored and Medicaid plans. This reflects the high costs of intensive care for certain newborns after the mother’s discharge from the hospital, but also includes costs for inpatient stays and emergency room visits during the first year of life, as well as visits for immunizations and developmental assessments. Preterm births are a significant contributor to those costs, particularly in the Medicaid program, and are discussed in Chapter 4.
- Preschool children – emergency room use and asthma.** Relatively higher costs for preschool children are related to routine care needs specific to that population, such as well-child visits (often for immunizations) and physician visits for common illnesses. However, they also reflect use of the emergency room, particularly for asthma. More generally, rates of emergency room visits are higher for younger children than they are for older ones; in both UnitedHealthcare’s employer-sponsored and Medicaid health plan populations, children under age four have twice the number of visits to the ER as children ages 4 to 13.

- **Gender differences.** For most of childhood, per capita medical costs are higher for boys than girls, regardless of payer (9 percent and 7 percent higher in employer-sponsored insurance and Medicaid health plans, respectively). In the Medicaid program overall (including fee-for-service and Medicaid health plans), per enrollee medical costs for boys are about 8 percent higher than costs for girls, on average.⁹⁵ Their higher costs are related to higher rates of disability and injuries; they are also related to use of prescription drugs for mental health conditions. Pharmacy costs for boys are almost 40 percent higher in both the employer-sponsored and Medicaid health plan populations for boys than those for girls. Those trends reverse with the onset of teenage pregnancy, particularly in the Medicaid population (see Exhibit 3.2 and Exhibit 3.4).
- **Onset of acquired chronic conditions and obesity.** In a UnitedHealthcare study of the employer-sponsored population in a Midwestern metropolitan area, about one-third of girls and close to 40 percent of boys had one or more chronic conditions including obesity, and about three-quarters of all child health care spending in that area could be attributed to those children. Although most children with chronic conditions had a single condition (65 percent of girls and 62 percent boys), a notable share had multiple chronic conditions. Furthermore, prevalence of general or acute conditions was also higher for children with chronic conditions than for those without.
- **Mental health – drug use and inpatient hospitalization.** Use of mental health services starts to increase in the early teen years, and continues to escalate as children reach adulthood. ADHD is more common among boys than girls, and impacts 23 percent of boys with a mental health condition, compared to 10 percent of girls. Central nervous system drugs (including antidepressants and anti-anxiety drugs) represent key therapeutic areas with high spending and growth levels for this population.

Analysis of HCCI multi-payer data on health spending for children with employer-sponsored coverage indicates that both unit costs and utilization increased for inpatient mental health and substance abuse services; over the 2007 to 2010 period, use of those services increased by 6.7 percent a year on average primarily for children ages 9 to 18, and the cost of those services per child grew by about 6.4 percent.⁹⁶

- **Services to support children with disabilities.** Children with developmental or physical disabilities understandably and quite appropriately use more services than other children. In the Medicaid population (where about 5 percent of children are eligible for the program because they have certain disabilities and low family income that qualify them for coverage), spending for children with disabilities is four to five times higher on average than for children without, reflecting the more intensive services required by that population. About 27 percent of all Medicaid spending on children is for children with disabilities.⁹⁷ In UnitedHealthcare’s Medicaid health plan population, pharmacy costs for children with disabilities with Medicaid are over six times higher than for those without disabilities.
- **Use of specialist providers and therapies.** During the 2007 to 2010 period, visits to specialist providers increased for children enrolled in employer-sponsored coverage by about 5.8 percent a year on average, contrasting with a slight reduction in visits to primary care providers. Cardiovascular drugs and hormones were the fastest growing categories of prescription therapies for children.⁹⁸ Hormones include adrenals, antidiabetic agents, and thyroid and antithyroid agents, according to the American Hospital Formulary Service therapeutic classes.

What are some of the practical approaches to improving children’s health? That is the question to which this paper now turns.

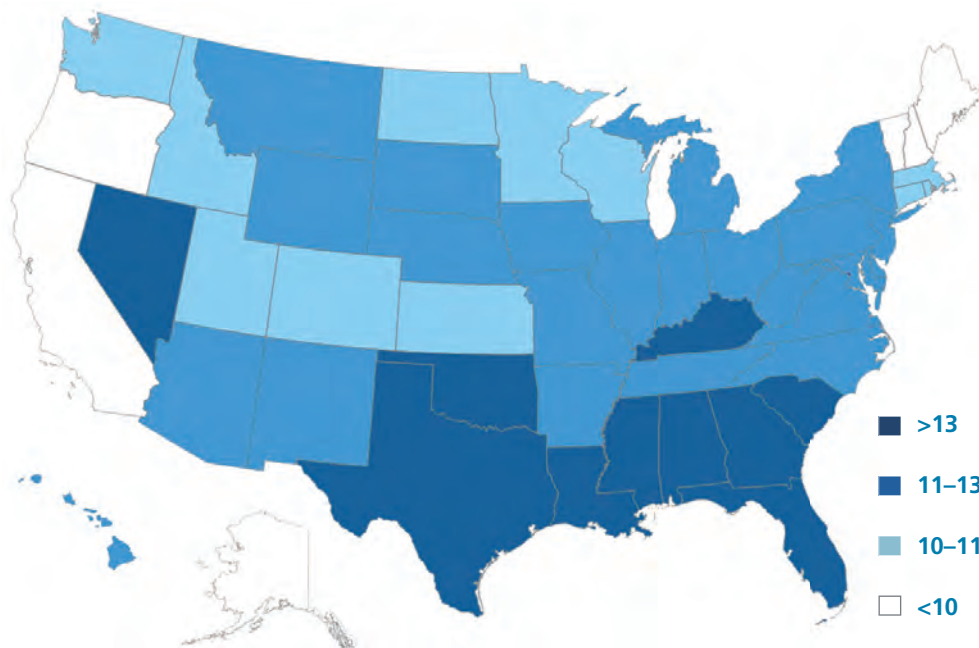
PART B – SOME PRACTICAL OPPORTUNITIES FOR IMPROVEMENT

CHAPTER 4: Healthy pregnancy — giving children the best possible start in life

Each year more than half a million infants are born preterm (12.2 percent of births), which is defined as less than 37 weeks of a pregnancy. This represents a 33 percent increase over the last three decades.^{99,100} Most preterm births occur between 32 and 37 weeks of pregnancy. Since 1990, late preterm births (37 to 38 weeks) have also increased, now accounting for almost 30 percent of births, in part due to increased induction of labor and cesarean delivery.¹⁰¹

Preterm infants have relatively higher rates of mortality and are at risk for low birth weight and long-term health problems, including respiratory conditions and developmental delays.¹⁰² Compared to infants born at term, preterm infants have higher rates of cognitive deficits and increased behavioral and neurodevelopmental problems, which may be due to the loss of brain development that can occur between 34 and 36 weeks.^{103,104}

Exhibit 4.1; Percent of births considered preterm by state, 2010



Source: UnitedHealth Center for Health Reform & Modernization analysis of America's Health Rankings, United Health Foundation.

On average, hospitalization costs for preterm infants are approximately \$100,000 with an average length of stay of 16.1 days, compared to \$7,000 and an average length of stay of 2.3 days for full-term infants.¹⁰⁵ A large portion of these costs can be attributed to lengthy inpatient stays in neonatal intensive care units (NICUs), which treat infants that are premature, have low birth weight, and/or have a medical condition requiring specialized care.¹⁰⁶ For newborns with employer-sponsored or Medicaid coverage, those with NICU stays cost 3.7 to 5.6 times the amount of all newborns.¹⁰⁷ Because Medicaid provides coverage for nearly half of pregnant women, the program pays for many of the potentially preventable health care needs and costs related to those births and subsequent costs associated with early childhood health problems.

Rates of preterm birth are disproportionately high in the South. (See Exhibit 4.1.) Women with low incomes and women who are African American have relatively high rates of preterm birth. In 2009, 17 percent of infants born to African American women were preterm, compared with 11 and 12 percent of infants born to white and Hispanic mothers, respectively.¹⁰⁸ Although the rate of teen pregnancy is at a 70-year low, teen mothers are more likely than those over age 20 to have a preterm birth, with rates of close to 15 percent.^{109,110,111} Drug use and smoking also play significant roles in preterm and adverse birth outcomes, while the relative risk of specific factors like homelessness or domestic abuse are not fully understood.

Lack of early and consistent use of prenatal services contributes to preterm birth rates. Standard prenatal care typically begins in the first trimester and includes regular visits with a provider who monitors the health of expectant mothers and provides guidance throughout pregnancy. Women who begin prenatal care later in pregnancy (i.e., second or third trimester) or who do not receive any prenatal care are at increased risk for having a baby with low birth weight, that is stillborn, or that dies within the first year of life.¹¹²

About 70 percent of women receive prenatal care during the first trimester, leaving many women without those services during a critical period in pregnancy. In 2010, only 40 percent of women reported at least 10 prenatal care visits, while the American Congress of Obstetricians and Gynecologists (ACOG) recommends 14 visits for uncomplicated pregnancies.^{113,114} Evidence suggests that children born to mothers who did not receive prenatal care are three times more likely to be low weight at birth and five times more likely to die, compared to children whose mothers received prenatal care.¹¹⁵ In the Medicaid program (where pregnancy is an eligibility trigger), only a quarter of women are enrolled a full nine months before giving birth, leaving fewer opportunities for receiving prenatal care.¹¹⁶

Low use of prenatal care also may be due in part to lack of access and the availability of prenatal programs, such as in remote rural areas or low-income neighborhoods. Ethnic and racial disparities in prenatal care access are also well documented.¹¹⁷ Even women who receive the recommended number of visits may not be getting high-quality care that can lead to better birth outcomes or generate behavior change during pregnancy.^{118,119}

Actions and implications

Programs to keep women healthy during their pregnancy and engage them in prenatal care have typically been offered through community-based organizations, public health agencies, or through educational materials provided by physicians. Community-based models, such as the Nurse-Family Partnership, conduct home visits and provide coaching to low-income women enrolled in Medicaid. A Centers for Medicare and Medicaid Services (CMS) initiative called Strong Start supports development and evaluation of prenatal care programs. The agency has also launched an initiative that promotes adoption of best practices to reduce early elective deliveries.¹²⁰

Exhibit 4.2; UnitedHealthcare care management programs for pregnant women

UnitedHealthcare offers care management programs to pregnant women in its employer-sponsored and Medicaid health plans through the Healthy Pregnancy Program and Healthy First Steps, respectively. A key objective of both programs is decreasing adverse birth outcomes and NICU admissions through improved promotion of healthy lifestyles, behaviors, and improved quality of care. These programs engage expectant mothers through telephonic outreach and risk assessments – about 50 to 60 percent of the eligible population currently receives these assessments. The programs tailor clinical care and level of health education to each member’s health status throughout pregnancy and provide continuous monitoring. Members with moderate to highest-risk pregnancies also receive services such as chronic condition management, nurse case management, and integrated behavioral health and social work support.

Even basic interventions can lead to positive outcomes. A 2008 study of a state-funded program for the Medicaid population in rural South Carolina found that telephone-based education and communication about preterm labor risk reduced deliveries among program participants occurring at less than 28 weeks and reduced the frequency and duration of neonatal intensive care.¹²¹ However, the study also noted that about half the women referred to the programs were difficult to reach by phone and therefore were not enrolled.

Case management programs, offered through coordinated care plans and Medicaid managed care organizations (MCOs), provide intensive outreach to pregnant women, particularly for those with high-risk pregnancies. Those programs have been found to increase gestational age and infant weight, and to reduce the number of days spent in the hospital (see Exhibit 4.2).¹²² Emergency room diversion programs operated by those entities may educate and aid parents of newborns in care alternatives for respiratory events and injuries. Targeting those programs to teens could help to reduce preterm births in that population.

Exhibit 4.3; UnitedHealthcare Baby Blocks™

UnitedHealthcare’s Baby Blocks is an online and mobile application that uses gamification – a game-based engagement strategy – to encourage attendance at scheduled prenatal care and well-baby visits in the Medicaid population. Participating pregnant women enter attendance for each scheduled visit in the app or online. They receive gifts in the mail for meeting attendance goals (e.g., a car seat or gift certificates for baby clothes). Beyond using rewards to encourage prenatal care visits, the Baby Blocks tool also helps sustain engagement in prenatal and postnatal care by sending periodic reminders for appointments and health tips. The program has a 30 percent response rate among eligible women. Since November 2011, the program has engaged participants in eight states.

Exhibit 4.4; UnitedHealth Group's Quality Metrics pregnancy risk assessment

UnitedHealth Group is developing an empirically-based pregnancy risk assessment tool. The emerging assessment (currently being field tested) is based on primary research into the combinations of clinical and psychosocial factors that lead to or correlate with adverse birth outcomes. For example, research shows that pregnant women who present at the emergency department for non-pregnancy related issues and have less than a twelfth grade education level are much more likely to experience preterm births. The assessment tool will capture information about at-risk pregnant women and help identify opportunities for early interventions.

Mobile and online tools represent a new way to engage women more effectively in prenatal care. Technologies, such as text messaging and smartphone applications, remind expectant mothers of prenatal care visits and encourage healthy behaviors, often through tailored messaging. Early evidence suggests that such interventions may help increase participation in prenatal care visits and increase prenatal preparedness.¹²³ Text4Baby, for example, is a mobile information service that provides customized, educational tips to expectant mothers via text message.¹²⁴ Exhibit 4.3 shows a UnitedHealthcare initiative that utilizes an online and mobile application to engage pregnant women enrolled in Medicaid.

Improvements in pregnancy risk assessment methods may help to predict and prevent adverse birth outcomes for women with high-risk pregnancies, those with substance abuse problems, sexually-transmitted diseases, or who are victims of domestic abuse.

An innovative care delivery model, called group prenatal care, provides prenatal care and counseling to multiple women at the same time. In this care model, women meet individually with a clinician to check vital signs and then as a group for a discussion-based session with a trained obstetrician, nurse-midwife, or other credentialed provider. Sessions combine assessment, education, skill-building, and support. Existing models have used group sizes of

eight to 12 women at the same stage in pregnancy and offer approximately 10 sessions, each lasting two hours.

Whereas women in traditional or "individual" care generally receive a total of two hours of prenatal care over the course of their pregnancy, women in group care receive a total of 20 hours. The longer timeframe allows providers to cover basic physical health information, provide psychological counseling, and discuss nutrition, birth preparation, postpartum health issues, parenting, and family planning. The model allows women to share their experiences and build on the value of peer-based experiences to support behavior change.¹²⁵

A Yale School of Public Health study (2007) of a group prenatal care model documented the following outcomes for participants:¹²⁶

- Reduced risk of preterm birth: 9.8 percent versus 13.8 percent in individual care.
- Among African American women, even greater risk reduction: 10.0 percent versus 15.8 percent.
- Psychological benefits, including greater prenatal knowledge, a better sense of readiness, and higher satisfaction with prenatal care.

An additional study of the effects of this approach in a Medicaid population showed that the group care model reduced NICU days.¹²⁷

Savings opportunity

Based on analysis of UnitedHealthcare claims data for newborn costs and NICU stays and results from the Yale study, we estimated potential savings opportunities from widespread use of group prenatal models. **Nationally, if half of pregnant women enrolled in Medicaid received care through a group model over a five year period, we estimate that net savings to the Medicaid program overall would be about \$12 billion over the next decade.** Most of those savings would result from reduced NICU days, but other savings might accrue from reduced follow-up costs

in the first year of the newborn's life, reduced costs from repeat pregnancies within six months of delivery, reduced sexually-transmitted infections, and improved well-baby care. Additional spending would occur as pregnant women used more effective prenatal care services. Encouraging women with private coverage to use group prenatal models also would improve birth outcomes and reduce costs. If 200,000 pregnant women received care using a group prenatal model, we estimate spending on newborn intensive care and other services would decrease by an estimated \$4 billion over the next decade.

Exhibit 4.5; UnitedHealth Center for Health Reform & Modernization group prenatal care pilot

The UnitedHealth Center for Health Reform & Modernization and Yale University are developing the infrastructure to scale a group prenatal care program nationally based on findings from peer-reviewed research and lessons from initial pilot models. The effort, supported by the United Health Foundation, launches in 2013 in areas with large populations of high-risk pregnancies and well-documented disparities in birth outcomes, including South Texas, Nashville, and Detroit. The program design includes a path for community-wide engagement, identification and enrollment, a comprehensive curriculum, robust training for clinic providers and administrators, and operational reporting tools to measure quality and efficiency gains. Yale will evaluate the program's outcomes.

CHAPTER 5: Addressing childhood obesity

Childhood obesity rates have tripled since the 1980s, with one in three children overweight or obese today.¹²⁸ Rates vary across the country, with some states and counties reporting rates substantially higher than the national average. Obesity prevalence increases as children age; among children ages two to five years, 10 percent are considered obese, compared to 20 percent of children ages six to 19 years (see Exhibit 5.1). Exhibit 5.1 illustrates the rise in rates of obesity from 1960s and a slowing, or reduction of percent of children who are obese, in recent years.

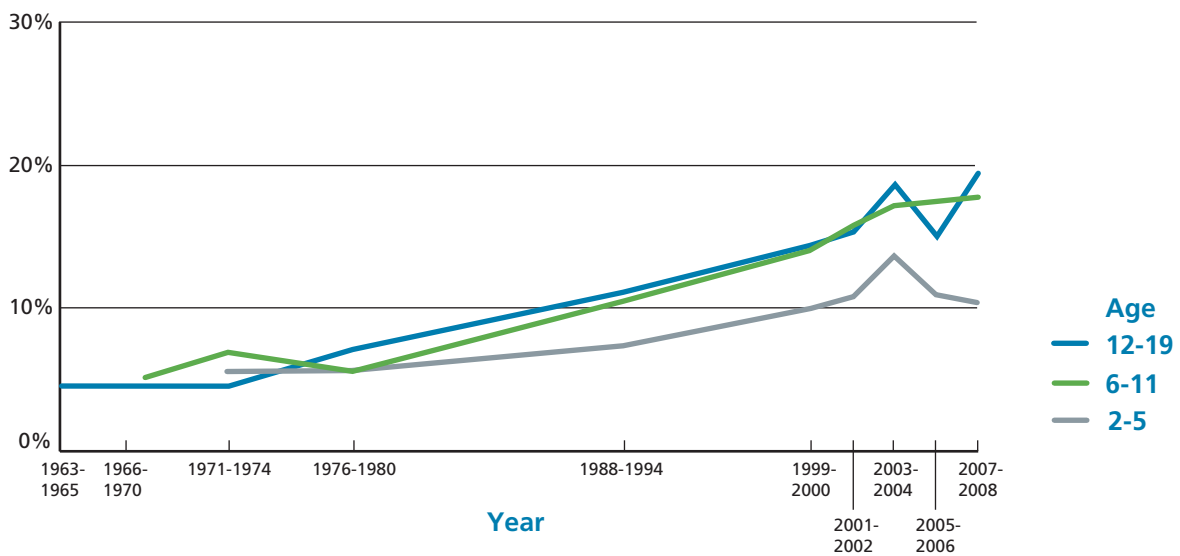
Changes in food and nutrition, physical activity, and the built environment have all contributed to today's childhood obesity rates. Children walk to school and attend daily physical education classes at significantly lower rates than in the past two decades, and watch television and play video games at much higher rates.¹³⁰ Children and adolescents ages two to 18 years consume 10 percent more calories per day than they did three decades ago, partly due to larger portion sizes.^{131,132} One in five children from low-income households is

obese, while one in eight children from higher income households is obese.¹³³ Racial and ethnic disparities in obesity rates exist, with Hispanic boy and non-Hispanic black girls having relatively higher rates. A relatively high proportion of obese children reside in the South and in Appalachia, but also in urbanized Northern states (see Exhibit 5.2).

The health case for tackling childhood obesity.

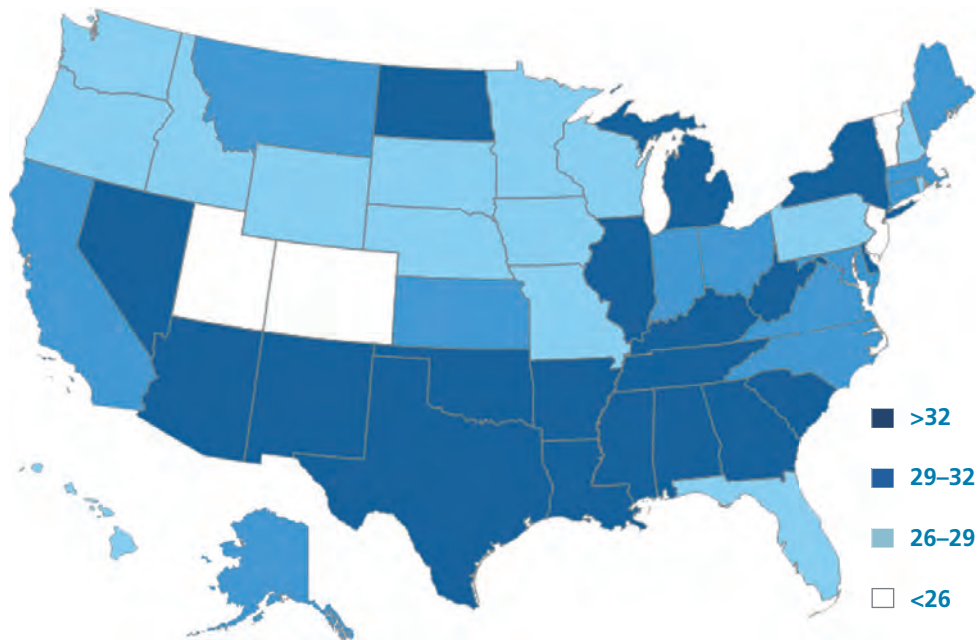
The health and social consequences of obesity include the potential for illness and disability, social exclusion, depression, poor quality of life, and lower academic outcomes.¹³⁴ Furthermore, childhood obesity increases the risk of developing serious medical conditions in childhood and adulthood, including diabetes and cardiovascular disease.¹³⁵ Evidence from several longitudinal studies suggests that for adults who were obese as children, 82 percent were also obese as adults. If obese or overweight children can reduce their weight and become non-obese or overweight in adulthood, their risks of cardiovascular disease can be reduced to the same as for non-obese children.¹³⁶

Exhibit 5.1; Obesity among U.S. children and adolescents by age, 1963-2008



Source: National Center for Health Statistics, 2010.¹²⁹

Exhibit 5.2; Percent of children who are overweight or obese by state, 2010



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 National Survey of Children's Health.

The economic case for tackling obesity. Based on data from the U.S. Census, the Centers for Disease Control and Prevention (CDC), and longitudinal research linking obesity in adulthood to obesity in childhood, we estimated the number of obese adults today who were obese or overweight as children. We also analyzed cost savings data associated with reduced body mass index (BMI) in UnitedHealth Group's wellness incentive program for employees to identify per capita savings opportunities for obese adults who lose weight.

We estimate that if childhood obesity rates had remained at 1990 levels, there would be about nine million fewer obese or overweight children today (about one-third fewer) and about three million fewer obese adults (a 5 percent overall reduction, primarily among young adults). That would translate into lower health spending. We estimate that the ten-year outlook for health care spending for children would be about \$54 billion lower than it is today (\$24 billion lower for children and \$30 billion lower for adults). (See Exhibit 5.3.)

Exhibit 5.3; Estimate of lower spending associated with reductions in childhood obesity

	If child obesity/overweight rates stayed at 1990 levels	
	Reduction in obesity/overweight population (2014)	10-year savings 2014-2023
Children	9 million	\$24.0 billion
Adults	3 million	\$29.5 billion

Source: UnitedHealth Center for Health Reform & Modernization, internal analysis 2013.

Actions and implications

Recent focus on childhood obesity has led to many public and private initiatives that address weight management, healthy eating, and physical activity in the child population. These initiatives are bringing attention, resources, and public engagement to prevention and intervention efforts. A recent slowing of the growth rates of obesity prevalence in the child population may be somewhat related to those efforts.¹³⁷

Effective obesity prevention programs have both school and home components that focus on healthy eating and/or physical activity. Research on those efforts concludes that interventions targeting both healthy eating and physical activity are more successful than those addressing only one factor.¹³⁸ Additionally, moderate to vigorous physical activity resulted in better outcomes than less strenuous activity in some research. New efforts seek to engage children in physical activity at school and home using approaches that also teach about healthy habits. (see Exhibit 5.4.)

Exhibit 5.4; UnitedHealthcare’s Activate for Kids program

Activate for Kids is a school-based wellness initiative that empowers students, families, and school staff to live healthier lives. This initiative operates in Florida, Georgia, and Texas and covers 277,000 students across 301 school campuses, with plans to expand to Tennessee, Wisconsin, and Louisiana. The program uses wellness coordinators to teach children about healthy living habits through a variety of program activities. Those activities include a school edition of Dance Dance Revolution, which is a form of exergaming. In exergames, children interact with a video game through physical movement, with the gaming technology capturing and monitoring physical activity levels. The program has demonstrated lasting body mass index (BMI) reductions in school district student populations and targeted intervention groups.

Primary care physicians often provide the first prompt to families to take action or get help for their children who are obese or overweight. Weight management programs, however, may not be enough for children. Generally, they do not coordinate with children's primary care providers and may not be sufficient to change the behaviors that lead to weight gain.

Intensive family-based intervention strategies can be effective in short and long-term weight management. These interventions, and most clinical guidelines, suggest focusing on family engagement, healthy eating, physical activity, sedentary activity, and the use of behavioral management techniques (such as incentives) to make and sustain behavior changes. If appropriately structured, those interventions can be effective in reducing obesity and related disease progression in children.¹³⁹ Family involvement in behavioral interventions for childhood obesity has been found to contribute to weight loss for up to 10 years following treatment.¹⁴⁰ There is evidence that childhood obesity intervention programs that include community partnerships, involve parents and schools in healthy eating, and employ physical activities also can be effective.¹⁴¹

Based on an emerging body of research around behavioral interventions, the U.S. Preventive Services Task Force (USPSTF) issued a recommendation in 2010 to provide screening and referral to behavioral interventions for children who are overweight or obese. Because of this recommendation, screening and intensive behavioral interventions for children who are overweight or obese are now covered preventive services required by the ACA.^{142,143} Specifically, the USPSTF recommends that clinicians screen children ages six years and older for obesity and offer or refer them to comprehensive, programs to promote improvement in weight status.

In practice, some intervention programs for children have met with limited success at reaching a broad population. Many approaches that rely on clinic-based settings and use psychologists, physicians, or dieticians, are labor intensive and expensive to operate, and place high demands on program participants for time and travel.

One successful model of a scaled, comprehensive, and intensive behavioral intervention to promote improvement in weight status is UnitedHealth Group's Diabetes Prevention Program (DPP), which partners with the YMCA, other community-based providers, and the CDC. The DPP provides the operational infrastructure (data, technology, reimbursement, national network contracting, provider training, and patient engagement strategies) needed to scale this evidence-based program. Participants who attended at least nine sessions showed a mean reduction of 5 percent body weight among those at high risk for developing type 2 diabetes.¹⁴⁴

Opportunities for the future

Creating scalable treatment interventions that produce clinically meaningful weight loss is an important next step in combating obesity for children. An early effort in this area was UnitedHealth Group's JOIN for ME. Like the DPP, JOIN for ME is a community-based program designed by leading obesity specialists (see Exhibit 5.5).¹⁴⁵

Exhibit 5.5; UnitedHealth Group's JOIN for ME

JOIN for ME teaches children and their families strategies for achieving a healthier weight through changes in lifestyle. To participate in the program, children and teens must be overweight or obese (based on BMI). The program uses official guidelines for weight management and evidence-based practices for family-based behavior change. Delivered in a group format, program sessions cover topics, such as nutrition, screen time, and increasing physical activity and sleep. The structure of the program is closely aligned to the national DPP for adults, with 16 community-based sessions involving skill-building, shared problem-solving, goal-setting, the use of a trained facilitator, and delivery in community settings.

The results of the initial JOIN for ME evaluation, published in *Pediatrics*, show that a scalable, community-based pediatric obesity intervention can produce clinically meaningful changes in weight and quality of life. The study was carried out in Rhode Island with 155 youth ages six to 17 and a participating parent or guardian. After six months of the program, children (including teens) experienced an average 3.5 percentage point reduction in percentage overweight. **Children ages 13 and younger had the greatest success, with an average 4.5 percentage point reduction in percentage overweight** and no significant differences by gender. The program's measure of impact, "percentage overweight," indicates how far a child's weight falls above the weight of an average child of the same gender, age and height. As an example, when compared to the median BMI of 17.4 for her age and gender, an 11 year-old girl with a BMI of 23.4 would be considered 34 percent overweight. Additional study findings include:

- Children who attended more than 75 percent of face-to-face sessions displayed greater reductions in percentage overweight than children who attended fewer sessions.
- Children experienced significant improvements in health-related quality of life, as measured by the 23-item Pediatric Quality of Life inventory.

UnitedHealth Group will offer the JOIN for ME program to members and dependents of UnitedHealthcare employer-sponsored health plans and Medicaid health plans in certain states. Schools participating in Activate for Kids also may use JOIN for ME.

Source: Gary D. Foster, Deborah Sundal, Cynthia McDermott, Elissa Jelalian, Michelle R. Lent, and Deneen Vojta, "Feasibility and preliminary outcomes of a scalable, community-based treatment of childhood obesity," *Pediatrics*, 130(4) (October 2012): 652-659.

Creative new approaches are emerging to increase physical activity. Because gaming and new communications technologies are popular with most children, evidence-based programs, such as JOIN for ME, can use them to help advance weight loss goals. Exergames, devices and video games that encourage physical activity with the use of technology that captures motion, have the potential to influence behavior change through active participation, and education. Personalization and instant feedback on performance

enhance children's engagement.¹⁴⁶ These games mimic play through popular activities, such as dance and sports, making them appealing for both boys and girls. Importantly, rewards and tracking systems (e.g., scores, times, and points) encourage adherence to exercise and movement regimens. Children can learn from their progress and modify exercise habits using information provided by the technology, such as: metrics (e.g., heart rate), number of steps, and changes in weight.

Most research on the efficacy of active video games has centered on the stand-alone use of such games outside of a health intervention. Results have been mixed, but show promise. A study of active video games involving 322 young teens (ages 10 to 14) found that those games can help improve weight and BMI for overweight and obese youths. Participants assigned to the intervention (who received a video game upgrade and several active games) saw statistically significant reductions in BMI.¹⁴⁷

Since completion of the evaluation discussed in Exhibit 5.5, UnitedHealth’s Center for Health Reform & Modernization developed and administered a new JOIN pilot in Rhode Island and Massachusetts, which is evaluating the effectiveness of a controller-free gaming device (Xbox 360 with Kinect) along with the proven weight management program on weight and physical activity outcomes. Results of the evaluation are forthcoming.

Savings opportunity

Looking forward, we estimate that implementing programs today that meaningfully reduce childhood obesity rates would produce substantial health and economic gains. For example, a behavioral intervention program that reduced rates of child obesity and overweight by 5 percentage points over five years **could reduce the number of obese and overweight children by about 10 million and the number of obese adults by two million (including some parents of children in the program) by 2023. Over 10 years, gross health care spending would decrease by \$25 billion (\$18 billion for children and \$7 billion for adults). Savings would continue to grow as the impact of lower childhood obesity reduces future growth in the number of obese adults; in 25 years, the number of obese adults would be five million lower.** Exhibit 5.6 summarizes those findings.

Exhibit 5.6; Estimate of impact of a five percentage point reduction in childhood obesity / overweight

	Reduction in obesity/overweight population (2023)	10-year savings 2014-2023
Children	10 million	\$18 billion
Adults	2 million	\$7 billion
Total	12 million	\$25 billion

Source: UnitedHealth Center for Health Reform & Modernization internal analysis, 2013.
 Note: Analysis assumes implementation of an intervention program in 2014.

CHAPTER 6: Children’s chronic health conditions

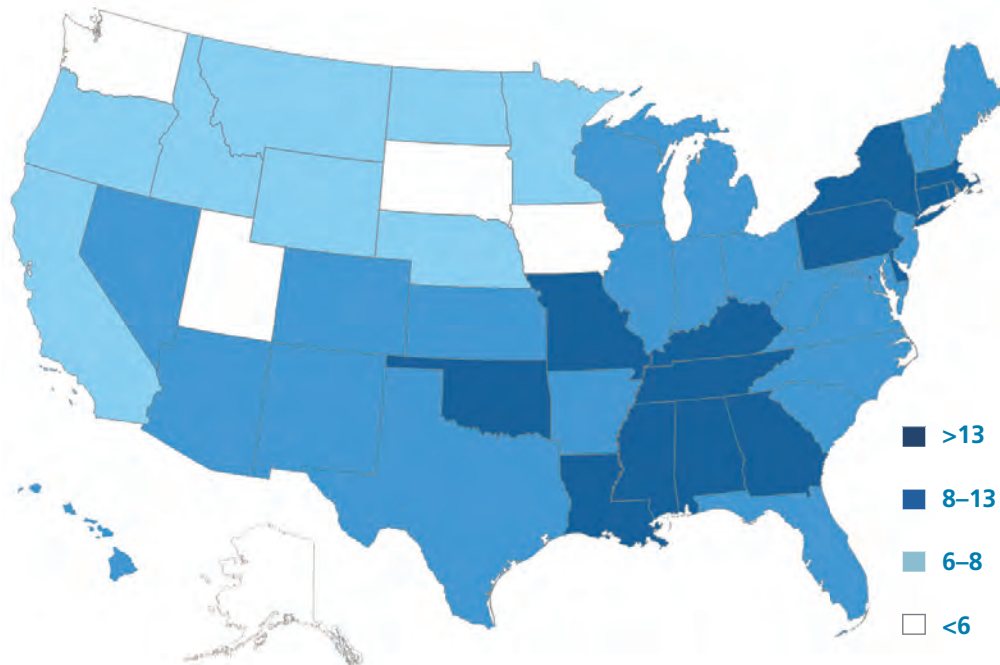
Children with chronic conditions require regular medical visits with providers who oversee their care, but those children and their caregivers continue to have day-to-day needs in managing their health conditions. Self-management, or co-management, plays a critical role in improving health outcomes, especially for children with chronic health conditions, and involves regular monitoring, administration of treatment, and certain lifestyle decisions. The challenges of managing type 1 diabetes and asthma, two more common chronic diseases in children, offer important lessons for managing the increased number of children with acquired chronic conditions, such as type 2 diabetes, hypertension, high cholesterol, and cardiovascular disease.

Asthma. Childhood asthma rates and related complications remain a health issue affecting many children, particularly those living in low-income communities. Asthma “attacks” are characterized by

periodic inflammation and airway hyperactivity, which may include bouts of wheezing, shortness of breath, chronic cough, and chest tightness that is sometimes triggered by infection or exercise. For some children, asthma is linked to stress; for others, environmental factors, such as dust mites, weather, allergens, and airborne irritants, such as tobacco smoke, can cause exacerbations. About two-thirds of children live in counties where one or more air pollutants are above acceptable levels and asthma prevalence is higher in states in the South and Northeast (see Exhibit 6.1).¹⁴⁸

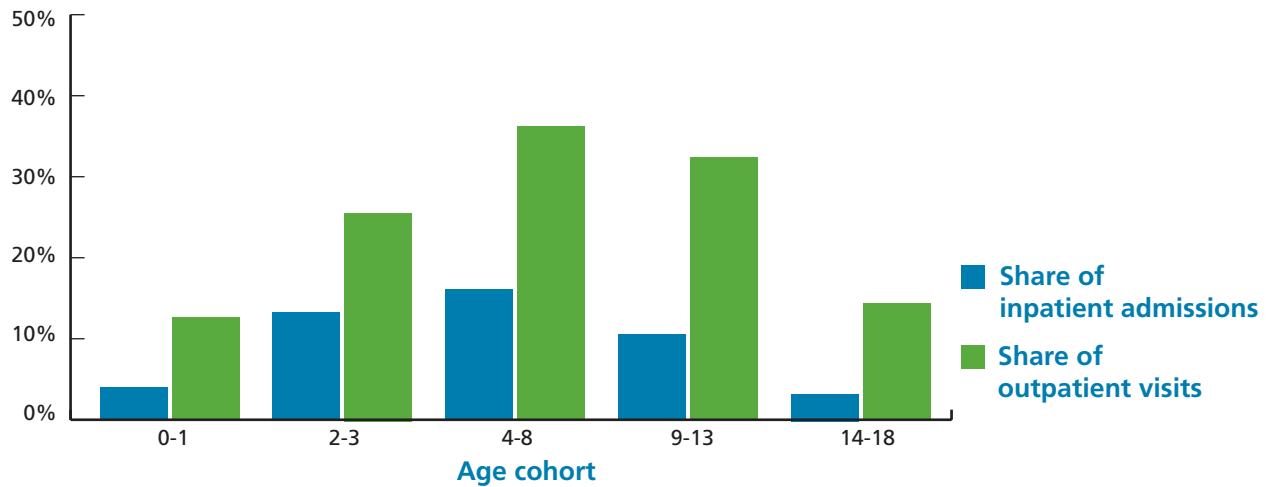
Children with asthma visit doctors and hospitals more often than adults with asthma, underscoring the importance of proactive measures, such as daily management.¹⁴⁹ Children with poorly-controlled asthma are nearly five times as likely to require an asthma-related physician office or emergency room visit as children whose asthma is well controlled.^{150,151}

Exhibit 6.1; Percent of children with asthma by state, 2010



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 National Survey of Children’s Health.

Exhibit 6.2; Utilization of inpatient and outpatient hospital services for asthma by children in UnitedHealthcare Medicaid health plans, 2011



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare Medicaid health plan claims.
 Note: Analysis is based on medical claims where asthma is included in the primary diagnosis.

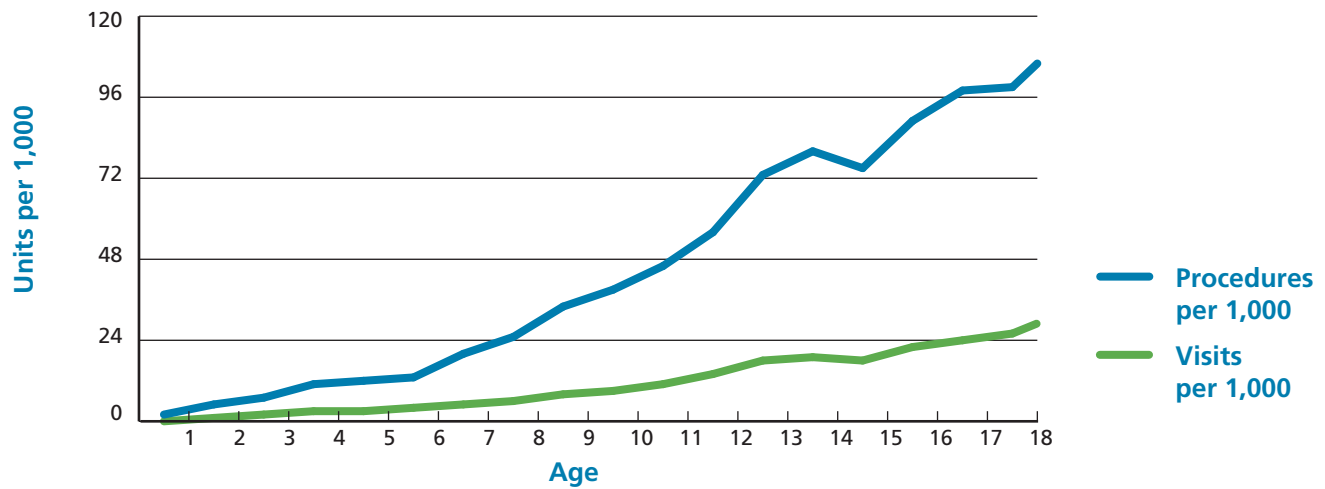
Low-income children with asthma enrolled in Medicaid require more hospitalizations and emergency room visits than children with private health insurance.¹⁵² Exhibit 6.2 illustrates the impact by age on utilization for asthma-related services in the UnitedHealthcare Medicaid health plan population.

Diabetes. Type 1 diabetes used to overwhelmingly be the main form of the disease affecting children. Today, a growing proportion of children are diagnosed with type 2 diabetes, which is characterized by acquired insulin resistance and is often linked to obesity. If unmanaged, both forms of the condition can lead to serious complications, including cardiovascular problems such as hypertension, heart disease, stroke, nerve

damage, kidney damage resulting in kidney failure or end-stage kidney disease, and eye damage including blindness. (Exhibit 6.3 illustrates the early onset of diabetes in children in the pre-teen years by looking at growth in medical procedures and visits for those services.)

Children with type 1 diabetes must learn to monitor glucose levels, count carbohydrates, and deliver insulin treatments. Children with type 2 diabetes also must learn to monitor glucose levels, count carbohydrates, and take medication (oral or insulin) in concert with lifestyle modifications (i.e., diet and exercise).¹⁵³ Type 1 and type 2 diabetes can, therefore, be difficult for children to manage and treat.

Exhibit 6.3; Utilization of diabetes services for children with type 1 or type 2 diabetes enrolled in UnitedHealthcare Medicaid health plans, 2011



Source: UnitedHealth Center for Health Reform & Modernization analysis of UnitedHealthcare Medicaid health plan claims. Note: Analysis is based on medical claims where diabetes is included in the primary diagnosis. “Visits” include outpatient and physician office visits and “procedures” include services associated with those visits, such as laboratory testing.

Hypertension. The recent rise in hypertension among children and adolescents with no other health problems is most often linked to obesity / overweight, inactivity, poor diet, stress, and family history (as opposed to underlying kidney disease that was previously the main cause in young children). All children with hypertension need to monitor blood pressure values as the condition is a risk factor for complications, such as stroke, heart failure, and kidney disease. In less severe cases, clinical interventions encourage children to adopt dietary changes and increase physical activity. This may reduce blood pressure levels to a normal range. Other cases require medication (diuretics, ACE inhibitors, or beta blockers) for control.¹⁵⁴ In all cases, monitoring is a key element of successful management.

High cholesterol. High cholesterol is also on the rise in children due to overweight, inactivity, poor diet, and family history, and is associated with the development of heart disease in adulthood. Treatment generally consists of weight management, increased exercise, and diet management. As children age, and if LDL levels (i.e., “bad cholesterol”) levels are high, physicians may recommend medications, such as statins. Like diabetes and hypertension, treatment for high cholesterol involves lifestyle change, a process that requires discipline and family and community support. Monitoring requirements are less demanding than for hypertension but still a

mainstay of management.¹⁵⁵

Children with other chronic conditions, such as cystic fibrosis and sickle cell disease, also benefit from self-management to improve health and quality of life. For children with cystic fibrosis, adherence to medications, physical therapy, diet, and exercise regimens can help reduce infections, maintain lung function, and improve overall management of the condition. Daily penicillin dosing and up-to-date immunizations help prevent infections due to functional asplenia and are central to managing sickle cell disease. Monitoring of pain triggers helps to manage disease flairs.¹⁵⁶

All children with chronic conditions benefit from learning condition management skills and strategies to improve their overall health and reduce symptoms and complications. Family support and care management teams can help with common challenges such as adherence to treatment regimens, monitoring, and adoption of healthy behaviors. This is particularly true as children transition into adulthood, adapting to adult social life and the adult health care system. This transition can be difficult to manage, particularly with a change in practitioners, care settings, and family/work environment. Applying the strategies and skills learned early in life that promote self-care can smooth the transition and prevent deterioration in health.

Exhibit 6.4; UnitedHealthcare Community & State's *A is for Asthma* program

In March 2010, UnitedHealthcare collaborated with *Sesame Workshop*, the nonprofit organization behind *Sesame Street*, to develop *A is for Asthma*. This initiative for children enrolled in Medicaid managed care programs aims to increase families' knowledge of asthma triggers and encourage discussions with their child's health care provider to successfully manage symptoms using *Sesame Street* characters, including one with asthma, as an outreach tool for children. In addition to a video, asthma action plan, and other web-based tools, UnitedHealthcare members in three pilot markets received written materials explaining the resources available to help them manage their child's asthma. UnitedHealthcare surveyed parents and guardians and found that 85 percent of respondents found the materials to be useful. Of these, almost all indicated they learned something new and about half planned to or had already taken the asthma action plan to their child's doctor.

Actions and implications

Programs targeted to children living with chronic conditions can help them and their families follow treatment plans and manage care on a daily basis outside the clinical setting. These programs may be found in community organizations, schools, or public health organizations. Coordinated care plans, such as Medicaid managed care organizations, can help in identifying preschool children at-risk for asthma hospitalization, partnering with schools for medication adherence in older children, or running education programs for families (see Exhibit 6.4). Successful programs combine engaging, personalized education at home or in the community, with targeted and tested instructional materials, sessions led by well-trained individuals familiar with the community, including those who are managing the condition themselves, and participant recognition and rewards.

For example, using those approaches, one community-based program reduced asthma-related emergency department visits by 68 percent and hospitalizations by 85 percent, and reduced days of limited physical activity, missed school, and missed work for parents. Estimates of savings from this type of intervention are \$1.46 in treatment costs for every \$1 spent on intervention costs.¹⁵⁷

Because young children rely almost exclusively on their parents, engaging families is an important element of effective care plans. Adolescents may face more challenges with family engagement than younger children, and also may be subject to negative influences of peers and the community. Transitions of care programs designed for those children approaching adulthood and can help provide self-management skills to manage conditions in adulthood but maintain close coordination between the patient, family, child health care providers, and adult health providers.

Opportunities for the future

Advances in technology increasingly help children with chronic conditions monitor and manage their day-to-day care and provide information to their providers. For example, Type 1 diabetic patients can use insulin pumps to improve management by delivering scheduled treatments designed to improve patient experience, improve glucose control, and reduce hypoglycemic events. An approach for hypertension management in children is the use of a device to measure blood pressure remotely over a 24-hour period to identify when spikes occur.^{158,159}

Online and mobile technologies, such as smartphones have applications (or apps) that allow children and parents to track and log biometric measurements, share data with providers, and receive guidance on treatment. Often those approaches are linked to a medical device, which could be a smartphone. For example, one diabetes management app, called “bant,” captures blood glucose readings with a glucometer (blood sugar monitor) linked to a smartphone. The app allows adolescents to upload readings to a personal health record, connect with others in a private social network, and track care goals.^{160,161}

A similar approach for asthma self-management can deliver pollen count and air quality alerts and keeps record of adverse events. The AsthmaSense™ app wirelessly collects and analyzes inhaler use data, generating a personal record of asthma events.¹⁶² Children with chronic lung conditions can use a smartphone as a spirometer, which analyzes audio

resonance and detects restriction in air flow when a child breathes into the microphone.¹⁶³ Exhibit 6.5 offers other examples.

Features embedded in online programs or mobile apps, such as multimedia education, gamification, and social networks, help drive engagement of boys and girls alike and participation in chronic care management. Interactive games serve as educational tools that can help children take medications, understand their condition, and change their own behaviors. For example, studies have shown that interactive games can promote reductions in diabetes-related emergency room visits among children and other populations, improvements in diet, adherence to chemotherapy treatment, and increases in physical activity levels.¹⁶⁴ Behavior change is still difficult to achieve, and advanced technologies and games may need to be integrated into broader intervention programs to be fully effective.

Exhibit 6.5; Optum applications to help children manage care

Gaming approaches can enhance technologies that already exist in children’s homes. Aside from interactive technologies that engage children and others in improving their health, application-based software can also aid communication with providers and patients. One example includes the Optum Messenger, which provides secure messaging using iPhones; these types of apps could be particularly effective in engaging adolescents.

CHAPTER 7: Children's mental health

Mental health conditions increasingly have become the “chronic diseases of the young”.^{165,166} A combination of increased prevalence, earlier onset, and more active diagnosis of conditions has led to greater recognition of the scope of the problem facing children. It also has generated greater demand for and use of mental health services and treatments, in many cases not in the most appropriate settings.

The most common mental health diagnosis is attention deficit hyperactivity disorder (ADHD). Others include anxiety, depression, and mood disorders, such as depression or bipolar disease. Mood disorders represent the most common principal diagnoses for all hospital stays for mental health, which overall rose by 80 percent during the 1997 to 2010 period.¹⁶⁷

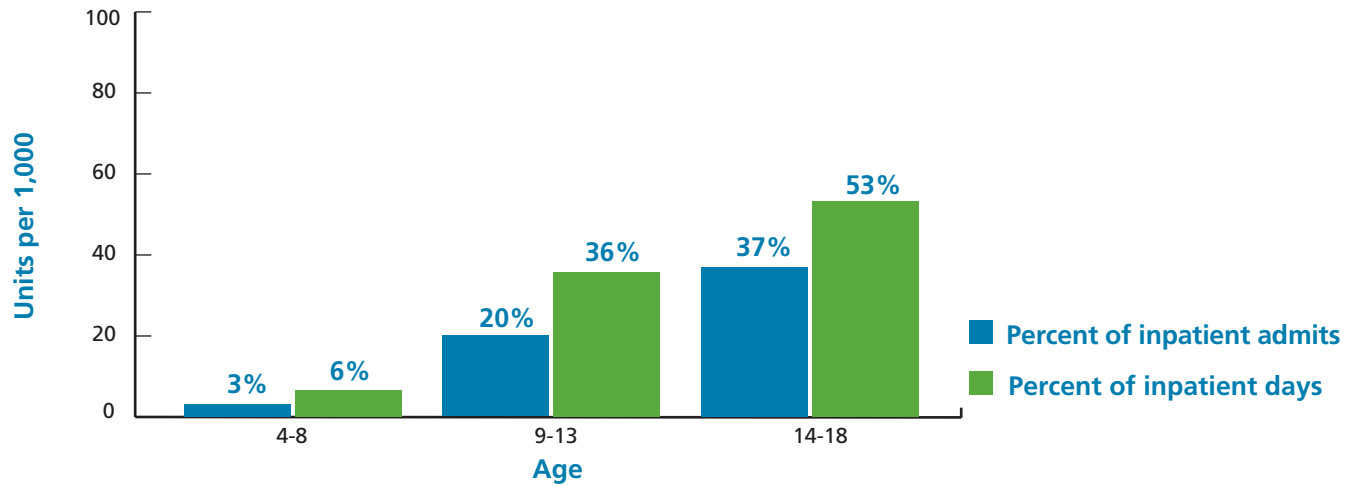
ADHD, a condition characterized by inattention and impulsive behavior, can have social and developmental implications for children.^{168,169,170} ADHD now is said to affect approximately 7 percent of children, the majority of whom are boys.¹⁷¹ The condition has become more prevalent with higher rates of diagnosis, particularly among low-income children covered by government-sponsored health programs, and clinical recognition by providers, which has increased by nearly one-third in a decade.¹⁷² About two-thirds of children with this condition have at least one other mental health condition.¹⁷³

Providers may find it difficult to identify or treat some mental health conditions, such as anxiety and depression, despite protocols that suggest or require mental health assessments in well-child visits.¹⁷⁴ Children with severe conditions, such as psychosis, bipolar or mood disorders, and severe depression, were no more likely to have received a mental health service in the past year than children with any other mental health condition.¹⁷⁵

Children with mental health conditions who do not receive timely treatment are at increased risk for inpatient hospitalization (physical, mental, or both) or more intensive therapeutic interventions. Analysis of UnitedHealthcare employer-sponsored and Medicaid health plan data shows that use of inpatient hospital services for mental health and substance abuse services starts to increase in children by ages nine to 13 and represents a substantial share of overall admissions and days in the hospital (see Exhibit 7.1). For children covered by employer-based insurance, about 40 percent of admissions and over half of inpatient days for older teens are for those services, reflecting the longer lengths of stay for mental health admission. Girls over age 14 have a higher rate of admissions for those services than boys (11 per 1,000 compared to nine per 1,000). Children enrolled in Medicaid health plans have higher rates of admission for those services, but tend to spend fewer days in the hospital than children with employer-based coverage.

Providing children with appropriate and timely mental health services is challenging. Primary care providers face difficulties in finding referrals to counselors, child psychiatrists, or specialized mental health providers for diagnosis and treatment, who are in relatively short supply in some parts of the country (see Exhibit 7.2). In particular, psychiatrists with expertise in adolescent mental health are difficult to access, in part due to a limited “pipeline” for training. Additionally, some parents may avoid seeking necessary mental health services for their children for a range of reasons, including concerns about the stigma of treatment.¹⁷⁶

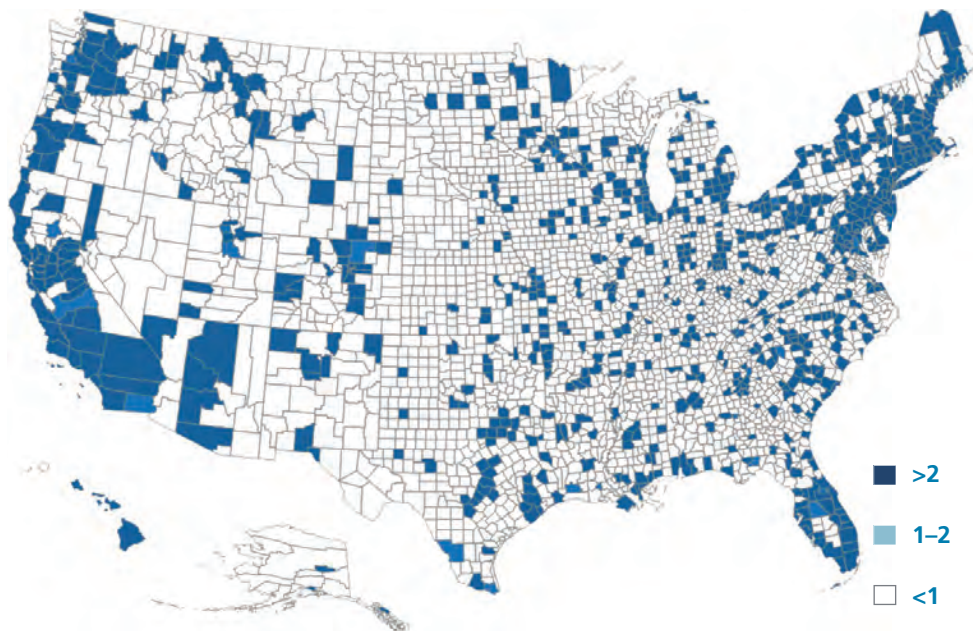
Exhibit 7.1; Use of mental health inpatient services for children (4 to 18), 2011



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 UnitedHealthcare employer-sponsored insurance claims.

Note: Inpatient admission and day totals exclude those for labor and delivery.

Exhibit 7.2; Distribution of child psychiatrists per 100,000 children by county, 2010



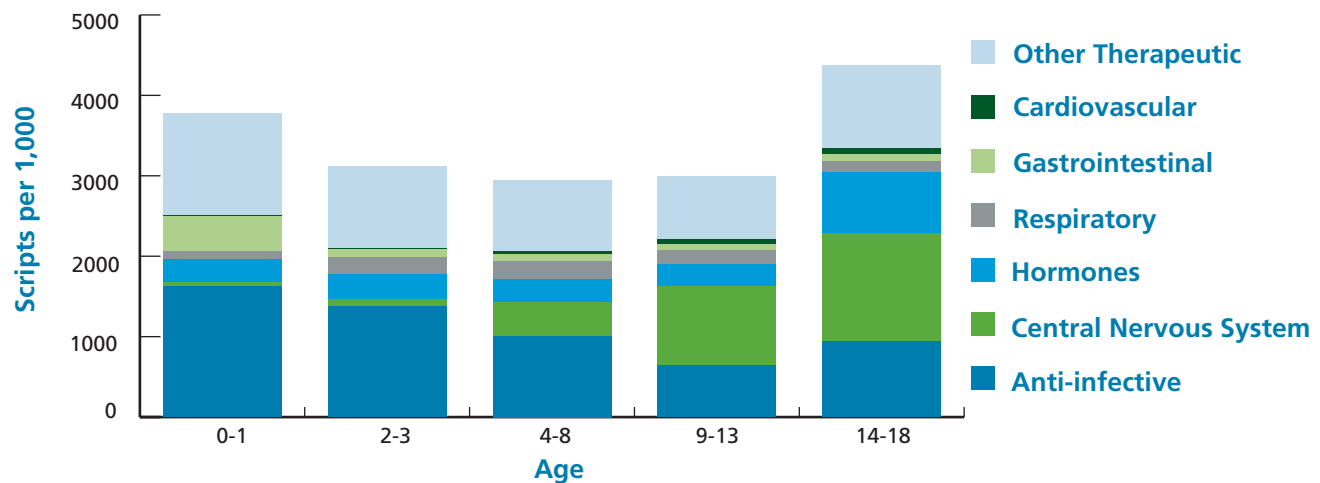
Source: UnitedHealth Center for Health Reform & Modernization analysis of 2012-2013 Health Resources and Services Administration Area Health Resource File.

The use of pharmacologic interventions (stimulants, antidepressants, antipsychotics, and mood-stabilizing medications) in the treatment of mental health disorders for children has increased dramatically, and in some cases controversially.^{177,178} In 2008, physicians prescribed about 3.5 million pharmacologic drugs to children for mental health conditions, accounting for \$4 billion in spending, compared to 1998 when 2.6 million children used these drugs, accounting for \$1 billion in spending.¹⁷⁹ Use of prescription drugs is 1.5 times that for younger children. In large part that is because use of central nervous system drugs, such as anti-anxiety drugs and antidepressants, are highest in adolescents aged 14 to 18. Children start using those drugs at much earlier ages (see Exhibit 7.3).¹⁸⁰ About 2.7 million children use these drugs to help manage their ADHD, a 46 percent

increase from 2002 to 2010.^{181,182} Evidence suggests that some of the increase may be attributable to inappropriate use of those drugs among teenagers.^{183,184}

Although appropriate use of drug therapies can be part of an effective treatment plan for children with mental health conditions, children may not be receiving other important mental health services concurrently. Only about 40 percent of young children who received medication to treat their condition received a mental health assessment, a clinical psychology visit, or a visit with a psychiatrist during the year of antipsychotic use.¹⁸⁵ This trend may be due in part to the increased role of primary care providers in treating mental health conditions. A recent Canadian study found that general practitioners wrote over 70 percent of prescriptions for antipsychotic drugs.¹⁸⁶

Exhibit 7.3; Utilization of prescription drugs by therapeutic class for children, 2011



Source: UnitedHealth Center for Health Reform & Modernization analysis of 2011 UnitedHealthcare employer-sponsored insurance claims.

Actions and implications

Data on evidence-based treatments or interventions for children with mental health conditions are limited; most interventions have been developed in academic medical centers and have not been tested in community settings. This has left a widening gap between research and practice.¹⁸⁷ Approaches to date have focused on improving early screening efforts to identify and help children at-risk for mental health conditions.

Schools and other non-clinical settings (where children spend much of their time) play an important role in early detection and helping direct children to preventive mental health programs and targeted services focused on those children with severe mental health diagnoses.^{188,189,190}

Early intervention programs can build on results from screening programs to target children at higher risk, particularly adolescents, with projects designed for different issues faced by boys and girls. For example, a West Virginia program offers self-esteem building and anti-violence instruction by school personnel and targeted interventions for at-risk children by school and community mental health staff.¹⁹¹ Maryland substantially reduced its out-of-state placement and residential care rates for youth with serious mental health problems by focusing on creating options for treatment and assessment in the community, including placing social workers in Baltimore schools.¹⁹²

These programs also can help children and teens learn coping and life skills that affect emotional health such as sleep, diet, and physical activity.¹⁹³ Self-management tools targeted to youth and adolescents can help augment limited primary care services. Programs that include family education can help parents understand the nature of their child's mental health condition, diminish the stigma associated with mental health care, and improve involvement in their child's care.¹⁹⁴

Effective management of children's mental health services requires linking entities that screen, diagnose, provide treatment, and engage social service providers. Approaches that integrate mental and physical health can help children receive appropriate and effective treatment. Many state Medicaid programs accomplish this by enrolling children in comprehensive managed care programs or in managed mental health organizations that coordinate mental health benefits with medical services.¹⁹⁵ This may be challenging, however, in states where mental health benefits are "carved out" and provided through a fee-for-service approach or a third party.

To encourage greater integration of services, states also may build relationships with community-based providers that specialize in mental health care on their own or through managed care programs. For example, community mental health centers in Michigan work with the state's Medicaid agency to prevent hospitalization of children living in foster care settings with serious emotional disturbances by providing intensive treatment and wrap-around services in the community.¹⁹⁶ Successful models for delivering integrated mental health care include monitoring of patient trends, use of case management approaches, active patient engagement, and use of evidence-based clinical decision supports.¹⁹⁷

Opportunities for the future

Technology offers important new approaches to getting resources and information about mental health diagnosis and treatment to providers and patients. A project in Massachusetts connects primary care physicians treating mental health conditions with specialists through telemedicine support. Through this program, physicians can communicate with psychiatrists, social workers, or psychologists to answer questions about diagnosis and treatment, assist with referrals, and identify community resources for children with mental health conditions.¹⁹⁸ This approach offers primary care physicians, who may

be serving as care coordinators for children, the ability to more effectively address the mental health needs of their child patients. Furthermore, telemedicine can replace some in-person visits or support care between appointments.¹⁹⁹

Support for primary care providers in assessing and treating mental health conditions requires materials and training to ensure the delivery of evidence-based care. Guideline-based protocols can improve detection and treatment, particularly when combined with other interventions and technology, including telephone-based

counseling. In Massachusetts, the state provides training to community physicians for required mental health screenings.²⁰⁰ Use of non-physician providers trained in counseling services also can extend options for care.

Other approaches engage and empower individuals and communities in mental health prevention, identification, and intervention. In particular, education and training programs can help parents, schools and peers identify, understand, and respond to signs of mental illnesses, substance use disorders, and suicide. (See Exhibit 7.4 for Optum approaches.)

Exhibit 7.4; Optum behavioral health

- **Prevention through training and education: Mental Health First Aid** is a public education program that helps individuals identify, understand, and respond to signs of mental illnesses and substance use disorders, including in children. The program provides a certification course, which introduces participants to risk factors and warning signs of mental health problems, builds understanding of their impact, and describes common treatments. Participants include families, employers, nursing home staff, law enforcement, teachers, and clergy. **QPR** (question, persuade, and refer) is a training program to help recognize a mental health emergency and how to help an at-risk person, including children and adolescents, to get appropriate counseling and treatment. Optum, in collaboration with the San Diego County Suicide Prevention Council and Community Health Improvement Partners, ran 37 QPR trainings throughout San Diego County and trained close to 1,000 individuals.
- **Aligned incentives for value-driven care: Optum New Mexico** operates a pay-for-performance initiative with mental health providers to reduce the use of out-of-home placement for certain children and adolescents using residential care facilities and find more appropriate treatment in the community. By providing incentives to those providers to appropriately reduce rates of out-of-home placements and improve primary mental health care, admission rates to residential care facilities declined 55 percent, readmission rates and critical incident rates also declined, and costs decreased.

New approaches also include models that provide resources to physicians to help determine effective treatment options that depend upon use of mental health drugs.^{201,202} In Minnesota, the state works with the Mayo Clinic to provide expert guidance to pediatricians and other primary care providers who prescribe psychotropic medications for children.²⁰³ Programs that rely on pharmacy analytics and telephonic outreach can apply real-time data to ensure use of evidence-based approaches and connection to appropriate care providers (see Exhibit 7.5).

New payment models may encourage greater integration of primary care and mental health, for example by using a global payment approach for the mental health component that gives primary care providers time to perform care coordination and develop interventions, with bonuses for achieving quality targets.²⁰⁴

Exhibit 7.5; Optum – Improving medication approaches for children

Optum focuses on identifying and reducing the widespread problem of a lack of evidence-based prescribing of psychotropic medications in children and adolescents by looking at targeted quality metrics, including concurrent use of multiple psychotropic medications, off-label utilization, and excessive dosing. It also provides prescribers with direct telephonic outreach to a licensed psychiatrist. Another approach uses a multidisciplinary team, including care managers and psychiatric consultants, to screen and track mental health conditions. This program integrates psychotropic pharmacy analytics and access to care managers and psychiatric consultation through video technology. By encouraging prescribers to follow best practices in treating youth and integrating mental health care with primary care, these programs increase the use of effective services and improve outcomes.

CHAPTER 8: Improving care coordination for children

Although children's care is primarily provided through a pediatrician or a family physician, multiple providers or care settings (e.g., emergency rooms, clinics, schools, or therapists) may play a role. Parents now routinely use urgent care for their children after-hours. Immunizations and other routine care are available at convenient retail stores. While these options may improve ease of access and affordability of care, they also underscore the need for confidential information-sharing between providers so that children receive seamless care. Yet, medical, mental health, and prescription drug information often does not flow well between care settings, potentially leading to adverse health outcomes.

Lack of care coordination affects the use of services, some of which might be preventable. Parents take their children to the emergency room for different reasons, primarily for serious events like trauma or onset of seizures. Yet about one-third of child visits to the emergency room are for conditions that are considered non-emergencies and treatable in a primary care setting.²⁰⁵ These "avoidable" visits often are for conditions, such as asthma, ear infections, or minor injuries. So why do so many of these young people end up in the emergency room? Sometimes the urgency of the symptoms and need for immediate treatment can be difficult for parents to assess; visits may be for conditions that appear urgent, though may not end up requiring immediate care. Additionally, working parents may not observe their child's symptoms until the evening hours after physician offices close and may rely on emergency rooms instead; for some families, those facilities are more convenient to access when their child is sick and may have a reputation for helping other children in the community.

Children covered by Medicaid visit emergency rooms at much higher rates than privately insured children do, reflecting the setting's significance as an access point for care. For all children, a substantial share of emergency room visits are for acute respiratory infections or other common infections and injuries (53 percent and 60 percent, respectively, for Medicaid and privately insured children).²⁰⁶ Less resource-intensive settings than emergency rooms might be more effective for those children.

Analysis of UnitedHealthcare claims data for individuals with employer-sponsored insurance show the relative rates of avoidable emergency room visits and preventable hospitalization for children and adults. While children and adults have similar rates of avoidable emergency room visits (about 22 percent of visits), those visits are not for the same conditions. Some conditions are more significant for children, such as fever, ear infections, and asthma. Additionally, there is more variation across the nation in emergency room visits for children than for adults. Children have higher rates of avoidable hospitalizations and greater variation in those rates than adults do (23 percent compared to 9 percent), suggesting opportunities to improve care that are child-focused.

Effective coordination is important for children in low-income families as they often shift between sources of coverage, depending on their family's income and changes in the economy. Children with chronic conditions benefit by avoiding serious and costly episodes of care such as trips to the emergency room. For example, children with asthma are somewhat more likely to visit those settings than adults with asthma (10.7 percent versus 7 percent, respectively).²⁰⁷ Children with developmental disabilities are especially affected by breakdowns in care coordination and communication, which may include a lack of data-sharing regarding previous diagnoses, treatments, and prevention plans.²⁰⁸ One study reports that 16.5 percent of children with a learning or behavioral developmental disability had more than nine office visits in the last year compared to 4.6 percent of other children. Multiple therapies, prescriptions, different types of specialists, and multiple systems of care lead to coordination of care challenges.²⁰⁹

Actions and implications

Efforts are increasing to coordinate care across the health care system. More can be done to ensure that children benefit from those investments, particularly the many children who are enrolled in public programs.²¹⁰ Specifically, it is important to develop a primary care infrastructure that is oriented to treating conditions impacting children and using targeted approaches to address avoidable use of hospitals (such as for upper respiratory infections).

Coordinated care plans (including Medicaid health plans and primary care medical homes) meet the health care needs of children by facilitating communication between providers, helping to establish care plans, and offering support programs for families. To address the issue of avoidable visits, practices and health plans offer guidelines that include use of nurse telephonic triage. Those services help parents assess the urgency of their child's symptoms and recommend appropriate follow-up care. Additionally, evidence suggests coordinated care plans can reduce complications and reliance on costly episodic care through development of care plans, provision of follow-up care, and health information systems (see Exhibit 8.1.) They also can prevent avoidable hospitalizations and visits for children with chronic conditions and other complex health problems by using diversion programs for at-risk children (for asthma-related events) or teens (for accidents or injuries).²¹¹

In one study, children with chronic conditions who were enrolled in Medicaid managed care had a 23 percent reduction in emergency room use (a marker for improved care coordination and cost reduction).²¹² In another example, patients enrolled in a Medicaid managed care plan had a 28.8 percent lower hospital admission rate for ambulatory care-sensitive conditions compared to those in fee-for-service. Medicaid managed care enrollees also were far more likely to report a regular source of care.²¹³ Children enrolled in those plans are more likely to obtain occupational and physical therapy at school, relative to children enrolled in fee-for-service Medicaid.

Entities responsible for coordinating care can guide children with chronic conditions to multi-specialty provider settings with appropriate expertise. Medicaid managed care plans have the data systems to effectively coordinate care, offer care that can be more comprehensive than traditional fee-for-service systems, and can enable providers to serve as medical homes.²¹⁴ Medicaid health homes, established under the ACA for people with chronic conditions and adopted by several states, may provide similar services.²¹⁵ Coordination between health care providers, including urgent care clinics and schools, also has the potential to improve access to necessary services for children with special needs.²¹⁶ Children enrolled in Medicaid managed care plans are more likely to obtain occupational and physical therapy at school relative to children enrolled in fee-for-service Medicaid.²¹⁷

Opportunities exist to expand the use of coordinated care in Medicaid for children as only about 37 percent of children’s benefit spending is paid through capitated Medicaid managed care organizations that cover a comprehensive set of coordinated benefits. Most spending is therefore paid on a fee-for-service basis,

including through primary care case management arrangements. Only about 20 percent of benefit spending for children with disabilities is for care provided through Medicaid managed care organizations, suggesting even greater opportunity to expand coordinated care for those children.²¹⁸

Additional opportunities to coordinate care will arise with implementation of the ACA. More uninsured (though currently Medicaid-eligible) children are expected to participate in Medicaid as the law goes into effect. Other children, including some currently enrolled in CHIP, may enroll in coverage offered through state health insurance exchanges, and many will be in families receiving subsidies for that coverage. As family incomes fluctuate, those children may migrate from one form of coverage to another (called “churning”) and experience disruptions in care. Coordinated care approaches can help to bridge gaps in care using network strategies that connect children to providers focused on children and youth, such as federally qualified health centers. Those approaches also may use health information systems that can ensure effective coverage transitions.

Exhibit 8.1; UnitedHealthcare medical homes

UnitedHealthcare operates several patient-centered medical homes and conducted an internal assessment of four pilots that were launched in Arizona, Colorado, Ohio, and Rhode Island starting in 2009. Compared to a control group of similar patients and averaged across the four pilots over two years, gross savings on medical costs were in the range of 4.0 percent to 4.5 percent per year. After factoring in additional payments for care coordination and bonuses to the participating practices, net savings averaged about 2 percent — thus generating a 2:1 return on investment — at the same time that notable improvements in care quality measures were observed.

Opportunities for the future

Health information technology, such as interoperable electronic health records, can advance coordination across provider settings and prevent medical errors through increased accuracy in reporting and timely, coordinated data capture.²¹⁹ As shown in Exhibit 8.2, approaches that enable information-sharing can help complex populations, such as children living in foster care.

New technologies that enable patients and providers to communicate outside of traditional face-to-face visits may help to address the challenges posed by specialty care access. Telemedicine consultations can help to increase access to specialists for children, particularly those requiring services to treat mental health issues. Tele-psychiatry, which involves the use of interactive videoconferencing technology for providers and patients, can improve access to mental health services in communities with a shortage of providers.²²⁰ Those models also might include mobile or web-based information, such as certain risk factors, community resources, and treatment options made available on smart phones.

New care delivery models, such as patient-centered medical homes, were first deployed in pediatrics 30 to 40 years ago.²²¹ Today, their use is increasing for children (though less so in low-income areas), with managed Medicaid models that include care coordination fees and use of performance-based payments.²²²

Recent studies demonstrate that children who receive care in a medical home have more preventive care visits, more dental visits, and a lower incidence of emergency department visits, compared to children without a medical home. Other studies confirm that children receiving care through medical homes use fewer inappropriate services and engage more in health promotion practices.^{223,224} Though the concept of the medical home is one that has been championed in the pediatric provider community, implementation of these models is lacking in some regions and more can be done to advance them.

Greater use of coordinated care offered by health plans and use of primary care medical homes can bring tools, financial incentives, and performance data to providers to help them meet performance goals. In the Medicaid program, many states have contracted with health plans to help them achieve quality goals (see Exhibit 8.4). Managed care approaches tend to improve quality for child enrollees when compared to those participating in a strictly fee-for-service model, including improvements in the frequency of well-child visits.²²⁵ Medical homes also may be a factor in overall performance in provision of preventive care.²²⁶ Incentives for better discharge planning, coordinated outpatient follow-up, and technology assistance can prevent readmissions, especially for children with chronic conditions, such as cerebral palsy.²²⁷

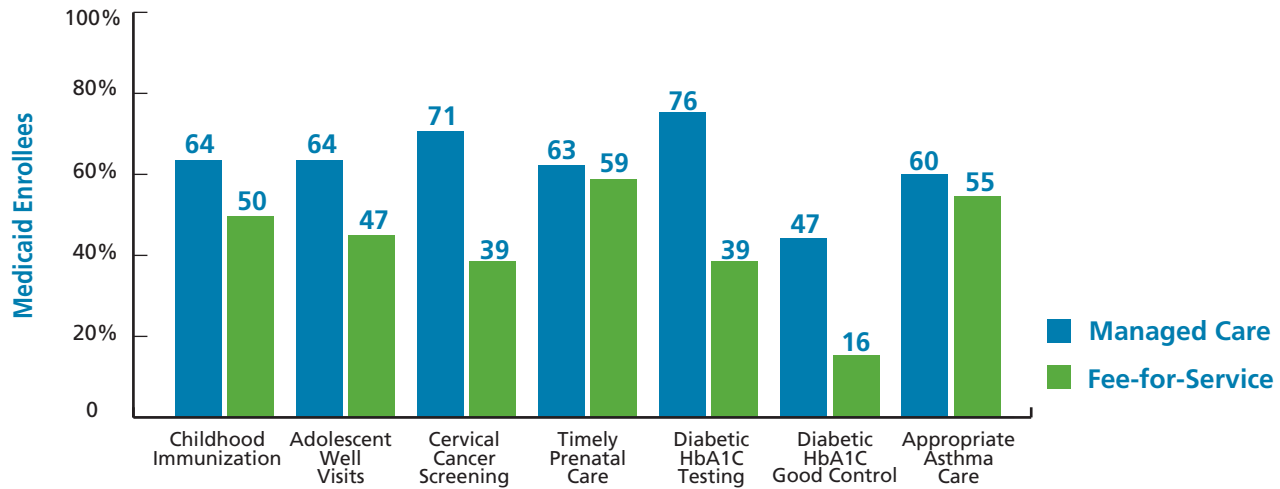
Exhibit 8.2; UnitedHealthcare Foster Bridge

Children in foster care receive services through multiple public and private-sector programs that capture important information about the health, education, and social service needs for each child in their care. UnitedHealthcare's Foster Bridge provides a secure electronic platform that supports providers, case workers, courts, and schools with timely access to this critical information. By making it easier to identify gaps in care and reduce duplication of services, Foster Bridge helps support the healthy development of children through improved care coordination.

In New York, managed care outperformed fee-for-service, in some cases dramatically, across a range of indicators for critical preventive services. In a managed care setting, 60 percent of enrollees received appropriate asthma care, compared with 55 percent of fee-for-service enrollees.

Similarly, 64 percent of children in managed care had immunizations, in comparison to 50 percent of children in fee-for-service. Results can be seen in Exhibit 8.3 below.

Exhibit 8.3; Rates of preventive care in Medicaid managed care versus fee-for-service care in New York state



Source: New York State Department of Health, 2008.

Exhibit 8.4; UnitedHealthcare Medicaid health plan performance

In UnitedHealthcare’s Medicaid health plan population, plan performance ranks above 90 percent of recommended levels for ensuring access to a primary care provider for children and the use of asthma medication in school-age children. Compared to the performance of employer-sponsored insurance on the same measures for children, Medicaid health plans perform similarly – confirming recent research that Medicaid health plans are closing the “quality gap.”

CHAPTER 9: Opportunities in research, care delivery, and quality for children

Advancing new models of outcomes research and dissemination

A successful model for outcomes research in children is the Children's Oncology Group at the National Cancer Institute whose members care for more than 90 percent of children and adolescents diagnosed with cancer. The program enables organized collaboration with research scientists, data collection, and analysis of which interventions work best for patients. It has led to greater understanding of the causes of cancer and effective treatments and contributed to the dramatic improvement in five-year survival rates (from 58 percent in 1975 to 83 percent in 2009).²²⁸

New approaches to research, such as child health research networks for complex conditions (e.g., cystic fibrosis, Crohn's disease, and oncology), can generate a repository of information for improving the evidence base and support the work of child health researchers.²²⁹ Those approaches will grow in importance as advances in genetics, genomics, and proteomics shed light on key questions affecting treatment and cures for children with congenital and genetic conditions and others.²³⁰ Additionally, on-line patient-driven research activities enable parents of children with rare diseases to link to others through social media, identify treatment options, share care experiences, and communicate with experts. Electronic medical records designed specifically for children can capture that data as well as patient-generated information from mobile, gaming, and monitoring devices and use it to expand evidence about interventions, therapies, and treatment.²³¹

An example of a new approach is the *Collaborative Chronic Care Network*, a national initiative based at Cincinnati Children's Hospital. This initiative operates a technology platform and enhanced data registry for clinicians, researchers, child patients, and their families. Participants can identify effective practices in chronic care for children and advance the use of health-related data about individuals and populations. Through a nationwide network called *ImproveCareNow*, pediatric subspecialists, other children's providers, researchers, patients, and families suggest innovative approaches to pediatric care and work with the Cincinnati-based initiative to test those models' applicability in treating diseases. Patients monitor how the new models affect them and add data to the registry through computers or smartphones. Once models are tested, the results are distributed to pediatric specialists across the country. The prototype for this initiative is chronic gastrointestinal disease (Crohn's Disease and Ulcerative Colitis) at Children's Hospital of Philadelphia.²³²

Developing a primary-specialty model for the future

Improving children's access to appropriate specialty services requires a combined approach that includes: 1) innovations in technology and system redesign to fully realize the potential of utilizing non-physician providers more productively, 2) improvements in pediatric training with additional focus on competency in subspecialty care, 3) development of guidance to assist primary care providers in the successful co-management of pediatric patients with chronic and complex conditions, and 4) creation of a referral mechanism for clinicians who have limited training or who are uncertain about complex cases with support in a model that integrates care.

Adding more opportunities for training in pediatric chronic care and using non-physician providers skilled at screening for those conditions also would help to address gaps in the specialty workforce. Pediatricians prefer to keep shared management of patients; therefore, models that facilitate co-management and information flow might enable improved care for patients with chronic conditions.²³³

Similar to successes in improving cancer care for children, greater integration among providers of primary and specialty care could help pediatricians identify complex conditions early and refer children appropriately to specialists or centers of excellence for newer treatments. Reimbursement models that encourage appropriate distribution of those specialists, improvements to the referral process, and integration with primary care physicians treating children would help to advance integration goals and could be included in public-sector payment reform efforts.

Enhancing the delivery of care for children

Some children's hospitals have developed care models that analyze data, evaluate the performance of clinical areas, and follow up with pediatric patients after discharge to community settings following procedures or treatment. Others, however, can improve approaches to managing costs and transitions of care. Those facilities have lower levels of adoption of electronic health records, computerized order entry, and clinical decision support than other hospitals.²³⁴ They may struggle too with developing value-based or risk-based reimbursement models in specialty pediatrics.

Greater collaboration with payers could advance new ways of managing and providing incentives for high-quality care for high-cost cases.²³⁵ (see Exhibit 9.1.)

Exhibit 9.1; Optum "Centers of Excellence"

Optum offers a network of providers designated as Centers of Excellence to a wide range of patients, along with a highly specialized program of treatment decision support and coaching. Because these facilities may be located far from home, patients also are offered travel benefits to cover the costs of transportation and lodging. This package creates a national network of high-quality medical centers, giving patients a meaningful choice among top facilities and helping facilitate informed medical decision making. By establishing a national market for these services, the program also provides incentives for these highly functioning centers to continue to improve their performance on quality, cost, and patient experience.

New delivery models also can reduce costs and improve care management for high-cost procedures and inpatient stays through co-management, population-based data analytics, and incentives for improved approaches to prevention, follow-up, and care.

Pressures to maintain their patient base, optimize case management, and improve the level of care coordination are leading children's hospitals and pediatric providers to form networks to contract directly with payers and Medicaid. Those networks include accountable care organizations (ACOs), community hospitals (co-management of NICUs or specialty clinics), physician specialty practices, and Medicaid managed care. Hospitals can pursue greater alignment with pediatric specialty practices and community-based physicians, extend hospital specialty resources to community pediatricians, and provide certain services through distant ambulatory centers.

Medicaid pediatric ACOs, (included in the ACA to spur development of those models for children), are in the early development stages in a few states, such as Ohio, which contracts with Medicaid managed care plans to facilitate the coordination of services.²³⁶ The ACO approach may face challenges in adapting to children's care, in part because having children move to and from Medicaid and private coverage adds complexity to patient assignment.²³⁷ Additionally, the "value proposition" in managing a population of children may be different from adults. While adult ACOs may focus on reducing avoidable admissions and direct patients toward more cost-effective sites of service, a pediatric ACO might need to consider the broader community context, furnishing adequate family support, and implementing new chronic care models for the many emerging conditions now found in children.

Improving the quality of children's care

Quality of care for children can be improved in multiple areas and requires both targeted and system-wide approaches. It is important to prioritize improving medication adherence rates and screening. More also needs to be done to ensure appropriate provision of adolescent well-care and counseling; and treatment of asthma still calls for better approaches. More generally, where there is variation or large gaps in care, opportunities exist for doctors and those who work with them to improve their performance.

New and improved tools can help physicians and non-physicians identify and diagnose chronic conditions, particularly as those conditions become more prevalent among children at earlier ages. Use of electronic health records may help physicians track lab results and monitor medication use for children under their care. Greater use of mobile apps and monitoring technologies offer new avenues for reminding patients about the need to get recommended care and can engage families more extensively in a child's care.

New models of value-driven reimbursement can link pay to performance in ways that improve quality for children. Deploying these approaches for children's care can create incentives for providers to perform better on preventive, routine, and complex care and enable investment in pediatric delivery systems. Such approaches are already being recommended for children in Medicaid health plans for certain conditions, such as asthma.²³⁸

Efforts by providers, community organizations, schools, and local public health departments also help improve quality of care for children by fostering awareness among families in high-risk communities about screening and prevention strategies.

Continued efforts to develop, test, and modify quality measures for the pediatric population, particularly in areas where measures are currently lacking, will make it easier to target areas of poor quality. The Institute of Medicine suggests a need for measures for low-income, Medicaid-insured children, inpatient care, mental health services, and for certain health disparities and services, such as dental health.²³⁹

PART C – CONCLUSION

Investment and innovation can improve the state of children’s health and address the trends and emerging health care issues facing many children today including obesity, chronic disease, and mental health conditions.

Practical approaches include:

- New models of care offer considerable promise, such as group models to incentivize and provide prenatal care, community-based behavioral interventions to target obesity, and telemedicine models to extend needed mental health services. Mobile health technologies, such as smartphone apps and exergaming devices, offer opportunities to educate and engage children, their families, and pregnant women in managing chronic conditions, reducing obesity, and ensuring healthy pregnancies.
- Advances in data and analytics linked to electronic health records can help to target timely interventions for children with chronic care needs, enable earlier diagnosis of conditions, identify appropriate use of psychotropic medications, and manage high-risk pregnancies. Improved outcomes research efforts can help to build an evidence base of treatments that work for children and get those into the hands of practitioners.
- More broadly, greater use of care coordination can drive improvements in the quality and availability of primary care for children, improve communication among providers, and avert avoidable visits to the hospital. Incentives for greater use of non-physician providers and primary and specialty collaboration can address gaps in care for children, particularly for those with mental health conditions.

Putting those initiatives into action will require a concerted effort, involving a range of public and private stakeholders. State Medicaid and CHIP programs will be central to those efforts because of their important role in covering children; they can sponsor some of the innovative approaches described in this working paper. Changes to traditional payment systems, regulations, and practices will be necessary, however, to advance initiatives in public programs. Employer health plan sponsors, payers, and providers also have opportunities to employ those care models, incentives and technologies. Public health and community-based organizations can inform these efforts with their experiences addressing behavioral, environmental, social, and substance abuse problems for children. Finally, the scientific and research community can continue to advance understanding of children’s health, and find cures and new treatments to help ensure a healthy passage to adulthood.

Practical opportunities for improving child health

Challenges	Current approaches include:	Future opportunities include:
<p>Healthy pregnancy</p> <p>12 percent of births are preterm and can lead to adverse birth outcomes; costs for children in the first year of life are four to six times the average for all children, depending on source of insurance</p>	<ul style="list-style-type: none"> • Greater use of prenatal care reduces preterm births and improves outcomes, community-based approaches can facilitate services and programs • Case management by Medicaid managed care and analytic tools improve outcomes of high-risk pregnancies 	<ul style="list-style-type: none"> • Group prenatal care model offer opportunity to engage women in prenatal care, improve health • Mobile and online tools for pregnant women encourage healthy behaviors and prenatal care visits
<p>Childhood obesity</p> <p>1 in 3 children in the United States is overweight or obese</p>	<ul style="list-style-type: none"> • Home and school-based obesity interventions focus on health eating and physical activity • Family engagement strategies to promote healthy eating, physical activity • Primary care physicians prompt families to enroll their children in weight management programs 	<ul style="list-style-type: none"> • Exergames and mobile technologies can encourage and increase physical activity in boys and girls • New community-based behavioral health interventions, such as JOIN for ME, can produce clinically meaningful reductions in weight
<p>Chronic health conditions in children</p> <p>Approximately 25 percent of children have one or more chronic conditions; A growing proportion of children have asthma, type 2 diabetes, hypertension, and high cholesterol. Managing those conditions and other complex illnesses presents challenges for children and families</p>	<ul style="list-style-type: none"> • Education programs help children and their families follow treatment plans and manage daily care, but requires planning • Coordinated care plans, such as Medicaid managed care organizations, provide an effective platform for service delivery • Family engagement in care planning for young children effective; harder for adolescents • Transitions of care programs designed for children help provide self-management skills, but challenging to implement 	<ul style="list-style-type: none"> • Apps and devices can help children manage conditions, such as diabetes and asthma • Multimedia education, gamification, and social networks help drive children’s engagement and participation in their own self-care
<p>Children’s mental health</p> <p>Approximately 20 percent of children have a mental health condition, with increases in prevalence and diagnoses; limited use of early intervention services, providers lack resources and have difficulties with referrals, and some inappropriate use of certain prescription drugs</p>	<ul style="list-style-type: none"> • Schools, other settings, such as nonprofit clinics, provide early detection and prevention; • Medicaid managed care organizations help states integrate mental health with medical services; States may build relationships with community-based providers. • Support for primary care providers in assessing and treating mental health conditions and training on evidence-based child mental health care. 	<ul style="list-style-type: none"> • Telemedicine technology can help provide access to services • Resources for physicians to help determine effective treatment options which depend upon use of mental health drugs: pharmacy analytics and telephonic outreach
<p>Care coordination for children</p> <p>Lack of coordination of care for children; leads to avoidable ER visits and hospitalizations; difficulties coordinating care for children with multiple providers and complex conditions</p>	<ul style="list-style-type: none"> • Coordinated care plans (including Medicaid health plans) and primary care medical homes facilitate communication between providers, help to establish care plans, and offer support programs for families. • Opportunities to increase coordination with Medicaid managed care and primary care medical homes 	<ul style="list-style-type: none"> • Health information technology coordinates across provider settings and prevents medical errors through increased accuracy in reporting and timely, coordinated data capture • Coordinated care to bring tools, financial incentives, and performance data to providers to help them to meet performance goals
<p>Opportunities in research, care delivery, and quality for children</p> <p>Evidence-base needs improvement; delivery models not tailored for children’s specialty needs; Quality gaps exist relating to common acute conditions, adolescent care; regional disparities (South) persist</p>	<ul style="list-style-type: none"> • Organized collaborations with research scientists, data collection, and analysis of interventions. • Some children’s hospitals have care models with capabilities to analyze data, evaluate the performance of clinical areas, and follow up with pediatric patients after discharge to community settings 	<ul style="list-style-type: none"> • Child health research networks for complex conditions that can generate a repository of information for improving the evidence base • New models to encourage integration of specialty and primary care for children, including new care delivery and reimbursement models • Quality initiatives that engage parents and communities, linkages to public health providers

APPENDIX A: ANALYSIS OF UNITEDHEALTHCARE CLAIMS DATA

Analysis of UnitedHealthcare employer-sponsored insurance and Medicaid health plan claims data. In 2013, we analyzed commercial claims data for children ages 0 to 18 using a de-identified data base covering 2010 and 2011 claims for a representative sample of approximately 4.4 million members for medical care and 2.4 million for prescription drug coverage. Based on aggregated spending, utilization, and per member per month data, we analyzed patterns and trends for broad categories of service, single year of age, and gender. Service categories included inpatient hospital, outpatient hospital, professional (including primary and specialty physician services), and prescription drugs. We performed additional analysis using sub-categories of service, such as emergency room spending and inpatient mental health spending. Utilization measures analyzed include inpatient admissions, inpatient days, outpatient visits and procedures, professional visits and procedures and prescriptions by therapeutic category.

Additionally, we reviewed Medicaid health plan claims data for children ages 0 to 18 from states in which UnitedHealth Care has members using a separate de-identified data base which included aggregated claims for roughly 1.7 million members. (In some states, some or all prescription drugs are carved out of the Medicaid managed care benefit and provided on a fee-for-service basis and thus not captured in our data.) Similar to our analysis of employer-sponsored data, we analyzed spending and utilization patterns by service and select sub-service categories, single year of age, and gender. For the managed Medicaid population specifically, we analyzed spending and utilization by disability status and for claims related to diabetes and asthma. Because some states carve out certain medical and mental health benefits and pay for them on a fee-for-service basis, our estimates of spending and utilization for those services may therefore be modestly understated.

To analyze differences in spending and utilization for children with employer-sponsored insurance or enrolled in Medicaid health plans, we selected 11 states where we have significant membership in both types of plans and which represent different regions of the country. We identified the cost of care per child, price per unit of service, and utilization for children by service category and single year of age in each of those states. We then developed ratios of employer-sponsored to Medicaid health plan coverage. Because of different approaches in the treatment of newborn costs, we limited our analysis to children ages 1 to 18. For comparison purposes, we adjusted the Medicaid data to match the distribution of ages observed in the employer-sponsored population. (Because of Medicaid eligibility rules, the distribution of children ages 0 to 18 is more heavily weighted toward younger children; in contrast, commercially insured child populations tend to be more evenly distributed.)

To develop a proxy for a national estimate, we averaged the results of the 11 states. We also provided a range for our estimate to convey the variation observed around the country and by service area. While there are limitations to this approach, the analysis provides reasonable insights into the magnitude and variation of differences by source of coverage and may serve as the basis for further research. Limitations of the comparison include potential differences in claims attribution to service categories, benefit package variation (state Medicaid programs are required to provide certain benefits for children not typically provided in the commercial market and are limited in the use of cost sharing), treatment of newborn costs, intra-state market variation, and differences in the underlying health of the population.

APPENDIX B: STATISTICS ON CHILD HEALTH STATUS AND DELIVERY OF CARE BY STATE

State	State Population that is Children	Children in Poverty	Births Considered Preterm	Children Who Are Overweight or Obese	Children Who Currently have Asthma	Children with One Current Chronic Condition	Primary Care Physicians per 100,000 Children
Alabama	27%	28%	16%	35%	12%	16%	360
Alaska	29%	15%	10%	30%	4%	9%	461
Arizona	29%	27%	12%	37%	9%	15%	292
Arkansas	27%	28%	13%	34%	8%	14%	411
California	28%	23%	10%	30%	7%	13%	388
Colorado	27%	18%	11%	23%	9%	12%	431
Connecticut	26%	15%	10%	30%	11%	15%	471
Delaware	26%	19%	13%	32%	12%	17%	382
District of Columbia	23%	31%	N/A	35%	16%	16%	1007
Florida	24%	25%	13%	28%	10%	16%	396
Georgia	29%	27%	14%	35%	10%	15%	310
Hawaii	25%	17%	12%	27%	10%	13%	502
Idaho	30%	21%	10%	28%	6%	11%	314
Illinois	28%	21%	12%	34%	9%	12%	434
Indiana	28%	23%	12%	31%	10%	16%	385
Iowa	27%	17%	12%	28%	6%	12%	378
Kansas	28%	19%	11%	30%	8%	13%	400
Kentucky	26%	27%	14%	36%	11%	14%	379
Louisiana	28%	29%	15%	40%	10%	15%	380
Maine	23%	19%	10%	30%	8%	14%	612
Maryland	27%	14%	13%	32%	10%	14%	481
Massachusetts	25%	15%	11%	31%	10%	14%	590
Michigan	27%	25%	12%	33%	8%	13%	401
Minnesota	27%	15%	10%	27%	7%	12%	578
Mississippi	29%	32%	18%	40%	11%	16%	273
Missouri	27%	22%	12%	28%	10%	16%	345

Source: UnitedHealth Center for Health Reform & Modernization analysis of 2012-2013 Health Resources and Services Administration Area Health Resource File.

Note: Percent of children with one current chronic condition from a list of 18 chronic conditions.

State	State Population that is Children	Children in Poverty	Births Considered Preterm	Children Who Are Overweight or Obese	Children Who Currently have Asthma	Children with One Current Chronic Condition	Primary Care Physicians per 100,000 Children
Montana	25%	21%	12%	29%	6%	13%	457
Nebraska	28%	18%	11%	29%	7%	12%	474
Nevada	28%	22%	14%	33%	8%	13%	277
New Hampshire	25%	12%	9%	26%	9%	16%	509
New Jersey	26%	15%	12%	25%	9%	14%	420
New Mexico	28%	29%	12%	33%	9%	12%	413
New York	26%	23%	12%	32%	11%	14%	487
North Carolina	27%	25%	13%	31%	9%	16%	399
North Dakota	26%	15%	11%	36%	8%	12%	574
Ohio	26%	24%	12%	31%	9%	15%	416
Oklahoma	28%	24%	14%	34%	11%	16%	301
Oregon	26%	23%	10%	26%	8%	12%	509
Pennsylvania	25%	19%	11%	26%	11%	16%	454
Rhode Island	25%	22%	11%	28%	11%	15%	532
South Carolina	27%	28%	14%	39%	9%	16%	410
South Dakota	28%	19%	11%	27%	5%	9%	455
Tennessee	26%	27%	13%	34%	12%	16%	418
Texas	31%	27%	13%	37%	8%	14%	285
Utah	35%	16%	11%	22%	6%	11%	257
Vermont	24%	16%	8%	25%	9%	14%	741
Virginia	26%	16%	12%	30%	9%	14%	446
Washington	26%	19%	10%	26%	6%	11%	508
West Virginia	24%	26%	12%	34%	10%	16%	444
Wisconsin	26%	18%	11%	29%	9%	12%	495
Wyoming	27%	16%	11%	27%	7%	12%	417

Source: UnitedHealth Center for Health Reform & Modernization analysis of 2012-2013 Health Resources and Services Administration Area Health Resource File.

Note: Percent of children with one current chronic condition from a list of 18 chronic conditions.

APPENDIX C: APPROACH TO ANALYSES IN THE REPORT

Analysis of the quality of care provided by physicians to children with employer-sponsored insurance. The UnitedHealth Premium Designation program analyzes physician performance based on the quality and efficiency of the care they provide. The program includes over 250,000 physicians across 21 specialties, including pediatrics and obstetrics, accounting for 60 percent of the medical spending covered by UnitedHealthcare’s employer plans. The program operates in 41 states and includes over 300 care quality measures across more than 75 medical conditions. Under the program, physicians can receive a “star” for care quality if they are successful in meeting rules for evidence-based medicine that are appropriate to their practice and specialty; those physicians meeting quality standards can receive a second star for efficiency if they are able to consistently provide care in a more affordable manner.

The goal of the Premium Designation program is to support physician practice improvement and to help members make informed decisions about their medical care. The program assesses how frequently doctors follow evidence-based guidelines established for monitoring and treating various health problems and uses many widely accepted measures of care quality, such as the share of patients receiving appropriate screening for high cholesterol and the share of patients with high cholesterol who receive recommended treatments for that condition.

For the purposes of our analysis, we used data from the Premium Designation program covering calendar years 2006 through 2008. The data set was narrowed to providers rendering care to at least one member 18 years of age or under and included all providers participating in the program, regardless of whether they received a “star” for quality or efficiency. For the purposes of our analysis, we also defined a “market” to mean a HRR as

specified by the Dartmouth Institute (which divides the country into 306 HRRs). We selected specific conditions for the analysis that were common among child patients or important components of child health that were well represented in the data.

Geographic variation for individuals with employer-sponsored coverage. We analyzed de-identified UnitedHealthcare claims data (including pharmacy) for adults and children from a 2011 to 2012 national claims database of over 20 million commercially insured members. Specifically, we looked at 306 hospital referral regions (HRR) to examine variation in quality of care. HRRs are regional markets for medical care that include the services of at least one major hospital referral center. (The Dartmouth Institute developed HRRs and they are commonly used in research.) Our final analysis excluded HRRs with fewer than 4,000 members.

The quality measures used in our analysis include avoidable hospitalizations, avoidable emergency room visits, and rates of medication adherence. Those measures were developed using administrative claims algorithms from the Agency for Health Care Research and Quality (AHRQ). Those measures are relevant for performance-based payment and population health management as they seek to identify inappropriate or non-evidence based service use or underuse. Specifically, avoidable admissions data is based on primary discharge diagnoses for ambulatory care-sensitive conditions identified by AHRQ and the Massachusetts Department of Health. Those include admissions for asthma, congestive heart failure, and dehydration. Similarly, avoidable emergency department visits are based on primary discharge diagnoses; visits fall into the following categories: 1) truly non-emergent, 2) emergent but could be appropriately managed in a primary care setting, or 3) emergent, but the urgency could have been avoided with appropriate primary care. Emergent visits include those

for ear infections, back pain, and asthma. Medication adherence is a composite of medication compliance measures for specific chronic conditions, including diabetes, depression, hypertension, and hyperlipidemia.

Finally, we developed age and gender-adjusted rates of utilization and avoidable utilization for children (ages 0 to 18) and non-elderly adults (ages 19 to 64) for each of those measures. We then calculated how the rates of avoidable utilization compared to rates that might be “expected” based on the national population and developed average to expected ratios for each HRR. We ranked HRRs in terms of their performance on individual measures of avoidable utilization for both children and adults. Rankings for each of those measures for children are divided into 10 performance “deciles” and displayed in color-coded maps (Exhibits 2.3, 2.5, and 2.7) with blue representing highest relative performance level and crimson the lowest relative performance level. The scatter plot shown in Exhibit 2.4 shows the positive relationship between actual-to-expected ratios for adults and for children by HRR (*correlation coefficient* = .57). The scatter plot in Exhibit 2.6 examines the relationship between actual-to-expected rates of avoidable hospitalizations and avoidable ER visits for children by HRR (*correlation coefficient* = .37).

Estimate of the impact of broader use of group prenatal care models for pregnant women. Based on U.S. population census data and projections and research on the health insurance status of pregnant women and newborns, we developed 10-year projections of the number of births by source of insurance coverage, primarily Medicaid and commercial. We then categorized those births by the stage of pregnancy where individual prenatal care began and the degree of care received. To do so, we relied on multiple research sources, including work from Yale University (cited in Chapter 4 of this paper).

We then estimated the impact of introducing group prenatal care models on a broad scale. To do so, we assumed that 10 to 15 percent of pregnant women with private coverage ultimately would voluntarily join such models while 50 percent of pregnant women enrolled in Medicaid would. Most of those women otherwise would have received some degree of individual prenatal care. Under the group model approach, we assumed participating women would start prenatal care earlier and receive more intensive services (either more visits or more effective visits). Based on early evidence from research on several group prenatal care pilot programs, we estimated the number of reduced days in neo-natal intensive care units (NICU) resulting from the transition to group prenatal care for participating women (about 0.4 days for women with private coverage and about 0.8 for women enrolled in Medicaid, depending on the quality and timeliness of current approach to individual prenatal care).

Relying on UnitedHealthcare claims data on the cost of NICU days per newborn, we developed estimates of savings per newborn for those reduced days attributable to the use of group prenatal care. Based on additional findings from that research, we estimated savings per birth that would accrue from other factors related to group prenatal care. Those include improved care during the first year of life, lower costs due to sexually-transmitted diseases, and a reduction in rapid repeat births. We also estimated additional costs that would arise as pregnant women visited providers more for prenatal care services.

Our estimates assumed that implementing group prenatal care programs on this scale would take five years. Limitations of this analysis include the early state of existing research and pilot testing; additional research may modify assumptions about participation and cost savings per birth for different sub-populations.

Estimates of the impact of reducing childhood obesity. Based on U.S. population census data and projections and historical rates of obesity and overweight in children from the Centers for Disease Control and Prevention, we estimated the percent of adults today who were obese or overweight as children by age and gender. We did so by “looking back” for each cohort of adults to when they were children and identifying overweight/obesity rates in evidence at the time. (Older adults today are less likely than young adults to have been overweight or obese as children because childhood obesity is a relatively recent phenomenon.)

To develop baseline estimates of the number of obese adults with childhood obesity/overweight as a past condition, we reviewed research on the persistence of obesity from childhood to adulthood in four separate longitudinal research studies published in the *New England Journal of Medicine* (Markus, et. al., “Childhood adiposity, adult adiposity, and cardiovascular risk factors”, November 17, 2011). The research findings showed a substantial share of adults who were obese or overweight as children remained so as adults; of adults who were obese as children 82 percent were obese as adults and of adults who were overweight as children, 60 percent were obese as adults. We developed projections over a 25-year period to estimate the impact of childhood obesity on the number of obese adults in the future, based on those core assumptions and assumptions about continued, but slower, growth in the share of children who are overweight or obese.

To address the hypothetical question of how many fewer adults might today be obese had they not been overweight or obese as children, we determined how our baseline estimates of adult obesity might change if rates of childhood obesity or overweight had remained constant at 1990 levels (one-fifth compared to one-third of children today.) We offset our estimates by about one-quarter to account for individuals who otherwise would have become obese regardless of childhood obesity/overweight status. We also assumed that most of those adults instead would be overweight; about one-quarter instead would be normal weight.

We estimated savings per adult and child based on new BMI-related data from UnitedHealth Group’s employee wellness program, which identifies health care costs per person by BMI, age, and gender. (Early results from that program show that the distribution of BMI among program participants is similar to that found in other nationally representative samples.) We developed annual projections for per capita savings amounts using per capita growth in national health expenditures. We also adjusted estimated savings amounts to account for differential payment rates and utilization in public programs. Applying annual per capita savings estimates to our estimates of the reduction in the number of obese adults and children yielded an estimate of annual savings. We estimated savings for the reduction in the number of obese children using per capita savings that are based off of the savings for the youngest employees.

Additionally, using similar methods and data sources, we estimated the potential savings that might accrue in the future if a community-based behavioral intervention designed for children was successfully scaled to the entire population. For this scenario, we assumed such a program might lead to a 5 percentage point reduction in the rate of childhood obesity or overweight (to about one-quarter of children) based on our early research and pilot programs focused on childhood obesity. For this estimate, we assumed that the national intervention would reduce obesity rates in children and some of their parents (one parent for every 10 children also based on early evidence from our pilot programs.) We assumed that implementing such a program on a national scale would take at least five years.

REFERENCES

- 1 UnitedHealth Center for Health Reform & Modernization, analysis of Center for Medicare & Medicaid Services administrative data and Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 2 Urban Institute, "Kids' Share 2012 – Report On Federal Expenditures On Children Through 2011," July 19, 2012: 1-53 and Ezra Klein, "Feds spend \$7 on elderly for every \$1 on kids," Washington Post, February 15, 2013.
- 3 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "National, State, and Local Area Vaccination Coverage Among Children Aged 19–35 Months – United States, 2011," Morbidity and Mortality Weekly Report, 61(35) (September 7, 2012): 689-696.
- 4 U.S. Department of Health and Human Services Health Resources and Services Administration, "The Health and Well-Being of Children: A Portrait of States and the Nation 2007," National Survey of Children's Health, July 2009: 1-107.
- 5 Elise Gould, "2010 Marks Another Year of Decline for Employer-Sponsored Health Insurance Coverage," Economic Policy Institute, September 13, 2011.
- 6 Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 7 Medicaid and CHIP Payment and Access Commission (MACPAC), "Report to the Congress on Medicaid and CHIP," March 2012: 1-284.
- 8 Carmen DeNavas-Walt, Bernadette D. Proctor, and Jessica C. Smith, "Income, Poverty and Health Insurance Coverage in the United States: 2010," U.S. Census Bureau, P60-243 (September 2011): 1-81.
- 9 StateHealthFacts.org: Urban Institute and Kaiser Commission on Medicaid and the Uninsured estimates based on the Census Bureau's March 2010 and 2011 Current Population Survey (CPS: Annual Social and Economic Supplements) and National Academy of State Health Policy, "Health Care Reform and Children: Planning and Design Considerations for Policymakers," June 2013.
- 10 Jeanne Van Cleave, Steven L. Gortmaker, and James M. Perrin, "Dynamics of obesity and chronic health conditions among children and youth," JAMA: The Journal Of The American Medical Association, 303(7) (February 17, 2010): 623-630.
- 11 The definition of Children with Special Health Care Needs is from the federal Maternal and Child Health Bureau and is used in the administration of certain government programs such as the Title V block grant.
- 12 National Survey of Children's Health 2011-2012, Data query from the Child and Adolescent Health Measurement Initiative, Data Resource Center for Child and Adolescent Health Website, Accessed June 19, 2013.
- 13 U.S. Department of Health and Human Services, "Health, United States, 2011," National Center for Health Statistics, Hyattsville, Maryland, 2012: 1-566.
- 14 Giuseppina Imperatore, James P. Boyle, Theodore J. Thompson, Doug Case, Dana Dabelea, Richard R. Hamman, and Debra Standiford, "Projections of Type 1 and Type 2 Diabetes Burden in the US Population Aged <20 Years Through 2050," Diabetes Care, 35(12) (December 2012): 2515-2520.
- 15 TODAY Study Group, "A Clinical Trial to Maintain Glycemic Control in Youth with Type 2 Diabetes," The New England Journal of Medicine, 366 (June 14, 2012): 2247-2256.
- 16 U.S. Department of Health and Human Services, "Fact Sheet: SEARCH for Diabetes in Youth," Centers for Disease Control and Prevention (Atlanta, Georgia), May 20, 2011.
- 17 Ashleigh L. May, Elena V. Kuklina, and Paula W. Yoon, "Prevalence of cardiovascular disease risk factors among US adolescents, 1999-2008," Pediatrics, 129(6) (June 2012): 1035-1041.
- 18 Akl C. Fahed, Bruce D. Gelb, J. G. Seidman, and Christine E Seidman, "Genetics of congenital heart disease: the glass half empty," Circulation Research, 112(4) (February 15, 2013): 707-720.

- 19 Ruth Perou, Rebecca H. Bitsko, Stephen J. Blumberg, Patricia Pastor, et al., "Mental health surveillance among children, United States, 2005-2011," *Centers for Disease Control and Prevention Mortality and Morbidity Report*, 62(2) (May 17, 2013): 1-35.
- 20 Chris Collins, Denise Levis Hewson, Richard Munger, and Torlen Wade, "Evolving Models of Behavioral Health Integration in Primary Care," *Milbank Memorial Fund*, May 2010: 1-102.
- 21 Marc Roemer, "Health Expenditures for the Five Most Common Children's Conditions, 2008: Estimates for US Civilian Noninstitutionalized Children, Ages 0-17," *Agency for Healthcare Research and Quality, Statistical Brief #349* (Rockville, Maryland), December 2011: 1-6.
- 22 Coleen A. Boyle, Sheree Boulet, Laura A. Schieve, Robin A. Cohen, Stephen J. Blumberg, Marshalyne Yeargin-Allsopp, Susanna Visser, and Michael D. Kogan, "Trends in the Prevalence of Developmental Disabilities in US Children, 1997-2008," *Pediatrics*, 127(6) (June 6, 2011): 1034-1042.
- 23 Coleen A. Boyle, Sheree Boulet, Laura A. Schieve, Robin A. Cohen, Stephen J. Blumberg, Marshalyne Yeargin-Allsopp, Susanna Visser, and Michael D. Kogan, "Trends in the Prevalence of Developmental Disabilities in US Children, 1997-2008," *Pediatrics*, 127 (6) (June 6, 2011): 1034-1042.
- 24 Pew Center on the States, "A Costly Dental Destination," *Pew Children's Dental Campaign*, February 2012:1-24.
- 25 Institute of Medicine, "Improving Access to Oral Health Care for Vulnerable and Underserved Populations," *July 2011*: 1-4.
- 26 Centers for Disease Control and Prevention, "Untreated Dental Caries (Cavities) in Children Ages 2-19, United States," *Analysis utilizing data from National Center for Health Statistics. Health, United States, 2009 With Special Feature on Medical Technology*, Hyattsville, MD: 2010, February 9, 2011.
- 27 Centers for Disease Control and Prevention, "Youth and Tobacco Use," *June 10, 2013*.
- 28 Liam Delaney and James P. Smith, "Childhood health: trends and consequences over the life course," *The Future Of Children / Center For The Future Of Children, The David And Lucile Packard Foundation*, 22(1) (Spring 2012): 43-63.
- 29 Child Welfare Information Gateway, *Child Maltreatment 2011*, U.S. Department of Health and Human Services, Children's Bureau, Washington, DC, 2011.
- 30 James A. Baker III Institute for Public Policy of Rice University, "The Economic Impact of Uninsured Children in America," *Number 40*, June 2009: 1-15.
- 31 Charlotte A. Pratt, "Cardiovascular Health Risk Behaviors Among Children and Adolescents: An Overview," *National Heart Lung and Blood Institute, Presented at 2012 National Conference on Health Statistics, August 6-8, 2012*, Accessed May 14, 2013: 1-28.
- 32 Jason M. Fletcher, Jeremy C. Green, and Matthew J. Neidell, "Long term effects of childhood asthma on adult health," *Journal Of Health Economics*, 29(3) (May 2010): 377-387.
- 33 Liam Delaney, and James P. Smith, "Childhood health: trends and consequences over the life course," *The Future Of Children / Center For The Future Of Children, The David And Lucile Packard Foundation*, 22(1) (Spring 2012): 43-63.
- 34 Research has defined developmental disabilities to include ADHD, autism, blindness, cerebral palsy, hearing loss, intellectual disability, learning disorders, seizures, and speech impediments, among other physical and cognitive developmental delays. U.S. Department of Health and Human Services, "Key Findings: Trends in the Prevalence of Developmental Disabilities in U.S. Children, 1997-2008," *Centers for Disease Control, (Atlanta, GA) February 1, 2012*, Accessed July 31, 2012.
- 35 Lisa A. Simpson, Laura Peterson, Carole M. Lannon, Sharon B. Murphy, Clifford Goodman, Zhaoxia Ren, and Anne Zajicek, "Special challenges in comparative effectiveness research on children's and adolescents' health," *Health Affairs (Project Hope)*, 29(10) (October 2010): 1849-1856.
- 36 National Heart, Lung, and Blood Institute and the National Institutes of Health, "Children and Clinical Studies," *accessed March 24, 2013*.
- 37 Diana L. Miglioretti, Eric Johnson, Andrew Williams, Robert T. Greenlee, Sheila Weinmann, Leif I. Solberg, and Rebecca Smith-Bindman, et al. 2013. "The Use of Computed Tomography in Pediatrics and the Associated Radiation Exposure and Estimated Cancer Risk." *Journal Of The American Medical Association (JAMA) Pediatrics*, (June 10, 2013): 1-8.
- 38 David N. Cornfield, Robert Lane, and Steven H. Abman, "Creation and retention of the next generation of physician-scientists for child health research," *JAMA: The Journal Of The American Medical Association*, 309(17) (May 1, 2013): 1781-1782.

- 39 Matthew M. Davis, "Stunting the growth of child health research: a need to reframe 'children are not small adults'," *Journal Of The American Medical Association (JAMA) Pediatrics*, 167(7) (July 1, 2013): 598-599.
- 40 Florence T. Bourgeois, Srinivas Murthy, Catia Pinto, Karen L. Olson, John P. A. Ioannidis, and Kenneth D. Mandl, "Pediatric versus adult drug trials for conditions with high pediatric disease burden," *Pediatrics*, 130(2) (August 2012): 285-292. The conditions included asthma, migraine headaches, schizophrenia, depression, diarrheal illness, lower respiratory infection, bipolar disorder and HIV/AIDS.
- 41 National Heart, Lung, and Blood Institute and the National Institutes of Health, "Children and Clinical Studies," accessed March 24, 2013.
- 42 Sanjit K. Bhogal, David McGillivray, Jean Bourbeau, Andrea Benedetti, Susan Bartlett, and Francine M. Ducharme, "Early administration of systemic corticosteroids reduces hospital admission rates for children with moderate and severe asthma exacerbation," *Annals Of Emergency Medicine*, 60(1) (July 2012): 84-91.
- 43 U.S. Department of Health and Human Services, "Health, United States, 2011," National Center for Health Statistics, Hyattsville, Maryland, 2012: 1-566.
- 44 U.S. Department of Health and Human Services, National Institute for Health, National Institute of Allergy and Infectious Diseases "Common Cold." Last Updated August 17, 2012, Accessed July 23, 2012.
- 45 James A. Baker III Institute for Public Policy of Rice University, "The Economic Impact of Uninsured Children in America," Number 40, June 2009: 1-15.
- 46 U.S. Department of Health and Human Services, "Health, United States, 2011," National Center for Health Statistics: (Hyattsville, Maryland), 2012: 1-566.
- 47 American Academy of Child and Adolescent Psychiatry, "AACAP Workforce Fact Sheet," September 15, 2011.
- 48 Institute of Medicine, "Improving Access to Oral Health Care for Vulnerable and Underserved Populations," (July 2011): 1-4.
- 49 U.S. Department of Health and Human Services, "Health, United States, 2011," National Center for Health Statistics, (Hyattsville, Maryland), 2012: 1-566. There are 67 pediatricians per 100,000 children according to analysis using the latest data from the Area Health Resource File containing 2010 physician data increasing from 32 per 100,000 children in 1975.
- 50 U.S. Department of Health and Human Services, "The Number of Practicing Primary Care Physicians in the United States" Agency for Healthcare Research and Quality Primary Care Workforce Facts and Stats, 1: (Rockville, Maryland) (October 2011): 1-2.
- 51 America's Health Rankings, "United States – Primary Care Physicians 2005 – 2012," America's Health Rankings 2012 Edition, Accessed July 14, 2013. Number of primary care physicians (including general practice, family practice, OB-GYN, pediatrics and internal medicine) per 100,000 population.
- 52 Sandra L. Decker, "Two-Thirds Of Primary Care Physicians Accepted New Medicaid Patients In 2011–12: A Baseline To Measure Future Acceptance Rates," *Health Affairs*, 32 (July 2013): 71183-71187.
- 53 Michelle L. Mayer, "Are We There Yet? Distance to Care and Relative Supply Among Pediatric Medical Subspecialties," *Pediatrics*, 118(6) (December 2006): 2313-2321.
- 54 Eyal Ben-Issac, Sheree M. Schragger, Matthew Keefer, and Alex Y. Chen, "National Profile of Non-emergent Pediatric Emergency Department Visits," *Pediatrics*, 125(3) (February 1, 2010): 454-459.
- 55 Children's Hospital Association, "Pediatric Specialist Physician Shortages Affect Access to Care," August 2012.
- 56 Joanna Bisgaier and Karin V. Rhodes, "Auditing access to specialty care for children with public insurance," *The New England Journal of Medicine* 364(24) (2011):2324-2333.
- 57 ECG Management Consultants, "Getting Down to Business: Challenges for Pediatric Hospitals and Specialty Services," *Insight*, Winter 2011.
- 58 Children's Hospital Association, "Pediatric Specialist Physician Shortages Affect Access to Care," August 2012.
- 59 ECG Management Consultants, "Getting Down to Business: Challenges for Pediatric Hospitals and Specialty Services," *Insight*, Winter 2011.

- 60 Joanna Bisgaier and Karin V. Rhodes, "Auditing access to specialty care for children with public insurance," *The New England Journal of Medicine*, 364(24) (2011):2324-2333.
- 61 ECG Management Consultants, "Getting Down to Business: Challenges for Pediatric Hospitals and Specialty Services," *Insight*, Winter 2011.
- 62 Joanna Bisgaier and Karin V. Rhodes, "Auditing access to specialty care for children with public insurance," *The New England Journal of Medicine*, 364(24) (2011):2324-2333. Medicaid patients waited 42 days for an appointment; commercial insured patients waited 20 days.
- 63 Karin V. Rhodes, Joanna Bisgaier, Charlotte C. Lawson, David Soglin, Steven Krug, and Martha Van Haitsma, "'Patients who can't get an appointment go to the ER': access to specialty care for publicly insured children," *Annals Of Emergency Medicine*, 61(4) (April 2013): 394-403.
- 64 National Association of Children's Hospitals and Related Institutions, "What is a Children's Hospital".
- 65 ECG Management Consultants, "Getting Down to Business: Challenges for Pediatric Hospitals and Specialty Services," *Insight*, Winter 2011.
- 66 Jay G. Berry, Matt Hall, David E. Hall, Dennis Z. Kuo, Eyal Cohen, Rishi Agrawal, Kenneth D. Mandl, Holly Clifton, and John Neff, "Inpatient growth and resource use in 28 children's hospitals: a longitudinal, multi-institutional study," *The Journal Of The American Medical Association (JAMA) Pediatrics*, 167(2) (February 2013): 170-177.
- 67 Rita Mangione-Smith, Alison H. DeCristofaro, Claude Messan Setodji, Joan Keeseey, David J. Klein, John L. Adams, Mark A. Schuster, and Elizabeth A. McGlynn, "The Quality of Ambulatory Care Delivered to Children in the United States," *New England Journal of Medicine*, 357 (15) (2007): 1515-1523.
- 68 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "National, State, and Local Area Vaccination Coverage Among Children Aged 19–35 Months – United States, 2011," *Morbidity and Mortality Weekly Report*, 61(35) (September 7, 2012): 689-696.
- 69 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, (February 2011): 1-90.
- 70 U.S. Department of Health and Human Services, "Most Medicaid Children In Nine States Are Not Receiving All Required Preventive Screening Services," *Office of Inspector General*, (May 2010): 1-40.
- 71 U.S. Department of Health and Human Services, "2012 Annual Report on the Quality of Care for Children in Medicaid and CHIP," December 2012: 1-112.
- 72 Mark W. Smith, John Richardson, Emily Ehrlich, "Has Medicaid Closed the Gap for Kids?" *Truven Health Analytics*, June 22, 2013: 1-13.
- 73 U.S. Department of Health and Human Services, "2012 Annual Report on the Quality of Care for Children in Medicaid and CHIP," December 2012: 1-112.
- 74 Paul J. Chung, Tim C. Lee, Janina L. Morrison, and Mark A. Schuster, "Preventive Care for Children in the United States: Quality and Barriers," *Annual Review Public Health*, 27(10) (April 2006): 491-515.
- 75 Rita Mangione-Smith, Alison H. DeCristofaro, Claude M. Setodji, John Keeseey, David J. Klein, John L. Adams, Mark A. Schuster, Elizabeth A. McGlynn, "The Quality of Ambulatory Care Delivered to Children in the United States," *The New England Journal of Medicine*, 357(15) (October 2007): 1515-1523.
- 76 Rita Mangione-Smith, Alison H. DeCristofaro, Claude M. Setodji, John Keeseey, David J. Klein, John L. Adams, Mark A. Schuster, Elizabeth A. McGlynn, "The Quality of Ambulatory Care Delivered to Children in the United States," *New England Journal of Medicine*, 357(15) (October 2007): 1515-1523.
- 77 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, February 2011: 1-90.
- 78 Jeffrey O. Tom, Chien-Wen Tseng, James Davis, Cam Solomon, Chuan Zhou, and Rita Mangione-Smith, "Missed well-child care visits, low continuity of care, and risk of ambulatory care-sensitive hospitalizations in young children," *Archives Of Pediatrics & Adolescent Medicine*, 164(11) (November 2010): 1052-1058.
- 79 Celeste M. Torio, Anne Elixhauser, and Roxanne M. Andrews, "Trends in Potentially Preventable Hospital Admissions among Adults and Children, 2005–2010: Statistical Brief #151." *Agency for Healthcare Research and Quality*, March 2013.

- 80 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," The Commonwealth Fund, February 2011: 1-90.
- 81 Sheldon Winnick, David O. Lucas, Adam L. Hartman, and David Toll, "How do you improve compliance?" *Pediatrics*, 115(6) (2005): 718-724.
- 82 World Health Organization, "Report on Adherence to Medications in Children," World Health Organization, 2003: 1-34.
- 83 Rachael T. Zweigorn, Helen J. Binns, and Robert R. Tanz, "Unfilled prescriptions in pediatric primary care," *Pediatrics*, 130(4) (October 2012): 620-626.
- 84 Anne C. Beal, John Patrick T. Co, Denise Dougherty, Tanisha Jorsling, Jeanelle Kam, James Perrin, R. Heather Palmer, "Quality Measures for Children's Health Care," *Pediatrics*, 113(1) (January 2004): 199-209.
- 85 Institute of Medicine and National Research Council of the National Academies, *Child and Adolescent Health and Health Quality: Measuring What Matters*, The National Academies Press: Washington, D.C., 2011: 1-341.
- 86 Medicaid and CHIP Payment and Access Commission (MACPAC), "Report to the Congress on Medicaid and CHIP", March 2012: 1-284.
- 87 National Maternal and Child Oral Health Policy Center "Quality Improvement in Children's Oral Health: Moving from Volume to Value," *Trend Notes*, May 2012: 1-16.
- 88 Institute of Medicine and National Research Council of the National Academies, *Child and Adolescent Health and Health Quality: Measuring What Matters*, The National Academies Press: Washington, D.C., 2011: 1-341.
- 89 Philip Ellis, Lewis G. Sandy, Aaron J. Larson, and Simon L. Stevens, "Wide variation in episode costs within a commercially insured population highlights potential to improve the efficiency of care," *Health Affairs (Project Hope)*, 31(9) (September 2012): 2084-2093.
- 90 Annual spending per child was about \$2,200 in 2010, about half the costs of coverage for adults. In the Medicaid program, costs per child (non-disabled) enrolled on a full-year basis were about \$2,900, also about half of the costs of non-disabled adults in the program. Those costs include both fee-for-service spending and managed care, and reflect a broader range of benefits (including long-term care services and supports) provided to children enrolled in Medicaid than commonly offered through private coverage.
- 91 Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 92 Health Care Cost Institute, "Health Care Cost and Utilization Report: 2011," September 2012: 1-23.
- 93 UnitedHealth Center for Health Reform & Modernization, analysis of CMS-MSIS 2010 data.
- 94 Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 95 UnitedHealth Center for Health Reform & Modernization, analysis of CMS-MSIS 2010 data.
- 96 Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 97 UnitedHealth Center for Health Reform & Modernization, analysis of CMS-MSIS 2010 data.
- 98 Health Care Cost Institute, "Children's Health Care Spending Report: 2007-2010," July 2012: 1-20.
- 99 March of Dimes, "Toward Improving the Outcome of Pregnancy III: Enhancing Perinatal Health Through Quality, Safety and Performance Initiatives," December 2010, Reissued August 2011: 1-138.
- 100 William A. Engle and Michelle A Kominiarek, "Late preterm infants, early term infants, and timing of elective deliveries." *Clinics In Perinatology*, 35(2) (June 2008): 325.
- 101 Elliott Main, Bryan Oshiro, Brenda Chagolla, Debra Bingham, Leona Dang-Kilduff, and Leslie Kowalewskif, "Elimination of Non-medically Indicated (Elective) Deliveries Before 39 Weeks Gestational Age," March of Dimes, California Maternal Quality Care Collaborative Maternal, Child and Adolescent Health Division, and the Center for Family Health at the California Department of Public Health, August 31, 2011: 1-130.
- 102 T.J. Mathews and Marian F. MacDorman, "Infant Mortality Statistics From the 2007 Period Linked Birth/Infant Death Data Set," Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, *National Vital Statistics Report*, 59(6) (June 29, 2011): 1-30. Mortality rates are 178.4 per 1,000 for infants born earlier than the 32nd week of pregnancy and 2.1 per 1,000 for full term births compared with 7.4 per 1,000 for late preterm infant.
- 103 Melissa A. Woythaler, Marie C McCormick, and Vincent C Smith. "Late preterm infants have worse 24-month neurodevelopmental outcomes than term infants." *Pediatrics*, 127(3) (2011): e622-e629.

- 104 Esther A. Hutchinson, Cinzia R. De Luca, Lex W. Doyle, Gehan Roberts, Peter J. Anderson, "School age Outcomes of Extremely Preterm or Extremely Low Birth Weight Children," *Pediatrics*, 131(4) (April 2013): pp. e1053-61.
- 105 Mary Ann Blosky, Zhengmin Qian, G. Craig Wood, James Betoni, Libby Black, Andrea Wary, Harry Mateer, and Walter Stewart, "PS1-22: Premature Birth, Initial Hospital Length of Stay, and Costs," *Clinical Medicine and Research*, 8(3-4) (December 2010): 184.
- 106 Melissa A Woythaler, Marie C McCormick, and Vincent C Smith, "Late preterm infants have worse 24-month neurodevelopmental outcomes than term infants." *Pediatrics*, 127(3) (March 2011): e622-e629.
- 107 Truven Health Analytics, "The Cost of Having a Baby in the United States," January 2013: 1-86.
- 108 Brady E. Hamilton, Joyce A. Martin, and Stephanie J. Ventura, "Births: Preliminary Data for 2009." U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics Report, 59(3) (December 21, 2010): 1-19.
- 109 March of Dimes, "Teenage Pregnancy," Accessed July 2012: 1-2.
- 110 Brady E. Hamilton and Stephanie J. Ventura, "Birth Rates for U.S. Teenagers Reaches Historic Lows for All Age and Ethnic Groups," U.S. Department of Health and Human Services, Centers for Disease Control, NCHS Data Brief, 89, (April 2012): 1-7.
- 111 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, "STD Rates by Age," Last Updated August 4, 2011, Accessed on July 25, 2012.
- 112 U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation (2004). *Trends in the well-being of America's children and youth, 2003*. Washington, D.C. Government Printing Office.
- 113 National Vital Statistics System, 2010.
- 114 National Committee for Quality Assurance, "Frequency of Ongoing Prenatal Care," 2009.
- 115 Health Resources and Services Administration, "Prenatal Care," Accessed July 18, 2013.
- 116 Truven Health Analytics, "The Cost of Having a Baby in the United States," January 2013: 1-86.
- 117 U.S. Department of Health and Human Services, Centers for Disease Control (1994). *CDC's Public Health Surveillance for Women, Infants, and Children CDC's Maternal & Child Health Monograph, 1994*. Atlanta, GA.
- 118 Jeannette R. Ickovics, Trace S. Kershaw, Claire Westdahl, Urania Magriples, Zohar Massey, Heather Reynolds, and Sharon Schindler Rising, "Group prenatal care and perinatal outcomes: a randomized controlled trial." *Obstetrics And Gynecology*, 110(2) (August 2007): 330-339.
- 119 Wendy Sword, Maureen I. Heaman, Sandy Brooks, Suzanne Tough, Patricia A. Janssen, David Young, Dawn Kingston, Michael E. Helewa, Noori Akhtar-Danesh, and Eileen Hutton, "Women's and care providers' perspectives of quality prenatal care: a qualitative descriptive study," *BMC Pregnancy And Childbirth*, 12 (April 13, 2012): 29.
- 120 U.S. Department of Health and Human Services, "2012 Annual Report on the Quality of Care for Children in Medicaid and CHIP," December 2012: 1-112.
- 121 Roger B. Newman, Scott A. Sullivan, M. Kathryn Menard, Charles S. Rittenberg, Amelia K. Rowland, Jeffrey E. Korte, and Heather Kirby, "South Carolina Partners for Preterm Birth Prevention: a regional perinatal initiative for the reduction of premature birth in a Medicaid population", *American Journal of Obstetrics and Gynecology*, 199(4) (2008): 393:e1-8.
- 122 John Morrison, Niki K. Bergauer, Debbie Jacques, Suzanne K. Coleman, and Gary J. Stanziano, "Telemedicine: Cost-Effective Management of High-Risk Pregnancy," *Managed Care*, 10(11) (November 2001): 42.
- 123 Partners Healthcare Press Release, "Text Messaging may improve prenatal care according to pilot study conducted by Partners Healthcare Center for Connected Health," February 2, 2012.
- 124 National Healthy Mothers, Healthy Babies Coalition, "Text4baby," Accessed November 5, 2012.
- 125 Jeannette R. Ickovics, Trace S. Kershaw, Claire Westdahl, Urania Magriples, Zohar Massey, Heather Reynolds, and Sharon Schindler Rising, "Group prenatal care and perinatal outcomes: a randomized controlled trial." *Obstetrics And Gynecology*, 110(2) (August 2007): 330-339.
- 126 Jeannette R. Ickovics, Trace S. Kershaw, Claire Westdahl, Sharon Schindler Rising, Carrie Klima, Heather Reynolds, and Urania Magriples. "Group prenatal care and preterm birth weight: results from a matched cohort study at public clinics." *Obstetrics And Gynecology*, 102(5) (November 2003): 1051-1057.

- 127 Internal UnitedHealth Group analysis, based on findings from: Jeannette R. Ickovics, Trace S. Kershaw, Claire Westdahl, Urania Magriples, Zohar Massey, Heather Reynolds, and Sharon Schindler Rising, "Group prenatal care and perinatal outcomes: a randomized controlled trial." *Obstetrics And Gynecology*, 110(2) (August 2007): 330-339.
- 128 Centers for Disease Control and Prevention, "Adolescent and School Health," June 7, 2012, Accessed July 31, 2012.
- 129 Cynthia Ogden and Margaret Carroll, "Prevalence of Obesity Among Children and Adolescents: United States, Trends 1963-1965 Through 2007-2008," National Center for Health Statistics, June 2010: 1-5 and Centers for Disease Control and Prevention, *Vitalsigns*, August 2013.
- 130 Roland Sturm, "Childhood obesity -- what we can learn from existing data on societal trends, part 2." *Preventing Chronic Disease*, 2(2) (April 2005): A20.
- 131 Jennifer M. Poti and Barry M. Popkin, "Trends in energy intake among US children by eating location and food source, 1977-2006," *Journal of the American Dietetic Association*, 111(8) (August, 2011): 1156-1164.
- 132 According to a 2011 study published in the *Journal of Nutrition*, since 1977, soft drink consumption has increased by about 100 mL, hamburger consumption has increased by 90 kcal/day, and pizza consumption has increased by 131 kcal/day.
- 133 Institute of Medicine, "Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation," Committee on Accelerating Progress in Obesity Prevention Food and Nutrition Board, Institute of Medicine, 2012: 1-462 and Centers for Disease Control and Prevention, "Childhood Obesity Facts," January 11, 2013.
- 134 Andrew B. Geier, Gary D. Foster, Leslie G. Womble, Jackie McLaughlin, Kelley E. Borradaile, Joan Nachmani, Sandy Sherman, Shiriki Kumanyika, and Justine Shults, "The relationship between relative weight and school attendance among elementary schoolchildren." *Obesity*, 15(8) (August 2007): 2157-2161.
- 135 Larry T. Mahoney, Trudy L. Burns, William Stanford, Brad H. Thompson, John D. Witt, Catherine A. Rost, and Ronald M. Lauer, "Coronary risk factors measured in childhood and young adult life are associated with coronary artery calcification in young adults: the Muscatine Study." *Journal of the American College of Cardiology*, 27(2) (February 1996): 277-284.
- 136 Markus Juonala, Costan G. Magnussen, Gerald S. Berenson, Alison Venn, Trudy L. Burns, Matthew A. Sabin, and Olli T. Raitakari, et al., "Childhood adiposity, adult adiposity, and cardiovascular risk factors," *The New England Journal Of Medicine*, 365(20) (November 17, 2011): 1876-1885.
- 137 Centers for Disease Control and Prevention, "Weight of the Nation," Briefing on May 7, 2012 in Washington, DC.
- 138 U.S. Department of Health and Human Services, "Childhood Obesity Prevention Programs: A Comparative Effectiveness Review and meta-analysis," Agency for Healthcare Research and Quality (Rockville, MD) (December 2011): 1-22. Accessed: July 30, 2012.
- 139 Inmaculada Bautista-Castano, Jorge Doreste, and Lluís Serra-Majén, "Effectiveness of Interventions in the Prevention of Childhood Obesity," *European Journal of Epidemiology*, 19(7) (2004): 617-622.
- 140 Leonard H. Epstein, Alice Valoski, Rena R. Wing, and James McCurley, "Ten-year outcomes of behavioral family-based treatment for childhood obesity," *Health Psychology: Official Journal Of The Division Of Health Psychology, American Psychological Association*, 13(5) (September 1994): 373-383.
- 141 Carolyn D. Summerbell, Elizabeth Waters, Laurel Edmunds, Sarah A.M. Kelly, Tamara Brown, Karen J. Campbell, "Interventions for preventing obesity in children," *Cochrane Heart Group*, (December 7, 2011): CDcd001871.
- 142 U.S. Preventive Services Task Force, "Screening for Obesity in Children and Adolescents", released January 2010. Per USPSTF, "The USPSTF recommends that clinicians screen children aged 6 years and older for obesity and offer them or refer them to comprehensive, intensive behavioral interventions to promote improvement in weight status."
- 143 In 2010, the Affordable Care act effectively linked health insurance coverage to preventive care services recommended by the U.S. Preventive Services Task Force (USPSTF). Under the Affordable Care Act, all USPSTF recommended services receiving grades of A or B must be provided to plan members without cost-sharing when delivered by a provider in the plan's network. The USPSTF issues grade A and B recommendations for those services with the most certainty of net benefit. Coverage of these services (with no cost-sharing) applies to Medicare and commercial health insurance plans. Financial incentives are also provided to States that cover "A" and "B" services under Medicaid.

- 144 Ronald T. Ackermann, Emily A. Finch, Edward Brizendine, Honghong Zhou, and David G. Marrero, "Translating the Diabetes Prevention Program into the community. The DEPLOY Pilot Study," *American Journal of Preventive Medicine*, 35(4) (October 2008): 357-363.
- 145 Gary D. Foster, Barbara Linder, Tom Baranowski, Dan M. Cooper, Linn Goldberg, Joanne S. Harrell, Francine Kaufman, Marsha D. Marcus, Roberto P. Treviño, and Kathryn Hirst, "A school-based intervention for diabetes risk reduction," *The New England Journal of Medicine*, 363(5) (July 29, 2010): 443-453
- 146 Kimberley Kieftje, Jennifer Edelman, Deepa R. Camenga, and Lynn E. Fiellin, "Electronic Media Based Health Interventions Promoting Behavior Change in Youth," *Journal of the American Medical Association Pediatrics*, 167(6) (April 2013): 574-580.
- 147 Ralph Maddison, Cliona Ni Mhurchu, Andrew Jull, Harry Prapavessis, Louise S. Foley, and Yannan Jiang, "Active video games: the mediating effect of aerobic fitness on body composition," *The International Journal Of Behavioral Nutrition And Physical Activity*, 9 (May 3, 2012): 54.
- 148 Federal Interagency Forum on Child and Family Statistics, "America's Children in Brief: Key National Indicators of Well-Being, 2012 – Physical Environment and Safety," 2012: 1-24.
- 149 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, (February 2011): 1-9.
- 150 Theresa W. Guilbert, Cindy Garris, Priti Jhingran, Machaon Bonafede, Kenneth J. Tomaszewski, Tiffany Bonus, Rebecca M. Hahn, and Michael Schatz, "Asthma that is not well-controlled is associated with increased healthcare utilization and decreased quality of life," *The Journal Of Asthma: Official Journal Of The Association For The Care Of Asthma*, 48(2) (March 2011): 126-132.
- 151 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, (February 2011): 1-9.
- 152 Jongwha Chang, Gary L. Freed, Lisa A Prosser, Isha Patel, Steven R. Erickson, Richard P. Bagozzi, and Rajesh Balkrishnan, "Comparisons of Health Care Utilization Outcomes in Children With Asthma Enrolled in Private Insurance Plans Versus Medicaid," *Journal Of Pediatric Health Care: Official Publication Of National Association Of Pediatric Nurse Associates & Practitioners*, (January 8, 2013): 1-9.
- 153 Kenneth C. Copeland, Janet Silverstein, Kelly R. Moore, Greg E. Prazar, Terry Raymer, Richard N. Shiffman, and Susan K. Flinn, "Management of newly diagnosed type 2 Diabetes Mellitus (T2DM) in children and adolescents." *Pediatrics*, 131(2) (February 2013): 364-382.
- 154 Marc B. Lande, and Joseph T. Flynn, "Treatment of hypertension in children and adolescents," *Pediatric Nephrology*, (Berlin, Germany), 24(10) (October 2009): 1939-1949.
- 155 National Heart, Lung, and Blood Institute, "Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents: Summary Report," October 2012: 1-84.
- 156 U.S. Department of Health and Human Services, Health Resources and Services Administration, "Secretary's Advisory Committee on Heritable Disorders in Newborns and Children: 2012 Annual Report," 2012.
- 157 Elizabeth R. Woods, Urmi Bhaumik, Susan J. Sommer, Sonja I. Ziniel, Alaina J. Kessler, Elaine Chan, Ronald B. Wilkinson, Maria N. Sesma, Amy B. Burack, Elizabeth M. Klements, Lisa M. Queenin, Deborah U. Dickerson, and Shari Nethersole, "Community Asthma Initiative: Evaluation of a Quality Improvement Program for Comprehensive Asthma Care," *Pediatrics*, 129(3) (2012): 465-472.
- 158 Marc B. Lande and Joseph T. Flynn, "Treatment of hypertension in children and adolescents," *Pediatric Nephrology*, (Berlin, Germany), 24(10) (October 2009): 1939-1949.
- 159 Brian W. McCrindle, "Assessment and management of hypertension in children and adolescents," *Nature Reviews Cardiology*, 7(3) (March 2010): 155-163.
- 160 Joseph Cafazzo, "Can kids improve their own health? Results from a study of smartphone use in juvenile diabetes," February 28, 2012.
- 161 iMedicalApps, "Can kids improve their own health? Results from a study of smartphone use in juvenile diabetes," February 28, 2012.

- 162 Henry Ehrlich, "Using smartphones to track asthma compliance," *Asthma Allergies Children*, April 20, 2012.
- 163 Seattle Children's Hospital, "Making the smartphone smarter," 2012 Academic Annual Report.
- 164 J. Leighton Read, and Stephen M. Shortell, "Interactive games to promote behavior change in prevention and treatment," *JAMA: The Journal Of The American Medical Association*, 305(16) (April 27, 2011): 1704-1705.
- 165 Neal Halfon, Amy Houtrow, Kandyce Larson, and Paul W Newacheck, "The changing landscape of disability in childhood," *The Future Of Children / Center For The Future Of Children, The David And Lucile Packard Foundation*, 22(1) (Spring 2012): 13-42.
- 166 Chris Collins, Denise Levis Hewson, Richard Munger, and Torlen Wade, "Evolving Models of Behavioral Health Integration in Primary Care," *Milbank Memorial Fund*, May 2010: 1-102.
- 167 Ruth Perou, Rebecca H. Bitsko, Stephen J. Blumberg, Patricia Pastor, et al., "Mental health surveillance among children, United States, 2005-2011," *Centers for Disease Control and Prevention Mortality and Morbidity Report*, 62(2) (May 17, 2013): 1-3.
- 168 Morris Zwi, Hannah Jones, Camilla Thorgaard, Ann York, and Jane A. Dennis, "Parent Training Interventions for ADHD in children 5 to 18 years." *Cochrane Database Systematic Review*, 7(12) (December 2011).
- 169 Robert Rader, Larry McCauley, and Erin C. Callen, "Current strategies in the diagnosis and treatment of childhood attention-deficit/hyperactivity disorder," *American Family Physician*, 79(8) (April 15, 2009): 657-665.
- 170 Lara J. Akinbami, Xiang Liu, Patricia N. Pastor, Cynthia A. Reuben, "ADHD among children aged 5 -17 years in the US, 1998 – 2009," *NCHS Data Brief*, 70 (August 2011): 1-8.
- 171 U.S. Department of Health and Human Services, "Key Findings: Trends in the Prevalence of Developmental Disabilities in U.S. Children, 1997-2008," *Centers for Disease Control (Atlanta, GA)*, February 1, 2012, accessed July 31, 2012.
- 172 Ruth Perou, Rebecca H. Bitsko, Stephen J. Blumberg, Patricia Pastor, et al., "Mental health surveillance among children, United States, 2005-2011," *Centers for Disease Control and Prevention Mortality and Morbidity Report*, 62(2) (May 17, 2013): 1-3.
- 173 Kouichi Yoshimasu, William J. Barbaresi, Robert C. Colligan, Robert G. Voigt, Jill M. Killian, Amy L. Weaver, and Slavica K. Katusic, "Childhood ADHD is strongly associated with a wide range of psychiatric disorders during adolescence: a population based birth cohort study," *Journal of Child Psychology and Psychiatry*, 53(10) (May 31, 2012): 1036-1043.
- 174 Kathleen Ries Merikangas, Jian-Ping He, Debra Brody, Prudence W. Fisher, Karen Bourdon, and Doreen S. Koretz, "Prevalence and treatment of mental disorders among US children in the 2001-2004 NHANES," *Pediatrics*, 125(1) (January 2010): 75-81.
- 175 U.S. Department of Health and Human Services Substance Abuse and Mental Health Services Administration, "Mental Health, United States, 2010," Publication No (SMA) 12-4681, Rockville, MD: 1-108.
- 176 Jane Meschan Foy, "Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health. Introduction," *Pediatrics*, 125(3) (June 2010): S69-S74.
- 177 Robert Rader, Larry McCauley, and Erin C. Callen, "Current strategies in the diagnosis and treatment of childhood attention-deficit/hyperactivity disorder," *American Family Physician*, 79(8) (April 15, 2009): 657-665.
- 178 Jane Meschan Foy, "Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health. Introduction," *Pediatrics*, 125(3) (June 2010): S69-S74.
- 179 U.S. Department of Health and Human Services, "Mental Health, United States, 2010," Substance Abuse and Mental Health Services Administration (Rockville, MD), HHS Publication No. (SMA) 12-4681 (March 2012): 1-350.
- 180 Kevin M. Antshel, Teresa M. Hargrave, Mihai Simonescu, Prashant Kaul, Kaitlin Hendricks, and Stephen V. Faron, "Advances in understanding and treating ADHD," *BMC Medicine*, 9 (June 10, 2011): 72.
- 181 Samuel H. Zuvekas and Benedetto Vitiello, "Stimulant medication use in children: a 12-year perspective," *American Journal of Psychiatry*, 169(2) (September 28, 2011): 160-166, and New York State Office of Mental Health, "Treatment of Children with Mental Disorders," (November 2012): 1-6.

- 182 Grace Chai, Laura Governale, Ann W. McMahon, James P. Trinidad, Judy Staffa, and Dianne Murphy, "Trends of Outpatient Prescription Drug Utilization in US Children 2002 – 2010," *Pediatrics*, 130(1) (July 2012): 23-31.
- 183 U.S. Department of Justice, "Prescription for Disaster: How Teens Abuse Medicine," *Drug Enforcement Administration 2* (August 2012): 1-55, Accessed April 29, 2013.
- 184 Cassie Goldberg, "National Study: Teen misuse and abuse of prescription drugs up 33 percent since 2008, stimulants contribution to sustained RX epidemic," *The Partnership at Drugfree.org*, (April 23, 2013).
- 185 Mark Olfson, Stephen Crystal, Cecilia Huang, and Tobias Gerhard, "Trends in antipsychotic drug use by very young, privately insured children," *Journal of the American Academy of Child and Adolescent Psychiatry*, 49(1) (January 2010): 13-23; mental health assessment (40.8 percent), a psychotherapy visit (41.4 percent), or a visit with a psychiatrist (42.6 percent) during the year of antipsychotic use.
- 186 Silvia Alessi-Severini, Robert G. Biscotri, David M. Collins, Jitender Sareen, and Murray W. Enns, "Ten years of antipsychotic prescribing to children: A Canadian population based study," *Canadian Journal of Psychiatry*, 57(1) (January 2012): 52-58.
- 187 Chris Collins, Denise Levis Hewson, Richard Munger, and Torlen Wade, "Evolving Models of Behavioral Health Integration in Primary Care," *Milbank Memorial Fund*, May 2010: 1-102.
- 188 Bradley O. Boekeloo, and Melinda G. Novik, "Clinical approaches to improving alcohol education and counseling in adolescents and young adults," *Adolescent Medicine: State Of The Art Reviews*, 22(3) (December 2011): 631.
- 189 Amy N. Mendenhall, Christine Demeter, Robert L. Findling, Thomas W. Frazier, Mary A. Fristad, Eric A. Youngstrom, and Sarah McCue Horwitz, et al., "Mental health service use by children with serious emotional and behavioral disturbance: results from the LAMS study," *Psychiatric Services* (Washington, D.C.), 62(6) (June 2011): 650-658.
- 190 American Academy of Pediatrics, "School-Based Mental Health Services," *Pediatrics*, 113 (2004): 1839-1845.
- 191 Donna Behrens, Julia Graham Lear, and Olga Acosta Price, "Improving access to children's mental health care: lessons from a study of 11 states," *The Center for Health and Health Care in Schools at George Washington University*, Washington, DC, March 2013: 1-12.
- 192 Beth A. Stroul and Robert M. Friedman, "Effective Strategies for Expanding the System Of Care Approach," September 2011, U.S. Department of Health and Human Services Substance Abuse and Mental Health Services Administration, Atlanta, Georgia, September 2011: 1-120.
- 193 National Academy of Sciences, Report Brief for Policymakers, "Preventing Mental, Emotional, and Behavioral Disorders Among Young People: Progress and Possibilities, March 2009.
- 194 Jane Meschan Foy, "Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health," *Pediatrics*, 125(3) (June 2010): S69-S74.
- 195 Garfield, RL, Beardslee, WR. Behavioral health services in separate CHIP programs on the eve of parity, *Adm Policy Ment Health*. 2012 May; 39(3): 147-157.
- 196 National Council for Community Behavioral Healthcare, *Increasing Access to Behavioral Healthcare Managed Care Options and Requirements*, July 2011.
- 197 Chris Collins, Denise Levis Hewson, Richard Munger, and Torlen Wade, "Evolving Models of Behavioral Health Integration in Primary Care," *Milbank Memorial Fund*, May 2010: 1-102.
- 198 The Catalyst Center, "The Massachusetts Child Psychiatry Access Project – Combining Innovation and Collaboration to Enhance children's mental health services in the primary care setting," *Catalyst Center Coverage*, February 2011: 1-4.
- 199 UnitedHealth Center for Health Reform and Modernization, "Modernizing Rural Health Care: Coverage, quality and innovation," *Working Paper 6*, July 2011: 1-84.
- 200 Donna Behrens, Julia Graham Lear, and Olga Acosta Price, "Improving access to children's mental health care: lessons from a study of 11 states," *The Center for Health and Health Care in Schools at George Washington University*, Washington, DC, March 2013: 1-12.
- 201 Amy N. Mendenhall, Christine Demeter, Robert L. Findling, Thomas W. Frazier, Mary A. Fristad, Eric A. Youngstrom, and Sarah McCue Horwitz, et al., "Mental health service use by children with serious emotional and behavioral disturbance: results from the LAMS study," *Psychiatric Services* (Washington, D.C.), 62(6) (June 2011): 650-658.
- 202 Jane Meschan Foy, "Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health. Introduction," *Pediatrics*, 125(3) (June 2010): S69-S74.

- 203 Donna Behrens, Julia Graham Lear, and Olga Acosta Price, "Improving access to children's mental health care: lessons from a study of 11 states," *The Center for Health and Health Care in Schools at George Washington University*, Washington, DC, March 2013: 1-12.
- 204 Colorado Beacon Consortium, "Tear down this wall: Rocky Mountain Health Plans embarks on a mission to bring together behavioral health and primary care," *Issue 1(1)*, 2012: 1-7.
- 205 Eyal Ben-Issac, Sheree M. Schragar, Matthew Keefer, and Alex Y. Chen, "National Profile of Non-emergent Pediatric Emergency Department Visits," *Pediatrics*, 125(3) (February 1, 2010): 454-459.
- 206 Anna Sommers, Ellyn R. Boukus, and Emily Carrier, "Dispelling Myths About Emergency Department Use: Majority of Medicaid Visits Are for Urgent or More Serious Symptoms Center for Studying Health System Change," *Center for Studying Health System Change (HSC) Research Brief No. 23*, July 2012: 1-13.
- 207 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, (February 2011): 1-9.
- 208 Donna Anderson, Sere Dumont, Philip Jacobs, and Leila Azzaria, "The Personal Costs of Caring for a Child with a Disability: A Review of the Literature," *Public Health Reports*, 122(1) (January 2007): 3-16.
- 209 Cynthia R. Schuster, Jean M Mitchell, and Darrell J. Gaskin, "Partially Capitated Managed Care Versus FFS for Special Needs Children," *Health Care Financing Review*, 28(4) (Summer 2007): 109-123.
- 210 Carrie Hanlon, "Measuring and Improving Care Coordination: Lessons from ABCD III," *National Academy for State Health Policy*, June 2013: 1-29.
- 211 American Academy of Pediatrics Committee on Child Health Financing "Guiding Principles for Managed Care Arrangements for the Health Care of Newborns, Infants, Children, Adolescents, and Young Adults," *Pediatrics*, 118(2) (August 2006): 828-833.
- 212 Harold A. Pollack, John R. C. Wheeler, Anne Cowan, and Gary L. Freed, "The Impact of Managed Care Enrollment on Emergency Use Among Children with Special Health Care Needs," *Medical Care*, 45(2) (February 2007): 139-145.
- 213 Andrew B. Bindman, Arpita Chattopadhyay, Dennis H. Osmond, William Huen, and Peter Bacchetti, "The impact of Medicaid managed care on hospitalizations for ambulatory care sensitive conditions," *Health Services Research*, 40(1) (February 2005): 19-38.
- 214 Margaret L. Oehlmann, "Improving Managed Care for Children with Special Needs," *Center for Health Care Strategies*, 2004: 1-59.
- 215 Meagan Lyon, Anne Rossier Markus, and Sara Rosenbaum, "The Affordable Care Act, Medical Homes, and Childhood Asthma: A Key Opportunity for Progress", *George Washington University School of Public and Health Services, Department of Health Policy*.
- 216 James M Perrin, "Health Services Research for Children with Disabilities," *The Milbank Quarterly*, 80(2) June 2002: 303-324.
- 217 Cynthia R Schuster, Jean M Mitchell, and Darrell J Gaskin, "Partially Capitated Managed Care Versus FFS for Special Needs Children" *Health Care Financing Review*, 28(4) (Summer 2007): 109-123.
- 218 UnitedHealth Center for Health Reform & Modernization, analysis of Center for Medicare & Medicaid Services administrative data (2010 MSIS). Figures represent benefit spending for children enrolled in Medicaid managed care for the majority of their benefits. Some services, such as prescription drugs or mental health benefits may be "carved out" and paid for on a fee-for-service basis. Some children are enrolled in managed care organizations that cover a subset of benefits, such as mental health services or dental services.
- 219 Beth Morrow, "Electronic Information Exchange: Elements that Matter for Children in Foster Care," *The Children's Partnership State Policy Advocacy and Reform Center*, January 2013: 1-10.
- 220 Jane Meschan Foy, "Enhancing pediatric mental health care: report from the American Academy of Pediatrics Task Force on Mental Health," *Pediatrics*, 125(3) (June 2010): S69-S74.
- 221 MD Dickens, JL Green, AE Kohrt and HA Pearson, *The Medical Home*, *Pediatrics*, 1992: 90; 774.
- 222 Jaya Aysola, E. John Orav, and John Z. Ayanian, "Neighborhood characteristics associated with access to patient-centered medical homes for children," *Health Affairs (Project Hope)*, 30(11) (November 2011): 2080-2089.
- 223 Katherine A. Auger, Robert S. Kahn, Matthew M. Davis, Andrew F. Beck, and Jeffrey M. Simmons, "Medical home quality and readmission risk for children hospitalized with asthma exacerbations," *Pediatrics*, 131(1) (January 2013): 64-70.

- 224 Webb E. Long, Howard Bauchner, Robert D. Sege, Howard J. Cabral, and Arvin Garg, "The value of the medical home for children without special health care needs," *Pediatrics*, 129(1) (January 2012): 87-98.
- 225 UnitedHealth Center for Health Reform and Modernization, "Coverage for Consumers, Savings for States: Options for Modernizing Medicaid," Working Paper 3, April 2010: 1-66.
- 226 Sabrina K. H. How, Ashley K. Fryer, D. McCarthy, Cathy Schoen, and Edward L. Schor, "Securing a Healthy Future: The Commonwealth Fund State Scorecard on Child Health System Performance," *The Commonwealth Fund*, (February 2011): 1-90.
- 227 Jay G. Berry, Matt Hall, David E. Hall, Dennis Z. Kuo, Eyal Cohen, Rishi Agrawal, Kenneth D. Mandl, Holly Clifton, and John Neff, "Inpatient growth and resource use in 28 children's hospitals: a longitudinal, multi-institutional study," *Journal Of The American Medical Association (JAMA) Pediatrics*, 167(2) (February 2013): 170-177.
- 228 Children's Oncology Group, Accessed May 30, 2013. The Children's Oncology Group includes more than 8,000 childhood cancer professionals at more than 200 children's institutions across North America, Australia, New Zealand, and Europe.
- 229 Lisa A. Simpson, Laura Peterson, Carole M. Lannon, Sharon B. Murphy, Clifford Goodman, Zhaoxia Ren, and Anne Zajicek, "Special challenges in comparative effectiveness research on children's and adolescents' health," *Health Affairs (Project Hope)*, 29(10) (October 2010): 1849-1856.
- 230 U.S. Department of Health and Human Services, "Secretary's Advisory Committee on Heritable Disorders in Newborns and Children: 2012 Annual Report," *Health Resources and Services Administration*, (2012): 1-27.
- 231 Patricia J. Barta, "Improving Asthma Care for Children: Best Practices in Medicaid Managed Care," *Center for Health Care Strategies*, July 2006: 1-4.
- 232 ImproveCareNow, Accessed June 4, 2013.
- 233 Paul H. Wise, "The rebirth of pediatrics," *Pediatrics*, 123(1) (January 2009): 413-416.
- 234 Nir Menachemi, Robert G. Brooks, Ellen Schwalenstocker, and Lisa Simpson, "Use of health information technology by children's hospitals in the United States," *Pediatrics*, 123(Suppl 2) (January 2009), S80-S84.
- 235 Bob Doyle, Christine Dalton, and Melissa Lupella, "Children's Hospitals and the Changing Healthcare Environment," *Navigant Healthcare*, 2012: 1-7.
- 236 The PFK ACO was awarded a \$13.1M health care innovation grant from the Centers for Medicare and Medicaid Services (CMS) in 2012. The grant will enable them to expand coverage under the ACO and provide coverage to over 500,000 children in 46 out of 88 counties in Ohio and this program will be evaluated by CMS. "\$13.1 million innovation grant expands pediatric health care for underserved children.6/18/2012." Accessed on 8/2/12 from Other partners include the State of Ohio, Nationwide Children's Hospital and other providers in the Ohio program. Other states, including California, Missouri, and Michigan, are in the early stages of forming pediatric ACOs.
- 237 *ACO Business News*, June 2012, 3(6).
- 238 Patricia J. Barta, "Improving Asthma Care for Children: Best Practices in Medicaid Managed Care," *Center for Health Care Strategies*, July 2006: 1-4.
- 239 Institute of Medicine and National Research Council of the National Academies, *Child and Adolescent Health and Health Quality: Measuring What Matters*, The National Academies Press: Washington, D.C., 2011: 1-341.

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