

#1 Overall

How Children's Hospitals
Can Quarterback America
to Health & Prosperity



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A Message From the CEO



The football references in this white paper are no accident. As a Jacksonville, Florida, resident, I was over the moon when the Jaguars selected Trevor Lawrence as the number one overall pick this past spring at the NFL draft.

Quarterbacks scan the field, consider the unique skills of their teammates, and execute the play. It's their job to assess the circumstances and get the ball in the hands of the player best equipped to gain yardage and score. I see a future in which children's hospitals are drafted as the official quarterbacks for child health in America. With this approach, we can achieve the real goal of a children's hospital: to do such a good job managing children's health outside its walls that fewer children need to visit the hospital in the first place.

The point is to increase the number of children who become healthy adults. It won't surprise many readers to learn that physical activity is a powerful way to build health and cognitive function in childhood and adulthood. But readers may be surprised to learn that a range of additional factors beyond quality medical care, from literacy to nutrition, are directly related to achieving success in adulthood: Decades of research tell us that factors like these lead to higher incomes, better health, and reduced criminal activity.

NFL draft picks aside, there has been no shortage of historic events this year. From commercial space flights, the Olympic Games, the development of the COVID-19 vaccine in record time, and the infrastructure bill in Congress, these events prove not only our resilience, but are celebrations of human ingenuity and "can do" moments for our country and the world. These events give us important information about our health as a population and our capacity to hit new records, achieve bigger goals, and improve our economy and quality of life in the 21st century and beyond. We know this because America has met these challenges before — in the last century, we battled the Spanish flu, put a man on the moon, won numerous Olympic gold medals, and built infrastructure that transformed life as we know it.

My goal in writing this sports-themed paper is to illustrate a new vision for America, one in which medical care is delivered in coordination with the other factors that create child health. As healthier children become healthier adults, they will transform the health care system and power our economy for decades to come.

A handwritten signature in black ink that reads "R. Moss". The signature is stylized and cursive, with a large initial "R" and a long, sweeping underline.

R. Lawrence Moss, MD, FACS, FAAP
President and Chief Executive Officer
Nemours Children's Health

What the Game Footage Tells Us

Athletes review footage of past games — gathering insights into both their performance and their opponents' — to plan their next win.

A brief review of American history offers us the same opportunity to win in the 21st century. Life expectancy in America increased dramatically from the late 1800s through the 1900s. This was initially due to decreased child mortality and later to increases in the average life span.ⁱ A variety of investments in the nation's health and productivity powered better health, from sewage systems that reduced the spread of disease to the medical research that produced antibiotics and vaccines.

During the same period, states made school attendance compulsory for children and lending libraries spread across the country, further bolstering well-being and prosperity by capitalizing on the mutually reinforcing relationship between education and health. America built railroads, highways and telecommunication systems, allowing more people to receive a greater variety of goods, information and services. We built new hospitals and expanded existing hospitals. The economy grew, the average income increased, and more people could get and stay healthy.ⁱⁱ

Then, in 2020, life expectancy dropped by 1.5 years.ⁱⁱⁱ While deaths due to COVID-19 impacted the data, Pulitzer Prize-winning journalist David Leonhardt explains that “Even before the pandemic, the U.S.

During the second half of the 2010s, life expectancy fell on a sustained basis for the first time since the fighting of World War II killed several hundred thousand Americans.

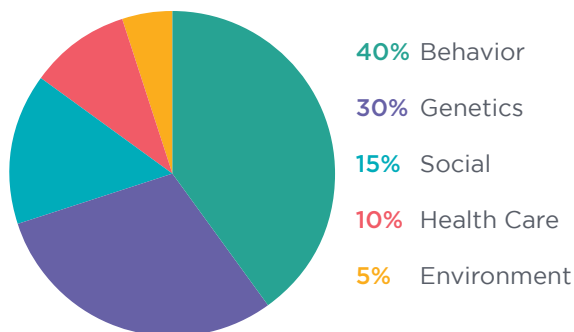


was mired in an alarming period of rising mortality. It had no modern precedent: During the second half of the 2010s, life expectancy fell on a sustained basis for the first time since the fighting of World War II killed several hundred thousand Americans.”^{iv}

Mortality, Health and Health Care

Considering life expectancy as a measure of population health, it becomes clear — as the pie chart below illustrates — that access to health care alone does not equal health.^v

Figure 1: Causes of premature death.^{vi}



Humans need the “whole pie” to be free from illness and to thrive. On some level, we know this intuitively. The word health is related to the Old English word for “whole,” as in “people should be whole in body, mind, and spirit.”^{vii}

Now, thanks to technology, we know more about why this is true at a physiological level. Here’s just one recent example of many. A 2021 study published in the Journal of the American Medicine Association found that “in the U.S., local variation in neighborhood

Kids Aren’t Little Adults: Child Health *is* Different

For much of human history, children were thought of as “little adults”: Their minds and bodies were regarded as being miniature versions of adult minds and bodies. Research and scientific discoveries prove that this is not true. Just as a caterpillar is not a butterfly, human children are physiologically different from human adults. Childhood is a finite window of time of development, and this makes children particularly susceptible to harmful things and gives them a high capacity for benefiting from positive things. As history demonstrates, the more we design our systems to prevent bad things (lead in the water supply, tainted milk, illiteracy) and to promote good things (mental health, physical activity, nutrition), the greater the gains will be in adulthood. Countries with the resources and the will to build systems that promote child health have a distinct advantage over those that do not.^{viii}

disadvantage was associated with lower neurocognitive performance and smaller cortical surface area and subcortical volume in young people.^{ix}

In other words, a lack of the necessary inputs to health in childhood can cause permanent harm that snowballs for years, negatively impacting the individual and causing a ripple effect throughout communities and the country.

The Evolution of Children's Hospitals



Drafting children's hospitals to be the quarterbacks of child health is a natural next step in their evolution. The first children's hospital was founded in Paris, France, in 1802. Beginning in the late 1800s and throughout the 1900s, cities across America followed suit. This period was one of massive improvements in health, to which children's hospitals were active contributors. For example, decades before pasteurization became mandatory in the United States, they established milk labs to ensure that young patients did not drink milk infected with tuberculosis, typhoid fever, or other diseases responsible for the deaths of an untold number of children.

As illustrated by archival photographs, children's hospitals prescribed and provided nutritious food, outdoor activities, play and education. Long before the Civil Rights Movement, children's hospitals also accepted and cared for children of all races and ethnicities, regardless of their ability to pay. These nonprofit institutions conducted research that led to vaccines, medicines and treatments for some of the worst childhood diseases. The lab at Nemours Children's Health, for example, was a leading source of research into streptococcal infections (today, these infections still cause high rates of infant deaths in countries without adequate access to health care and antibiotics). By the mid- to late 1900s, many existing children's hospitals built new facilities to treat more patients and allowed parents and caregivers to stay with children.

Today, modern children's hospital infrastructure includes remote monitoring, electronic health records and telemedicine and integrated programs that involve schools, housing departments, and other institutions. The remarkable history and 21st-century capabilities of America's children's hospitals give us a glimpse of what the future could look like if we fully empowered them to partner with communities and become the quarterbacks of child health.*

Making sure that America's children have access to things that create health — like clean water, a bed to sleep in at night, supportive mentors at school, and health care — is well within our nation's reach.

The 2021 infrastructure legislation from Congress suggests that America is moving in this direction by delivering clean water (reducing illness caused by aging systems), cleaner air (reducing asthma rates), and expanded broadband access (allowing more families to benefit from telemedicine, remote learning, and remote employment). We know that when our children enter adulthood with the physical, mental, and emotional health necessary to lead stable and productive lives, they — and all American taxpayers — benefit from the corresponding increase in average income and the reduction in health care spending, crime and welfare reliance. All of which begs the question: With more resources and knowledge at our disposal than we've ever had, are we healthier and more productive?

For decades, the U.S. has been trying to retool its expensive, cumbersome health care system to prevent and treat chronic diseases more efficiently. Efforts to control health care spending are often oriented to cost containment and, as a result, focus on the largest and most expensive demographic of the population — adults. Evaluating and containing health care spending on adults is necessary, but it's not sufficient. To create more health and transform the health care system, we must reduce the prevalence of conditions that take root in childhood and directly impact adult health, well-being and productivity — in other words, quality of life and nothing less than the American Dream. As the many inputs to health on the pie chart of health suggests, doing so requires an integrated approach.

What's an ACE?

An ace may be a good thing in golf or poker, but unaddressed ACEs in childhood can physically change our bodies and the course of our adult lives. Adverse Childhood Experiences (ACEs) create toxic stress capable of disrupting development and creating epigenetic markers that pass the detrimental effects to the next generation, creating an intergenerational cycle.

Fortunately, studies show that humans are also capable of passing the effects of a healthy childhood to the next generation. With the right support, children are capable of remarkable healing, growth and resiliency. If we align our health system to address ACEs in childhood, we can dramatically improve outcomes and reduce costs for all Americans for years to come.^{xi}



Instead of thinking narrowly about health care spending, we need to look more broadly at what creates health in childhood. Only then can we begin to dramatically improve the health of each child entering adulthood in America. When we do that, health care spending among adults will start to decrease simply because they are healthier when they enter the adult health care system. The benefits of a healthier adult population will snowball over time. Evidence proves that healthy behaviors adopted in childhood are subsequently passed on to the next generation.

The Outsized Power of Child Health

Thanks to our 21st-century understanding of child health, we can harness its transformative power.

Children’s Health Is Powerful Because ... Early Is Less Expensive.

Catching and addressing the factors that lead to diseases in adulthood — such as heart disease, diabetes and mental illness — is orders of magnitude less expensive than treating these conditions in adulthood. Doctors, schools and other organizations already successfully do this today, but at a much smaller scale than is needed to transform the health of American adults.



Children’s Health Is Powerful Because ... the Gains Are Greater.

For many American adults, preventable and chronic underlying conditions reduce quality of life and productivity while increasing the risk of premature death.

As individuals and as a nation, we gain so much more than child health when we use the tools at our disposal to create health in childhood. We gain time in the form of longevity and increased quality time during which we can thrive and prosper. We gain a more productive workforce to drive our economy. We even pass the benefits of health on to the next generation, further extending the reach of childhood health into the future.



Children’s Health Is Powerful Because ... Small Is Nimble.

Being a small industry segment is an advantage for building consensus among stakeholders and putting value-based care and population health agreements and policies in place (changing the way contracts are designed, partnerships are facilitated, and infrastructure is used). Health care spending for children and youth is a fraction of spending on adults. We can try bold experiments in this small group that can produce a massive return on investment. One hundred percent of the adult population start as children.





A Winning Playbook

More Teamwork, More Touchdowns

Children’s hospitals are well-positioned to serve as quarterbacks to teams of experts. By expanding programming and partnerships with a variety of organizations and agencies, children’s hospitals can ensure that children are receiving the inputs to health at home, at school, at play, and in the doctor’s office.

Legendary football coach Vince Lombardi said that “We would accomplish many more things if we did not think of them as impossible.” Well, we know that it is possible to create more health for more children — even, or maybe especially, those children who do not set foot in one of our hospitals or clinics.

Here are just a few ways Nemours Children’s is working to create more health for more children in our communities and beyond.

1. Better Data, More Insights for Health

In 2020, Nemours Children’s began asking families if they experience any challenges when it comes to obtaining or maintaining the things that create health. “With a growing database of almost 25,000 responses from parents and guardians, we can identify obstacles to health and design programs to address them. When we think of health innovation, a new drug or medical device often comes to mind. But I think some of the most exciting breakthroughs of the 21st century will come from patient families themselves and from health systems listening more closely to the obstacles that impact their health,” explains Alex Koster, director of Analytics and Technology for the Nemours Children’s Office of Value-Based Care. Barriers to healthier children in our communities include financial and housing issues, food insecurity and affordable internet service. Through a combination of on-the-ground coordinators embedded in pediatric practices, policy advocates at every level of government, and committed community partners, we are working to tackle each barrier to health head-on.

2. Meeting Financial Needs Where It Counts

Many families are stuck between a financial rock and a hard place: They do not qualify for various grant assistance programs, but they lack access to affordable credit options. Nemours Children’s has partnered with Discover Bank to fund The Health Enabling Assistance and Loan (HEAL) program. With implementation support from the United Way of Delaware and Capital Good Fund, HEAL is designed to help parents overcome the financial barriers to improving the health and well-being of their children.



The American Health System Includes Schools, Libraries and the Internet

Education and health are the building blocks for human capital and the foundation of adult human capital is laid during childhood.

Hospitals, schools and all other systems that distribute knowledge — from telecommunications to libraries — must work together if America is going to win in the 21st century.

3. Building Health Equity for Community Resilience

Medical-legal partnerships are unique collaborations between health care teams and legal aid attorneys to address issues such as housing code violations. For a child with asthma, corrected housing conditions can improve asthma control, reduce time spent in the hospital, and increase days spent in school (and at play). For the child's parents, managed asthma can mean fewer days of missed work. Through Delaware First Lady Tracey Quillen Carney's First Chance Delaware initiative, Nemours Children's is partnering with legal aid services and an early education provider to provide a multidisciplinary and neighborhood-based approach to legal aid services. As the first pediatric medical-legal partnership in the state, this initiative can improve health equity and community resilience.

We also work closely with community partners to support the well-documented connection between education and health and connect families with the resources they need to raise tomorrow's healthy American adults.

Programs include telemedicine in schools, early literacy interventions, nutrition and physical activity programming for pre-k children, a program for introducing talented undergraduates from diverse backgrounds to careers in medicine and public health, and a partnering with local schools to help students cope with racial stress and trauma.

We also created one of the world's most-visited websites devoted to children's health. Nemours KidsHealth.org and KidsHealth in the Classroom are together visited more than 250 million times each year by parents, teens, kids and teachers looking for physician-vetted information on staying healthy.

Nemours Children's learns more about what creates the most health and well-being for the children in our neighborhoods, cities and states with each program. Working with parents, community partners and government leaders, we'll continue to refine our playbook, tackling more and more of the issues that stand between America's children and healthy, happy adulthood.

Imagine a World...



... where America harnesses the outsized power of child health to transform the definition of health in children and create the healthiest populations in human history.

... where children's hospitals can use their ability to identify trends and patterns in combination with their expertise, infrastructure and community partnerships to maximize the impact of every dollar spent on child health.

... where children's hospitals are empowered to create health for millions of children, improving the quality of life in our communities and country in a matter of years, and for generations to come.

... where, even though infants, toddlers, and young adults cannot vote, children's hospitals become the voice for the interests of children to powerful stakeholders.

... where the government funding criteria incentivize children's hospitals to create health instead of maximizing the number of procedures.

... where Trevor Lawrence leads the Jaguars to a Super Bowl Championship!

Endnotes

- i See “Life expectancy (from birth) in the United States, from 1860 to 2020” at Statista.com <https://www.statista.com/statistics/1040079/life-expectancy-united-states-all-time/> and “How Humanity Gave Itself an Extra Life” by Stephen Johnson, Updated July 21, 2021, *The New York Times* <https://www.nytimes.com/2021/04/27/magazine/global-life-span.html>
- ii Fisk, Donald M., “American Labor in the 20th Century”, Bureau of Labor Statistics, Fall 2001 issue of *Compensation and Working Conditions* <https://www.bls.gov/opub/mlr/cwc/american-labor-in-the-20th-century.pdf>
- iii See “Provisional Life Expectancy Estimates for 2020” by Elizabeth Arias, Ph.D., Betzaida Tejada-Vera, M.S., Farida Ahmad, M.P.H., and Kenneth D. Kochanek, M.A. via the CDC website at https://stacks.cdc.gov/view/cdc/100392/cdc_100392_DS1.pdf
- iv See “Life Expectancy, Falling” by David Leonhardt, The New York Times, July 22, 2021 <https://www.nytimes.com/2021/07/22/briefing/life-expectancy-falling-covid-pandemic.html>
- v Health is commonly understood to refer to a state of being, “especially freedom from illness or disease.” See Merriam-Webster at <https://www.merriamwebster.com/dictionary/health> and Lexico, powered by Oxford University Press, at <https://www.lexico.com/definition/health>.
- vi Dzau, V. J., M. McClellan, J. M. McGinnis, and E. M. Finkelman, editors. 2017. “Vital directions for health & health care: An initiative of the National Academy of Medicine Washington, DC”, National Academy of Medicine
- vii See Lexico entries for *health and whole* at <https://www.lexico.com/definition/health> <https://www.lexico.com/definition/whole>
- viii On how children have been viewed historically: “Children in the New Millennium; Environmental Impact on Health” UNEP/UNICEF/WHO, 2002 www.who.int/water_sanitation_health/hygiene/settings/millennium/en/

On the definition of child health: “Children’s Health, The Nation’s Wealth: Assessing and Improving Child Health” by The National Research Council and The Institute of Medicine https://www.ncbi.nlm.nih.gov/books/NBK92210/#__NBK92210_dtls__

ix Hackman D, Cserbik D, Chen J, et al. “Association of local variation in neighborhood disadvantage in metropolitan areas with youth neurocognition and brain structure”, *JAMA Pediatrics*, 2021
<https://jamanetwork.com/journals/jamapediatrics/fullarticle/2779445>

x Regarding pasteurization of cow’s milk, see “Achievements in Public Health, 1900-1999: Healthier Mothers and Babies” at <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm4838a2.htm>, “How Humanity Gave Itself an Extra Life” by Stephen Johnson <https://www.nytimes.com/2021/04/27/magazine/global-life-span.html>, *Images of America: Children’s Hospital of Boston* by The Archives Program of Children’s Hospital Boston, Arcadia Publishing, pg. 24 and 38, and *Images of America: Children’s Memorial Hospital of Chicago*, by Stanford T. Shulman, Arcadia Publishing, pg. 24.

For reference to Streptococcal infections, see *Images of America: Nemours Children’s Health* by R. Lawrence Moss, Arcadia Publishing, pg. 68-69 and “Group B Streptococcus infection causes an estimated 150,000 preventable stillbirths and infant deaths every year” by the World Health Organization
<https://www.who.int/news/item/05-11-2017-group-b-streptococcus-infection-causes-an-estimated-150-000-preventable-stillbirths-and-infant-deaths-every-year>

xi Regarding the impact of toxic stress in childhood, see pg. 55 of *The Deepest Well: Healing the Long-Term Effects of Childhood Adversity* by Nadine Burke Harris, M.D., published by Mariner Books: “High doses of adversity affect not only the brain structure and function but also the developing immune system and hormonal systems, and even the way DNA is read and transcribed. Once the stress-response system gets wired into a dysregulated pattern, the biological effects ripple out, causing problems within individual organ systems ... what happens in your immune system is deeply connected to what happens in your cardiovascular system.” See also pg. 90 of *The Deepest Well* regarding epigenetic stress.

For an example of a study exploring how positive effects of investments in child health are passed to the next generation, see “The Dynastic Benefits of Early Childhood Education” by Jorge Luis García, Frederik H. Bennhoff, Duncan Ermini Leaf, and James J. Heckman, published online by the National Bureau of Economic Research, July 2021
<https://www.nber.org/papers/w29004>

About Nemours Children's Health

Nemours Children's Health is one of the nation's largest multistate pediatric health systems, which includes two free-standing children's hospitals and a network of nearly 75 primary and specialty care practices. Nemours seeks to transform the health of children by adopting a holistic health model that utilizes innovative, safe, and high quality care, while also caring for the health of the whole child beyond medicine. Nemours Children's also powers the world's most-visited website for information on the health of children and teens, Nemours [KidsHealth.org](https://www.kidshhealth.org).

The Nemours Foundation, established through the legacy and philanthropy of Alfred I. duPont, provides pediatric clinical care, research, education, advocacy, and prevention programs to the children, families and communities it serves. For more information, visit [Nemours.org](https://www.nemours.org).

