

The next great medical innovations that could save children

By Sandee LaMotte, CNN

🕒 Updated 7:08 AM ET, Mon April 24, 2017



Photos: 7 medical advancements that saved children's lives

7 major advancements that saved children's lives - Familiar with the "Back to Sleep" campaign sudden infant death syndrome or SIDS, one of the leading causes of infant death? Called "[Safe to Sleep](#)" today, it urges parents to put babies to sleep on their backs, never on their stomachs or until age 1. Since the start of the campaign in 1994, SIDS rates have dropped by half, which was chosen by the American Academy of Pediatrics as one of the [most important achievements in health](#) in the last 40 years.

1 of 7

Health +

Live TV

U.S. Edition+

AAP committee highlights medical advancements needed for children's health

Child research lags behind adult research, says AAP

"We wanted to identify areas that could have the greatest impact on improving children's lives," added co-author Dr. Clifford Bogue, a critical care pediatrician at Yale University School of Medicine. "Because we believe child research is a great investment, we thought it would be helpful for advocating for funding in the future."

Pediatrics asked themselves. Their answers were published last week in the journal Pediatrics.

"We thought about the next 40 years and what fields of study might lead to great medical achievements," said co-author Dr. Tina Cheng, Director of the Department of Pediatrics at John Hopkins Hospital.

What has pediatric research accomplished?



Related Article: How my daughter died from a simple case of flu

Studies say research into diseases that disable and kill children [falls far behind](#) those done on adults in both scope and quality.

"The amount of research being done with children and infants has been declining," said Cheng, "and funding for pediatric research has been flat or declining as well."

To draw attention to the disparity, the American Academy of Pediatrics created a campaign: the "[7 Great Achievements in Pediatric Research.](#)" By canvassing board members and asking them to rank key advances in childhood health, the AAP created a list of seven of the greatest pediatric research achievements of the last 40 years.

[Published in 2015](#), the historical advances included the famous "Back to Sleep" campaign to prevent sudden infant death syndrome, or SIDS; the all-out push for laws requiring car seats and seat belts for children of all ages; preventing disease with life-saving immunizations and finding a successful treatment for the most common childhood cancer, acute lymphocytic leukemia.

Other great achievements they highlighted were helping premature babies breathe with a surfactant therapy, reducing HIV transmission from mother to baby and increasing the life expectancy for children with sickle cell anemia and cystic fibrosis.

"We wanted to highlight to the public and to legislators just what the value was for the research dollars that were spent, most of which were funded by the National Institutes of Health," said Bogue, "to show the huge impact the research had on saving and improving the lives of children and their families."

Health +

Live TV

U.S. Edition+



Photos: The health game-changers of the last 500 years

Prosthetics – The world's first prosthetic toe dates to an Egyptian mummy. The Romans and wrote about prosthetic arms and legs. But artificial limbs didn't gain a lot of movement and the 1500s, with hands that had the ability to grasp and legs that were able to kneel. While technology continued to develop, the injuries of the Civil War would push Americans to the forefront of prosthetics. Today, technology is taking prosthetics to new levels: bionic limbs with natural feel, and 3D printed prosthetics.

1 of 19

What could the future hold?

Drawing on that same survey, here are the advancements the AAP's Committee on Pediatric Research predicts could occur over the next 40 years.

Health +

Live TV

U.S. Edition+



Related Article: Concerned about vaccine safety? Here are the facts

emerging diseases, and even some of the vaccines we have need to be better."

Some of the vaccines the survey participants hope to see in the future include Zika, Ebola, certain cancers, and the flu.



Related Article: The big one is coming, and it's going to be a flu pandemic

dividends in childhood cancer treatment, especially for cancers notoriously difficult to treat.

"Immunotherapy is booming right now and that's why we picked it," agreed Bogue. "But children are often left out of that research. One reason is safety issues, but they are also a very small market for pharmaceutical companies.

"Yet it's very important to do the research in children," added Bogue. "Because if you can cure a cancer with immunotherapy at age 10 or 15 instead of 65 you have greatly magnified the impact of that therapy."

vaccinations as one of the best ways to protect children from dangerous diseases. Two examples in the survey are rotavirus, a severe gastroenteritis, and Haemophilus influenzae type b (Hib), a leading cause of bacterial meningitis.

Before vaccines were developed, rotavirus killed about 450,000 children worldwide each year. In the United States Haemophilus influenzae type b took the lives of 1,200 children annually.

"We'd had incredible success," said Cheng. "A lot of residents-in-training have never seen tetanus, influenza or polio. But there are always new and

"As we see from history, there are regular pandemics in our world and we are due for one," said Cheng. "Many point to the flu as most likely culprit. It's especially hard on the young and elderly and those with chronic illness."

Cancer immunotherapy 'moonshot'

"We need to find an innovation that can really make a difference with childhood cancer, and immunotherapy may be the next great thing, the sort of 'moonshot' we need," said Cheng.

Using one's own immune system to target cancer cells is cutting-edge research that is showing enormous potential. While most current research focuses on adults, it's also expected to reap huge

Health +

Live TV

U.S. Edition+



Related Article: The weirder side of obesity: genetic forms of obesity are rare yet numerous

He points out that as science works on the human genome, it's getting cheaper and easier to gather information, take it to the lab and do the work to figure out why a mutation causes a disease, the pathways involved and how science might intervene.

"That's the big promise in genomic information," Bogue said. "We can not only tell parents what their child has, but also why and even come up with new treatments."

Early interventions



Related Article: Apple cider vinegar: What the experts say

intervene before the disease becomes severe.

"In the future, if we knew someone was going to become a diabetic at 25, we could start intervening at age 5. Just think of the impact on that child's life, as well as society."

Impact of social, behavior and environmental factors

to grow, so will the ability of science to discover genetic mutations and test for them "prenatally, at birth, and throughout the life course", says the committee, which will allow us to better predict, diagnose and prevent disease.

"Right now when you have a baby, she gets a heel stick for a few drops of blood and they test for a host of genetic conditions that if found early, can be much more treatable," said Cheng.

"30% of disease in young infants and children is due to a genetic disorder and that's just based on the small number of genes we have identified and confirmed to date," added Bogue.

Wouldn't you like to know as a child if you might get type 2 diabetes, heart disease or cancer later in life?

"Many adult diseases are present in childhood," said Bogue, "and follow a pathway that may take years to develop."

As research on the human genome progresses, it is beginning to pinpoint the environmental, behavioral and genetic triggers that might flip a disease switch into action.

"For example, science is beginning to show that young adults who develop schizophrenia may have had brain abnormalities as infants," explained Bogue. "So we can now begin to predict and

Health +

Live TV

U.S. Edition+



Related Article: EPA won't ban pesticide chlorpyrifos; is it safe?

them in front of a TV," said Bogue, "can have a huge impact on their child's development. We need to focus on those factors as well."

Improving our systems of care

What's the third most common cause of death in the United States? It's not a disease. According to researchers at Johns Hopkins, medical errors by health care providers lead to approximately 251,000 deaths each year. The AAP committee sees advances in service among health care providers to be a key area of growth that will have an impact on children's health in the future.

"We're not talking on the individual level, but improving health care itself," explained Cheng. "If we decrease medical errors and provide the same highest quality of care every time we see a patient, we will save lives."

"It's about systems of care," agreed Bogue. "How do we engineer the care we deliver so that it gives us better outcomes? And oddly it often ends up being cheaper."



Related Article: Polluted environments kill 1.7 million children each year, WHO says

exposure to heavy metals, such as arsenic, mercury and lead, can lead to lower IQ and other neurologic and psychological disorders in their children.

But according to the AAP committee, there are social and behavioral ways that can limit a child's potential. They point to maternal malnutrition and other stresses, as well as childhood exposure to violence as stress factors that can "clearly re-program a variety of gene interactions."

"Even interactions that parents have with their child, such as reading to them versus propping

up a book, can have a huge impact on their child's development. We need to

focus on those factors as well."

Increasing global access to care

Today, many children around the world are without access to even the basics of proper health care, such as sanitary water, medical supplies, and food. Nearly one in five children have not received routine immunizations, much less the many advances that have occurred in the last 40 years.

Knowing that intervention A reduces disease B by 90% is great medicine, said Bogue, but how do you actually implement that science so providers and even whole countries are doing it?

"It can take years for those breakthroughs to become standard practice," he explained. "We need to markedly shorten time frame from knowing when it works to putting it into practice so that people can benefit from it."

Health +

Live TV

U.S. Edition+

See the latest news and share your comments with CNN Health on [Facebook](#) and [Twitter](#).

"It's true we can't really predict what comes next, but we need to be thinking about it and where are we going," said Cheng. "The take home message here is that pediatric research has led to improved life expectancy and there are emerging diseases and issues we need to combat. We just want to start the conversation."



What Trump thinks about his presidency so far



Family sues T-Mobile after baby dies without 911 help



Why humans lack an 'anti-aging switch'



'I will die': Moms live-stream visits to lawmaker to protest health care bill

Recommended by