

AAMCNEWS - RESEARCH

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Scientists Closer Than Ever to Earlier Treatments for Autism

A new article in the AAMCNews Innovation Series examines how researchers are making headway in diagnosing autism within the first years of life—the key to more effective treatment, better outcomes.



In 2012, Geraldine Dawson, PhD, director of the Duke Center for Autism and Brain Development at Duke University School of Medicine, coauthored a first-trial study to show that early intervention can result in normalized brain patterns among young children with autism. But because the average age at which children are diagnosed with autism is four, when their brains aren't as malleable, many children with the developmental disorder have missed the chance for early treatment.

Now, screening tools to roll back that average age of diagnosis to the first year of life could soon be widely used in pediatric practices. Much of this innovative work is happening inside the country's medical schools, where researchers are uncovering the roots of autism as well as developing and testing techniques that could literally change the trajectory of a child's life.

"By providing therapy as early as possible, we can have very significant impacts on outcomes—long-term outcomes," says Dawson.

“By studying autism, we’re not only helping children with autism, but also children with other developmental disabilities. Ultimately, it’s about understanding how our brains work.”

Katarzyna Chawarska, PhD
Yale School of Medicine

To help bridge the gap between the science of early intervention and the reality of late diagnosis, Dawson and colleagues are leading research on an iPhone app that records a toddler’s reaction to visual stimuli and analyzes the response for early signs of autism. Duke researchers plan to follow thousands of children who were assessed with the tool at 18 months to determine whether the app is effective at predicting the development of autism.

“Primary care doctors are very busy, and whatever you ask them to do needs to be quick and feasible,” Dawson says. “Conducting an MRI on every child isn’t feasible, but a five-minute video? That’s something that’s scalable.”

In September 2017, Duke was among nine universities awarded a new round of research funding from the National Institutes of Health’s (NIH) Autism Centers of Excellence (ACE) program, which began in 2007 and supports large-scale research to better understand and address autism spectrum disorder, a condition that affects about 1 in every 68 U.S. children and costs billions of dollars in related care and lost productivity every year. ACE recipients receive nearly \$100 million over five years for autism studies. The program is overseen by the NIH’s Eunice Kennedy Shriver National Institute of Child Health and Human Development.

“By studying autism, we’re not only helping children with autism, but also children with other developmental disabilities,” says Katarzyna Chawarska, PhD, director of the Yale Early Social Cognition Program and its Toddler Developmental Disabilities Clinic. “Ultimately, it’s about understanding how our brains work.”

Bridging the “science-to-service gap”

Chawarska, an ACE grantee at Yale University School of Medicine, is leading research on brain development in the last trimester of pregnancy and the first month of a newborn’s life when the neural networks related to social attention start to appear. “If we understand which neural networks are involved in abnormal social attention related to autism, we can design very targeted interventions,” Chawarska says.

The Yale researchers plan to recruit 120 pregnant mothers who previously gave birth to a child with autism—and have a greater risk of doing so again—and 30 pregnant mothers who didn’t. Researchers will conduct brain imaging on the fetuses in late pregnancy and again shortly after birth. The babies will then be followed until they turn two.

Children with autism can display deficiencies in social attention as early as six months old. If Chawarska and her colleagues can identify reliable early indicators of autism before behavioral symptoms emerge, more families can seek help during a pivotal period for intervention.

Beyond the brain study, Yale researchers are using ACE funding to study another intervention aimed at improving social attention in 18-month-olds at risk for autism. Chawarska said if proven effective, the computer-based tool could be particularly beneficial for families with limited access to autism treatment.

Increasing such access is also the goal of ACE awardees at Florida State University, where Amy Wetherby, PhD, director of the Autism Institute within the university's College of Medicine, is leading a network of researchers studying whether an online tool—the Autism Navigator—can effectively turn community health workers into autism interventionists.

One goal, Wetherby says, is to address significant disparities in both autism diagnosis and treatment rates. If community health and social workers can be trained to help medically underserved families identify autism symptoms when they first arise and then engage effectively with their children, the outcomes for these children could be life changing.

“[Early intervention] can mean a big difference in IQ and cognitive ability and whether a child can function well in general education,” she says. “We’re hoping to bridge that science-to-service gap.”

At the heart of the study is whether Autism Navigator, a collection of web-based tools and resources, can train community workers to coach parents in how to support their child's learning and development and, ultimately, lessen their child's autism symptoms. “Right now, the early intervention system depends on specialists,” Wetherby says. “We want to expand the workforce and increase access.”

“I am a clinician first, so what I want is something that is going to allow me to face a parent and tell that parent, ‘I have a solution for optimizing your child’s development.’ From that standpoint, we are closer than ever to helping a new generation of children born at risk of autism by ensuring that this vulnerability does not turn into a disability.”

Ami Klin, PhD
Emory University School of Medicine

Wetherby and colleagues plan to work with about 180 children between ages 18 and 24 months across Florida, Massachusetts, and California. If the Autism Navigator training works in all three states—with each having very different systems for autism services and support—it could likely work in just about any state, she says.

Brain development and social interaction

Ami Klin, PhD, professor and chief in the Division of Autism and Related Disorders at Emory University School of Medicine, is leading a number of ACE-supported projects, all aligning with the premise that “the platform for brain development is reciprocal social interaction,” he says.

One of the Emory projects focuses on speech, language, and communication development. Researchers are recording a child’s home vocal environment and then analyzing the stages of speech acquisition from birth and the impact of caregiver engagement on that development. According to Klin, the project will represent the largest body of data ever collected on the vocal environments of babies.

Brain development is another focus for Klin and his colleagues. For their study cohort, investigators identified subjects before birth who will be followed until they reach 36 months. Researchers will conduct three MRIs before the children reach 6 months to gain insights into how babies’ experiences influence their neural development. The research, Klin says, will offer some of the most comprehensive and intensive study of early brain development concerning social and communication capacities to date.

Klin, also director of the Marcus Autism Center at Children’s Healthcare of Atlanta, says his group’s work is guided by one word: relevance. “We want to be relevant to public health,” he says.

“I am a clinician first, so what I want is something that is going to allow me to face a parent and tell that parent, ‘I have a solution for optimizing your child’s development,’” he says. “From that standpoint, we are closer than ever to helping a new generation of children born at risk of autism by ensuring that this vulnerability does not turn into a disability.”

For more information, visit the NIH’s ACE program.

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