ABCD Challenge

Alabama Baby & Child Development Challenge

Future of the State | State of the Future

Developing the Future Talent Pool of Alabama, Today

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The future of Alabama is born every nine minutes with the birth of a newly developing young mind. What that mind experiences from day one is the future of our state. The Grand Challenge of the Alabama Baby & Child Development Challenge (ABCD Challenge) is to make Alabama the state of the future when it comes to the health, education, and welfare of developing minds.

The ABCD Challenge will shape the earliest experiences and environment of our youngest minds when it matters most. From age zero to three, the brains of our future are shaped by their experiences and exposures. In less than 3 years, they learn to communicate in entirely new languages, to socialize, to share experiences, to express the gamut of emotions, to "read the minds" of others—how to be in the world. Everything they learn beyond age 3 is incremental by comparison. Parents and families are the main gatekeepers of sensory input for infants and toddlers; they also dictate virtually every chemical that goes into their children's bodies. Developing brains literally soak up their immediate environment and experiences without discrimination. Thus, it is critical that we as a university, community, city, and state focus our efforts on optimizing the potential of every developing young mind. Yet for all the parenting books and strategies available, so often we as a society ignore this most critical of period of a child's development, leaving it to chance. To paraphrase Louis Pasteur, chance favors preparing the mind!

In addition to optimizing typically developing minds, we need to lead in early identification and remediation/treatment of those who fall outside of the typical neurodevelopmental trajectory. Early screening and intervention for neurodevelopmental differences/disorders is critical. We need to build infrastructure for thorough early diagnosis and state-of-the-art early interventions. In this arena, Alabama should be a model for the rest of the country by providing families outstanding care now and hope for the future in the form of cutting-edge research.

How do we harness the entire UAB community, the city of Birmingham, and the State of Alabama to ensure optimum brain development for the future of our state? Through coordinated education, awareness, training, and dissemination of current strategies as well as focused research on implementation, efficacy, effectiveness, and ultimately outcomes. We need to understand the genetics and early exposures of parents and infants and how these exposures affect neurodevelopment and ultimately the future of our state.

These efforts will involve and indeed require the entire UAB campus community. This will include Education, Neurobiology, Genetics, Toxicology, Pharmacology, Chemistry, Psychology, Psychiatry, Pediatrics, Neurology, Computer Science, Sociology, among other sciences. In addition, the Arts have a key role to play with the Theatre Department creating lively videos for public service announcements and the Art Department creating visual ads/posters/fliers. Sports teams will be involved in messaging and implementation in the community alongside other student service and Greek organizations, working directly with families and their children.

Several facets of typical and atypical development are targets through large-scale, visionary research projects, community education and training projects, and outcomes research to measure the success of these efforts and to tailor future efforts in an iterative manner. We hope to measure

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genes and environmental exposures, model genetic differences in human cells and animal models and through scientific discovery identify the interventions of the future.

Through our efforts, we aim to demonstrate improved outcomes for the children of our state as measured by quantitative metrics including, but not limited to, improved educational achievement, improved test scores, high school graduation rate, improved early literacy rate, among other milestones for typically developing minds. In addition, we aim to lower the age of diagnosis of neurodevelopmental disorders such as autism and intellectual disability, lower the age of treatment initiation, increase proportion of children with neurodevelopmental disorders who are mainstreamed into typical classrooms, all quantifiable metrics.

The outline below will stimulate initial ideas and discussion among Team Members:

1. Fostering typically developing minds from the beginning of life
    a. Early word exposure shapes working vocabulary and IQ
        i. teaching parent strategies to talk to infants through pointing and labelling physical environment (joint attention predicts word comprehension)
        ii. dissemination of students into Pediatricians' offices in the city of Birmingham (teach vocabulary-building, joint attention, and early reading methods to parents of infants/toddlers; assist developmental screening).
        iii. ultimate goal to "manualize" program for dissemination to entire state.
        iv. research opportunity to record early language exposure with advanced technologies (early word exposure=better vocab/IQ/etc.)
    b. Early reading is marker of future success in many facets of life
        i. teaching parents and families to label words in environment
        ii. develop social skills, communication/language, IQ, and reading
        iii. research opportunity to measure reading level assessments at ages 3-5
2. Improving the lives of young minds dealing with neurodevelopmental challenges
    a. Study environmental exposures, banking maternal blood and urine during pregnancy and cord/heel blood after birth for every pregnancy across the state
    b. Banking sample of every blood draw during childhood ages 0-3 across the state
    c. Alabama Child Genome project—collecting DNA from every child in the state
    d. Alabama Autism Project—screening, early diagnosis, early intervention, biorepository for genetics, genomics, metabolomics, environ. exposures, et al.
    e. Ultimately genotyping all children with neurodevelopmental challenges
    f. Ultimately scanning the brains of these children for future meta-analysis
3. Pipeline to turn these studies of neurodevelopmental disorders into novel therapeutics
    a. human pluripotent stem cell models
    b. lower invertebrate and vertebrate genetic models for screening
    c. rodent models
    d. clinical studies

Sustainability of these efforts will be challenging and critical. Programs proven efficacious via quantifiable outcome measures may be funded through local/state/federal programs/grants in the future. Coordinating with governmental agencies to leverage our campus-wide resources of student volunteers, faculty expertise, manualized educational programs, & educational messaging will be critical to long-term success. The future of our state is worth it.

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List of Likely Team Members

UAB People/Partners
Craig M. Powell, M.D., Ph.D.
Tony Fargason, M.D.
Leon Dure, Ph.D.
Peter Ginter, Ph.D.
Robert E. Palazzo, Ph.D.
Vern M. Keith, Ph.D.
Autumn Cyprès, Ed.D.
Mitchell Cohen, M.D.
James Meador-Woodruff, M.D.
Bruce Korf, M.D., Ph.D.
Lori McMahon, Ph.D.
Lee Ascherman, M.D.
Alan Percy, M.D.
Fred Biasini, Ph.D.
Lucas Pozzo-Miller, Ph.D.
Rajesh Kana, Ph.D.
Sarah Elizabeth O'Kelley, Ph.D.
Justin Schwartz, M.D.
Kristi Menear, Ph.D.
Scott Snyder, Ph.D.
Sylvie Mrug, Ph.D.

UAB Departments/Schools

- College of Arts and Sciences
- School of Education
- School of Engineering
- School of Health Professions
- School of Medicine
- School of Nursing
- School of Optometry
- School of Public Health
- The Graduate School
- Biochemistry and Molecular Genetics
- Biology
- Biomedical Engineering
- Biostatistics
- Cell, Developmental and Integrative Biology
- Chemistry
- Clinical and Diagnostic Sciences
- Communication Studies
- Computer Science

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Environmental Health Sciences
Family and Community Medicine
Genetics
Health Behavior
Health Care Organization and Policy
Health Services Administration
Management, Information Systems, & Quantitative Methods
Marketing, Industrial Distribution & Economics
Music
Neurobiology
Neurology
Nutrition Sciences
Obstetrics and Gynecology
Occupational Therapy
Optometry and Vision Science
Pediatrics
Pharmacology and Toxicology
Political Science and Public Administration
Physical Medicine and Rehabilitation
Physical Therapy
Psychiatry and Behavioral Neurobiology
    Division of Child and Adolescent Psychiatry
Psychology
Schools
Social Work
Sociology
Theatre
Women's Advocacy and Counseling

UAB Centers/Programs

Civitan International Research Center
LEND program
Civitan/SPARKS Clinics
ECHO program

Children's of Alabama/UAB Pediatrics

Child Life
Children's Behavioral Health
Children's Harbor
CHIP's Center (child abuse screening/counseling)
Clinical Nutrition
Cochlear Implant
Division of Developmental and Behavioral Pediatrics
Early Intervention
Division of Pediatric Neurology

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Division of Academic General Pediatrics
Hearing and Speech
Imaging
Lactation Center
Medical Autism Clinic
Midtown Pediatrics
Division of Neonatology
Physical and Occupational Therapy
Speech therapy
Division of Rehabilitation Medicine

Community Partners

Hudson Alpha
Alabama Department of Rehabilitation Services (Early Childhood Intervention System)
Alabama Department of Early Childhood Education
Alabama Disabilities Advocacy Program
Developmental Disabilities Parent Support Group
Alabama Head Start
Alabama Autism Society
Alabama Autism Interagency Coordination Council
Mitchell's Place (education)
Glenwood (residential)
Bell Center (early intervention)
Kulture city (sensory sensitivity)
Alabama Chapter of the American Academy of Pediatrics (Wes Stubblefield-President, Linda Lee, Executive Director)