

The Grand Challenge to Save Your Brain

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Introduction

The brain is the most remarkable organ in the body. Although occupying only 2% of our body mass, it serves a critical role in most organ systems: cardiovascular, digestion, metabolism, endocrine, and so on. Beyond this systemic influence, however, the brain is also at the core of that which makes us uniquely human -- our ability to think, to remember, to communicate, to recognize those we love. The price of its outreach to all aspects of our biology, however, is its reciprocal vulnerability from these very relationships. We now know that brain integrity is affected by what we eat; breathe; quality of sleep, systemic diseases, medical conditions and their treatments, and by stress. These adverse influences rarely capture our attention until there is significant clinical impact by which time it is often too late to intervene, for unlike other cells in our body, neurons in the brain largely do not regenerate. Are we taking steps to mitigate these harms? Sadly, not enough.

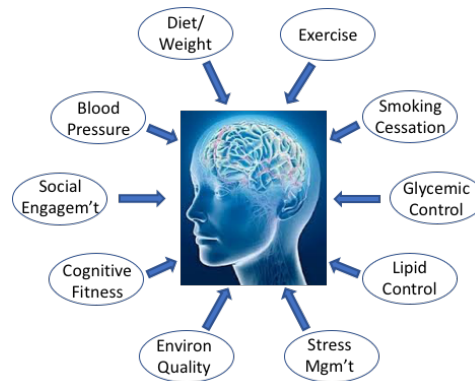
MAJOR OBJECTIVE: To take arms against these threats, first in Birmingham and then Alabama, providing a national model for a unified effort in brain health.

The Magnitude of the Challenge

The U.S., Alabama, and Birmingham in particular, are currently overwhelmed by the risks to the brain. In the U.S., there are 87.5M people living with hypertension, 81.6M with diabetes, and 140M who are obese. Fifty-three million continue to smoke. Relevant to our region, the REGARDS study shows that living in the “stroke belt”, our cardiovascular risk factors are among the worst in the country, and other studies show Afro-Americans are 2-3x more likely to suffer a stroke and dementia. Less than 45% of American children consume an intermediate healthy diet. Approximately 50% of the U.S. does not meet physical activity guidelines. Birmingham, once called “Smoke City”, made great strides in fighting pollution in the 1970’s. Nevertheless, the 2018 statistics from the American Lung Association found Birmingham tied for 15th among the most polluted cities in the US for small particles. According to the American Psychological Association 2017 “Stress in America” survey, loss of sleep remains a significant problem, with the highest levels among racial minorities. Among the 50 states for those who are sleep-deprived, Alabama ranks in the worst quintile. And, all of these risk factors have been shown to promote the onset of Alzheimer’s disease. The challenge is clear, and there is a solution.

The Grand Challenge: Research, Intervention, Partnership

There are 10 identifiable targets in meeting the challenge to save the brain (see below). They are responsive to the goals set forth recently by the National Academies, the American Heart Association-American Stroke Association, the American Academy of Neurology, and the American Academy of Pediatrics.



To address these domains in Birmingham will require alliance from a broad spectrum of participants and organizations, starting with **UAB** that include teaching, research, commercialization, and patient care. This will call for collaboration from the Schools of Medicine, Public Health, Engineering, Nursing, Business, Arts and Sciences, Health Professions, and the Graduate School. Although UAB will be the focus of the academic enterprise, there will also be partnership with the Univ of Alabama and the Univ of Alabama at Huntsville.

To facilitate reduction in cardiovascular risk factors requires important support from **food-industry partners**. With research and input from academic experts, growers will be encouraged to diversify their crops with healthy alternatives and meat producers to breed healthier choices, grocers need to increase their selection of natural foods, and restaurants will be encouraged to list choices that explicitly promote brain health. For this, we will need sustainable business models.

We will work with **municipal partners** who have oversight over the greater Birmingham community. In addition to the office of the mayor of Birmingham and the Jefferson County Commission, outreach will be made to entities that govern the water supply, sanitation, power supply, traffic control, and environmental protection.

The data definitively show that the importance of brain health must be addressed throughout the lifespan. Thus, **educational partners** will play critical roles, beginning with pregnancy via obstetric care, and later extending to primary care. Beyond the clinic, however, syllabi for the school system need to be developed, starting with elementary education. Curricula will need to be tailored to the cultural milieu of students, such as that shown so successfully in the Hip-Hop Public Health program in the NYC school system. Research has established the efficacy of having sons and daughters serve as healthcare agents for their parents and grandparents, in addition to facilitating their own well-being. Education also involves opportunities for social engagement and cognitive fitness for the elderly, which has been shown to enhance cognitive reserve and postpone cognitive decline.

Outcomes

The School of Public Health, using models like REGARDS, will serve to develop explicit metrics for each of the 10 target domains. Although some outcomes will not be known for years, we will be able to measure surrogates that will inform our progress. After Birmingham, we will expand to a state-wide endeavor. In the end, the Alabama, with its diversity of settings, will be a national model for achieving more successful brain health.

Potential Team Members

ACADEMICS

UAB

- a) School of Medicine
 - General Internal Medicine
 - Family Practice
 - Geriatrics
 - McKnight Brain Institute
 - Exercise Medicine
 - Neurology
 - Psychiatry
 - Obstetrics
 - Neurobiology
 - Cell, Developmental and Integrative Biology
- b) The Graduate School
 - Psychology
 - Biology
 - Social Work
- c) School of Public Health
 - Epidemiology
 - Biostatistics
- d) School of the Health Professions
 - Obesity and Nutrition Sciences
- e) School of Engineering
 - Civil Engineering
- f) School of Nursing
- g) School of Business

University of Alabama

- College of Community Health Sciences
- College of Human Environmental Sciences
- Law School
- Capstone College of Nursing
- Graduate School

University of Alabama at Tuscaloosa

- Civil and Environmental Engineering

Education Sector

- Birmingham Board of Education
- Birmingham Education Association
- Birmingham Parent-Teacher-Student Association

Municipal Services

- Office of the Mayor of Birmingham
- The Jefferson County Commission
- Alabama Power
- Birmingham Water Works
- Birmingham Traffic Engineering
- Jefferson County Environmental Services

Food Industry

- Alabama Farmers Federation
- Alabama Grocers Association
- Alabama Restaurant and Hospitality Association

Social Agencies

- United Way of Alabama
- Jefferson County Senior Citizens Services

Leadership Council

Chair

Co-Chair

Finance Administrator

Program Coordinator

UAB Administrative Representative

UA Administrative Representative

UA/Tuscaloosa Administrative Representative

Curriculum/Education Representative

Food Representative

Government Representative

Basic Research Representative

Clinical Research/Outcomes Representative

Clinical Practice Representative