



## Mental Health and Brain Research Institute of Texas

*By Harris Eyre MD PhD*

Brain disorders across the lifespan cause tremendous pain and suffering for individuals and families. Young parents lose infants or discover their child has a debilitating, lifelong brain disease such as autism, cerebral palsy, blindness, etc; military veterans struggle with suicidality; professionals are struck down by degenerative brain diseases such as MS, ALS in the prime of their life. These greatly impact our communities and economy.

With world leading research, what if aging Texans could **regain decades** of their neural health? What if emerging adults could reduce depression and stress **before it becomes clinically debilitating**? What if students living in poverty could close the gap and even **accelerate their academic achievement**? What if our service members, veterans and first responders could build **stronger, faster, more agile neural networks** to calmly meet the constantly changing demands of their work? What if people struggling with Alzheimer's disease could **increase their wellbeing** to find life still worth living? What if **babies with autism** could be diagnosed within first year to dramatically improve their life trajectory?

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These crises solutions demand major focused research commitments. Recent discoveries in neuroscience have radically revised our understanding of the brain's lifelong ability to change, adapt, and improve its function. **Concerted resources need to be directed toward preventive, predictive, and restorative** brain research, identifying strategies, tools and treatments for improving brain health and wellness. WHO defines brain health as the promotion of optimal brain development, cognitive health, and well-being across the life course (Brain Health. World health organization, 2022), and allows for the possibilities to push out age of disease onset or lessen the disability of brain disease and injuries.

Brain health has profound implications for **every person across their lifespan**. Improving the health of the human brain has recently become a pivotal goal on the road towards **enhancing population health** more broadly. The brain drives all that we do, think, create, overcome, solve, and feel. A healthy brain is essential for developing other healthy habits, for elevating well-being, enhancing social connection, increasing years of productivity, and expanding creativity to deal with challenges across the entire lifespan. The brain is our most vital organ, yet most of us do not give our brain a second thought unless it is injured, diseased or declining. This science needs urgent attention so we can achieve for brain health what has been done for heart health.

The following is a clarion call for a CPRIT-type state-funded institute to research, increase understanding of, and develop novel treatments for enhanced brain health to build a more vibrant Texas. The goal is to combat debilitating conditions such as autism, Alzheimer's and ALS, as well as to help all Texans become the architects of their own brains, improving their ability to flourish at any age.

## Overview

Today there is a renewed interest in a Texas-led, comprehensive, cutting-edge approach to integrating brain discoveries, brain metrics, and applied brain science across the myriad challenges facing our state. From the science of early learning to strategies for combating mental health issues to imbedding peak brain performance in workforce readiness, the time is now to focus our collective energies and funding on the brain.

Our knowledge and understanding of the brain has never been greater, and breathtaking breakthroughs are on the horizon. Advanced brain imaging is helping us improve our understanding of complex neural processes and disease mechanisms. Neuromodulation offers the ability to improve neurologic function by inhibiting or stimulating distinct sets of neurons. Genetic analyses are becoming cheaper and increasingly driving an era of personalized medicine. Gene editing has arrived. Additionally, deep brain stimulation (DBS) and brain-computer interfaces (BCI) constitute a new frontier of brain engineering. Collectively, these innovations offer new opportunities to understand and tackle some of the most pressing brain challenges, including holistic and durable approaches to prevention, diagnosis, and treatment of neurologic conditions. There is hope – but we must step up to the plate, invest, lead and work together.

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The pandemic highlighted the brain health crisis that has been developing for decades, as manifested by increasing mental health challenges, sleep disorders, anxiety, social divisiveness, and brain fog. An estimated 22-32% of patients who recovered from COVID-19 experience brain fog and cognitive challenges as part of their experience of long COVID. Other research suggests that one-third of COVID sufferers will have a new-onset or recurrent psychiatric problem (often depression or anxiety) in the ensuing year. Additionally, it is not just people with severe COVID who are affected. Studies have found that people across all stages of COVID, including those who were hospitalized and those who were not, have experienced challenges with attention, memory, and executive functioning. From a clinical perspective, we know that several factors can lead to post-COVID cognitive problems and mental disorders, including pre-existing illnesses, damage from the virus itself, neuroinflammation, and vascular damage. However, further research is needed to understand the mechanisms and implications of COVID on the brain.

Deaths from Alzheimer's disease were exacerbated by the pandemic, increasing 145% in 2020, and by 2050, the cost for Alzheimer's patients alone is expected to reach \$750 billion per year.

Disruptions in the education system have left millions of children falling behind, and U.S. students lag more and more behind their peers in other countries. In 2018, the U.S. ranked 32nd in math literacy and 10th in science literacy, among 35 member countries of the Organization for Economic Cooperation and Development.

Since 9/11, over 7,000 service members have died in military operations, yet we have lost over 30,000 active-duty service members and veterans by suicide, suggesting warriors may be four times more likely to die from suicide than in combat.

Even in otherwise healthy adults, our bodies outlive our brains by 20-plus years.

At the same time, our businesses and workplaces have become increasingly knowledge-intensive. There is pressure to be creative, curious, adaptable, and motivated to keep up with changes in technology, globalization and emerging work styles. In the aftermath of COVID lockdowns and ensuing labor shortages, the importance of a brain healthy workforce that can adjust to change is ever more apparent.

Peak brain performance is intricately linked to enhancing productivity and **Globally, an estimated**

the economy. Globally, an estimated \$2.5 trillion is lost due to poor brain performance. The most recent World Economic Forum's list of the top 10 skills for 2025 featured 1) analytical thinking and innovation and 2) active learning strategies. These two highest-ranked skills did not appear on WEF's previous lists. Another skill cluster that did not make the previous list debuted at No. 5 – resilience, stress tolerance, and flexibility. All of these "soft skills" are quantifiable.

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A newly created Mental Health and Brain Research Institute of Texas (MHBI) can lead a ground swell of innovation ranging from precision diagnostics and treatments to future-proofing economic policies and innovative investing models that put brain health at the forefront. Texas is uniquely positioned to lead the way for the country and the world.

The rewards and sources of economic growth are significant – increased sales revenue, greater local, state and federal tax revenues. Brain health-focused life sciences companies will build infrastructure in Texas to ensure they are proximal to the innovation, creating high quality, high paying jobs. Further, cost savings will be realized via reduced health care costs.

The competition to lead the field of brain health is mounting. Major efforts underway include the [Davos Alzheimer's Collaborative](#), [Healthy Brains Global Initiative](#) and the [European Academy of Neurology's Brain Health Strategy](#).

Texas leads the United States and much of the world in creating economic growth that fuels quality of life. **This is an opportunity to be on the forefront that we cannot afford to lose.**

### COVID-19 Effects on Brain Health

22-32% of recovered COVID-19 patients experience brain fog and cognitive challenges as part of their experience of long COVID. One-third experience depression, anxiety or other psychiatric problems in the ensuing year. Challenges with attention, memory and executive function impact people across all stages of COVID.

### Alzheimer's Disease and Texas' Aging Population

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## Brain Health and the Economy

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## Veterans Mental Health

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## Impact on Student Education

Disruptions in the education system have left millions of children falling behind, and U.S. students lag more and more behind their peers in other countries. In 2018, the U.S. ranked 32nd in math literacy and 10th in science literacy, among 35 member countries of the Organization for Economic Cooperation and Development.

## Appendices

1. Overview of Texas State Legislature funded brain and mental health projects
2. Other large scale national and global brain health funding initiatives
3. Financial Times article "[Boosting brain health is key to a thriving economy](#)"
4. Brookings Institution blog "[Combatting America's crisis of despair by investing in brains](#)"

### Appendix 1: Overview of Texas State Legislature funded brain or mental health projects:



The [Darrell K Royal-Texas Alzheimer's Initiative](#): Since the initial funding of \$2M in 2006, the Texas Legislature has provided almost \$70M to the member institutions of the DKR Texas Alz Initiative. This appropriation was used early in the funding stream for the organization of the Steering Committee, establishing specific aims, participant recruitment, data collection and management, and launching a new research focus on the impact of AD on Hispanics. In recent years the Steering Committee, following the advice and oversight of an expert non-Texas review panel of nationally prominent scientists, has awarded direct research funding to support meritorious research plans of work on a competitive basis to Texas medical schools.



The [Lone Star Stroke \(LSS\) Research Consortium](#) is a novel collaboration among leading medical research institutions in Texas to improve the health of Texans affected by stroke and cerebrovascular disease. The mission of LSS is to establish a state-wide network for patient-centered stroke research and therapeutic trials within Texas, linking academic health institutions with proven expertise in stroke research to community stroke centers. Our objectives are to find better therapies and prevention strategies to improve cerebrovascular health for Texans throughout our state. The 83rd Texas Legislature appropriated \$4.5 million for FY14-15 to implement the LSS Research Consortium. The University of Texas System administers the LSS funding and contracts to LSS Hubs sites. The LSS Research Consortium has established a robust, geographically diverse, [network of sites](#) that has the capability and infrastructure to implement studies quickly throughout Texas. This is crucial for providing the game-changing breakthroughs that are needed now by people who have or may soon develop a stroke.



Signed into law in mid-2019, [the Texas Child Mental Health Care Consortium \(TCMHCC\)](#) was formed with the state's 12 publicly funded medical schools.<sup>7</sup> TCMHCC is funded with \$118.5 million in state funds to provide universal access to child psychiatry consultation in primary care through the Child Psychiatry Access Network (CPAN), urgent access to psychiatric telehealth care and referrals in Texas schools through the Texas Child Health Access Through Telemedicine (TCHAT) program, and expansion of workforce training and the public psychiatry workforce

more broadly. Launched in May 2020, TCMHCC engaged 5000 pediatric primary care providers in CPAN and reached nearly 1.7 million Texas students through TCHAT in less than a year, including 12.5% Black and 34% Latino students—numbers proportionate to the broader child population of Texas. TCMHC provides an infrastructure that can be scaled up or down as needs change. The Texas legislature just took advantage of this by adding \$113 million in American Rescue Act funds to ramp up all these programs in response to the ongoing mental health surge.

## Appendix 2: Other large scale national and global brain health funding initiatives:



**Healthy Brain Global Initiative:** HBGI is developing \$10 billion of financing mechanisms to fund increased delivery of brain science breakthroughs and evidence-based interventions. One Mind and the National Academy of Medicine are leading the HBGI in collaboration with the World Bank, the World Health Organization, the US National Institutes of Health, as well as leading investment banks, grant-making organizations, and research organizations. In the High-Income settings where HBGI capital may be deployed, the California's Stem Cell Agency (CIRM) provides a useful predicate for potential outcomes. CIRM aims to accelerate stem cell treatments for patients with unmet medical needs. A recent report found that CIRM has had a major impact on California's economy, creating tens of thousands of new jobs, and producing billions of dollars in additional tax revenue for the state—co-benefits to CIRM's main goal to improve health and well-being.



**Davos Alzheimer's Collaborative:** Initiated in Davos, Switzerland, during the World Economic Forum's Annual Meeting in 2020, The Davos Alzheimer's Collaborative is a public-private partnership committed to aligning stakeholders with a new vision for our collective global response against the challenges Alzheimer's presents to patients, caregivers, and healthcare infrastructures. Led by The World Economic Forum (WEF) and The Global CEO Initiative on Alzheimer's Disease (CEOi) and fueled by a mission of service to the 150 million families and half a billion people inevitably impacted by this disease by 2050, DAC is a collaborative for the benefit of all people, in all places. DAC is developing a cohort of 1 million people to provide a comprehensive data resource that is racially and ethnically inclusive and truly global in scope to analyze for scientific discovery. The program will aggregate current research data and support new data collection from teams of researchers across the globe.

- **California Institute for Regenerative Medicine and the Davos Alzheimer's Collaborative Release a Statement of Interest to Advance Brain Research**

The Davos Alzheimer's Collaborative (DAC) and the California Institute for Regenerative Medicine (CIRM) are announcing their interest in working together on a shared mission to accelerate the discovery, assessment, and delivery of precision and effective therapeutic interventions for diseases of the brain, including Alzheimer's disease. CIRM, created and based in California, is the world's largest institution dedicated to helping people by bringing the future of cellular medicine closer to reality. CIRM, was created in 2004 with a \$3B bond funding under Proposition 71 which was enacted by voters to support stem cell research in California. In 2020, California voters approved the passage of Proposition 14, which dedicates \$1.5B for the support of research and the development of treatments for diseases and conditions of the central nervous system, such as Alzheimer's disease and Parkinson's disease.



**Californian Institute for Regenerative Medicine (CIRM):** In 2004, Proposition 71, the California Stem Cell Research and Cures Initiative, led to the issuing of \$ 3 BN in funding to create Californian Institute for Regenerative Medicine (CIRM).

CIRM's funding of stem cell research has the primary mission of accelerating stem cell

treatments to patients with unmet medical needs, but those funds also create tax income for the state.

A 2019 independent Economic Impact Report conducted by the Schaeffer Center for Health Policy and Economics at USC says that CIRM has had a major impact on California's economy, creating tens of thousands of new jobs, generating hundreds of millions of dollars in new taxes, and producing billions of dollars in additional revenue for the state. The report looked at the impacts of CIRM funding on both the state and national economy from the start of the Stem Cell Agency in 2004 to the end of 2018.

The estimated impacts from the report are:

- \$10.7 billion of additional gross output (sales revenue)
- \$641.3 million of additional state/local tax revenues
- \$726.6 million of additional federal tax revenues
- 56,549 additional full-time equivalent (FTE) jobs, half of which offer salaries considerably higher than the state average

Furthermore, an additional 2019 independent report conducted by the Schaeffer Center for Health Policy & Economics at USC says that developing stem cell treatments and cures for some of the most common and deadly diseases could produce multi-billion dollar benefits for California in reduced healthcare costs and improved quality and quantity of life.