

BRAIN FUTURES

# Neurofeedback

An Efficacious Treatment  
for Behavioral Health  
**Executive Summary**



# Executive Summary

## A CHALLENGING TIME. BRAIN-BASED DISORDERS ON THE RISE

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The incidence of attention-deficit hyperactivity disorder (ADHD) and other behavioral health issues in children, as well as overall mental health challenges in the general population are on the rise. More than 10% of youth in the U.S. are diagnosed with ADHD (Children and Adults with Attention-Deficit/Hyperactivity Disorder [CHADD], 2020), and 25% of children have some form of anxiety (Centers for Disease Control and Prevention [CDC], 2018a). Alarming, 64% of children diagnosed with ADHD have at least one additional behavioral, emotional, or mental health disorder (CDC, 2018b). In adults, anxiety affects 20% of Americans (National Institute of Mental Health [NIMH], 2019), with just over one-third of these individuals getting treatment (Anxiety and Depression Association of America [ADAA], n.d.).

Treatment for many behavioral conditions is primarily pharmacological, which itself carries risks and side effects. Many studies show that psychosocial therapies combined with psychotropic medications have better outcomes than medications alone. Yet large portions of the population are not adequately able to access affordable behavioral and mental health services, with recent research indicating that reimbursement for behavioral services represents only 4.4% of total medical spending (Davenport et al., 2020). Of equal note, behavioral conditions when present with a physical disorder contribute to extremely high total medical costs. In other words, there is a grave financial burden on payers when behavioral health issues go unaddressed (Davenport et al., 2020).

The onset of COVID-19 has certainly exacerbated behavioral and mental health issues, as indicated by preliminary research in China and here in the U.S. More than ever, accessible, effective treatments for ADHD and other stress- and adjustment-related mental health disorders are needed.

## NEUROFEEDBACK IS AN EFFICACIOUS AND EFFECTIVE TREATMENT FOR ADHD AND OTHER CONDITIONS

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With a more than 70-year history of research and real-life applications with populations ranging from school-aged children to veterans to adults, neurofeedback (NFB) is proven to be an effective standalone or adjunct treatment for ADHD and symptoms of anxiety.

Since 2009, at least four major research reviews by leading researchers in the U.S. and internationally have shown NFB to be an efficacious intervention for the treatment of ADHD. Several studies have found NFB improvement lasting up to a year post-treatment whereas improvements from ADHD medication tend to end immediately with the conclusion of treatment.

Highlights from key studies and reviews include:

- A 2020 review that investigated 2 major meta-analyses, 4 randomized controlled trials (RCTs), and 3 open-label studies found NFB treatment of ADHD to be efficacious and produce remission rates of 32-47%, with sustained post-treatment effects for 6-12 months (Arns et al., 2020).
- A 2018 meta-analysis reviewed 10 studies, finding significant effect of NFB on ADHD symptoms of inattention and hyperactivity/impulsivity, comparable to medication, and that improvements were sustained 2 to 12 months beyond the end of treatment (Van Doren et al., 2018).
- A 2014 review found that standard NFB treatment protocols have been well-investigated and are specific and effective at treating ADHD (Arns et al., 2014).
- A 2014 study found that NFB resulted in greater improvements in ADHD symptoms compared to cognitive training or control groups in public elementary schools (Steiner et al., 2014).

- A 2009 meta-analysis found NFB treatment for ADHD to be efficacious and specific: meaning treatment outcomes were statistically superior to fake treatments (known as sham treatments) or alternative treatments in at least two independent research settings (Arns et al., 2009).

NFB has also been found to be effective as a treatment for anxiety. Biofeedback equipment in general, and more specifically NFB equipment, is FDA-cleared for relaxation training. Research shows that relaxation is a primary treatment for anxiety and other symptoms of stress- and adjustment-related disorders. As a non-pharmacological option, NFB can be used to treat symptoms of anxiety and alleviate a host of related mental health disorders potentially including PTSD, depression and others.

Results from research on NFB as a treatment for anxiety include:

- A 2020 meta-analysis of 21 studies with 779 participants concluded that neurofeedback is efficacious in the treatment of anxiety and reactive stress disorders (Anxiety Disorders: Rethinking and Understanding Recent Discoveries, 2020).
- A 2008 meta-analysis that reviewed 27 studies found significant efficacy for relaxation training as a treatment to reduce anxiety (Manzoni et al., 2008).
- A 2011 study found that NFB reduced anxiety related symptoms (Moradi et al., 2011).
- A 2010 study found that NFB was approximately as effective as medication in treating anxiety and more effective in women with anxiety (Bhat, 2010).

#### **NEUROFEEDBACK IS EFFICACIOUS AS A FIRST-LINE OR ADJUNCT TREATMENT FOR ADHD AND ANXIETY**

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Professional practitioner-directed NFB treatment, like any other behavioral health intervention—pharmacological, therapy or other—is based on established, evidence-based protocols implemented by trained professionals on certified equipment. This level of NFB is highly efficacious and effective, and should be considered as a first-line treatment for ADHD, anxiety, and anxiety-related mental health issues, or as an adjunct treatment to existing protocols such as cognitive behavioral therapy (CBT) or prescription medication.

Given the current rates of ADHD and anxiety-related symptoms and disorders, now is the time for increased adoption of NFB as a first-line or adjunct treatment. It is imperative that medical practitioners and insurers provide adequate NFB treatments and reimbursements for ADHD and other behavioral and mental health conditions. More than ever, we need easy-to-access interventions that support the mental health and well-being of our nation.

NFB already carries Current Procedural Terminology (CPT) codes, the equipment is FDA-cleared, and the research shows efficacious results. Recent reports on access disparities demonstrate that lack of in-network access can lead to billions of dollars in additional medical and health costs, and immeasurable negative impacts on American lives (Melek et al., 2019; Davenport et al., 2020). While some insurers reimburse for NFB, many others do not. Compliance with the Mental Health Parity and Addiction Equity Act (MHPAEA) is one reason for insurance companies to cover NFB, but more so to make effective treatments for our nation's youth and adults available more broadly, thereby supporting the health and well-being of all Americans.

# BRAIN FUTURES

**B**rainFutures was launched in 2015 by the nation's second oldest mental health advocacy organization, the Mental Health Association of Maryland (MHAMd). For more than 100 years, MHAMd has addressed the mental health needs of Marylanders of all ages through programs that educate the public, advance public policy, and monitor the quality of mental healthcare services. Building on this success, and bolstered by a cross-disciplinary advisory board of leading experts, BrainFutures brings together diverse stakeholders, policymakers, funders, and influencers to accelerate and scaffold national adoption of effective practices targeting four main areas: youth, workforce, mental health treatment, and older adults. Breakthroughs in our understanding of the brain have the potential to improve learning outcomes for children, optimize functioning at work, enhance treatment for mental health or substance use problems, and maintain sharp thinking as we age.

BrainFutures writes evidence-based issue briefs and releases recommendations that fill knowledge gaps related to brain-focused applications targeting the above segments of society. These educational resources highlight the latest advances in brain plasticity and how their application is transforming quality of life for people of all ages. Through this process, we not only gain insight from experts and innovators, we also foster support for change, building coalitions and cross-disciplinary collaborations to advance both adoption and access to new breakthrough applications. Ultimately, by informing the public, cultivating influential relationships, and connecting communities of diverse advocates we help propel the change that is needed to make meaningful progress.

[www.brainfutures.org](http://www.brainfutures.org)